A Review of the Genus *Eunice* (Polychaeta: Eunicidae) Based upon Type Material

KRISTIAN FAUCHALD

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ABSTRACT

Fauchald, Kristian. A Review of the Genus *Eunice* (Polychaeta: Eunicidae) Based upon Type Material. *Smithsonian Contributions to Zoology*, number 523, 422 pages, 117 figures, 53 tables, 1992.—The genus *Eunice* has been widely reported in all kinds of marine environment. A total of 286 names have been applied to taxa originally described in, or subsequently referred to, the genus. All such taxa published prior to 1985 have been accounted for below. Of these, some or all types of about 175 are available and are described below. Twenty-five species are incompletely known; types are missing and original descriptions (or subsequent descriptions of types) are insufficient to relate these species to the rest. The descriptions of these species have been briefly summarized. A key to species includes nearly all species for which types were available. Species considered incompletely known are excluded from the key, but are included when possible in a set of tables comparing similar species. Forty-seven named taxa are indeterminable. Twenty-two have been referred to other genera, including some new combinations. In some cases the type lot included two species; some of these types could be referred to other, known species; however, four species are described as new. Seven species have been given new names for nomenclatural reasons.

Attempts to group the 206 reasonably well-characterized species into supra-specific taxa using cladistic techniques did not lead to interpretable results. The reasons might include the very large number of species compared to the number of characters. A detailed analysis of the characters has been started using freshly collected material in an attempt to expand the number of characters and measure the variability of currently used characters. Similar reviews are planned for the remaining eunicean genera.

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Introduction

Eunicean polychaetes are uniquely defined by the presence of laterally arranged maxillae and paired ventral mandibles mounted on an eversible, muscular U-shaped structure (Ehlers, 1868; Dales, 1962; Clark, 1964; Fauchald, 1974a). Traditionally the group was considered as a single family, Eunicidae, with a series of subfamilies (Fauvel, 1923; Day, 1967). Lately most authors recognize the group as a distinct order, Eunicida (e.g., Fauchald, 1977; Pettibone, 1982), with a series of families. The family Eunicidae Berthold (1827) is the nominal family. Other families include Onuphidae Kinberg (1865), Lumbrineridae Malmgren (1867), Hartmaniellidae Imajima (1977), Iphitimidae Fauchald (1970), Arabellidae Hartman (1944), Lysaretidae Kinberg (1865), Oenoniidae Kinberg (1865), and Dorvilleidae Chamberlin (1919a). The parasitic families Histriobdellidae Vaillant (1890) and Ichthyotomidae Eisig (1906) and the mesopsammic family Dinophilidae Remane (1932) are usually considered as members of the order, but are sometimes relegated to a satellite status. Relationships between the Eunicidae and the other families are outlined below in the section on cladistics. Formal definitions of the families can be found in Fauchald (1977), Pettibone (1982), and Colbath (1989).

Eunicoid polychaetes are known from fossilized jaws present in Ordovician fossil beds (Kielan-Jaworowska, 1966). Members of the order are present in all marine environments, most are free-living; parasitic taxa are found in part on other polychaetes, in part on fish or crustaceans. In some families, all or nearly all species are tubicolous; in other families most species lack tubes. Eunicids sensu stricto are present in all marine benthic environments. They are especially common in tropical shallow seas, in coral reef rubble, and in mangrove swamps. Some species form complex tubes (e.g., Hanley, 1986:215); most tubicolous species form less-complicated structures (Ehlers, 1887), but many eunicids lack tubes completely. Most species live in cracks and crevices in mixed rubble, rock, and sand environments in shallow water. Many species drill in dead coral rubble (Hutchings, 1981) and are sufficiently common to be of considerable ecological importance. The Atlantic and Pacific palolo-worms are known for their brief, lunar periods of spawning (e.g., Mayer, 1900; Hofmann, 1974). The Atlantic and Pacific palolos belong to different genera, *Eunice* and *Palolo*, respectively. The habit of having brief, intense spawning periods may be more common in the family than currently appreciated.

The first described eunicid species was originally placed in *Nereis*. *Nereis norvegica* Linnaeus (1767) was described from an ahermatypic coral reef in Norway. *Nereis aphroditois* was described from a hermatypic coral reef in Sri Lanka (Ceylon) by Pallas (1788). Other species were added by O.F. Müller from Norway (Müller, 1776, 1779).

Cuvier (1817:524) named a new genus, *Eunice*, to contain these and related taxa (a more detailed discussion of nomenclatural problems is given below). Audouin and Milne Edwards (1832), Kinberg (1865), Quatrefages (1866), Malmgren (1867), Ehlers (1868), and Grube (1870b, 1878a,b) reviewed early work and added numerous new species. McIntosh (1885) and Chamberlin (1919a) added new taxa based on materials from the *Challenger* and *Albatross* cruises, respectively, many from deep-water habitats. Treadwell (1921, 1922) added many new species from coral reefs in the Caribbean Sea and the Pacific Ocean, respectively. He also attempted to expand the set of features used to characterize species to include color patterns; he was not followed in this attempt by any later worker. The live color is, however, very characteristic for several species and may be useful as a character in a well-studied geographical area. Fauvel (1917, 1919) reviewed many of the tropical species, especially from the Indian Ocean, and established numer-

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ous synonyms. He failed to examine many available types, perhaps because of the political situation in Europe at the time. Augener (1922a,b, 1923) reviewed some early types and established other synonyms. Hartman (1944) reviewed, without access to many types, all species described from the Americas; later Hartman (1948, 1956) reviewed types of species described by Kinberg and Treadwell, respectively. In her 1944 publication Hartman codified the characters used to separate genera and species in the family and, following suggestions by Ehlers (1868), proposed a scheme of informal species groups within the genus *Eunice* for the American members of the genus. This scheme was expanded by Fauchald (1970) to include all species listed in Hartman (1959, 1965). He added a codification of the branchial distribution to the scheme, originally suggested by Grube (1878a), resulting in a more detailed set of groups than the original Ehlers-Hartman scheme. Miura (1986) detailed the branchial distribution of several species, suggesting that this distribution would add a valuable character to the description of eunicids.

Nomenclatural Notes

Publication Dates.—Some crucial publications are frequently misquoted in the literature. First of these is a set of French publications involving Savigny, Lamarck, and Cuvier. These three gentlemen based their publications on the collections of Musée National d'Histoire Naturelle, Paris. Savigny worked up the material collected during Napoleon's travels in Egypt and other polychaete material deposited in the Parisian collections. He probably had a manuscript finished before 1815 (the plate including the eunicids was engraved by 1812). This manuscript was not published until 1820 as a separate issue (preprint) of volume 1, part 3 of the "Description of Egypt." The publication date is printed on the back page of the preprint, which was separately paginated. Volume 1(3) was later repaginated as part of the complete volume and the publication date 1809 was printed on the frontispiece. Only volume 1(1), "The Fishes of the Nile," was issued in 1809; the publication date for Savigny's study of the annelids was 1820 and Savigny's plates were not issued until 1826. Sherbourn (1897:287) claimed that volume 1(3) was issued in 1822, quoting a review in *Göttingische Gelehrte Anzeigen*, 2:695, as his source. Quite correctly, a review of Savigny's study starts on that page, but the publication date of volume 1(3) is not mentioned. On the next page, 1822 is mentioned as a publication date but only for parts of volume 2; Sherbourn must have misunderstood the rather complicated review.

Cuvier issued in 1817 volume 2 of *Le Règne animal* ..., in which the name *Eunice* was first used (p. 524). Cuvier (1817:525) listed the same previously published species that were later included in the genus in Savigny's publications, but added no new taxa. In the next calendar year (1818) Lamarck published volume 5 of his *Histoire naturelle* .... Lamarck quoted Savigny's manuscript extensively; he described *Leodice* and in addition nearly all species Savingy had included in his manuscript, quoting Savigny's manuscript in his synonymy lists for all.

Three important publications from the mid-1860s have caused confusion. Kinberg in a series of papers published in *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar, Stockholm*, reported on the polychaetes collected during the *Eugenie* expedition. The euniceans were included in the number 10 of the journal for the year 1864, this number was published in 1865. Other parts of this series was published earlier and later, but do not concern the euniceans. Quatrefages' large *Histoire des Annelés* bears the publication date 1865 on the title page of the first volume; as pointed out by Wright (1867:578; see also Fauchald, 1986:252), this volume was not issued until 1866. Thus, new eunicean taxa proposed by Kinberg antedates those by Quatrefages, and Kinberg's names have priority in cases where the two gentlemen described the same species. Malmgren first treated eunicids in his 1867 publication; note that both of Malmgren's major publications (1865 and 1867) were issued as separately paginated reprints as well as in a journal.

Family Name.—The family Eunicidae, as a concept, was first used by Lamarck (1818). This mention is not available for purposes of synonymy because there is no reference to the genus *Eunice* in Lamarck's text and the name is spelled Eunicae. Savigny (1820) used the family name Eunicae, but the generic name *Eunice* is listed only as a synonym of *Leodice*. Such mention of a family name is invalid for priority purposes according to the *International Code of Zoological Nomenclature* (ICZN; also referred to herein as "the Code"). Latreille (1825:239) defined the family and listed *Eunice*, with *Leodice* as a synonym; however, the name form used is invalid. The first valid mention of the family is by Berthold (1827:227–228), a translation of Latreille (1825) to German.

Generic Names.—The oldest generic name applied to a member of this group (other than the Linnean *Nereis*) is *Tibiana* in Lamarck (1816). The specimen examined by Lamarck was the tube of a deep-water species from the Indian Ocean (Lamarck, 1816:148). Lamarck believed he was describing a coral, perhaps an octocoral, and the name *Tibiana* has not been used as a generic name for polychaetes. According to the Code, articles 12b(8), 23f(III), and 72c(I), the name is available for purposes of priority (ICZN, 1985). In a description of a tube under the specific name *Marphysa tibiana* by Pourtalès (1867) (now known as *Eunice tibiana*), a specific reference to *Tibiana* as the name of a eunicid-tube was made. The name has otherwise not been used. I have prepared an application to the International Commission on Nomenclature to have the name suppressed.

Cuvier (1817:525) defined *Eunice* and Lamarck (1818:321–323) diagnosed *Leodice*. The two taxa have been used more or less as synonyms since they were both first named.

Savigny worked up the collections of eunicid polychaetes in the museum in Paris (MNHN). His descriptions in Savigny

(1820) are exemplary as are the plates for that volume. Cuvier's (1817) and Lamarck's (1818) volumes were both based at least in part on Savigny's manuscript, but because of the publication dates, Savigny cannot be quoted as author for *Leodice* nor for the new species included in the "Description of Egypt" included by either one or the other of the two earlier authors. From Audouin and Milne Edwards in 1833 until the present, previous workers have attempted to rescue Savigny as author of the many genera and species described in Savigny (1820). The Code, however, is very clear on the point of priority of publication; and the publication dates are sufficiently well established that Cuvier and Lamarck end up with the honors.

Savigny recognized the separation between what is now called *Eunice* and *Marphysa*. Part of his definition, the presence or absence of peristomial cirri, is the only valid character separating the two genera.

Audouin and Milne Edwards (1833:208), in their section on the classification of the eunicids, commented:

La famille dont nous faisons ici l'histoire a été établie sous le nom d'Eunices par M. Savigny, pour recevoir, outre les *Eunices* de M. Cuvier, auxquelles il donne le nom de *Léodices*, trois genres nouveaux, les *Lysidices*, les *Aglaures* et les *Oenones*.

The family about which we are writing, was established by Savigny to receive, other than M. Cuvier's *Eunice* to which he gave the name *Leodice*, three new genera, *Lysidice*, *Aglaura*, and *Oenone*. [K.Fd translation, italicization as in the original.]

Audouin and Milne Edwards thus synonymized *Leodice* with *Eunice* as did Grube (1850). Note that Audouin and Milne Edwards recognized Savigny as author of the family; this problem has been discussed above.

The generic name *Eunice* has been considered preoccupied by *Eunice* Rafinesque (1815); this is incorrect, because Rafinesque's use is a nomen nudum. Verrill (1900) considered *Eunice* preoccupied by *Eunica* Hübner, 1816, thus preferring the name *Leodice*. Hübner's name is spelled differently; *Eunice* Cuvier, 1817, cannot be considered validly preoccupied by Hübner's name according to the Code.

The valid name for the genus is here considered to be *Eunice* Cuvier, 1817.

Other generic names proposed for the group include *Nereidonta*, erected by Blainville (1828:476) for his species *N. paretti*. This species may be a *Palola* according to Ehlers (1868:353). The question will be addressed in a future review of that genus. *Mayeria* was proposed by Verrill (1900:650) for *Staurocephalus gregaricus* Mayer, 1900, without any description of Mayer's material or any other material. Mayer's species was referred to *Eunice schemacephala* Schmarda (1861) by Augener (1925:29); the latter is here considered an indeterminable species of *Eunice*. Mayer left no specimens of his species in any collections; thus his species is indeterminable. The genus *Mayeria* lacks a clear definition and is here considered indeterminable.

Eriphyle Kinberg (1865), erected for *E. capensis* Kinberg (1865), is here considered a junior synonym of *Eunice* as first proposed by Malmgren (1867; see below). The species for which *Eriphyle* was erected was renamed *Eunice kinbergi* by Ehlers (1868; see below).

The generic name *Nicidion*, originally proposed as a subgenus of *Eunice* by Kinberg (1865:564), has been used by a variety of authors at the generic level. The original single identifying feature of the taxon, the absence of branchiae, does not appear to be a valid generic character. *Nicidion* is here treated as a synonym of *Eunice*.

Other generic names used in the family pertain to species to be treated in the future.

TYPE SPECIES.—Cuvier (1817:525) listed in a footnote a series of species he transferred to his new genus, *Eunice: Terebella aphroditois, Nereis pinnata, Nereis norwegica* (note spelling), *Nereis tubicola*, and *Nereis cuprea*. The last two are onuphids, *Hyalinoecia tubicola* and *Diopatra cuprea*, respectively (e.g., Fauvel, 1923). *Terebella aphroditois*, originally described as *Nereis* by Pallas (1788) and moved to *Terebella* by Gmelin (1788), is a valid species of *Eunice* (see below). *Nereis pinnata* and *pennata* were originally both described by O.F. Müller (1776; see also 1779); of these, *N. pinnata* is indeterminable (see below) and *N. pennata* is a valid species of *Eunice* (see below). *Nereis norwegica*, originally spelled *norvegica*, was described by Linnaeus (1767). I cannot determine from the text how many of these species Cuvier had seen. He made the following comment (Cuvier, 1817:525):

J'en connais une de la mér des Indes, de plus de quatre pieds de long.

I know one [specimen] from the Indian Ocean that is more than 4 feet long. [K.Fd translation.]

Cuvier probably examined the collection in Paris in some detail, but he explicitly stated that he had seen at least one specimen. Traditionally, his statement has been considered as referring to *E. aphroditois*, originally described from Sri Lanka; this species can become very large. However, Cuvier did not specifically name the large specimen he had seen; no other valid species is named by Cuvier (1817).

Lamarck (1818:321–323) quoted Savigny's manuscript extensively. He listed (for *Leodice*) *L. gigantea, L. antennata, L. gallica, L. norwegica, L. pinnata, L. hispanica, L. opalina*, and *L. sanguinea* and gave a brief Latin diagnosis for each.

For *L. gigantea* Lamarck listed the following synonyms:

An terebella aphroditois ?Gmel. p. 3114
Eunice.Cuv.Règne anim. 2 p.525
Leodice gigantea Sav. MSS.

This list, with original italization indicated, is an excerpt from a longer list of synonyms published by Savigny two years later; it is quoted here to demonstrate that as originally published, the name *Leodice gigantea* was tied to the species name *aphroditois*. Savigny's (1820:49) synonymy list for *Leodice gigantea* reads (French name forms omitted):

1. *Leodice gigantea.*
Nereis aphroditois Pall. Nov. Act. Petrop. tom II, pag. 229, tab. 5, fig.1–7.

-*Terebella aphroditois* Gmelin Syst. nat. tom I part. 6, pag. 3114, no. 9.
= Varietè d'âge ou espèce très-voisine.
Nereis gigantea Collect. du Mus.
Eunice gigantea Cuv. Collect. et Règn. anim. tom II, pag. 525.

The implication is that Savigny included all forms listed as synonyms of *Leodice gigantea*. Furthermore, it is implied that the species had been named by Cuvier (1817:525), as mentioned above; this is not the case. Cuvier may have labeled the specimen in the collections by the name *gigantea*, but that name is nowhere mentioned in his publication. The earliest valid use of the name *Leodice gigantea* is in Lamarck's (1818) publication. Because Pallas' description of *Nereis aphroditois* is valid, Savigny established *Leodice* (= *Eunice*) *gigantea* Lamarck (1818) as a junior synonym of Pallas species. This discussion establishes only a valid "name" for this species, but not a valid type species for the genus *Eunice;* a valid "concept" was established by Ehlers (1868; see below).

Malmgren (1867:64–65), in commenting on what he considered Kinberg's incorrect use of generic names, made the following statement:

Fasthållande såsom princip, att låta ett genusnamn alltid åtfölja den art, hvilken genusnamnets uppställare haft tillfälle att sjelf undersöka eller företrädesvis afsett, anser jag de gamla genusnamnen inom fam. Eunicidae böra rättast användas på följande sätt. Namnet Eunice gafs af CUVIER åt *Eunice gigantea* CUV. Règn. Anim. Tom II p.525, nouv. edit. Tom III, p. 199, hvarföre detta namn omöjligen kan användas för någon annan grupp inom familjen än dit *Eunice gigantea* CUV. hör. När KINBERG nyligen uppställt ett nytt genusnamn Eriphyle för en grupp, dit han sjelf äfven räknar *Eunice gigantea* CUV., och begagnat namnet Eunice CUV. i en betydelse, för hvilken SAVIGNY's gamla namn *Leodice* (sens. str.) hade varit det lämpligaste och rättaste uttryck, måste namnet Eriphyle KNBG, åtminstone i dess närvarande betydelse såsom fullkomligt öfverflödigt och synonymt med CUVIER's Eunice heltochhållet försvinna, och namnet *Leodice* SAV. s. str. bör begagnas för den grupp, såsom KINBERG benämnt Eunice, ty *Leodice antennata* SAV., Descr. d. l'Egypte Tom. XXI p. 380, som bör anses för typ för *Leodice* SAV. hör äfven till KINBERGS genus Eunice.

Maintaining as a principle to let a generic name always follow the species that the author of the generic name had the opportunity to examine himself, or preferentially designated, I consider that the old generic names in the family Eunicidae should be used in the following fashion. The name Eunice was given by Cuvier to *Eunice gigantea*, Cuvier, *Regn. Anim.*, Tom. II. p. 525, new edition, Tom. III, p. 199, hence this name cannot possibly be used for any other group of the family than the one to which *Eunice gigantea* Cuvier belongs. When Kinberg recently erected a new generic name, Eriphyle, for a group to which he himself ranks *Eunice gigantea* Cuvier, and applies the name *Eunice* Cuvier in a sense for which Savigny's old name *Leodice* (sensu stricto) had been the most appropriate and most correct name, the name Eriphyle Kinberg, at least in its current sense, should altogether disappear as being completely unnecessary and synonymous with Cuvier's *Eunice*, and the name *Leodice* Savigny sensu stricto should be applied to the group that Kinberg named *Eunice*, because *Leodice antennata* Savigny, *Descr.d.l'Egypte*, Tom. XXI, p.380, which must be considered the type for *Leodice* Savigny, belongs to Kinberg's genus *Eunice*. [K.Fd translation; capitalization and italicization as in the original.]

This rather complicated uttering boils down to three major theses:

1. Malmgren believed that Cuvier named his genus for the species *gigantea*, but including possibly other species. However, as indicated above, the name *gigantea* is nowhere mentioned on the page of Cuvier's book Malmgren cited.

2. Malmgren declared *Eriphyle* Kinberg a junior synonym of *Eunice*.

3. Malmgren designated *antennata* as type for the genus *Leodice*, but considered the latter as a synonym of *Eunice*.

Verrill (1900:638) quoted Malmgren as saying: "Malmgren ... restricted *Eunice* to the type of *E. gigantea*." Verrill's statement, although a misunderstanding of Malmgren's intent, is a clear designation of type for *Eunice* and is valid according to the Code. Moreover, it is the first correct designation and takes precedence over all other designations.

The type species has often been quoted as *Nereis aphroditois* Pallas, 1788, with type designation by Hartman (1959:308). Both Cuvier and Savigny cited *Nereis aphroditois* Pallas, 1788, as a synonym for *Eunice* (or *Leodice*) *gigantea* Cuvier. However, the first valid designation of type for the genus in the sense of the Code is Verrill (1900), fixing the type as *Eunice gigantea* Cuvier, 1817. This binomen is invalid in the sense of the Code, but there is a valid binomen available (Code recommendation 67B). Ehlers (1868:306–310) gave a detailed definition of *E. aphroditois* and in a discussion suggested that Cuvier's *E. gigantea* was a synonym as earlier authors had done. Ehlers listed *Leodice gigantea* Savigny and *E. gigantea* Milne Edwards and *E. gigantea* Quatrefages as synonyms. The former reference is to the last edition of Cuvier's *Le Règne animal* ..., the so-called student's edition; the latter is Quatrefages (1866). The two names probably refer to the same species, but both are without types and cannot be defined accurately without access to material from the type areas. Cuvier's material came from the Indian Ocean, presumably one of the French possessions, the Seychelles, Madagascar, or the Mascarenes. Pallas' material was from the coast of Sri Lanka. The two species are considered synonymous in this paper.

The type species should be cited as *Leodice gigantea* Lamarck (1818 = *Nereis aphroditois* Pallas, 1788) by subsequent designation (Verrill, 1900:688).

Scope of the Study

Most species treated in this review were described either as *Eunice* or *Leodice*. Species of the Linnean genus *Nereis* described prior to the erection of *Eunice* and *Leodice* and considered members of *Eunice* by Hartman (1959, 1965) are also included. The few species in the latter category either come from well-circumscribed type localities (e.g., *E. norvegica*), or a well-defined tradition has developed associating a morph with a name (*E. aphroditois*). I reviewed descriptions of other species of *Nereis* described prior to 1817 to seek out additional eunicids, but found none. Species named in *Eriphyle* Kinberg, 1865, and *Nicidion* Kinberg, 1865, have been included, because both genera are usually treated as subgenera of *Eunice* (cf. Hartman, 1959) if they are recognized at all. Species originally described as *Eunice (Marphysa)* also have been

included, but not species described and exclusively recognized in *Marphysa*, except for a few that have been transferred from that genus to *Eunice*.

Only species published before 1985 have been included in the study. Appendix C lists publications describing new taxa added since that time.

Limitations of the Study

During a study of the clastic effects of polychaetes on coral reefs, Pat Hutchings of the Australian Museum collected a very large collection of eunicids, including masses of small specimens. She requested my assistance in getting them identified to species. I realized that without a review of types of previously described species, the task would be impossible. I first reviewed (Fauchald, 1986) species described from Australia and New Zealand. This paper is an expansion of that effort to include species described from other areas.

Studies of types alone are inadequate for clarification of systematic problems in any group; however, without a description of all available types, all other taxonomic studies will lack foundation.

The family Eunicidae is poorly known, even if a few members have been intensively studied. We know, for example, very little about longevity and numbers of (annual?) reproductive episodes, and whether the females grow between these bouts. Perhaps, most importantly from a systematist's point of view, we know little about how morphological features vary with size or sex. Some species become sexually mature at about 10–15 mm in length (e.g., *Eunice marovoi* Gibbs, 1971; and examination of Gibbs' types below). On the other hand, very large individuals, 3–4 m in length, still appear to be reproductively active judging from the presence of large eggs in the body cavity (e.g., *E. aphroditois*, *E. sebastiani*). Several authors (e.g., Ehlers, 1868:309–311; Fauvel, 1917:209–232; Hartman, 1944:98) have wrestled with the problem of identifying smaller specimens of species that become very large, but their conclusions are unconvincing.

Newly metamorphosed eunicid juveniles may have 5–15 setigers (Åkesson, 1967) and grow, as usual among annelids, by addition of segments from a pre-pygidial growth zone. Unless anterior regeneration has taken place, the oldest segments are those immediately behind the peristomium. Parapodia, branchiae, and setae of each segment bear a characteristic relation to the relative position of the segment in the body. Branchiae start and end at a specifiable range of segments; subacicular hooks start within a limited range of segments. Thus ontogenetic changes in the structure and shape of the parapodia must take place. Because the distribution of features is relatively stable, the underlying ontogenetic changes must be structured. The complement of structures present on each segment varies with a segment's relative position, so all segments change in shape and structure during the life of the organism. For example, early juveniles of a species related to *Eunice afra* have branchiae represented by single filaments in segments 5–8 when the whole body consists of 20–30 setigers; adults of the same species with 120–130 setigers have branching branchiae starting at setiger 18–20 and continued to the posterior end (Fauchald, personal observations). Ontogenetic changes in soft-body features have been poorly documented, and a study of the types will yield limited information about such changes.

Changes in setal structures with size have been better documented. During the early juvenile life, the setal complement of the setigers change in an orderly pattern; eventually the adult complement of setae is established (Åkesson, 1967:157). Such orderly changes have been more frequently explored in the closest relatives of the eunicids, the onuphids (Blake, 1975:55; Hsieh and Simon, 1987:200–201; Paxton, 1986:20–21) and have been found to follow fairly restricted patterns of transformation. The obvious implication is that the setal complement of each segment is a well-regulated feature. The setal complement and distribution at any given time or over time may show species-specific patterns. These patterns may be related to the distribution of other morphological features or show independent patterns. In other polychaetes, such as maldanids (Green, 1987) and nephtyids (Rainer, 1984), even the number of different kinds of setae in each segment is considered a species-specific feature. Particular ontogenetic sequences may be unique to a single species, or characteristic of larger groups.

For these reasons, I started a study of the morphological variability of species available in shallow water at Carrie Bow Cay, Belize. Preliminary results (Fauchald, 1991) indicate that various length measures and some numerically variable morphological features are very precisely controlled in each taxon. Some features appear size related; others are size independent. The species studied appear to have their own patterns; simple, generalized patterns have yet to emerge. Thus, without considerably more detailed studies of ontogenesis in many more species, one can only suggest possible synonyms from a study of the types only. For this reason, I have made only a few suggestions about new synonyms. I expect that the study of variability will lead to many more, but I also suspect that some current names hide more than one taxon.

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I would like to thank my colleagues in many museums for lending me types and for helping me track down types no longer deposited in the obvious collections. Just as important, some colleagues informed me that types of some species were no longer in existence or had never existed. These minutiae were needed to identify many of the species. The specific persons and museums involved include Ms. Leslie Harris and

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The study was prompted by a request from Dr. Pat Hutchings of the Australian Museum for identification of eunicid species she had been finding on the Great Barrier Reef. This request lead me to spend some time in Sydney as a visiting curator at the Australian Museum. I am grateful for the funding provided through Dr. Des Griffin, Director of the Australian Museum, for this visit.

Dr. Klaus Rützler provided funding for the study of variability of the eunicid species associated with the reefs off Belize through the IMSWE, SWAMP, and CCRE programs and thus provided the wherewithal for assessing, if preliminarily, validity of the many types I have examined.

Dr. Mary E. Rice, Smithsonian Marine Station at Link Port, made it possible for me to undertake extensive investigations of *Kinbergonuphis simoni*, used as one of the outgroups in the cladistic analysis.

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I dedicate this study to Dr. Leonard P. Hirsch partly for his constant support and encouragement, but mostly for his insistent prodding on methodological issues.

Materials and Methods

The types of nearly 200 species of *Eunice* are available. The German collections are especially valuable, both the Berlin and Hamburg museums have types of many species described by Grube. Additional types are in the holdings of the museum in Wroclaw (Breslau) now in Poland, where Grube lived and worked for many years. The British Museum (Natural History), now called the Natural History Museum, and the Musée National d'Histoire Naturelle, Paris, have large holdings as does the National Museum of Natural History, Smithsonian Institution, and American Museum of Natural History, New York. Some authors, for example Claparède and Rioja, never deposited any types.

I have designated neotypes and lectotypes for a few species. Neotypes have been designated only for poorly defined, widely dispersed species such as *E. norvegica*. Most early authors did not designate holotypes; if they had more than one specimen available, these have here been considered syntypes. Only in cases where confusion could arise as to the identity of a species, as when the type lot(s) contained two or more species, have lectotypes and paralectotypes been designated.

Microscopes and Computer.—I used a Wild M8 stereomicroscope and a Zeiss Universal compound microscope with interference optics, both equipped with camera lucida. The paper was prepared on an IBM PS2-80. Word-processing packages included NotaBene and WordPerfect 4.1 through 5.1. Tables and calculations were prepared using SYSTAT 4.0, SuperCalc4 1.0, and PlanPerfect 3.0. For the cladistic analysis I used PAUP 1.1. DELTA 1.1 (Dallwitz and Paine, 1986) was used for the preparation of the text and key and for the data matrix for one of the PAUP runs. The rather idiosyncratic punctuation used in DELTA natural language descriptions was modified for publication. Details of the preparation of the key and the cladistic analysis are given elsewhere.

Several species have been moved to other genera. I give only brief comments for each of these, including a reference to the author responsible for the current generic disposition. New combinations are noted.

Some species for which types are missing were poorly described originally and have rarely if ever been found by

subsequent workers. They may have been listed in comprehensive works (e.g., Fauvel, 1923:451); such mention cannot be considered a use of the name in the sense of the Code. These species are here characterized as indeterminable and are briefly described, with references to the original descriptions and the first author to declare them invalid. A few nomina nuda are also included.

All other species are as extensively described and illustrated as possible. Where no types were available, original descriptions (or redescriptions of the original material) have been paraphrased. Type material is missing for some frequently reported species, such as *Eunice antennata* and *E. vittata*. In these cases specimens from the type locality (or as close to the type locality as practical) were examined in lieu of types.

Some recently described species, for which types are missing, have not been reported since their original description. These species are characterized as best as possible from the original illustrations and description and are considered incompletely known. In most cases these species are too poorly known to be included in the keys or the cladistic analysis. All species described (other than those declared indeterminable or moved to other genera) are included in the tables and can thus be compared to related taxa.

DISCUSSIONS OF INDIVIDUAL SPECIES.—The species are discussed in alphabetic order, and the treatment of each is separated into several sections. Lightfaced centerheads identify species that have been transferred to other genera; boldfaced centerheads identify species that I consider as belonging to *Eunice*.

A species number, arbitrarily designated by me, precedes boldfaced species centerheads. These numbers, rather than species names, are used in the comparison tables, making the tables less sprawling than they otherwise would be. Species of *Eunice* are listed in Appendix B, using the species numbers. In the first line following the heading are given references to illustrations and to tables demonstrating variability of the type material of the species.

Synonyms: The synonymy lists contain references only to the original descriptions, to redescriptions of the type material, and to important changes in generic assignment. The two generic names *Eunice* and *Leodice* have been used synonymously since about 1820 and various switches from one to the other and back again have been omitted as trivial. A brief check of materials in various museums revealed that up to 50% of the specimens had been misidentified. Without a careful check of the specimens on which a given record has been based, inclusion of such records in the synonymy lists may perpetuate old errors.

Several species have been victims of what I call a serial synonymy. A serial synonymy may arise as follows: Author A synonymizes species Y with species X. Later, author B synonymizes species Z with species Y. Finally, author C roots out this combination of synonyms from the literature and proceeds to lump all three named species under what she (or he) perceives to be the oldest available name. Very different morphs have been paraded under the same species name, often for many years, without anybody examining the types or even examining the types of one species and comparing them to descriptions of other species. Authors of widely used faunal surveys sometimes take serial synonyms into account when writing descriptions (e.g., Fauvel, 1923). The result is that species may become so poorly characterized that delimitation of any species in the genus becomes difficult. In other cases the descriptions encompass only one section of the species listed in the synonymy lists (e.g., Fauvel, 1953). Without direct comparison of the types of all named taxa included in one of these series, it is impossible to decide what parts (if any) of such a chain of synonyms are valid. References to obvious serial synonyms have not been included.

Most beginning students of polychaetes will use one of the major keys or handbooks as his or her major source of information. As I know from practical experience (Fauchald, 1977), no one scientist can handle all families equally well when writing a handbook or a key. One has to depend on available published sources. In cases where the original literature is poor, the result is often the introduction of unjustified synonyms into the literature. Keys include, obviously and trivially, only those species considered by the author when constructing it. Species not considered by the author may very well key out without any problems and the identification still be incorrect.

The secondary literature may cause some additional problems. These problems are here pointed out by the following example. Please note that both Fauvel (1953) and Hartman (1968, 1969) pointed out clearly and accurately the sources of their information in the publications. Problems arise in assuming taxonomic accuracy in these general works.

Using Fauvel (1953) to identify polychaetes from India, the purpose stated in the title of Fauvel's book, may create some problems. For many species he assumed to be widely dispersed geographically, Fauvel used illustrations already issued in his two volumes on the French fauna (Fauvel, 1923, 1927). The descriptions in Fauvel (1953) are very brief. He may have based his descriptions on Indian specimens or he may have abbreviated the descriptions prepared for the Atlantic fauna to cover Indian records.

Using Hartman's (1968, 1969) atlas of Californian polychaetes poses a related problem. Nearly all Hartman's descriptions were based on direct examination of California material. Most of the illustrations, however, were copied or redrawn from earlier publications, usually from the original descriptions. In several cases, the descriptions and illustrations do not agree (K.Fd, personal observation).

As it is usually not clear what aids were used for identification in later records of euniceans, the lists of synonyms have been limited to those that identify the species and the material used and a few well-documented synonyms. At a later date I will try to cope with all sources of synonyms (correct or not) for the group.

Material Examined: In this section, type status of the

specimens examined, as well as museum reference numbers, locality information, and number of specimens is given. Locality information is given as originally spelled either on the labels or in the original description. Where necessary, equivalent modern names have been added in parentheses. Depths of capture have been recalculated to the metric system.

Comments on the Material Examined: This section includes comments on the state of preservation of the specimens; any specimens referred to other species are named, as are specimens specifically described or illustrated if the quality of the specimens differ. I have also included comments on missing type materials.

Descriptions: The descriptions have been standardized, with all features named and described in the same sequence, beginning with overall body characters. Included are state of completeness of the specimen; sex (if identifiable); numbers of setigers present, total length, maximum width, length through setiger 10, width at setiger 10. All measurements expressed are in mm. In addition, the setiger at which the maximal width is first reached is noted. The shape of the body in general appearance is briefly noted. Descriptions of pygidium and anal cirri are given in this section.

Next are named and described all features associated with prostomium and peristomium. The jaw structure, often limited to a maxillary formula, is given in a separate section and the branchiae are described in a separate paragraph.

In the paragraph describing the parapodia, each feature is mentioned for anterior, median, and posterior setigers when possible. The ventral cirri are considered part of the neuropodia and are included in the description of the neuropodia. The notopodial cirri, in the literature referred to as the dorsal cirri, are here considered extensions of the notopodia and are for that reason described separately.

In the section on setae, the different kinds of setae are described in the following order: limbate setae, pectinate setae, compound hooks (and compound spinigers when present), aciculae, and finally subacicular hooks.

I have attempted to account for features not included in a description, either in terms of actual absence or because the type material is incomplete or in too poor condition to discern a given structure.

Several types have fragmented over time or were originally collected in several pieces. I have consistently assumed that the anterior end represents the individual originally described and that all other fragments, although they probably belong to the species, may belong to other individuals or even species collected at the same time. The problem is particularly serious when material has been collected by dredging, where one may get representatives of several species, and it may be difficult to associate anterior and posterior ends (cf. *Eunice torresiensis* and *E. tribranchiata* below). If the type has been cut into pieces that clearly match, I have assumed that the pieces are part of a single specimen.

Caution was taken to avoid damaging specimens. Single type specimens were not dissected to examine the jaws, even if the descriptions thereby remain incomplete.

The parapodia used for illustrations were, as much as possible, appended to the types in small glass vials to be available for future study.

The following four items are listed separately from the description to ensure that they are not considered part of the description itself.

Unknown Morphological Features: In this section is given a brief summary of major morphological features left undescribed, usually because of the fragmentary nature of the types.

Expected States of Selected Unknown Features: For some species a few predictions of the expected state of various unknown characters can be given. These predictions were made to stimulate a closer examination of specimens.

The next two features indicate the status of each character, using the character table.

Character States Unknown: "Inappropriate characters" are those characters that cannot under any circumstances be scored for the species in question; for example, all features associated with branchiae in an abranchiate species. "Unknown characters" are those characters that should have been scored but which had to be left out, usually because of the incomplete state of the type.

Assumed States Used in Preparing Key: Many species were described from anterior fragments only; some characters, such as the posterior branchial distribution, are thus unavailable. Because knowledge of the branchial distribution is crucial for creating a reasonably accurate key, I have assumed a state for the characters listed. The assumed states cannot be verified on the types; a study of additional material from the type area may test the likelihood of the assumption. In theory, as the holotype is the only specimen that is the carrier of a particular name, verification is impossible, but for all biological, rather than nomenclatural purposes, the character states can be demonstrated, based on the study of fresh material. Most of the assumed states follow traditions in the literature; where nothing else is stated, I follow suggestions in Hartman (1944) or Fauchald (1970).

Remarks: This section includes a few comments on similar species and reference to the appropriate comparison table(s). Where appropriate I have also specified differences between the original and the current descriptions. Remarks about each species have been kept brief because most of the comparisons to similar species can be done through the tables.

Illustrations: The anterior ends are drawn in lateral view. I adopted the convention of not drawing appendages from the far side of the worm in order to avoid cluttering illustrations of species with long notopodial cirri and branchiae. Parapodial and setal features are illustrated; where necessary, parapodia from both the anterior and median-posterior end were removed and illustrated. The parapodia were drawn in full anterior view as mounted on a microscopic slide. I have adopted the following conventions when drawing setal forms in the parapodial

illustrations. Setal length is indicated as accurately as possible; the number of setae drawn bears no relation to the number of different setae present. Limbate setae are rendered as single lines, pectinate setae as short single lines in the same fascicle as limbate setae. In compound falcigers and spinigers, the joints between appendages and shafts are indicated.

In poorly preserved specimens only the setae are illustrated; soft parts are usually so badly distorted that illustrations would be misleading.

The jaws, when illustrated, were drawn in dorsal view as flattened on a microscopic slide. The shapes of supporting plates are thereby distorted, but I preferred on this occasion to follow the convention first apparently adopted by Schmarda (1861) in illustrating eunicid jaws.

Tables: When the type material consisted of at least three specimens, the variability of all characters is presented in a series of tables. Each table consists of two parts. The upper part gives ranges, means, and standard deviations of measurements and presents variability in numerically characterized features. The lower half is a list of invariable features. Where possible, both incomplete and complete specimens have been included. Where only incomplete specimens were available, the only length measure used was the length through setiger 10 ("Length through 10").

Comparison Tables: Because the cladistic analysis gave no readily interpretable results, I decided to include a series of tables comparing "similar" species as aids for identification. These tables are based on species groupings first suggested by Ehlers (1868) and codified in Hartman (1944) and Fauchald (1970). I would like to emphasize that even though eventual cladistic analysis may show that some (or all) of these groups represent phylogenetic lines, phylogenetic conclusions cannot be drawn from membership in a group at this time. The groups are artificial aids for the identification of the species, nothing more, nothing less.

The comparison tables are grouped hierarchically so that each major group table (Tables 19, 22, 24, 27, 33, 40, 41, 46, 50, and 52) has been broken down into suitable smaller tables. The characters treated in the subordinate tables are exclusively presence-absence characters.

Not all characters included in the character table were included in the comparisons, and the characters used vary from one table to the next. Characters are listed in the left-hand column. The other columns show the character state for each character of a single species; each column is headed by a species number. The character numbers and states are listed in the character table. As noted above, each species was given a species number (another consequence of the use of the DELTA format). The species number for each species precedes the name in the systematic treatment. The species numbers included in each table are also listed at the bottom of each comparison table.

Note that if one of the characters used in the breakdown of the genus is unknown for a species, this species is listed in all tables to which it might belong. Some anomalies arise as a consequence: *Eunice prayensis* has been listed in four subtables and two major tables: poorly known species will turn up in more tables than well-known ones.

Morphological Features of the Eunicids

This review of eunicid morphology, with special reference to the nominal genus *Eunice*, is divided into sections corresponding to major body features. Characters and character states used in the cladistic analysis and in preparation of the key are based on the morphological structures described herein, but are detailed in the section on cladistic analysis. The main structures are diagrammed in Figure 1. The left- and right-hand diagrams show the same "specimen" in dorsal and left lateral view; the three median diagrams illustrate a pre-branchial, a branchial, and a postbranchial parapodium of the same "specimen" in anterior view.

Overall Body Features and Posterior End

Eunicids are relatively slender-bodied polychaetes with short parapodia. The parapodia gradually change shape along the body and no major segmental body regions are recognized.

Three different body shapes may be recognized, based on observations in full dorsal view. In all three, the anterior end tapers very little and the prostomium appears truncate.

1. The widest part of the body is at about setiger 10, corresponding to the position of the posterior end of the inverted jaw apparatus; the body tapers evenly and very gradually towards the posterior end from that point. This body shape is illustrated in Figure 1.

2. The maximum body width, reached at about setiger 10, is retained through most of the rest of the body; body tapering is relatively abrupt in a posterior end consisting of perhaps 20 segments.

3. Maximum body width occurs in a wide, usually flattened region in the posterior one-third of the body. The rest of the body is cylindrical or slightly tapering from the posterior end of the inverted jaw apparatus at about setiger 10. The latter body shape is most common in species of *Marphysa*, but is present in several species of *Eunice*.

The anterior end is always very muscular. The muscles are mainly used to support and move the large, protrusile jaw apparatus (for more detail see below). In cross section each anterior segment is usually distinctly convex dorsally. The ventrum is less distinctly convex than the dorsum or it may appear flattened or the ventral nerve cord may be located in a groove between paired longitudinal muscles. The paired ventrolateral longitudinal muscles usually form distinct longitudinal bands continuing at least through the first one-third of the body. The bands fade posteriorly and are indistinct in the posterior half of the body in most species. The middle part of the body region is less muscular than the anterior end. In cross section the middle body appears flattened, most usually ven-

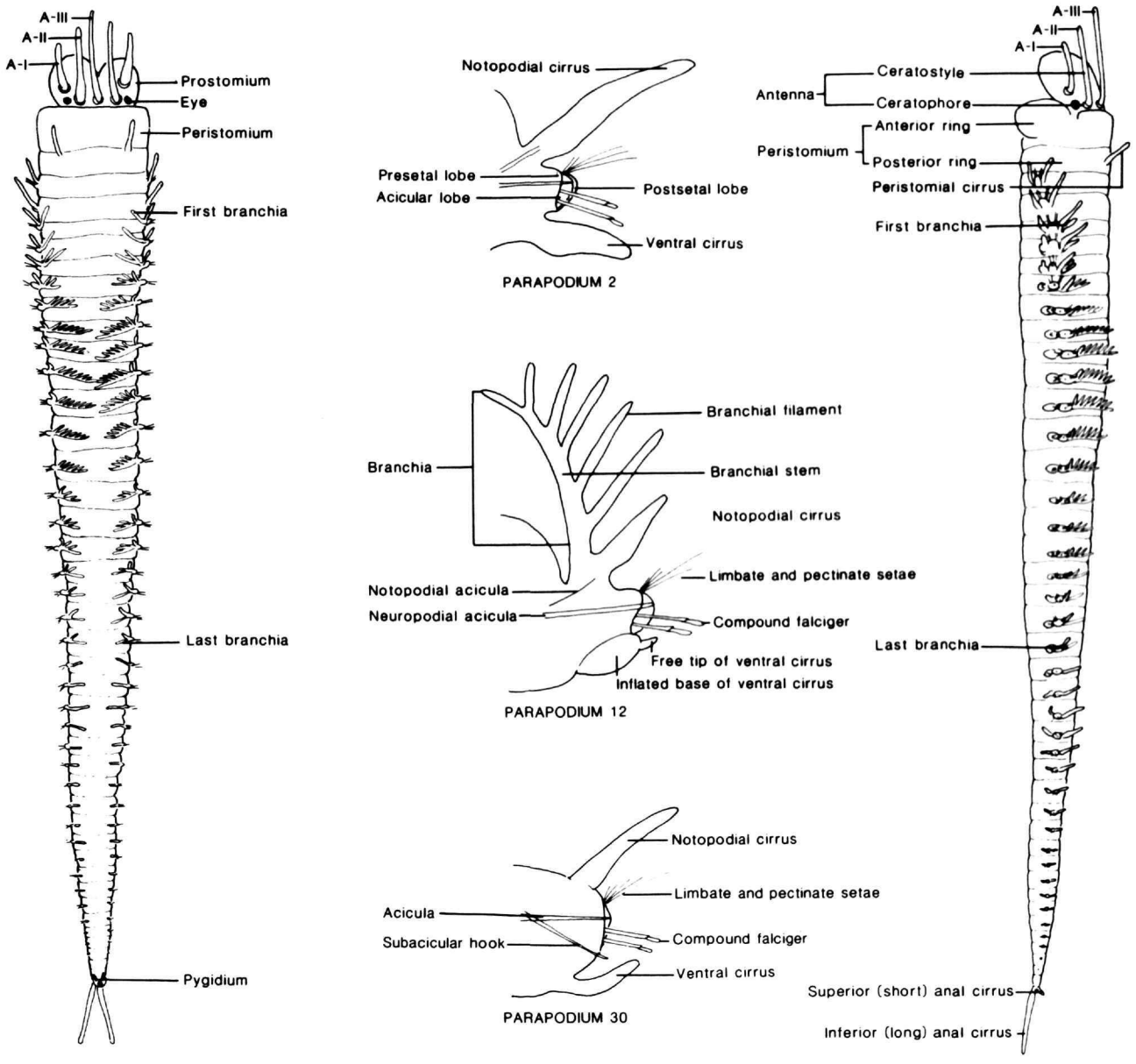

FIGURE 1.—Diagram of *Eunice* showing location of various morphological features.

trally, but often also dorsally. The posterior end is often nearly circular in cross section, but especially in species of body type 3 can be strongly dorsoventrally flattened.

The color of live specimens is usually highly characteristic. The most frequent color pattern, especially among species similar to *Eunice aphroditois,* is a dark, purplish red, with white or pale gray dots scattered over the surface. One, sometimes two, anterior setigers, most usually including setiger 4, has a transverse white dorsal band. Large specimens may be purplish black with a greenish iridescence and the light-colored spots or bands present on small to medium-sized specimens may be difficult to see. Species related to *E. antennata* are brick red, with minute white dots, but may also be uniformly bright scarlet without any markings. Species related to *E. vittata* often have a white base color with yellow or ocher cross bars and spots, but rarely have the white dots and bars that are present in other species. Colors fade rapidly in preservation and have been poorly described for most species. Treadwell (1921) gave good color notes for all species observed by him near the Dry Tortugas Islands in the Gulf of Mexico. All of his types are now

uniformly yellowish gray.

Colors and color patterns are clearly inconvenient as systematic characters, but appear to show very distinct systematic patterns. Color notes will be taken in the ongoing study of variability of eunicids, and color patterns will be introduced formally as systematic characters at a future date.

Most species consist of 100–200 segments as adults (defined as individuals containing recognizable sexual products), but adults with as few as 35 and as many as 1500 segments are known. In specimens with few segments, each segment is usually just slightly wider than long, in dorsal view. In large specimens, segments are often much wider than long. In species with an expanded posterior end, segments are usually very much wider than long, appearing crowded in the posterior one-third of the body.

Sexually mature individuals vary in length from about 5 mm to about 6000 mm. Most specimens examined during this study are 50–150 mm in length.

Eunicids have two pairs of anal cirri. The upper pair, actually located laterally on the pygidium, is usually shorter than the width of the pygidium and filiform in all species. The lower pair, whose base forms the ventrolateral rim of the anus, varies in length. In some species the lower anal cirri are short, barely reaching beyond the posteriormost five setigers and the pygidium proper; in other species they may outreach 15–20 setigers. The anal cirri are incomplete in most types examined, so the length of the anal cirri may be considerably more variable than indicated herein. Long anal cirri are always basally inflated. Distally, cirri are perhaps most frequently tapering, but may also be medially inflated or digitiform, with or without articulations. Articulations, when present, may be cylindrical or moniliform. Species with moniliform articulations in the anal cirri also have moniliform articulations in the ceratostyles. The dorsal edge of the pygidium may be smooth or crenulated. Far too few observations have been made to give any particular systematic or taxonomic significance to this feature at this time.

Prostomium and Peristomium

Most eunicid prostomia consist of two lobes in tandem. The bilobed nature of the prostomium may be visible only as a ventral longitudinal groove or suture, but is usually also visible dorsally as a median sulcus of varying length. In some species (e.g., *Eunice kinbergi*, Figure 54d), each prostomial lobe is separated longitudinally into a narrow, high medial ridge and paired wider, lower, lateral regions. Palps may be marked off by shallow, transverse or circular grooves on the anteroventral side of the prostomium. The palpal grooves are far more visible in preserved than in live material. Even when not distinctly set off from the rest of the prostomium, palpal regions are usually raised above the rest of the anteroventral surface of the prostomium.

In small specimens, the prostomium may be just slightly narrower than the peristomium, but is usually distinctly narrower ("distinctly narrower" defined as one-third narrower than the peristomium). The prostomium may be partially withdrawn under an anterior peristomial fold on the dorsal side; this is most obvious in forms with a narrow prostomium. The prostomium is usually distinctly shorter than the peristomium, when viewed dorsally, but the two may be of similar length. The prostomium is usually held more or less horizontally, but in some species the orientation appears to have shifted, and so the two prostomial lobes slope strongly ventrally. The prostomial orientation has rarely been mentioned in the literature and has yet to be adequately documented.

The dorsoventral dimension of the prostomia is here defined as the prostomial depth. Some species have very shallow prostomia as viewed from the side, being less than half as deep as the peristomium. In other species, the prostomium may be much deeper and may be very nearly as deep as the peristomium. The depth of the peristomium has consequences for distortions in shape associated with protrusion of the jaws. In species with a shallow prostomium, the jaws are protruded very nearly directly anteriorly underneath the prostomium; in species with a deeper prostomium, the prostomium is tilted back to allow eversion of the jaws. The jaws in these cases are everted anteroventrally, rather than strictly anteriorly. The difference in direction of eversion may have consequences for feeding behavior and burrowing activity.

Eyes, when present, are found posterolaterally on the dorsal side of the prostomium. They are paired, ovate, and vary in color from bright red through purple to black; the most common color is dark purple. Eye colors fade in preservation, making them useful characters only when recorded from fresh specimens. The eyes may be located in line with (between) the antennae, or distinctly outside the line of the antennae. In some species the eyes are found on the ceratophores of A-I or A-II (see below for a definition of these terms). All eyes are located directly on the dorsal surface of the anterior part of the cerebral ganglion, overlain by translucent tissue. Four small eyespots have been reported present in a few species (e.g., *Eunice americana*, Figure 8a; *E. gravieri*, not illustrated). Eyes are absent in several species.

The five antennae are situated in an occipital crescent or in a transverse row. The outer lateral antennae (A-I) are often shorter than the other antennae. The inner lateral antennae (A-II) and the unpaired median antenna (A-III) may be similar in length, but, perhaps most frequently, A-III is longer than all other antennae. In some species all antennae are short, barely reaching the tip of the prostomia, with thick, sausage-shaped styles. The spacing of the antennae and the thickness of the antennal styles (ceratostyles) vary among species. The antennal bases (ceratophores) are short and ring-shaped in most species, but may also be short, cylindrical structures confluent with the prostomial surface. The ceratophores lack articulations except in a single species (*Eunice unidentata*, not illustrated). The shape and structure of the ceratophores appear to be stable

features within any given species.

The ceratostyles may have cylindrical or moniliform articulations, or may lack articulations. The kinds of articulations present may vary among the antennae and from base to tip in the same antenna. The shape of what is herein referred to as a "moniliform articulation" may vary from drop-shaped through rounded quadrangular, to nearly triangular with the widest edge distally. Whether or not these differences are fixation artifacts has yet to be determined. Casual observations on live material indicate that shapes do not change upon fixation, but documentation is incomplete.

The peristomium forms a fold covering the base of the prostomium dorsally (see above). The pocket formed by this fold is deepest near the midline in live animals. The bases of antennae and eyes may be covered by the peristomial fold, both in live and preserved specimens. Laterally, the peristomial fold terminates in an ear-shaped fold. Ventral to this fold, the separation between the prostomium and peristomium is indistinct externally for a short distance. The anteroventral part of the peristomium is a more or less scoop-shaped lower lip. The lip may consist of paired, inflated, strongly muscular cushions, distinctly set off from the rest of the peristomium by a shallow groove. The cushions are usually separated in the ventral midline by a frontal notch and a mid-ventral, poorly muscularized region. The lower lip may also be relatively poorly muscularized; if this is the case, the peristomium will taper anteriorly.

The peristomium is nearly always separated into two rings. The rings are usually separated by dorsal and ventral grooves or by a groove encircling the peristomium. The separation may be visible only on either the dorsal or the ventral side; in a few cases, the separation is marked only as shallow grooves anterior to the bases of the peristomial cirri. The rings are ontogenetically presegmental in origin and do not represent fused segments (Åkesson, 1967).

Paired, dorsolateral peristomial cirri are located near the anterior edge of the posterior peristomial ring. The cirri vary in shape from short, ovate structures barely outreaching the posterior peristomial rings, to long, slender, tapering structures reaching well beyond the tip of the prostomium. They may be articulated, usually with cylindrical articulations. The peristomial cirri are articulated only in species in which the ceratostyles are articulated, but are not articulated in all species with articulated ceratostyles.

Jaw Apparatus

The eversible jaw apparatus consists of paired ventrally located mandibles and four pairs of lateral maxillae in addition to an unpaired plate on the left side (seen from above); a fifth pair of sclerotinized plates is present; these plates nearly always lack teeth, but may have a single sharpened ridge in a few species. The maxillae are diagrammed as seen slightly compressed in dorsal view in Figure 2.

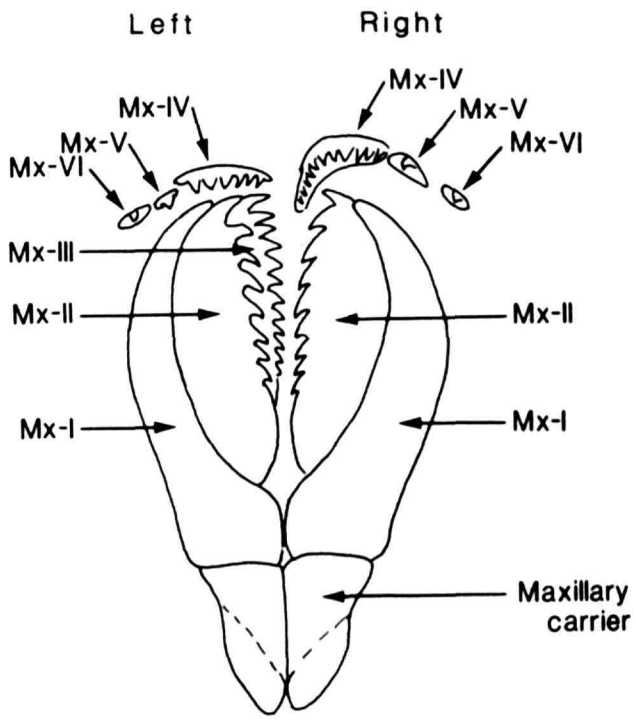

FIGURE 2.—Diagram of maxillae of *Eunice* showing the numbering system of the various parts. Mx-VI is absent in most species. The maxillary formula for this set of jaws would be 1+1, 8+9, 12+0, 6+11, 1+1, and 1+1. Mx-III in this instance is long and located behind left Mx II.

The mandibles are narrow and expanded anteriorly as a cutting edge, which may be impregnated with $CaCO_3$. In the genus *Palola* the mandibles are scoop-shaped and enclose the maxillae when retracted. In other genera, mandibles are flat, but may be tilted in relation to each other to form a shallow V.

The maxillae are attached to longitudinal, muscular ridges arranged on both sides of the eversible pharynx. Most of the muscle mass of the pharyngeal bulb is associated with the maxillae. Relatively less bulky muscles are used in retracting the apparatus. Protrusion is apparently mainly a function of a contraction of the body muscles of the whole anterior end (cf. Clark, 1964; Wolf, 1976). The dorsalmost pair of maxillae (Mx-I) are large, curved structures in a forceps-shaped arrangement. They are basally attached a pair of wide, thin, posteriorly tapering, usually short, maxillary carriers. Remaining jaw elements are numbered in order progressing ventrally and anteriorly from Mx-I. Each second maxilla (Mx-II) is a large plate, the base of which is folded at approximately right angles over a muscular ridge. The teeth of Mx-II are located on the convex edge and curve posteriad. The number of teeth varies from three to about 15; the number of teeth is largely independent of the size of the specimens. An Mx-III is present only on the left side. It may be located directly below Mx-II or under and in front of left Mx-II. Mx-III either forms a transition

to the frontal jaws (Mx-IV and V) or is part of an arc formed by the frontal jaws. When located behind Mx-II it resembles Mx-II in that it is an angled plate with teeth along the free edge. When located in front of Mx-II, the Mx-III base plate is smaller and the outer edge is curved, usually fitting into the curve of the left Mx-IV. The number of teeth is usually much lower in the second kind and the base plate is often tucked underneath the left Mx-IV. The shape of Mx-III and its relation to other maxillae are probably taxonomically informative; the topic is currently being pursued. Left and right Mx-IV consist of angled, comma-shaped plates with teeth along the cutting edge. The right Mx-IV usually has more teeth than the left one. In cases where Mx-III forms part of a distal arc with Mx-IV, the combined number of teeth in Mx-III and left Mx-IV often approximates the number present in right Mx-IV. The number of teeth vary from 2 or 3 to about 15 in each of Mx-III and IV. Mx-V is a small plate lateral to each Mx-IV and usually with a single tooth; in a few cases several teeth may be present. Mx-V may be asymmetric. Lateral to Mx-V may be found another sclerotinized piece, which, when present, may have a small tooth and is then referred to as Mx-VI.

BRANCHIAE

Branchiae are present in most species. They usually are located on the dorsal edge of the notopodia near the base, but may emerge, especially in posterior setigers, from the body wall dorsal to the notopodial bases. Branchiae are readily differentiated from notopodial cirri by the presence of a vascular loop, visible in most cases with the use of a high power stereo microscope in situ. Minute branchial capillaries loop between the epidermal cells and are visible in optical section as minute punctae lined up just below the surface of the branchiae.

Branchiae may consist of single filaments, or they may be more or less branched. Where best developed, branchiae are pectinate, with long, usually tapering stems and more than 40 filaments arranged in a single comb on the dorsolateral side of the shaft. Miura (1986) demonstrated that in most species the maximum number of filaments is seen just posterior to the start of branchiae, with the number of filaments tapering off towards the posterior end. In some species, an intermediate region of low numbers of filaments is present. In a set of diagrams showing the numbers of branchiae per segment, Miura demonstrated that patterns of branchial distribution are more or less species specific. Potential variability in these patterns are now under study as part of the study of variability within each species. In many species, branchiae are limited to the anterior one-third to one-half of the body, but branchiae often are present from setiger 5–10 to the posteriormost distinct segments.

The length of the branchial stems varies. When the stems are long in relation to the filaments, branchiae appear pectinate; when the shafts are short, branchiae have a palmate appearance. In species with palmate branchiae, the maximum number of filaments is usually only two or three. In some species, the branchial stems may be bent, or be slightly coiled, resulting in some rather unusual shapes. The basic structure of all branchiae are the same: a stem with a single series of filaments attached along one side. In some species filaments may themselves be branching; these secondary branching patterns are irregular, varying from one segment to the next. Only a few species are prone to secondary branching (e.g., *Eunice johnsoni*, Figure 59j).

Most species have an anterior and posterior region with single filaments, even if the branchiae are strongly pectinate elsewhere. The number of setigers with single filaments anteriorly and posteriorly appear to vary without any distinct patterns in some species; in other species distinct patterns may be present.

In most species the number of branchial filaments decrease monotonously after reaching a maximum somewhere in the anterior end of the body. In some species with branchiae continued to one of the last distinct segments, the number of filaments decrease to one or two in a mid-body region and increase again, usually to three or four in the posterior one-third of the body. The number of filaments decreases to a single filament in the last 10–15 prepygidial segments. The presence of a mid-body region with reduced branchiae is nearly always associated with the presence of tridentate yellow subacicular hooks, but not entirely so, and certainly not all species with such hooks have reduced number of filaments in a mid-body region.

In some species, I have observed an increase in filament length toward the posterior end without an increase in the number of filaments. This feature has not been well documented on the types and has been omitted in the present study, but will be taken up as part of the study of variability mentioned above.

In most species, filaments are digitiform. More rarely, filaments are smoothly tapering, whereas in some species, especially in those with single branchiae, they may be flattened, often nearly foliose with abruptly tapering tips. Fauchald (1991) found that single branchial filaments in juveniles often are flattened, whereas fully pectinate branchiae of adults of the same species have digitiform filaments.

PARAPODIA

Eunicid parapodia are biramous. The notopodia are represented by short bases and notopodial cirri. The notopodia are supported by internal aciculae (Stöp-Bowitz (1987:128) pointed out that the Latin term *acicula*, plural *aciculae*, is feminine). The notopodia are set off from the cirri by a distinct groove in some species (e.g., *Eunice pennata*, Figure 87p; *E. petersi*, Figure 89e), but in most instances the notopodia are separated from the cirri only by the distinctly to slightly expanded diameter of the cirri near their junction to the

notopodia. The notopodial aciculae, usually two or three in number, are slender, usually slightly yellow to clear, pliable rods; in some species one or more of the aciculae may be dark brown to black. Notopodial aciculae, being difficult to see in most species, have been reported only sporadically, but are apparently always present. The notopodial cirri may be articulated, especially in the anterior end of the body. The articulations are usually cylindrical, more rarely drop-shaped or moniliform. The first notopodial cirri are in some cases much longer than those in the following setigers (e.g., *Eunice polybranchia*, Figure 91a). More usually, cirri increase in length through the first 10–15 setigers and decrease monotonously in length posteriorly. In *E. aphroditois* (Figure 13c,d) and similar species, notopodial cirri are strongly inflated medially, often appearing rather flaccid. Notopodial cirri of this type retain the same length towards the posterior end. Thus, because the body narrows, and other parapodial features become reduced, these notopodial cirri become the dominant parapodial feature near the posterior end.

The neuropodia are herein described as they appear mounted on microscopic slides with the anterior side facing the observer.

Anterior neuropodial acicular lobes are usually rounded or truncate, supported by or more aciculae. The aciculae may emerge near the middle of the acicular lobe or dorsal to the midline. In some species, the acicular lobes become progressively reduced posteriorly and the aciculae may emerge directly from the body wall. In most species, the acicular lobes retain roughly the same size relative to the width of the body throughout, but become conical or triangular towards the posterior end.

The pre- and postsetal lobes actually comprise a continuous structure around the dorsal edge of the neuropodial acicular lobes, wrapping around the dorsal edge as a flattened collar, covering the bases of the setae. The appearance of the anterior and posterior part of this collar is nearly always so different that it is most usefully described as if it consisted of separate pre- and postsetal lobes. The presetal lobes are usually distinctly shorter than the acicular lobes, and form low, usually transverse, folds covering the bases of the compound falcigers and spinigers. In some species the presetal lobes are as high as the acicular lobes and closely follow the outline of the acicular lobes. The presetal lobes rarely change appreciably in shape along the body. The postsetal lobes are more variable. In some species, the anterior postsetal lobes outreach the acicular lobes to form a projecting, triangular or rounded lobe. The high part of this lobe may be dorsal to, directly behind, or ventral to the high point of the acicular lobes. In most species the anterior postsetal lobes are either low, transverse folds or follow the outline of the acicular lobes closely; in neither case will the postsetal lobes be visible in a parapodium mounted in anterior view. In median and posterior setigers the postsetal lobes are low, transverse folds or follow the outline of the acicular lobes closely in nearly all species.

Anterior, usually prebranchial, ventral cirri are tapering or conical; rarely slender or digitiform. The bases of the ventral cirri are inflated and glandular in the next 30–50 setigers in nearly all species examined. The distribution, size, and shape of the inflated bases vary among species. Most commonly, inflated bases are limited to 30–50 setigers and are ovate to spherical. The tips of the ventral cirri project as tapering, sometimes truncate or digitiform, tips. In posterior setigers, the inflated bases usually are gradually reduced. In some species, the bases are withdrawn into the body wall and the glandular tissues are retained but no longer form a perceptible bulge. Posterior ventral cirri usually become longer and more slender than those in the anteriormost setigers, but rarely become as long as the notopodial cirri in the same setigers. In some species the posterior ventral cirri emerge on the posterior face of the parapodia and project dorsally, behind the postsetal lobes. In species in which the inflated bases form thick, transverse welts along the ventral edge of the parapodia, the inflated bases are often present also in far posterior setigers.

Setae

All setae are neuropodial in origin. Limbate and pectinate setae are found in dorso-posterior fascicles forming bundles; compound falcigers and spinigers are in anteroventral, flattened, often fan-shaped fascicles. Subacicular hooks are also present and each neuropodium is supported by one or more aciculae. In a few species (e.g., *Eunice afuerensis*, Figure 7h,j,k; *E. pelamidis*, Figure 86i) compound falcigers are replaced by pseudocompound falcigers from setiger 25–50.

Limbate setae are usually slightly curved, tapering and have, when viewed with light microscope, a single, usually narrow, limbation. Limbate setae outreach all other setae, and may be slender or thick shafted, and marginally smooth or serrated. They usually decrease in number from anterior to posterior setigers and may be wholly absent in the posterior one-third of the body.

The distal half of each limbate seta consists of a core and an asymmetric hood formed by a halo of setal fibers (cf. Kryvi and Sörvig, 1990). The inappropriate term "limbate setae" is retained for two reasons: it is the appearance of the setae in the light-microscope, and it is the term used in the taxonomic literature.

Pectinate setae are present in fascicles of limbate setae. They are usually slender and less than 1/2 as long as the limbate setae. Each pectinate seta consists of a shaft, sometimes flattened, which is distally expanded into a variably wide, dentate blade. The blade may be distinctly furled (Figure 32d), forming an open, shallow scoop, or be flat (Figure 6b,g). In a few species, the edge of the blade is slightly oblique, but in most species it is at right angles with the shaft. The number of teeth along the edge varies between five and 30, the most usual number is from 10 to 15. The two outermost (marginal) teeth may be thicker than the other teeth (Figure 20d), or they may be as thick as the other teeth (Figure 6b). One or both of the marginal teeth may

be longer than the other teeth (compare Figures 13a, 5h, and 9c). All teeth may be wide and abruptly tapering distally (Figure 21c) or evenly tapering from the bases (Figure 5h). The number of pectinate setae usually increases from anterior to posterior setigers; in some species, pectinate setae appear to be absent in the first 15–20 setigers.

Compound falcigers are usually distinctly narrower than aciculae or subacicular hooks, but in some species they are as thick as the latter. Falcigers are composed of shafts and appendages. The shaft is usually slender, but often expanded distally to a distinct head (compare Figures 23a and 4e). Shaft heads may be marginally dentate or serrated. Shafts are usually clear, nearly translucent, but may become more strongly sclerotinized, especially towards the bases, which then become chestnut, brown, or even black in color (e.g., *Eunice sebastiani*). The appendages may be short (about as long as the distally expanded head of the shafts, Figure 4e) or they may be distinctly longer, becoming in some instances, very long and narrow (Figure 8b). The appendages may distinctly taper towards the tip (Figure 8b) or have nearly to completely parallel sides (Figure 12f). Distally, they are usually bi- or, rarely, tridentate. In bi- and tridentate falcigers (Figures 4e and 5e), the teeth are in a row, with one above the other. The teeth may be nearly erect or variably curved and differ in size from barely noticeable to long and pointed. Reduction in size of the teeth is most common in the proximal teeth. Distally the appendages are covered by a pair of guards. The guards usually fit closely around the appendages, but are very much wider in a few species. Each guard consists of a convex membrane, which distally may be rounded or bluntly to sharply pointed (Figures 3b, 4e, 5e). The guards may be equipped with distinct mucros (Figure 13f). Such mucros are mostly present in forms with bluntly to sharply pointed guards, but may also be present in forms with rounded guards (Figure 16f,i). The edge facing away from the teeth may be slightly thickened and the other, cutting edge may be serrated.

Pseudocompound falcigers (Figure 7h, j,k; Figure 86h,i) have thick shafts that are barely inflated near the reduced joint. The joint may be recognizable only as a swelling on one side of the falciger or be more distinct. The pseudoappendages are short, with nearly parallel sides and bidentate. Both teeth are directed distally and tapering.

Shafts of the compound spinigers closely resemble those of the falcigers (Figure 57c). Appendages (blades) vary in length and are always knife-edged; the narrower edge may be serrated.

Each neuropodium may be supported by a single acicula; perhaps most common are paired aciculae, but up to about seven have been recorded (e.g., *Eunice manihine*, four in Figure 69e). When multiple aciculae are present, they are arranged in a dorsoventral row. The aciculae usually are thicker than all other setae. The number and shape may vary from anterior to posterior end. Multiple aciculae are more common in anterior than in posterior setigers. Most species have tapering, distally bluntly pointed, straight aciculae; some species have distally hammer-headed or irregularly thickened and truncated aciculae. In some species, aciculae are distally bifid. Gently curved, or geniculate aciculae are common. Aciculae from a single neuropodium may differ in shape.

Subacicular hooks are exclusively present in the neuropodia and are first present from setigers 15–35 in most species. Hooks are usually present in all remaining setigers. Hooks originate near the base of the aciculae, but form a distinct angle relative to the aciculae (Figure 3e) and emerge along the lower edge of the neuropodia. Subacicular hooks are usually slightly thinner than the aciculae and are often somewhat lighter in color. Most species have a single subacicular hook per parapodium, but in some species a vertical series of as many as 5 may be present (e.g., *Eunice vittata*, three in Figure 114e). Distally, subacicular hooks may be bidentate (Figures 3d and 7c,h), tridentate (Figures 4d, 5c,d) or simple and spine-like (Figure 103k). In some species the two distal teeth in the tridentate hooks are arranged in tandem (e.g., *E. cirrobranchiata*, Figure 31e; *E. flaccida*, Figure 46c), but in most cases the teeth are crested (i.e., with the tips of the teeth in a single plane parallel to the curvature of the setal axis, e.g., Figures 4d, 5c,d).

Structurally, aciculae and subacicular hooks are similar when viewed with a light microscope; when any internal structure is visible, they appear to consist of an inner core of dense fibers, covered by a non-fibrous sheath. In some species, the separation between core and sheath is distinct, with a dark-colored core and a clear, often translucent sheath. In other species the separation between core and sheath is indistinct. Aciculae and subacicular hooks may be clear and nearly colorless, yellow, chestnut colored, various shades of brown, and in some instances a very distinct jet black. If paired aciculae are present, they are often of different colors. If paired subacicular hooks are present, they usually have the same color, but replacement subacicular hooks that have yet to emerge are often lighter in color. Aciculae and hooks in anterior setigers are often lighter in color then those farther back, and smaller specimens tend to have more light-colored aciculae than do larger specimens.

Cladistic Analysis

Species of *Eunice* have for the last 50 years organized into informal species groups (Hartman, 1944; Fauchald, 1970). A cladistic analysis was performed to test if these informal groups represented monophyletic, possibly definable taxa. The analysis was done using PAUP 2.4 on an IBM PS-2/80 and the corresponding mainframe version on an IBM 4381.

Selection of Outgroup Taxa

This initial analysis was intended to justify selection of outgroups to be used in this study. A complete analysis of the order Eunicoidea is beyond the scope of this study. The

relations proposed here follow the traditional family subdivisions of the order and are those that appear most probable to me at this point. I invite testing of all assumptions made in the following section.

The eversible pharyngeal structures in polychaetes are stomodeal invaginations. Such invaginations may take one of two major forms (cf. Dales, 1962). They may be axial structures with muscle layers arranged reasonably evenly on all sides or at most with narrow dorsal and ventral gaps in the musculature. Alternatively, they may be muscularized lower lips, in which the dorsal side of the stomodeum is poorly muscularized. The euniceans have a distinctive form of the latter construction.

The jaws of all polychaetes are epidermal structures, formed either superficially by the epidermis as part of the cuticle or in invaginated epidermal pockets. The main constituents are sclero-proteins of varying density impregnated with a variety of materials. Eunicoidean jaws often are impregnated with large quantities of calcium carbonate (Colbath, 1986, and references therein).

Members of the order Eunicoidea are uniquely characterized by having an eversible, muscular lower lip in the sense of Dales (1962), supporting laterally arranged maxillae and a pair of ventral mandibles. The muscular part of the stomodeum is scoop-shaped with the jaws located in partially isolated pockets formed by folds in the scoop. The mandibles are in a midventral pocket. The maxillae are supported on lateral muscular ridges and pockets along the sides of the mouth cavity. The mandibles, although probably of great interest, have been relatively poorly described in most taxonomic work and are herein not considered further for the purposes of selecting an outgroup.

The eunicoidean jaws, although reduced in some, especially small or parasitic members, differ from the jaws of other polychaetes, especially of the Phyllodocida, in which the jaws are formed along the inner lining of an axial, muscular eversible pharynx (cf. Dales, 1962; Clark, 1964; Fauchald, 1974a). Without anticipating a planned analysis of the relations among the major groups of the polychaetes, it appears likely that the structure of the jaws could be considered a synapomorphy for Eunicoidea. Thus, the search for an outgroup for *Eunice* sensu lato is herein limited to the order Eunicoidea.

As mentioned above, the following families are currently recognized in the order: Eunicidae, Onuphidae, Lumbrineridae, Arabellidae, Iphitimidae, Lysaretidae, Oenoniidae, Hartmaniellidae, and Dorvilleidae. The iphitimids were considered part of the dorvilleids by Gaston and Benner (1981), a finding that will influence the composition of the Dorvilleidae. However, these and other taxonomic problems associated with some of the families do not influence the selection of outgroups for the following reasons. Ehlers (1868:273–274, 280–282) recognized two distinct groups of eunicoideans: the prionognaths and the labidognaths. The families Eunicidae, Onuphidae, and Lumbrineridae belong to the latter; the other families to the former group. The two groups differ markedly in the jaw structures.

The prionognaths have (often numerous) jaw pieces arranged longitudinally along a single ridge. The carriers either form small box-like structures near the base of the posteriormost jaws, or are long, narrow, flexible support structures, completely uncovered by muscle in situ (Fauchald, 1970; Wolf, 1976). These jaws are hardened by very strong sclerotinization and a series of metal ions are present, similar to the condition in certain glycerid jaws (Colbath, 1986; see also Voss-Foucart et al., 1973).

In the labidognaths, one pair of jaws are large forceps (Hartmann-Schröder, 1967; Wolf, 1976). The jaws are attached to a pair of large, wide, usually short maxillary carriers covered in life with a thin layer of transverse muscle, making it possible for the organisms to tilt the jaws along the medial axis. The other jaw pieces include distinct, large, often paired pieces. Each piece consists of a curved base and a cutting edge with a variable number of teeth along the edge. In addition, the jaws, when hardened, are calcified with calcite or aragonite (Colbath, 1986).

As stated above, I assume that the presence of maxillae arranged in series laterally in the ontogenetic derivative of the stomodaeal invagination is a synapomorphy for the order Eunicoidea. I further assume that the group to which the eunicids sensu stricto belong is characterized by additional synapomorphies associated with the jaw structures; i.e., the distinction between prionognaths and labidognaths. Juvenile jaws of labidognath taxa have jaws that resemble the prionognath condition (Blake, 1975; Hsieh and Simon, 1987). For the purpose of this analysis, I have assumed that the two sets of jaw characters (or a subset of these characters) can be used as synapomorphies characterizing both groups of eunicoidean polychaetes.

The labidognaths have traditionally been separated into two groups; one containing the eunicids and onuphids and another containing the lumbrinerids. The latter lack the complex prostomial structures present in the two former and the parapodia are also relatively simple, characters that could easily be symplesiomorphies. The lumbrinerids are characterized by two synapomorphies associated with the jaws: the jaws are symmetrically paired and are always (as far as investigated) impregnated with calcite, independent of depth and latitude (Colbath, 1986).

The eunicids and onuphids have asymmetrical jaws, in which the left side has an additional jaw piece, usually placed behind the large maxillary plate (Mx II) or anterior to, but behind that plate, in close association with the distal, smaller jaw pieces, when the jaw apparatus is viewed from above. In addition, the jaws are impregnated with aragonite, as far as known, independent of the origin of the material. Both these features are here considered synapomorphies for the eunicids and onuphids.

The onuphids and eunicids differ in the structure of the prostomium. In the former the prostomium is a pentagonal to

rounded lobe about as wide at the base as the peristomium. A pair of small, frontal antennae (frontal palps, sensu Paxton, 1986) are present, as are five occipital antennae arranged in a row or a semicircle near the base of the prostomium. Each antenna consists of a ceratophore and a style. The ceratophores are often long with numerous articulations, but may also be smooth. They are never ring-shaped. The peristomium is a single ring with a pair of frontal peristomial cirri (missing in several genera).

Among the eunicids, the prostomium is more or less distinctly cleft longitudinally (the cleft is always visible ventrally, even among those members of the genus *Marphysa* that are characterized as having rounded prostomia in the literature) and the ventral side of the prostomium may be equipped with a pair of palpal cushions, more or less distinctly set off from the prostomium proper. The frontal palps are missing. The antennae are in a transverse row or an open horseshoe. Each antenna consists of a ceratophore and a ceratostyle. The ceratophore is either ring-shaped or a cylindrical extension of the dorsal wall of the prostomium; it is ringed only in one described species (*E. unidentata*). The ceratostyles are often ringed and may consist of many moniliform articulations. The peristomium consists of two rings (not segments, cf. Åkeson, 1967) and the peristomial cirri are attached near the anterior edge of the second peristomial ring.

The search for an outgroup for the genus *Eunice* has been limited to the families Eunicidae and Onuphidae. Historically, all non- *Eunice* genera of the Eunicidae were formed as subsets of *Eunice*. The sets of characters currently used to recognize genera in the family can be summarized fairly simply. Two genera (*Nematonereis* and *Lysidice*) have one and three antennae, respectively. During ontogenesis other members of the family go through stages in which they have first one and then three antennae before adding the last, outer pair (personal observations). *Marphysa* lacks peristomial cirri, the only feature that consistently can be used to separate all species assigned to this genus from species of *Eunice*. *Palola* lacks subacicular hooks and pectinate setae; as an autapomorphic feature, the mandible is very large, scoop-shaped, and encloses the other jaws. *Palola* consists of a few species; all live in calcareous substrates. *Nauphanta* Kinberg, 1865, recently resurrected (Fauchald, 1986), is characterized by the presence of large, flat pectinate setae emerging in rows on the dorsal edge of the neuropodia. The genus is poorly known, and several additional species of *Marphysa* may turn out to belong to this genus. Additional genera have been described as offshoots of *Marphysa* (*Paramarphysa* and *Heteromarphysa*). These are poorly known and have been relatively rarely reported.

Selection of any one of the other eunicid genera, with the exception of *Palola* and *Nauphanta*, might involve creation of a paraphyletic group. Ontogenetically, species of *Eunice* and *Marphysa* undergo *"Nematonereis"* and *"Lysidice"* states before they reach the adult configuration of antennae. Furthermore, other differences all involve the loss or modification of selected setal types. Selection of *Palola* is possible because a distinct apomorphy defines it; however, it is entirely possible that the genus will be lumped back into *Eunice*, as is current usage by several authors (e.g., Hofmann, 1974). *Nauphanta* is simply too poorly known to be an effective outgroup. A full-fledged cladistic analysis is probably not possible until all other genera named have been reviewed. I suspect that although there may be definable genera in the family, the current distribution is paraphyletic. I undertook this first survey to attempt to get an initial idea of possible patterns of relations among the species examined.

I took two routes out of a problematic selection of outgroup. The first involved the selection of an onuphid as outgroup. The generic subdivision of the onuphids has recently been the subject of thorough revisions (Fauchald, 1982a, but especially Paxton, 1986). All members of this family are tubicolous and in some taxa the anteriormost parapodia are very different from those farther back (especially *Rhamphobrachium* and allied genera; see Paxton, 1986; see also *Nothria*, *Paradiopatra*, and *Hyalinoecia*). The transition from the modified segments to the remainder of the body segments is usually rather abrupt. Members of other onuphid genera, such as *Onuphis*, *Kinbergonuphis*, *Paradiopatra*, and *Mooreonuphis*, are less strongly cephalized and transitional segments are present over a longer section of the body. Eunicids and all other eunicoids appear far less cephalized than the onuphids. The anterior parapodia of eunicids differ in size more than in structure from those farther back. Transitions in the size, shape, and equipment of the parapodia are not abrupt.

Kinbergonuphis simoni Santos, Day, and Rice, 1981, was selected as the outgroup onuphid. The level of variability of all the taxonomic characters among the onuphids is generally unknown. *Kinbergonuphis simoni* has been the subject of a three-year study at the type locality in Florida by Hsiang Hwey-Lian (Hsiang and Simon, 1987). She followed in detail the larval development and metamorphosis, including setal transition during ontogenesis, formation of the jaw apparatus (Hsiang and Simon, 1987), and a detailed study of the adult population structure at the type locality. Fauchald (1991) has studied the variability of adult morphology in this species from various localities around the Florida peninsula, but especially from a locality near Vero Beach on the east coast, a locality also studied by the authors of the species. The species is thus comparatively well known and when decisions as to character polarity had to be made, reference to this accumulated information assisted greatly.

Even if the onuphids and eunicids are related, a number of features with similar relative position in the body are consistently very different. For example, the digitate postsetal lobes of anterior parapodia of onuphids are very different structurally from the transverse, low folds present in the eunicids. Similarly, the onuphids have pseudocompound or

simple hooks present in a few anterior setigers; eunicids have compound hooks present in all segments (except in *Eunice afuerensis* and *E. pelamidis*). Further, the hooks appear very different and no structural analysis has been done to demonstrate their homologies.

For this reason, a second outgroup was selected. In this case a eunicid, *Marphysa sanguinea* (Montagu, 1815), was selected as an outgroup; this species is a member of the genus that most closely resembles *Eunice*. *Marphysa sanguinea* has been reported widely from warm-water areas and the identity of the different populations is problematic. For that reason, a single specimen from Florida (USNM 17131) was examined when the descriptions of the species were too vague to be used in the analysis, or when features had not been included in previous descriptions. As mentioned above, the presence of peristomial cirri is a distinct synapomorphy for all species of *Eunice* in relation to *M. sanguinea* (or alternatively the absence of peristomial cirri in *Marphysa* may represent an apomorphy for that genus; this issue will be explored at a later date).

Character List

Originally a character list including, in all, 228 characters was developed. The standardized format used in character files of DELTA, a program for developing standardized keys and descriptions, was originally used to develop the list. The list was based on the first 50 species encountered in an alphabetic listing of the species. The character states were systematically organized from small to large (few to many) and from absent to present. Additional character states were included as encountered going through the remaining descriptions. Once an outgroup had been selected (see below), the character list was rescored, using the character state present in the outgroup as the plesiomorphic condition. Where a character was missing in the outgroup, the character states were ordered as in the original list, but were always run as unordered in the analysis.

The original DELTA-style table included some 228 "characters," many of which created serious problems in the cladistic analysis. Iterated reductions in the number of characters, combining the extremely detailed notations necessary for descriptions, led to the development of an analyzable character list. The result was a list (Appendix A) of 68 characters, of which 38 are multistate and 30 binary. Appendix A also includes a series of measurements and numerical counts that were excluded from the analysis, because they could not be broken down into discrete states. The total number of character states are 210, barely adequate for the number of taxa present, if all character states had shown perfect behavior in the analysis.

Plesio- and Apomorphic States of the Characters

All characters are included in this overview, except those that identify the specimens, such as species number, name, state of specimen completeness, and sex. Characters and character states are those included in the preparation of the key; it is a printout of the DELTA file CHARS without the formatting characters. The characters are grouped by major morphological structures. Character state 1 is always plesiomorphic.

Size Characters

1. number of setigers
2. total length mm

These two characters are mentioned only for complete specimens. In all other species they have been scored as unknown. Length is measured from the tip of the prostomium to the end of the pygidium; antennae and anal cirri are omitted.

3. maximum width in mm
4. maximum width first reached at setiger
5. length through setiger 10 in mm
6. width at setiger 10 in mm

These characters can be scored for all specimens. The combined score of characters 3, 4, and 6 can be used to characterize the overall shape of the body. Character 5 can give a good approximate measure of total size of incomplete specimens (Fauchald, 1991).

Prostomium and Peristomium

7. prostomium
   1. frontally truncate
   2. frontally obliquely truncate
   3. frontally rounded
8. prostomium
   1. dorsally inflated
   2. dorsally flattened
   3. dorsally excavate with a thickened rim
9. median sulcus
   1. median sulcus invisible dorsally
   2. median sulcus shallow
   3. median sulcus deep

These characters define the shape of the prostomium. They are observed from the dorsal and lateral side. For characters 7 and 8, both outgroup species have character state 1. *Kinbergonuphis simoni* lacks a median sulcus wholly; *Marphysa sanguinea* has a shallow, rather wide notch.

10. prostomium
    1. distinctly shorter than peristomium
    2. about as long as peristomium
11. prostomium
    1. about as wide as peristomium
    2. distinctly narrower than peristomium
12. prostomium
    1. less than 1/2 as deep as peristomium
    2. as deep as 1/2 of the peristomium or deeper

These characters define the size of the prostomium in relation to the rest of the anterior end. By "distinctly shorter" in character 10 is meant "more than 30% shorter than"; the break-off point is defined similarly for characters 11 and 12.

Both outgroup species have short, wide prostomia and both have the prostomium about as deep as one-half of the peristomium.

Eyes

13. eyes
    1. present
    2. absent
14. eyes
    1. lateral to the bases of A-I
    2. behind bases of A-I
    3. between bases of A-I and A-II
    4. behind bases of A-II
    5. on ceratophores of A-I
    6. on ceratophores of A-II

The presence or absence of eyes is probably very important, but because the color fades, and most types are rather old, character 13 is not featured prominently in any discussions. Both outgroup species have character state 1; the other states are arranged in order of frequency in the ingroup.

Antennae

15. antennae arranged in a
    1. horseshoe
    2. semicircle
    3. straight line
16. antennae
    1. evenly spaced
    2. with A-I isolated by a gap
    3. with A-III isolated by a gap
17. antennae
    1. similar in thickness
    2. with A-I slimmer than other three
    3. with A-III slimmer than other four
    4. with A-I thicker than other three
    5. with A-II thicker than other three
    6. with A-III thicker than other four

The relative position and size of the antennae have never been used as systematic characters. The differences observed have an unknown value as systematic characters at this point. The features have been included here because they are being recorded in fresh material and appear to show some interesting properties. *Kinbergonuphis simoni* has antennae in a horseshoe; in *Marphysa sanguinea* A-I is placed just slightly ahead of the other antennae. Character 15 was always treated as unordered. For character 16 state 1 is by far the most common in both onuphids and eunicids and is present in both outgroup species. For character 17, state 4 may be the most common among onuphids, but is not present in *K. simoni,* which has state 1, as does *M. sanguinea.* The character was run unordered in all runs.

18. ceratophores
    1. long in all antennae
    2. long in A-I and ring-shaped in other three
    3. ring-shaped in all antennae
19. ceratophores
    1. articulated
    2. without articulations

In *Kinbergonuphis simoni* the ceratophores are cylindrical with three or four vaguely indicated articulations; in *Marphysa sanguinea* the ceratophores are short and ring-shaped without articulations.

20. ceratostyles
    1. tapering
    2. medially inflated
    3. digitiform
    4. club-shaped

The shape of the ceratostyles is usually not considered a strong character; a common excuse has been that the styles are often lost and thus not worthy of detailed description. *Kinbergonuphis simoni* has tapering styles; *Marphysa sanguinea* has digitiform styles.

21. ceratostyles
    1. articulated
    2. without articulations

The styles are articulated in *Marphysa sanguinea;* and lack articulations in *Kinbergonuphis simoni.*

22. ceratostyle articulations
    1. long or short cylinders
    2. moniliform or drop-shaped distally
    3. moniliform throughout

Character state 3 may be heterogenous; some "moniliform" articulations are medially inflated, shaped more or less as pearls on a string. In other forms, the "moniliform" articulations are truncated cones with the base distally. It is possible that the apparent difference is due to contraction, but this has never been well documented. In several species the inner one-third to one-fifth of each style lack articulations; in most cases the articulations become more distinct distally.

23. length of
    1. A-II and III similar and A-I shorter
    2. antennae increasing from A-I to A-III
    3. A-II greater than A-I and A-III
    4. all antennae similar (short)

Length of the antennae is here characterized only as relative length in relation to the other antennae. The absolute length is important, but was poorly recorded. A-I is shorter than the other antennae in character states 1–3 and about as long as the other antennae in character state 4. The antennae must differ by at least 30% in length for the difference to be considered distinct.

Peristomium

24. peristomium
    1. with distinct, muscular lower lip
    2. cylindrical

I originally had a series of characters describing the shape of the peristomium; character 24 is the last remnant of these

characters. It was the only character among them that could be characterized whether the jaws were everted or not; it has been poorly described in the literature, even if most illustrations in ventral view show the distinction rather clearly. *Kinbergonuphis simoni* has character state 2; *Marphysa sanguinea* has character state 1.

25. separation between peristomial rings
    1. visible dorsally only
    2. visible ventrally only
    3. visible both dorsally and ventrally
    4. present on all sides
    5. absent

In at least one case, the peristomium appears to be undivided; this state may be a juvenile feature. *Kinbergonuphis simoni* has a single peristomial ring on which the peristomial cirri are attached anteriorly, as do all onuphids; *M. sanguinea* has character state 3. The character was run unordered in all runs. It is possible that it should be run in order from 5 to 1, but not enough is known about variability and ontogeny to decide this issue.

26. anterior ring makes up
    1. 1/2 of total peristomial length
    2. 2/3 of total peristomial length
    3. 3/4 of total peristomial length
    4. 4/5 of total peristomial length
    5. 5/6 of total peristomial length
    6. 6/7 of total peristomial length
    7. 7/8 of total peristomial length
    8. 8/9 of total peristomial length
    9. 9/10 of total peristomial length

This feature is undoubtedly subject to variation due to contractions. Differences between the extremes appear to reflect valid differences between taxa.

27. peristomial cirri reach
    1. middle or anterior end of peristomium
    2. middle or front of prostomium
    3. beyond prostomium

Scoring the length of the peristomial cirri in this fashion avoids the use of terms such as "short," "medium," and "long." By definition, *Kinbergonuphis simoni* has character state 2 because it lacks the anterior peristomial ring; *M. sanguinea* lacks peristomial cirri, so characters 27 and 28 have not been scored for this species.

28. peristomial cirri
    1. tapering
    2. digitiform
    3. medially inflated
    4. basally inflated
    5. ovate

Kinbergonuphis simoni has character state 1; the character was run unordered.

29. peristomial cirri
    1. articulated
    2. without articulations

Peristomial cirri are not articulated in any onuphid to my knowledge.

Branchiae

30. branchiae
    1. present
    2. absent

Branchiae are present in both outgroup species; they are absent in some taxa in both families. They are absent in most other euniceans; possibly homologous structures termed branchiae are present sporadically in other groups.

31. branchiae
    1. pectinate
    2. palmate
    3. single filaments

Single branchial filaments present in immature specimens with only a few segments appear structurally different from those of the adults. Some species retain these branchiae; in other species with single filaments, the juvenile branchiae are lost. In the latter case the structure of adult branchiae appears to differ from the juvenile branchiae.

32. branchiae
    1. distinctly longer than notopodial cirri
    2. about as long as notopodial cirri
    3. distinctly shorter than notopodial cirri

The definition of "distinctly" follows the pattern established for the antennae: one-third longer (or shorter) than the notopodial cirri in this case. The three character states proposed here represent a first attempt to measure the relative length of the two structures. Eventually I expect to have to characterize the absolute lengths of each structure; without careful study of the variability in a number of specimens, this first step appears to show promise. Both outgroup species have character state 1.

33. branchiae
    1. reduced in mid-body region
    2. not reduced in mid-body region

Both outgroup species have character state 2 as do most species of *Eunice*.

34. branchial stems
    1. erect
    2. flexible

Among species with character state 2 have been included also species with distinctly twisted, nearly cork-screwed branchiae. The difference between folded and twisted (or cork-screwed) shapes may be more due to fixation than to structural characteristics. There is, however, a clear-cut distinction between the two character states defined above. *Kinbergonuphis simoni* has state 1; *Marphysa sanguinea* has state 2.

35. branchiae from setiger number
36. to setiger number
37. branchiae
    1. present to near posterior end
    2. terminating well before posterior end

By "near posterior end" is here meant within 10 setigers of the pygidium in species with 100 or more setigers. Especially in species in which the body tapers smoothly towards the posterior end, the position of the last branchiae may be difficult to determine.

38. branchiae present on
    1. more than 65% of total number of setigers
    2. less than 55% of total number of setigers

This feature was included to make comparisons between small and large species easier. It is defined as the percentage of branchiated setigers in relation to the total numbers of setigers in complete specimens. The character corresponds to the grouping, suggested already by Grube, into species with branchiae terminating in mid-body and those branchiated through the posterior end of the body. The break-off point was determined by scoring all species for which the branchial distribution was known; no species described have branchiae on more than 55% but less than 65% of the body. All other gaps in distribution are less than 5%. Both outgroup species have character state 1 in characters 37 and 38. Characters 37 and 38 are often, but not necessarily, congruent.

39. single filaments in number of anterior setigers
40. single filaments in number of posterior setigers
41. maximum number of filaments
42. maximum number of filaments first reached in setiger number

Parapodia

43. median acicular lobes
    1. distally truncate
    2. distally rounded
    3. triangular or conical
    4. withdrawn into body wall
    5. bilobed
44. median acicular lobes with
    1. aciculae emerging ventral to midline
    2. aciculae emerging at midline
    3. aciculae emerging dorsal to midline

The states of these two characters are relatively easily scored in carefully mounted parapodia. The character states for character 43 are clearly unordered. Detailed observations were also made on anterior and posterior parapodial lobes, but were excluded from use in this study. Many of the types are incomplete posteriorly, and in order to make the necessary observations, additional parapodia would have to be removed, something deemed less than desirable on material consisting of types only.

45. anterior presetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes
46. median presetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes
47. posterior presetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes

Kinbergonuphis simoni has character state 1 in all three characters; *Marphysa sanguinea* has character state 2. The latter is by far the most common state among the eunicids.

48. anterior postsetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes
49. median postsetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes
50. posterior postsetal lobes
    1. follow outline of acicular lobes closely
    2. form low transverse lobes
    3. project as free lobes

These character states are determined as parapodia are observed from the front as mounted on a microscopic slide. During mounting, care has to be taken to avoid twisting the parapodium around its long axis. *Kinbergonuphis simoni* has character state 3 for character 48, provided that the digitiform postsetal lobes of the onuphids are homologous with the transverse folds called state 3 among the eunicids. For characters 49 and 50, both outgroup species have character state 1.

51. ventral cirri not inflated in number of anterior setigers

The first several ventral cirri show a smooth taper from the base; then, usually from setigers 5-10, the bases become distinctly inflated, whereas the tips retain their taper. This character lists the numbers of segments without distinct basally inflated ventral cirri. The numbers do not show any distinctly separated ranges and the character is not included in cladistic analysis.

52. anterior ventral cirri
    1. tapering from narrow bases
    2. tapering from wide, triangular bases
    3. digitiform

Both outgroup species have character state 1.

53. median ventral cirri
    1. basally inflated
    2. without basal inflations

Tubicolous eunicid species always have inflated bases; however, a number of species for which tubes have not been reported also have inflated bases. Both outgroup species have inflated bases; *Kinbergonuphis simoni* constructs a tube; *Marphysa sanguinea* lives in a burrow possibly with a thin lining.

54. bases of median inflated ventral cirri
    1. bases ovate or spherical
    2. bases thick, transverse welts

3. bases scoop-shaped

The scoop-shaped bases are folded around the lower edge of the neuropodium and usually enclose the emerging bases of the subacicular hooks; the scoop-shaped region is usually angled, and so it reaches farther dorsally on the posterior face of the parapodium than on the anterior face.

55. median inflated ventral cirri
    1. narrow tips short and button-shaped
    2. narrow tips tapering
    3. narrow tips digitiform
    4. narrow tips absent

In nearly all species, median ventral cirri have a distinctly marked tip lacking the distinct glands present in the bases; the presence of these glands makes it possible to recognize the presence of the base, without the narrow tip.

56. median ventral cirri
    1. tapering
    2. digitiform

This character is scored only for species in which the bases are not inflated.

57. posterior ventral cirri
    1. basally inflated
    2. without basal inflation
58. bases of posterior inflated ventral cirri
    1. ovate or spherical
    2. thick, transverse welts
    3. triangular welts
    4. scoop-shaped
59. posterior inflated ventral cirri with narrow tips
    1. short and button-shaped
    2. tapering
    3. digitiform
    4. absent

These characters parallel the ones already characterized for median setigers. In most species, the posterior ventral cirri lack basal inflations; however, when inflated, the shape of the bases is often different from that present in median setigers.

60. posterior ventral cirri
    1. tapering
    2. digitiform
    3. short, nearly tubercular
    4. broadly triangular, nearly scoop-shaped
61. anterior notopodial cirri
    1. basally inflated
    2. medially inflated
    3. tapering
    4. digitiform
    5. clavate
62. median notopodial cirri
    1. basally inflated
    2. medially inflated
    3. tapering
    4. digitiform
    5. clavate
63. posterior notopodial cirri
    1. basally inflated
    2. medially inflated
    3. tapering
    4. digitiform
    5. clavate

These character states are listed in the same order for all three regions of the body; both outgroup species have character state 1 throughout the body. In most species, the notopodial cirri differ in shape from one end of the body to the other.

64. notopodial cirri
    1. articulated throughout body
    2. articulated in anterior setigers
    3. without articulations

Both outgroup species have character state 3. Notopodial cirri are rarely articulated in species without articulated ceratostyles; most species with articulated notopodial cirri have articulations limited to the anterior end, usually about the first 20 setigers in a specimen with 100–120 setigers.

Pectinate Setae

65. anterior pectinate setae
    1. furled
    2. flat
66. anterior pectinate setae
    1. distally tapering
    2. distally flaring
67. median and posterior pectinate setae
    1. furled
    2. flat
68. median and posterior pectinate setae
    1. distally tapering
    2. distally flaring

Onuphids often have narrow, furled, tapering pectinate setae with relatively few teeth in anterior setigers and wider, flaring pectinate setae in median and posterior setigers. A similar pattern can be found in some eunicids, but most of them appear to have similar pectinate setae in anterior and posterior setigers. The median and posterior pectinate setae appear to differ in a few cases, but documentation is difficult because these setae are small and are often broken in posterior setigers where the limbate setae, which protect pectinate setae in anterior setigers, are few in number or absent.

Falcigers and Spinigers

Compound falcigers differ a great deal in shape from anterior to posterior end and from superior to inferior positions in a single fascicle. The differences are mainly in the length and shape of the appendages, but the shafts may also change along the length of the body. In addition to the characters scored here, these shape differences should be consulted for additional characterizations of the different species.

69. dentition of appendages of compound falcigers
    1. bidentate
    2. tridentate

Both outgroup species and most species of *Eunice* have bidentate falcigers; species similar to *E. antennata* have tridentate appendages.

70. guards distally
    1. mucronate
    2. without mucro

"Mucronate" is here defined as having a distinct, slender spike attached distally to the guard. The two edges of a guard may meet at a low angle to form a sharply pointed guard, but this has not been coded as mucronate. The shape of the guards was originally coded in a more extensive version of the character list, but inconsistent scoring made it difficult to maintain the identity of the different character states. The issue will be pursued in a study of the variability within the genus *Eunice*.

71. pseudocompound falcigers
    1. present
    2. absent

Among the onuphids the anterior falcigers are often pseudocompound; *Kinbergonuphis simoni* happens to have only compound falcigers. Most eunicids, including *Marphysa sanguinea*, lack pseudocompound falcigers.

72. compound spinigers
    1. present
    2. absent

Among the onuphids, members of the genus *Mooreonuphis* have compound spinigers in some anterior setigers, usually in the lowermost position of the fascicles (Fauchald, 1982). Compound spinigers, when present among the eunicids, replace the compound falcigers and are thus present medially anterior to the aciculae. Both outgroup species happen to lack compound spinigers; the presence of spinigers is still scored as plesiomorphic, because presence of spinigers is widespread in both families.

Aciculae

The number of aciculae in anterior, median, and posterior parapodia may also turn out to be of interest; this character was included in earlier PAUP runs, but was omitted in the data transfer to this version of the character table. These characters are tracked in a current study of variability in the family.

73. aciculae
    1. light yellow or translucent (clear and colorless)
    2. dark honey-colored to black

This character may, rarely, be difficult to score; however, in most circumstances, there are no problems separating between species with brown and light-yellow aciculae. *Kinbergonuphis simoni* has light-yellow aciculae; *Marphysa sanguinea* has brown aciculae.

74. separation of acicular cores and sheaths
    1. distinct
    2. indistinct

75. cross section of aciculae
    1. round
    2. flattened and knife-edged

Character 75 is best observed in posterior parapodia in three-quarter view, where the aciculae penetrate the body wall.

76. aciculae distally
    1. pointed (sharp or blunt)
    2. flattened with rounded tabs
    3. expanded, knurled and knobbed
    4. hammer-headed
    5. bifid (bidentate)

Most species, including both outgroup species, have sharply or bluntly pointed aciculae. The two last character states may not be separable at all times: in the hammer-headed forms, both projecting knobs are similar in size; in the bidentate forms one is very much larger than the other.

Subacicular Hooks

77. subacicular hook color
    1. light yellow or translucent (colorless)
    2. dark honey-colored to black

Kinbergonuphis simoni has light-colored subacicular hooks; *Marphysa sanguinea* has brown subacicular hooks.

78. separation of cores and sheaths
    1. distinct
    2. indistinct

79. distal ends of hooks
    1. simple and spine-like
    2. bidentate
    3. tridentate with teeth in a crest
    4. tridentate with teeth in tandem

Character state 1 is often referred to as being unidentate. Both outgroup species have bidentate subacicular hooks. Character state 4 may appear when the shafts are very much thicker than the head: the medial part of the shaft is continued as the distal tooth and on each side the two upper ends of the wide shafts may be continued as distinct teeth on either side of the "true" head.

80. hooks first present from setiger number

81. hooks
    1. present in all setigers thereafter
    2. missing in a some setigers
    3. missing in many setigers

Relative size of the hooks appears to decrease with increasing size of the specimens and especially in large specimens of species similar to *Eunice aphroditois*, hooks may be missing over long stretches of the body. *Kinbergonuphis simoni* has hooks in all segments; the specimen of *Marphysa sanguinea* used as the other outgroup specimen also has hooks in all segments; other specimens referred to *Marphysa sanguinea* by various authors have character state 3. This problem cannot be resolved without a detailed review of the species, based on

material from the type area and elsewhere.

82. hooks
    1. always single (except for replacements)
    2. sometimes paired
    3. paired in most setigers
    4. in multiples in some setigers
    5. in multiples in most setigers

Character states 1 and 2 may be difficult to separate; I anticipate that this character may be reduced to three states (1 and 2), 3, (4 and 5). Both outgroup species have character state 1.

RESULTS

The analysis included only species for which at least 75% of the characters could be scored. Nearly all of the 167 species included were scored for at least 90% of the characters. The number of unscored characters for each species included is indicated in the description of each species. All characters were run equally weighted.

In all runs, more than 100 equally parsimonious trees were found; exactly how many trees could be produced was not determined. Strict consensus trees were created using both outgroups. Under such circumstances, a reduction of the number of terminal taxa by considering stable pairs of taxa as single taxa will often lead to a reduction in the number of equally parsimonious trees. This device reduces the apparent number of terminal taxa in relation to the number of characters present, making it more probable that a relatively limited number of trees can be identified. In the analysis of *Eunice*, a few stable species pairs were established, but attempts to reduce the number of taxa through running combinations turned out to be futile.

Species of *Eunice* have for the last 120 years been separated into several groups based on the color and dentition of subacicular hooks (Ehlers, 1868; Hartman, 1944; Fauchald, 1970). These groupings were never considered to have any systematic importance: the groupings functioned as sorting devices to allow taxonomists to group the species into manageable subunits.

Species with yellow subacicular hooks are grouped together in the cladograms. Species with black subacicular hooks are organized into a reasonable number of (in most cases 5–6) clades; however, sister taxa for any "black" species varies widely from one case to the next. Thus, although the number of groups in each cladogram was limited, membership of any group was extremely varied. Some "black" groups could be defined by reversals; other groups were characterized by combinations of character states clade.

Theoretically, these features of the cladograms do not singly or severally represent insurmountable problems for interpretation. It is possible that *Eunice* is a single clade with repeated reversal from light-colored to dark subacicular hooks and aciculae. It is also possible that in this particular case, the way in which PAUP handles polytomies made the results difficult to interpret. Another problem probably lies in the character definitions. The selection of characters must be re-examined; other characters must be added and all characters must be examined for possible homologies.

Ontogenetic studies are needed to analyze the distribution of different shapes of subacicular hooks. In the present study, known ontogenetic differences were excluded from consideration, because information was available for so few species. For example, it appears as if shape of the subacicular hooks may be related to size. The type specimens vary a great deal in size, but I was at this time unable to statistically test an association of a particular kind of hook with the size of the specimens in which they were found. This aspect is being pursued in some detail in a study of variability.

The next step is obvious: study the variability of as many characters as possible, including but not limited to those listed in the character table. This study will be done within a single population, preferably from the type locality, of as many species as possible. Ontogenetic changes may reduce the number of states of some characters listed above, but may also add characters not yet considered. I am also attempting to categorize and organize the soft-body shapes into characters so that more of them can be included in cladistic analysis.

Overview of the Species

Included in this overview are all species originally described in *Eunice* and all species now or at one time considered as members of that genus. Species described in genera usually considered synonymous with *Eunice*, but which have never been referred to by that generic name, have been excluded.

accrescens Hoagland, 1920, as *Leodice;* referred to *Palola;* previously also listed in *Eunice.*

aciculata Treadwell, 1922, as *Leodice;* referred to *Eunice.*

adriatica Schmarda, 1861, as *Eunice;* referred to *Palola siciliensis.*

aenea Blanchard, 1849, as *Eunice;* referred to *Marphysa.*

aequabilis Grube, 1878a, as *Eunice.*

afra Peters, 1855, as *Eunice.*

afuerensis Hartman, 1944, as *Eunice.*

americana Hartman, 1944, as *Eunice.*

amoureuxi Rullier, 1974, as *Eunice.*

amphiheliae Marion in Filhol, 1885, as *Eunice.*

anceps Pruvot, 1930, as *Eunice;* referred to *Eunice pruvoti* in text.

annulicornis Johnston, 1865, as *Eunice.*

antarctica Baird, 1869, as *Eunice.*

antennata aedificatrix Monro, 1933, as *Eunice;* referred to *Eunice aedificatrix* in text.

antennata Lamarck, 1818, as *Leodice;* referred to *Eunice.*

antillensis Ehlers, 1887, as *Eunice.*

aphroditois djiboutiensis Gravier, 1900, as *Eunice;* referred to

Eunice djiboutiensis in text.
aphroditois punctata Fishelson and Rullier, 1969, as *Eunice;* referred to *Eunice rullieri* in text.
aphroditois Pallas, 1788, as *Nereis;* referred to *Eunice.*
arenosa Kinberg, 1865, as *Eunice.*
argentinensis Treadwell, 1929, as *Leodice;* referred to *Eunice.*
ariculata Treadwell, 1900, as *Eunice;* error in Hartman, 1959, for *auriculata.*
armillata Treadwell, 1922, as *Leodice;* referred to *Eunice.*
articulata Ehlers, 1887, as *Eunice.*
articulata Hoagland, 1920, as *Leodice;* referred to *Eunice hirschi* in text.
atlantica Kinberg, 1865, as *Eunice.*
attenuata Grube, 1866b, as *Eunice.*
auriculata Treadwell, 1900, as *Eunice;* referred to *Euniphysa* in text.
australis Quatrefages, 1866, as *Eunice.*
badia Grube, 1878, as *Eunice.*
balfouriana McIntosh, 1885, as *Nicidion;* referred to *Eunice.*
barvicensis McIntosh, 1885, as *Eunice.*
bassensis McIntosh, 1885, as *Eunice.*
bellii Audouin and Milne Edwards, 1833, as *Eunice;* referred to *Marphysa.*
benedicti Verrill, 1885, as *Leodice;* referred to *Eunice.*
biannulata Moore, 1904, as *Eunice.*
biannulata mexicana Fauchald, 1970, as *Eunice;* referred to *Eunice mexicana* in text.
bicirrata Rullier, 1964, as *Eunice.*
biformicirrata Treadwell, 1922, as *Leodice;* referred to *Eunice.*
bilobata Treadwell, 1906, as *Eunice.*
binominata Quatrefages, 1866, as *Eunice.*
bipapillata Grube, 1866a, as *Eunice.*
bitorquata Grube, 1870b, as *Eunice;* referred to *Palola siciliensis.*
borneensis Grube, 1878, as *Eunice (Eriphyle);* referred to *Eunice.*
bottae Quatrefages, 1866, as *Eunice.*
bowerbanki Baird, 1869, as *Eunice.*
brasiliensis Kinberg, 1865, as *Eunice.*
brevis Ehlers, 1887, as *Nicidion;* referred to *Eunice.*
bucciensis Treadwell, 1921, as *Leodice;* referred to *Eunice.*
burmeisteri Grube, 1878, as *Eunice.*
caeca Shisko, 1981, as *Eunice.*
capensis Schmarda, 1861, as *Eunice;* referred to *Marphysa.*
capensis Kinberg, 1865, as *Eriphyle;* referred to *Eunice kinbergi.*
cariboea Grube, 1856, as *Eunice.*
cedroensis Fauchald, 1970, as *Eunice.*
challengeri McIntosh, 1885, as *Eunice.*
cincta Kinberg, 1865, as *Nicidion;* referred to *Eunice.*
cingulata Claparède, 1868, as *Eunice.*
cirribranchis Grube, 1870b, as *Eunice.*
cirrobranchiata McIntosh, 1885, as *Eunice.*
claparedii Quatrefages, 1866, as *Eunice.*
coccinea Grube, 1878b, as *Eunice.*
coccinioides Augener, 1922b, as *Eunice.*
collaris Grube, 1869, as *Eunice.*
collini Augener, 1906, as *Eunice.*
complanata Grube, 1877, as *Eunice.*
concinna Verrill, 1900, as *Leodice;* referred to *Eunice.*
congesta Marenzeller, 1879, as *Eunice.*
conglomerans Ehlers, 1887, as *Eunice.*
contingens Chamberlin, 1919a, as *Leodice;* referred to *Eunice.*
crassitentaculata Treadwell, 1922, as *Leodice;* referred to *Eunice.*
culebra Treadwell, 1901, as *Eunice.*
curticirrus Knox, 1960, as *Eunice.*
denticulata Webster, 1884, as *Eunice.*
depressa Schmarda, 1861, as *Eunice;* referred to *Marphysa.*
dilatata Grube, 1877, as *Eunice.*
dubia Woodworth, 1907, as *Eunice.*
ebranchiata Quatrefages, 1866, as *Eunice;* referred to *Palola siciliensis.*
edwardsi McIntosh, 1885, as *Eunice.*
ehlersi Gravier, 1900, as *Eunice.*
elegans Verrill, 1900, as *Leodice;* referred to *Eunice.*
elseyi Baird, 1869, as *Eunice.*
enteles Chamberlin, 1918, as *Leodice;* referred to *Eunice.*
equibranchiata McIntosh, 1885, as *Eunice.*
erithrocephala Risso, 1826, as *Leodice;* referred to *Eunice.*
fasciata Risso, 1826, as *Leodice;* referred to *Eunice.*
fasciculata Lamarck, 1816, as *Tibiana;* referred to *Eunice.*
fauveli Gravier, 1900, as *Eunice.*
fijiensis Baird, 1869, as *Eunice.*
filamentosa Grube, 1856, as *Eunice.*
fimbriata Grube, 1870b, as *Eunice.*
flaccida Grube, 1869, as *Eunice.*
flavapunctata Treadwell, 1922, as *Leodice;* referred to *Eunice.*
flavocuprea Grube, 1869, as *Eunice.*
flavofasciata Grube, 1878b, as *Eunice.*
flavopicta Izuka, 1912, as *Eunice.*
floridana Pourtalès, 1867, as *Marphysa;* referred to *Eunice.*
franklini Monro, 1924, as *Eunice.*
frauenfeldi Grube, 1866c, as *Eunice.*
fucata Ehlers, 1887, as *Eunice.*
fuscafasciata Treadwell, 1922, as *Nicidion;* referred to *Eunice.*
fusicirris Grube, 1878a, as *Eunice.*
gagzoi Augener, 1922b, as *Eunice.*
gaimardi Quatrefages, 1866, as *Eunice.*
gallica Lamarck, 1818, as *Leodice;* referred to *Eunice.*
gigantea Lamarck, 1818, as *Leodice;* referred to *Eunice.*
goodsiri McIntosh, 1885, as *Marphysa;* referred to *Eunice.*
gracilicirrata Treadwell, 1922, as *Leodice;* referred to *Eunice.*
gracilis Grube, 1866a, as *Eunice.*
gracilis Moore, 1903, as *Eunice;* referred to *Eunice japonica* in text.
gracilis Crossland, 1904, as *Nicidion;* referred to *Eunice wasinensis* in text.

gravieri Fauvel, 1911, as *Eunice*.
gregaricus Mayer, 1900, as *Staurocephalus;* referred to *Eunice;* previously also referred to *Mayeria*.
grubei Gravier, 1900, as *Eunice*.
guanica Treadwell, 1921, as *Leodice;* referred to *Eunice*.
guildingi Baird, 1869, as *Eunice*.
gunneri Storm, 1881, as *Leodice;* referred to *Eunice norvegica*.
guttata Baird, 1869, as *Eunice*.
hamata Schmarda, 1861, as *Eunice;* referred to *Marphysa*.
harassii Audouin and Milne Edwards, 1833, as *Eunice*.
havaica Kinberg, 1865, as *Eunice*.
hawaiensis Treadwell, 1906, as *Eunice*.
heterochaeta Quatrefages, 1866, as *Eunice*.
hispanica Lamarck, 1818, as *Leodice;* referred to *Eunice*.
imogena Monro, 1924, as *Nicidion;* referred to *Eunice*.
impexa Grube, 1878b, as *Eunice*.
incerta Hansen, 1882, as *Nicidion;* referred to *Eunice cariboea* in text.
indica Kinberg, 1865, as *Eunice*.
interrupta Treadwell, 1906, as *Eunice*.
investigatoris Fauvel, 1932, as *Eunice*.
jagori Grube, 1878a, as *Eunice*.
januarii Grube, 1881, as *Eunice;* referred to *Marphysa*.
jeffreysii McIntosh, 1903, as *Eunice;* referred to *Euniphysa* in text.
johnsoni Hartman, 1954, as *Eunice*.
kinbergi Ehlers, 1868, as *Eunice*.
kinbergi Webster, 1884, as *Nicidion;* referred to *Eunice goodei* in text.
kobiensis McIntosh, 1885, as *Eunice*.
langi Treadwell, 1943, as *Leodice;* referred to *Eunice*.
laticeps Ehlers, 1868, as *Eunice*.
laurillardi Quatrefages, 1866, as *Eunice*.
leptocirris Grube, 1870b, as *Eunice*.
leucodon Ehlers, 1901, as *Eunice;* referred to *Palola siciliensis*.
leuconuchalis Benham, 1900, as *Eunice;* referred to *Eunice australis*.
leucosticta Grube, 1878a, as *Eunice*.
levibranchia Hoagland, 1920, as *Leodice;* referred to *Eunice*.
limosa Ehlers, 1868, as *Eunice*.
lita Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
longicirrata Kinberg, 1865, as *Nicidion;* referred to *Eunice*.
longicirrata Webster, 1884, as *Eunice;* referred to *Eunice websteri*.
longicirris Grube, 1869, as *Eunice*.
longicornis Grube, 1866b, as *Eunice*.
longiqua Kinberg, 1865, as *Eunice*.
longisetis Webster, 1884, as *Eunice*.
lucei Grube, 1856, as *Eunice*.
macrobranchia Schmarda, 1861, as *Eunice*.
macrochaeta Schmarda, 1861, as *Eunice*.
madeirensis Baird, 1869, as *Eunice;* referred to *Palola*.
madrepora pertusae Gunnerus, 1768, as *Nereis;* referred to *Eunice norvegica*.
magellanica McIntosh, 1885, as *Eunice*.
magnifica Grube, 1866a, as *Eunice*.
makemoana Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
manihine Longbottom, 1972, as *Eunice*.
manorae Aziz, 1938, as *Eunice*.
marenzelleri Gravier, 1900, as *Eunice*.
margaritacea Williams, 1853, as *Eunice*.
margaritacea Verrill, 1900, as *Leodice;* referred to *Eunice*.
margariticacea Fischli, 1900, as *Eunice*.
marovoi Gibbs, 1971, as *Eunice*.
martensi Grube, 1878a, as *Eunice*.
maxima Quatrefages, 1866, as *Eunice*.
medicina Moore, 1903, as *Eunice*.
megabranchia Fauchald, 1970, as *Eunice*.
megalodus Grube, 1878b, as *Eunice*.
microprion Marenzeller, 1879, as *Eunice*.
mindanavensis McIntosh, 1885, as *Eunice*.
minuta Grube, 1850, as *Eunice*.
modesta Grube, 1866a, as *Eunice*.
monilifer Chamberlin, 1919b, as *Leodice;* referred to *Eunice*.
mossambica Peters, 1855, as *Eunice;* referred to *Nauphanta;* previously also referred to *Marphysa*.
mucronata Moore, 1903, as *Eunice*.
multicylindri Shisko, 1981, as *Eunice*.
multipectinata Moore, 1911, as *Eunice*.
murrayi McIntosh, 1885, as *Eunice*.
mutabilis Gravier, 1900, as *Eunice*.
mutilata Webster, 1884, as *Eunice*.
mutilata samoae Hartmann-Schröder, 1965a, as *Eunice;* referred to *Eunice samoae* in text.
mutilatoides Augener, 1922b, as *Eunice*.
narconi Baird, 1869, as *Eunice*.
nesiotes Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
nicidioformis Treadwell, 1906, as *Eunice*.
nigricans Schmarda, 1861, as *Eunice*.
northioidea Moore, 1903, as *Eunice*.
norvegica Linnaeus, 1767, as *Nereis;* referred to *Eunice*.
notata Treadwell, 1921, as *Leodice;* referred to *Eunice*.
oerstedii Stimpson, 1854, as *Eunice*.
oliga Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
oliga papeetensis Chamberlin, 1919a, as *Leodice;* referred to *Eunice papeetensis* in text.
ornata Andrews, 1891, as *Eunice*.
ovalifera Fauvel, 1936, as *Eunice*.
pacifica Kinberg, 1865, as *Eunice*.
palauensis Okuda, 1937, as *Eunice*.
paloloides Moore, 1909, as *Eunice (Eriphyle);* referred to *Palola*.
panamena Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
parasegregata Hartmann-Schröder, 1965b, as *Eunice*.
parca Grube, 1878a, as *Eunice*.
parva Hansen, 1882, as *Eunice*.
parvibranchis Grube, 1870b, as *Eunice*.
paucibranchis Grube, 1866a, as *Eunice*.

paupera Grube, 1878b, as *Eunice*.
pauroneurata Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
pectinata Grube, 1869, as *Eunice*.
pelamidis Quatrefages, 1866, as *Eunice*.
pellucida Kinberg, 1865, as *Eunice*.
pennata Müller, 1776, as *Nereis;* referred to *Eunice*.
pentadactylum Schmarda, 1861, as *Sphaerodorum;* referred to *Eunice schemacephala*.
perimensis Gravier, 1900, as *Eunice*.
perrieri Gravier, 1900, as *Eunice*.
philocorallia Buchanan, 1893, as *Eunice*.
pinnata Müller, 1779, as *Nereis;* referred to *Eunice*.
plicata Baird, 1869, as *Eunice*.
polybranchia Verrill, 1880, as *Leodice;* referred to *Eunice*.
prayensis Kinberg, 1865, as *Eunice*.
procera Grube, 1866b, as *Eunice*.
prognatha McIntosh, 1885, as *Eunice*.
pulvinopalpata Fauchald, 1982b, as *Eunice*.
punctata Risso, 1826, as *Leodice;* referred to *Eunice*.
punctata Peters, 1855, as *Eunice;* referred to *Eunice petersi*.
punctata Grube, 1856, as *Eunice;* referred to *Eunice binominata*.
purpurea Grube, 1866b, as *Eunice*.
pycnobranchiata McIntosh, 1885, as *Eunice*.
quadrioculata Grube, 1856, as *Eunice;* referred to *Marphysa*.
quinquefida Moore, 1903, as *Eunice*.
quoya Quatrefages, 1866, as *Eunice*.
ramosa Lamarck, 1816, as *Tibiana;* referred to *Eunice*.
reducta Fauchald, 1970, as *Eunice*.
rissoi Quatrefages, 1866, as *Eunice*.
rosaurae Monro, 1939, as *Eunice*.
roussaei Quatrefages, 1966, as *Eunice*.
rubella Knox, 1951, as *Eunice*.
rubra Grube, 1856, as *Eunice*.
rubrivittata Treadwell, 1921, as *Leodice;* referred to *Eunice*.
rubrocincta Ehlers, 1868, as *Eunice*.
savignyi Grube, 1878b, as *Eunice*.
schemacephala Schmarda, 1861, as *Eunice*.
schizobranchia Claparède, 1870, as *Eunice*.
scombrinis Quatrefages, 1866, as *Eunice*.
sebastiani Nonato, 1965, as *Eunice*.
segregata Chamberlin, 1919a, as *Leodice;* referred to *Eunice*.
semisegregata Fauchald, 1969, as *Eunice*.
siciliensis Grube, 1840, as *Eunice;* referred to *Palola*.
simplex Peters, 1855, as *Eunice Palola*.
sonorae Fauchald, 1970, as *Eunice*.
splendida Grube, 1856, as *Eunice*.
spongicola Treadwell, 1921, as *Leodice;* referred to *Eunice*.
stigmatura Verrill, 1900, as *Leodice;* referred to *Eunice*.
stragulum Grube, 1878b, as *Eunice;* referred to *Marphysa*.
subdepressa Grube, 1866b, as *Eunice*.
suviensis Treadwell, 1922, as *Leodice;* referred to *Eunice*.
taenia Claparède, 1864, as *Eunice;* referred to *Palola siciliensis*.
tahitana Kinberg, 1865, as *Eunice*.
tentaculata Kinberg, 1865, as *Eunice*.
tentaculata Quatrefages, 1866, as *Eunice;* referred to *Eunice laticeps*.
tenuicirrata Verrill, 1900, as *Leodice;* referred to *Eunice*.
tenuis Treadwell, 1921, as *Leodice;* referred to *Eunice*.
teretiuscula Schmarda, 1861, as *Eunice;* referred to *Marphysa*.
thomasiana Augener, 1922b, as *Eunice*.
tibiana Pourtalès, 1867, as *Marphysa;* referred to *Eunice*.
torquata Quatrefages, 1866, as *Eunice*.
torresiensis McIntosh, 1885, as *Eunice*.
triantennata Risso, 1826, as *Leodice;* referred to *Eunice*.
tribranchiata McIntosh, 1885, as *Eunice*.
tridentata Ehlers, 1905, as *Eunice*.
tristriata Grube, 1870b, as *Eunice*.
tubicola Treadwell, 1922, as *Leodice;* referred to *Eunice*.
tubifex Crossland, 1904, as *Eunice*.
unidentata Rioja, 1962, as *Eunice*.
unifrons Verrill, 1900, as *Leodice;* referred to *Eunice*.
valenciennesii Grube, 1878a, as *Eunice;* referred to *Eunice tentaculata* Kinberg.
valens Chamberlin, 1919c, as *Leodice;* referred to *Eunice*.
valida Gravier, 1900, as *Eunice;* referred to *Palola siciliensis*.
validissima Grube, 1866a, as *Eunice*.
validobranchiata Monro, 1937, as *Eunice*.
violacea Grube, 1856, as *Eunice*.
violaceomaculata Ehlers, 1887, as *Eunice*.
vittata Chiaje, 1828, as *Nereis;* referred to *Eunice*.
vittatopsis Fauchald, 1970, as *Eunice*.
vivida Stimpson, 1854, as *Eunice*.
websteri Fauchald, 1969, as *Eunice*.
woodwardi Baird, 1869, as *Eunice*.
zonata Chiaje, 1841, as *Eunice*.

Eunice Cuvier, 1817

TYPE SPECIES.—*Leodice gigantea* Lamarck, 1818:322 (junior synonym of *Nereis aphroditois* Pallas, 1788:229–230, pl. 5: figs. 1–7), by subsequent designation (Verrill, 1900:638, see discussion above).

SYNONYMS.—*Eriphyle* Kinberg, 1865; described for *E. capensis* Kinberg, 1865:561 (= *Eunice kinbergi* Ehlers, 1868, see below). Kinberg also listed *Leodice gigantea* Savigny and *Nereis aphroditois* Pallas as members of his genus.

Leodice Lamarck (1818), erected for *Leodice gigantea* (see discussion in introductory section of paper).

Mayeria Verrill, 1900, erected for *Staurocephalus gregaricus* Mayer, 1900; no specimens available, usually considered; type species usually considered a junior synonym of *Eunice schemacephala* (see below).

Nicidion Kinberg, 1865; erected for three species, *N. longicirrata, N. cincta,* and *N. gallapagensis* (all discussed below).

Tibiana Lamarck, 1816; erected for two species, *T. fasciculata* and *T. ramosa*, both tubes of an unidentifiable species of *Eunice*.

Kinberg (1865) attempted to subdivide the genus using the structure of the prostomium, the number of pairs of maxillae, the presence or absence of branchiae and their structure, and the presence or absence of peristomial cirri. The presence of peristomial cirri is used to separate the genus *Marphysa* (and similar genera, see above) from *Eunice;* the other features have not been accepted in the literature as valid characters at the generic level. Two of Kinberg's new genera (*Nicidion* and *Eriphyle*) are here considered junior synonyms of *Eunice;* the two other, *Nausicaa* and *Nauphanta* are more closely related to *Marphysa* and will be discussed in an upcoming review of that genus.

The genus *Nicidion* was erected by Kinberg (1865:564) for abranchiate *Eunice;* the absence of branchiae does not appear to be well correlated with other variable features. The genus *Eriphyle* was erected by Kinberg (1865:561) for species with quadrilobate prostomia and nine, rather than seven maxillae; these features are not well correlated with each other or with other features.

Key to the Species of *Eunice*

The key was produced using the auxiliary program, KEY, in the DELTA program. Of the 82 characters in the character table, 65 were used in preparing the key; of these 48 were directly included in the key. The key includes 179 species; because of uncertainty in coding some states, some species will key out more than once. A total of 191 taxa can be recognized through the key, including the duplications due to uncertainties.

None of the numerical measurements or counts were included among the key characters. For this reason alone, it is crucially important that use of the key be followed up by a careful study of description and illustrations of the named taxon and the comparative tables be consulted.

For the purpose of preparing the key only, certain characters, such as the presence or absence of branchiae and the color of the aciculae and the subacicular hooks were weighted. The sole reason for this weighting was to sort the characters so that those that could be relatively easily observed without dissection were used to break down the key into several subsections. The advantage for the user is that once he or she is in a particular section of the key, chances are that the specimen under study will belong to one of the taxa in that section of the key. Note that the sections of the key do not correspond to the groups used as a basis for the comparison tables. These groups are based, at least in part, on the distribution of branchiae, a feature that was not included in the key. The advantage for the user is that a set of readily characterized features were not used in preparing the key, giving some measure of independent confirmation of an identification obtained through the key.

1(0). Subacicular hooks light yellow or translucent 2
Subacicular hooks dark honey-colored to black 61

2(1). Subacicular hooks bidentate [Figure 7j] 3
Subacicular hooks tridentate with teeth in a crest [Figure 4d] 26
Subacicular hooks tridentate with teeth in tandem [Figures 41o, 46c] . . . 60

3(2). Pseudocompound falcigers present [Figure 7h,k] . . . . . ***afuerensis***
Pseudocompound falcigers absent 4

4(3). Branchiae present on more than 65% of total number of setigers 5
Branchiae present on less than 55% of total number of setigers 9

5(4). Branchiae present to near posterior end 6
Branchiae terminating well before posterior end 8

6(5). Peristomial cirri reach middle or anterior end of peristomium [Figure 100l]; branchiae distinctly longer than notopodial cirri 7
Peristomial cirri reach middle or front of prostomium [Figure 106d]; branchiae about as long as notopodial cirri . . . . . ***stigmatura***
Peristomial cirri reach beyond prostomium [Figure 64a]; branchiae distinctly shorter than notopodial cirri . . . . . ***leptocirris***

7(6). Ceratostyles articulated [Figure 15a]; aciculae light yellow or translucent;

length of antennae increasing from A-I to A-III; antennae in a transverse row . . . . . ***armillata***

Ceratostyles without articulations [Figure 100l]; aciculae dark honey-colored to black; all antennae similar in length (short); antennae arranged in a horseshoe . . . . . ***schizobranchia***

8(5). Eyes present; ceratostyles club-shaped [Figure 59f]; peristomial cirri digitiform; antennae similar in thickness . . . . . ***johnsoni***

Eyes absent; ceratostyles tapering [Figure 55g]; peristomial cirri tapering; A-I slimmer than other three antennae . . . . . ***heterochaeta***

9(4). Peristomial cirri reach middle or anterior end of peristomium [Figure 55a] 10

Peristomial cirri reach middle or front of prostomium [Figure 10a] 17

Peristomial cirri reach beyond prostomium [Figure 12b] 23

10(9). Subacicular hooks always single (except for replacements); neuroaciculae emerging at parapodial midline 11

Subacicular hooks paired in some setigers; neuroaciculae emerging dorsal to parapodial midline 15

11(10). Ceratostyles articulated; hoods of compound falcigers distally without mucros; prostomium less than 1/2 as deep as peristomium 12

Ceratostyles without articulations; hoods of compound falcigers distally mucronate; prostomium at least as deep as 1/2 of peristomium . . . . . ***hawaiensis***

12(11). Ceratostyle articulations long or short cylinders [Figure 61a]; anterior presetal lobes form low transverse folds 13

Ceratostyle articulations moniliform or drop-shaped distally [Figure 86a]; anterior presetal lobes follow outline of acicular lobes closely . . . . . ***pectinata***

13(12). Peristomial cirri articulated; peristomial cirri tapering; notopodial cirri articulated in anterior setigers; median acicular lobes triangular or conical [Figure 86] 14

Peristomial cirri without articulations; peristomial cirri digitiform; notopodial cirri without articulations; median acicular lobes distally rounded . . . . . ***semisegregata***

14(13). Ceratostyles tapering; anterior postsetal lobes form low transverse folds; narrow tips of ventral cirri tapering; anterior notopodial cirri medially inflated [Figure 61] . . . . . ***kobiensis***

Ceratostyles digitiform; anterior postsetal lobes project as free lobes; narrow tips of ventral cirri digitiform; anterior notopodial cirri tapering [Figure 103] . . . . . ***segregata***

15(10). Ceratostyle articulations long or short cylinders; inflated bases of ventral cirri thick, transverse welts . . . . . ***valens***

Ceratostyle articulations moniliform or drop-shaped distally; inflated bases of ventral cirri ovate or spherical 16

16(15). Antennae evenly spaced and similar in thickness [Figure 21b]; peristomial cirri basally inflated; narrow tips of ventral cirri digitiform . . . . . ***biannulata***

Antennae with A-III isolated by a gap; A-I thicker than other three [Figure 87g]; peristomial cirri digitiform; narrow tips of ventral cirri tapering . . . . . ***pennata***

17(9). Ceratostyles articulated; inflated bases of ventral cirri ovate or spherical [Figure 10b] 18

Ceratostyles without articulations; inflated bases of ventral cirri thick, transverse welts [Figure 69e] 22

18(17). Ceratostyle articulations long or short cylinders 19

Ceratostyle articulations moniliform or drop-shaped distally 20

19(18). Anterior notopodial cirri basally inflated . . . . . ***edwardsi***
Anterior notopodial cirri medially inflated . . . . . ***antarctica***
Anterior notopodial cirri tapering . . . . . ***gracilicirrata***
Anterior notopodial cirri digitiform . . . . . ***caeca***

20(18). Subacicular hooks always single (except for replacements) 21
Subacicular hooks paired in some setigers . . . . . ***japonica,*** new name
Subacicular hooks paired in most setigers . . . . . ***websteri***
Three or more subacicular hooks in most setigers . . . . . ***mexicana***

21(20). Ceratostyles tapering; peristomial cirri digitiform; narrow tips of ventral cirri digitiform; anterior notopodial cirri basally inflated . . . . . ***parasegregata***
Ceratostyles digitiform; peristomial cirri tapering; narrow tips of ventral cirri tapering; anterior notopodial cirri medially inflated . . . . . ***tridentata***

22(17). Branchiae pectinate; hoods of compound falcigers distally mucronate; subacicular hooks paired in some setigers; eyes present . . . . . ***benedicti***
Branchiae palmate; hoods of compound falcigers distally without mucros; three or more subacicular hooks in most setigers; eyes absent . . . . . ***manihine***

23(9). Ceratostyles articulated; peristomial cirri articulated; peristomial cirri digitiform; anterior notopodial cirri digitiform [Figure 12] 24
Ceratostyles without articulations; peristomial cirri without articulations; peristomial cirri tapering; anterior notopodial cirri tapering [Figure 71f-m] 25

24(23). Ceratostyle articulations long or short cylinders; neuroaciculae distally flattened with rounded tabs; subacicular hooks paired in some setigers; antennae similar in thickness . . . . . ***antillensis***
Ceratostyle articulations moniliform or drop-shaped distally; neuroaciculae distally pointed (sharp or blunt); subacicular hooks always single (except for replacements); antennae with A-III thicker than other four . . . ***articulata***

25(23). Hoods of compound falcigers distally mucronate; neuroaciculae emerging dorsal to parapodial midline; narrow tips of ventral cirri tapering; notopodial cirri articulated in anterior setigers . . . . . ***megabranchia***
Hoods of compound falcigers distally without mucros; neuroaciculae emerging at parapodial midline; narrow tips of ventral cirri digitiform; notopodial cirri without articulations . . . . . ***validobranchiata***

26(2). Branchiae present on more than 65% of total number of setigers 27
Branchiae present on less than 55% of total number of setigers 40

27(26). Ceratostyle articulations long or short cylinders [Figure 5a] 28
Ceratostyle articulations moniliform or drop-shaped distally [Figure 67d] . . . . . ***lucei***
All ceratostyle articulations moniliform [Figure 58a] 30

28(27). Peristomial cirri reach middle or anterior end of peristomium; eyes absent; peristomial cirri tapering; ceratostyles tapering . . . . . ***aequabilis***
Peristomial cirri reach middle or front of prostomium; eyes present; peristomial cirri digitiform; ceratostyles digitiform 29

29(28). Appendages of compound falcigers distally bidentate; branchiae about as long as notopodial cirri; neuroaciculae emerging dorsal to parapodial midline; anterior notopodial cirri tapering . . . . . ***stigmatura***
Appendages of compound falcigers distally tridentate; branchiae distinctly longer than notopodial cirri; neuroaciculae emerging at parapodial midline; anterior notopodial cirri basally inflated . . . . . ***martensi***

30(27). Branchiae pectinate 31
Branchiae palmate . . . . . ***interrupta***

31(30). Subacicular hooks always single (except for replacements); prostomium distinctly shorter than peristomium 32
Subacicular hooks paired in some setigers; prostomium about as long as

peristomium . . . . . ***rubra***

32(31). Peristomial cirri reach middle or anterior end of peristomium [Figure 81i] 33

Peristomial cirri reach middle or front of prostomium [Figure 56a] 39

33(32). Neuroaciculae distally pointed (sharp or blunt) 34

Neuroaciculae distally hammer-headed . . . . . ***panamena***

Neuroaciculae distally bifid (bidentate) . . . . . ***ornata***

34(33). Notopodial cirri articulated throughout body 35

Notopodial cirri articulated in anterior setigers 37

35(34). Appendages of compound falcigers distally bidentate; ceratostyles tapering; neuroaciculae emerging at parapodial midline; prostomial median sulcus deep 36

Appendages of compound falcigers distally tridentate; ceratostyles digitiform; neuroaciculae emerging dorsal to parapodial midline; prostomial median sulcus shallow . . . . . ***bottae***

36(35). Eyes behind bases of A-I; ceratophores ring-shaped in all antennae; anterior ventral cirri tapering from narrow bases; anterior notopodial cirri basally inflated . . . . . ***antennata***

Eyes between bases of A-I and A-II; ceratophores long in all antennae; anterior ventral cirri digitiform; anterior notopodial cirri digitiform . . . . . ***torresiensis***

37(34). Antennae similar in thickness; ceratostyles tapering; peristomial cirri tapering; prostomium less than 1/2 as peristomium 38

Antennae with A-I thicker than other three; ceratostyles digitiform; peristomial cirri digitiform; prostomium at least as deep as 1/2 of peristomium . . . . . ***gracilis***

38(37). Eyes behind bases of A-I; branchiae about as long as notopodial cirri; median acicular lobes distally truncate; anterior postsetal lobes form low transverse folds . . . . . ***havaica***

Eyes between bases of A-I and A-II; branchiae distinctly longer than notopodial cirri; median acicular lobes distally rounded; anterior postsetal lobes project as free lobes . . . . . ***ornata***

39(32). Notopodial cirri articulated throughout body . . . . . ***hirschi,*** new name

Notopodial cirri articulated in anterior setigers . . . . . ***ornata***

Notopodial cirri without articulations . . . . . ***aedificatrix***

40(26). Branchiae present to near posterior end . . . . . ***murrayi***

Branchiae terminating well before posterior end 41

41(40). Hoods of compound falcigers distally mucronate [Figure 30c] 42

Hoods of compound falcigers distally without mucros [Figure 17b] 53

42(41). Ceratostyles articulated 43

Ceratostyles without articulations 50

43(42). Peristomial cirri reach middle or anterior end of peristomium [Figure 117a] 44

Peristomial cirri reach middle or front of prostomium [Figure 8a] 45

Peristomial cirri reach beyond prostomium . . . . . ***rubrivittata***

44(43). Subacicular hooks always single (except for replacements); narrow tips of ventral cirri digitiform . . . . . ***rubrivittata***

Subacicular hooks paired in some setigers; narrow tips of ventral cirri short and button-shaped . . . . . ***flavocuprea***

Three or more subacicular hooks in most setigers; narrow tips of ventral cirri tapering . . . . . ***woodwardi***

45(43). Ceratostyles tapering [Figure 8a] 46

Ceratostyles digitiform [Figure 71d] 48

46(45). A-II and III similar in length; A-I shorter; peristomial cirri without

articulations; prostomial lobes frontally truncate; prostomial lobes dorsally inflated 47

Length of antennae increasing from A-I to A-III; peristomial cirri articulated; prostomial lobes frontally rounded; prostomial lobes dorsally flattened . . . . . ***atlantica*** and ***indica***

47(46). Antennae in a horseshoe; peristomial cirri tapering; neuroaciculae emerging dorsal to parapodial midline; narrow tips of ventral cirri tapering . . . . . ***cedroensis***

Antennae in a transverse row; peristomial cirri medially inflated; neuroaciculae emerging at parapodial midline; narrow tips of ventral cirri digitiform . . . . . ***americana***

48(45). Neuroaciculae emerging at parapodial midline; posterior ventral cirri without basal inflation; anterior notopodial cirri tapering; prostomium about as long as peristomium 49

Aciculae emerging dorsal to midline; posterior ventral cirri basally inflated; anterior notopodial cirri digitiform; prostomium distinctly shorter than peristomium . . . . . ***medicina***

49(48). A-II and III similar in length with A-I shorter; branchiae distinctly shorter than notopodial cirri; anterior presetal lobes follow outline of acicular lobes closely; narrow tips of ventral cirri digitiform . . . . . ***rubrivittata***

Length of antennae increasing from A-I to A-III; branchiae distinctly longer than notopodial cirri; anterior presetal lobes form low transverse folds; narrow tips of ventral cirri tapering . . . . . ***arenosa***

50(42). Subacicular hooks always single (except for replacements); posterior ventral cirri without basal inflation; prostomial median sulcus shallow 51

Three or more subacicular hooks in most setigers; posterior ventral cirri basally inflated; prostomial median sulcus invisible dorsally . . . . . ***marovoi***

51(50). Eyes present; branchiae distinctly longer than notopodial cirri; neuroaciculae emerging dorsal to parapodial midline; anterior notopodial cirri tapering 52

Eyes absent; branchiae about as long as notopodial cirri; neuroaciculae emerging at parapodial midline; anterior notopodial cirri basally inflated . . . . . ***eugeniae,*** new species

52(51). Ceratostyles tapering; anterior postsetal lobes form low transverse folds; narrow tips of ventral cirri tapering; eyes behind bases of A-I . . . . . ***mucronata***

Ceratostyles digitiform; anterior postsetal lobes follow outline of acicular lobes closely; narrow tips of ventral cirri short and button-shaped; eyes between bases of A-I and A-II . . . . . ***congesta***

53(41). Ceratostyle articulations long or short cylinders [Figure 75f] 54

Ceratostyle articulations moniliform or drop-shaped distally [Figure 115j] 57

All ceratostyle articulations moniliform [Figure 83f] 59

54(53). Subacicular hooks always single (except for replacements) 55

Subacicular hooks paired in most setigers . . . . . ***aucklandica***

Three or more subacicular hooks in most setigers 56

55(54). Peristomial cirri articulated; antennae with A-III isolated by a gap; peristomial cirri tapering; narrow tips of ventral cirri tapering . . . . . ***multicylindri***

Peristomial cirri without articulations; antennae with A-I isolated by a gap; peristomial cirri digitiform; narrow tips of ventral cirri digitiform . . . . . ***unifrons***

56(54). Pectinate setae tapering in both anterior and posterior setigers; prostomial median sulcus invisible dorsally . . . . . ***vittata***

Pectinate setae flaring in both anterior and posterior setigers; prostomial median

sulcus shallow . . . . . ***tentaculata***

57(53). Peristomial cirri reach middle or anterior end of peristomium; peristomial cirri digitiform; narrow tips of ventral cirri tapering; prostomium at least as deep as 1/2 of peristomium 58

Peristomial cirri reach beyond prostomium; peristomial cirri tapering; narrow tips of ventral cirri digitiform; prostomium less than 1/2 as deep as peristomium . . . . . ***vittatopsis***

58(57). A-II and III similar in length with A-I shorter; peristomial cirri without articulations; ceratostyles digitiform; branchiae about as long as notopodial cirri . . . . . ***kerguelensis***

Length of antennae increasing from A-I to A-III; peristomial cirri articulated; ceratostyles tapering; branchiae distinctly longer than notopodial cirri . . . . . ***australis***

59(53). Neuroaciculae distally pointed (sharp or blunt); anterior notopodial cirri tapering . . . . . ***parva***

Neuroaciculae distally expanded, knurled and knobbed; anterior notopodial cirri basally inflated . . . . . ***papeetensis***

Neuroaciculae distally hammer-headed; anterior notopodial cirri medially inflated . . . . . ***pellucida***

60(2). Neuroaciculae distally pointed (sharp or blunt); appendages of compound falcigers distally bidentate; ceratophores ring-shaped in all antennae; peristomial cirri digitiform . . . . . ***flaccida***

Neuroaciculae distally bifid (bidentate); appendages of compound falcigers distally tridentate; ceratophores long in A-I and ring-shaped in other three; peristomial cirri tapering . . . . . ***elseyi***

61(1). Compound spinigers present [Figure 57c] 62

Compound spinigers absent 64

62(61). Branchiae present to near posterior end; neuroaciculae dark honey-colored to black; branchiae distinctly longer than notopodial cirri; neuroaciculae emerging dorsal to parapodial midline 63

Branchiae terminating well before posterior end; neuroaciculae light yellow or translucent; branchiae about as long as notopodial cirri; neuroaciculae emerging at parapodial midline . . . . . ***tubicola***

63(62). Ceratostyles articulated; branchiae palmate; neuroaciculae distally pointed (sharp or blunt); three or more subacicular hooks in most setigers . . . . . ***impexa***

Ceratostyles without articulations; branchiae pectinate; neuroaciculae distally flattened with rounded tabs; subacicular hooks always single (except for replacements) . . . . . ***tubifex***

64(61). Pseudocompound falcigers present . . . . . ***pelamidis***

Pseudocompound falcigers absent 65

65(64). Branchiae present 66

Branchiae absent 145

66(65). Subacicular hooks tapering to simple falcate tips [Figure 49a] 67

Subacicular hooks bidentate 70

Subacicular hooks tridentate with teeth in tandem Figure 96p] 144

67(66). Branchiae present to near posterior end 68

Branchiae terminating well before posterior end 69

68(67). Branchiae pectinate; three or more subacicular hooks in most setigers; length of all antennae similar (short); antennae similar in thickness . . . . ***sebastiani***

Branchiae single filaments; subacicular hooks always single (except for replacements); A-II and III similar in length with A-I shorter; A-I thicker than other three antennae . . . . . ***marenzelleri***

69(67). Ceratostyles articulated; peristomial cirri reach middle or anterior end of

peristomium; length of antennae increasing from A-I to A-III; neuroaciculae emerging at parapodial midline . . . . . ***sonorae***

Ceratostyles without articulations; peristomial cirri reach middle or front of prostomium; length of A-II and III similar and A-I shorter; neuroaciculae emerging dorsal to parapodial midline . . . . . ***fucata***

70(66). Branchiae present on more than 65% of total number of setigers 71

Branchiae present on less than 55% of total number of setigers 129

71(70). Branchiae present to near posterior end 72

Branchiae terminating well before posterior end 127

72(71). Branchiae pectinate [Figure 44b] 73

Branchiae palmate [Figure 92e] 114

Branchiae single filaments . . . . . ***pruvoti,*** new name

73(72). Ceratostyles articulated 74

Ceratostyles without articulations 107

74(73). Ceratostyle articulations long or short cylinders [Figure 44a] 75

Ceratostyle articulations moniliform or drop-shaped distally [Figure 63a] 98

All ceratostyle articulations moniliform [Figure 109a] 106

75(74). Guards of compound falcigers distally mucronate 76

Guards of compound falcigers distally without mucros 78

76(75). Peristomial cirri reach middle or anterior end of peristomium; without articulations; pectinate setae distally furled . . . . . ***fauveli***

Peristomial cirri reach middle or front of prostomium; articulated; pectinate setae distally flat 77

77(76). Peristomial cirri tapering; branchiae distinctly shorter than notopodial cirri; median acicular lobes triangular or conical; neuroaciculae emerging at parapodial midline . . . . . ***franklini***

Peristomial cirri basally inflated; branchiae distinctly longer than notopodial cirri; median acicular lobes distally truncate; neuroaciculae emerging dorsal to parapodial midline . . . . . ***nigricans***

78(75). Neuroaciculae distally pointed (sharp or blunt) 79

Neuroaciculae distally expanded, knurled and knobbed . . . . . ***bilobata***

79(78). Peristomial cirri reach middle or anterior end of peristomium 80

Peristomial cirri reach middle or front of prostomium 93

Peristomial cirri reach beyond prostomium . . . . . ***bipapillata***

80(79). Narrow tips of ventral cirri short and button-shaped 81

Narrow tips of ventral cirri tapering 84

Narrow tips of ventral cirri digitiform 89

81(80). A-II and III similar in length with A-I shorter; pectinate setae flaring . . . 82

Length of all antennae similar (short); pectinate setae tapering . . . . . ***petersi,*** new name

82(81). Anterior postsetal lobes follow outline of acicular lobes closely . . . . . ***purpurea***

Anterior postsetal lobes form low transverse folds . . . . . ***ehlersi***

Anterior postsetal lobes project as free lobes 83

83(82). Subacicular hooks paired in most setigers; median acicular lobes bilobed; neuroaciculae emerging at parapodial midline; pectinate setae tapering . . . . . ***roussaei***

Three or more subacicular hooks in some setigers; median acicular lobes distally truncate; neuroaciculae emerging dorsal to parapodial midline; pectinate setae flaring . . . . . ***borneensis***

84(80). Subacicular hooks always single (except for replacements) 85

Subacicular hooks paired in some setigers 88

85(84). Peristomial cirri tapering 86

Peristomial cirri digitiform 87
Peristomial cirri basally inflated . . . . . ***tribranchiata***
Peristomial cirri ovate . . . . . ***magellanica***

86(85). A-II and III similar in length with A-I shorter; peristomial cirri articulated; eyes between bases of A-I and A-II; neuroaciculae emerging dorsal to parapodial midline . . . . . ***violaceomaculata***
Length of antennae increasing from A-I to A-III; peristomial cirri without articulations; eyes lateral to the bases of A-I; neuroaciculae emerging at parapodial midline . . . . . ***harassii***

87(85). A-II and III similar in length with A-I shorter; peristomial cirri without articulations; eyes present; median acicular lobes distally rounded . . . . . ***afra***
Length of antennae increasing from A-I to A-III; peristomial cirri articulated; eyes absent; median acicular lobes distally truncate . . . . . ***argentinensis***

88(84). Peristomial cirri tapering; branchiae about as long as notopodial cirri; median acicular lobes triangular or conical; anterior postsetal lobes follow outline of acicular lobes closely . . . . . ***kinbergi***
Peristomial cirri digitiform; branchiae distinctly longer than notopodial cirri; median acicular lobes distally truncate; anterior postsetal lobes form low transverse folds . . . . . ***laticeps***

89(80). Anterior notopodial cirri basally inflated 90
Anterior notopodial cirri medially inflated 91
Anterior notopodial cirri digitiform 92

90(89). Neuroaciculae emerging at parapodial midline; ceratostyles tapering; pectinate setae tapering . . . . . ***pauroneurata***
Neuroaciculae emerging dorsal to parapodial midline; ceratostyles digitiform; pectinate setae flaring . . . . . ***bipapillata***

91(89). Length of antennae increasing from A-I to A-III; antennae with A-III isolated by a gap; inflated bases of ventral cirri thick, transverse welts; posterior ventral cirri without basal inflation . . . . . ***pacifica***
Length of all antennae similar (short); antennae evenly spaced; inflated bases of ventral cirri ovate or spherical; posterior ventral cirri basally inflated . . . . . ***eimeorum,*** new species

92(89). Peristomial cirri articulated; neuroaciculae emerging dorsal to parapodial midline; ceratostyles digitiform; antennae in a horseshoe . . . . ***longisetis***
Peristomial cirri without articulations; neuroaciculae emerging at parapodial midline; ceratostyles tapering; antennae in a transverse row . . . ***mutilata***

93(79). A-II and III similar in length with A-I shorter 94
Length of antennae increasing from A-I to A-III 96
Length of all antennae similar (short) . . . . . ***bipapillata***

94(93). Subacicular hooks always single (except for replacements); branchiae not reduced in mid-body region; antennae evenly spaced; neuroaciculae emerging dorsal to parapodial midline 95
Three or more subacicular hooks in some setigers; branchiae reduced in mid-body region; antennae with A-III isolated by a gap; neuroaciculae emerging at parapodial midline . . . . . ***microprion***

95(94). Branchiae distinctly longer than notopodial cirri; median acicular lobes distally truncate; anterior postsetal lobes follow outline of acicular lobes closely; anterior ventral cirri tapering from narrow bases . . . . ***violaceomaculata***
Branchiae distinctly shorter than notopodial cirri; median acicular lobes distally rounded; anterior postsetal lobes form low transverse folds; anterior ventral cirri digitiform . . . . . ***pulvinopalpata***

96(93). Subacicular hooks always single (except for replacements); prostomial lobes dorsally flattened 97

Subacicular hooks paired in some setigers; prostomial lobes dorsally excavate with thickened rim . . . . . ***norvegica***

Three or more subacicular hooks in some setigers; prostomial lobes dorsally inflated . . . . . ***philocorallia***

97(96). Anterior postsetal lobes follow outline of acicular lobes closely; notopodial cirri articulated in anterior setigers . . . . . ***mindanavensis***

Anterior postsetal lobes form low transverse folds; notopodial cirri without articulations . . . . . ***nesiotes***

Anterior postsetal lobes project as free lobes; notopodial cirri articulated throughout body . . . . . ***jagori***

98(74). Subacicular hooks always single (except for replacements) 99

Subacicular hooks paired in some setigers 104

Subacicular hooks paired in most setigers . . . . . ***quinquefida***

99(98). Peristomial cirri reach middle or anterior end of peristomium 100

Peristomial cirri reach middle or front of prostomium . . . . . ***laurillardi***

Peristomial cirri reach beyond prostomium . . . . . ***longicirris***

100(99). Peristomial cirri articulated; neuroaciculae emerging dorsal to parapodial midline; anterior ventral cirri digitiform 101

Peristomial cirri without articulations; neuroaciculae emerging at parapodial midline; anterior ventral cirri tapering from narrow bases 103

101(100). Antennae evenly spaced; branchiae distinctly longer than notopodial cirri; anterior postsetal lobes form low transverse folds; narrow tips of ventral cirri tapering 102

Antennae with A-III isolated by a gap; branchiae about as long as notopodial cirri; anterior postsetal lobes project as free lobes; narrow tips of ventral cirri digitiform . . . . . ***pycnobranchiata***

102(101). Inflated bases of ventral cirri ovate or spherical; peristomial cirri tapering; notopodial cirri articulated throughout body; anterior pectinate setae distally flat . . . . . ***biformicirrata***

Inflated bases of ventral cirri thick, transverse welts; peristomial cirri digitiform; notopodial cirri articulated in anterior setigers; anterior pectinate setae distally furled . . . . . ***multipectinata***

103(100). Antennae evenly spaced; peristomial cirri digitiform; eyes behind bases of A-I; median acicular lobes distally rounded . . . . . ***collaris***

Antennae with A-I isolated by a gap; peristomial cirri medially inflated; eyes behind bases of A-II; median acicular lobes triangular or conical . . . . . ***northioidea***

104(98). Peristomial cirri reach middle or anterior end of peristomium; A-II and III similar in length with A-I shorter; branchiae not reduced in mid-body region; ceratostyles tapering 105

Peristomial cirri reach middle or front of prostomium; length of antennae increasing from A-I to A-III; branchiae reduced in mid-body region; ceratostyles digitiform . . . . . ***floridana***

105(104). Antennae in a horseshoe; median acicular lobes distally truncate; anterior postsetal lobes follow outline of acicular lobes closely; anterior ventral cirri tapering from wide, triangular bases . . . . . ***grubei***

Antennae in a transverse row; median acicular lobes triangular or conical; anterior postsetal lobes project as free lobes; anterior ventral cirri digitiform . . . . . ***bowerbanki***

106(74). Peristomial cirri reach middle or anterior end of peristomium; subacicular hooks paired in some setigers; antennae in a horseshoe; peristomial cirri tapering . . . . . ***torquata***

Peristomial cirri reach middle or front of prostomium; subacicular hooks always single (except for replacements); antennae in a transverse row;

peristomial cirri digitiform . . . . . ***annulicornis***

107(73). Subacicular hooks always single (except for replacements) 108
Subacicular hooks paired in some setigers . . . . . ***guttata***
Subacicular hooks paired in most setigers 113
Three or more subacicular hooks in most setigers . . . . . ***scombrinis***

108(107). Peristomial cirri reach middle or anterior end of peristomium 109
Peristomial cirri reach middle or front of prostomium 112

109(108). Peristomial cirri digitiform 110
Peristomial cirri basally inflated 111
Peristomial cirri ovate . . . . . ***aciculata***

110(109). A-II and III similar in length with A-I shorter; anterior notopodial cirri basally inflated; eyes on ceratophores of A-II; prostomial lobes frontally rounded . . . . . ***perrieri***
Length of antennae increasing from A-I to A-III; anterior notopodial cirri medially inflated; eyes behind bases of A-I; prostomial lobes frontally obliquely truncate . . . . . ***dilatata***
Length of all antennae similar (short); anterior notopodial cirri digitiform; eyes between bases of A-I and A-II; prostomial lobes frontally truncate . . . . . ***perimensis***

111(109). Inflated bases of ventral cirri ovate or spherical; anterior postsetal lobes form low transverse fold . . . . . ***djiboutiensis***
Inflated bases of ventral cirri thick, transverse welts; anterior postsetal lobes project as free lobes . . . . . ***mutabilis***
Inflated bases scoop-shaped; anterior postsetal lobes follow outline of acicular lobes closely . . . . . ***aphroditois***

112(108). Antennae similar in thickness; peristomial cirri digitiform; neuroaciculae emerging at parapodial midline; inflated bases of ventral cirri ovate or spherical . . . . . ***polybranchia***
A-I thicker than other three antennae; peristomial cirri basally inflated; neuroaciculae emerging dorsal to parapodial midline; inflated bases of ventral cirri thick, transverse welts . . . . . ***mutabilis***

113(107). Neuroaciculae emerging at parapodial midline; inflated bases of ventral cirri thick, transverse welts; narrow tips of ventral cirri short and button-shaped; anterior notopodial cirri basally inflated . . . . . ***roussaei***
Neuroaciculae emerging dorsal to parapodial midline; inflated bases of ventral cirri ovate or spherical; narrow tips of ventral cirri tapering; anterior notopodial cirri medially inflated . . . . . ***rullieri***, new name

114(72). Ceratostyles articulated 115
Ceratostyles without articulations 121

115(114). Ceratostyle articulations long or short cylinders 116
Ceratostyle articulations moniliform or drop-shaped distally 119

116(115). A-II and III similar in length with A-I shorter; prostomium less than 1/2 as deep as peristomium 117
Length of all antennae similar (short); prostomium at least as deep as 1/2 of peristomium 118

117(116). Antennae evenly spaced; branchiae distinctly longer than notopodial cirri; anterior postsetal lobes project as free lobes; prostomial lobes dorsally excavate with thickened rim . . . . . ***plicata***
Antennae with A-I isolated by a gap; branchiae distinctly shorter than notopodial cirri; anterior postsetal lobes form low transverse folds; prostomial lobes dorsally inflated . . . . . ***prognatha***
Antennae with A-III isolated by a gap; branchiae about as long as notopodial cirri; anterior postsetal lobes follow outline of acicular lobes closely; prostomial lobes dorsally flattened . . . . . ***excariboea***

118(116). Antennae in a semicircle; anterior postsetal lobes project as free lobes; anterior ventral cirri digitiform; inflated bases of ventral cirri ovate or spherical . . . . . ***guanica***

Antennae in a transverse row; anterior postsetal lobes form low transverse folds; anterior ventral cirri tapering from narrow bases; inflated bases of ventral cirri thick, transverse welts . . . . . ***conglomerans***

119(115). Subacicular hooks always single (except for replacements); inflated bases of ventral cirri ovate or spherical; notopodial cirri without articulations 120

Subacicular hooks paired in some setigers; inflated bases of ventral cirri thick, transverse welts; notopodial cirri articulated in anterior setigers . . . . . ***frauenfeldi***

120(119). A-II and III similar in length with A-I shorter; ceratostyles tapering; median acicular lobes triangular or conical; anterior notopodial cirri tapering . . . . . ***goodsiri***

Length of all antennae similar (short); ceratostyles digitiform; median acicular lobes distally truncate; anterior notopodial cirri medially inflated . . . . . ***rubella***

121(114). Neuroaciculae distally pointed (sharp or blunt) 122

Neuroaciculae distally hammer-headed 125

122(121). Subacicular hooks always single (except for replacements); peristomial cirri tapering; pectinate setae flaring 123

Subacicular hooks paired in most setigers; peristomial cirri ovate; pectinate setae tapering . . . . . ***tenuis***

123(122). Length of antennae increasing from A-I to A-III; ceratostyles tapering . . . . . ***crassitentaculata***

Length of all antennae similar (short); ceratostyles digitiform 124

124(123). Peristomial cirri articulated; antennae in a semicircle; ceratophores ring-shaped in all antennae; anterior postsetal lobes follow outline of acicular lobes closely . . . . . ***parvibranchis***

Peristomial cirri without articulations; antennae in a horseshoe; ceratophores long in all antennae; anterior postsetal lobes project as free lobes . . . . . ***bucciensis***

125(121). Guards of compound falcigers distally mucronate; A-II and III similar in length with A-I shorter; ceratostyles digitiform; anterior notopodial cirri basally inflated . . . . . ***filamentosa***

Guards of compound falcigers distally without mucros; length of all antennae similar (short); ceratostyles tapering; anterior notopodial cirri digitiform 126

126(125). Antennae in a horseshoe; ceratophores ring-shaped in all antennae; peristomial cirri digitiform; neuroaciculae emerging at parapodial midline . . . . . ***spongicola***

Antennae in a transverse row; ceratophores long in all antennae; peristomial cirri tapering; neuroaciculae emerging dorsal to parapodial midline . . . . . ***denticulata***

127(71). Peristomial cirri reach middle or anterior end of peristomium 128

Peristomial cirri reach middle or front of prostomium . . . . . ***guildingi***

Peristomial cirri reach beyond prostomium . . . . . ***tibiana***

128(127). Branchiae pectinate; anterior notopodial cirri digitiform . . . . ***flavapunctata***

Branchiae palmate; anterior notopodial cirri tapering . . . . . ***goodsiri***

Branchiae single filaments; anterior notopodial cirri basally inflated . . . . . ***modesta***

129(70). Branchiae pectinate [Figure 61k] 130

Branchiae palmate [Figure 39g] 135
Branchiae single filaments 142

130(129). Peristomial cirri reach middle or anterior end of peristomium 131
Peristomial cirri reach middle or front of prostomium . . . . . ***elegans***
Peristomial cirri reach beyond prostomium . . . . . ***langi***

131(130). Ceratostyles articulated; prostomium at least as deep as 1/2 of peristomium; prostomium distinctly narrower than peristomium 132
Ceratostyles without articulations; prostomium less than 1/2 as deep as peristomium; prostomium about as wide as peristomium 134

132(131). A-II and III similar in length with A-I shorter . . . . . ***reducta***
Length of antennae increasing from A-I to A-III . . . . . ***coccinea***
Length of all antennae similar (short) 133

133(132). Peristomial cirri articulated; ceratostyles digitiform; antennae in a transverse row; peristomial cirri digitiform . . . . . ***fimbriata***
Peristomial cirri without articulations; ceratostyles medially inflated; antennae in a horseshoe; peristomial cirri medially inflated . . . . . ***samoae***

134(131). Subacicular hooks always single (except for replacements); ceratostyles digitiform; peristomial cirri medially inflated; branchiae distinctly longer than notopodial cirri . . . . . ***coccinioides***
Subacicular hooks paired in some setigers; ceratostyles tapering; peristomial cirri tapering; branchiae about as long as notopodial cirri . . . ***barvicensis***

135(129). Ceratostyles articulated 136
Ceratostyles without articulations 139

136(135). Peristomial cirri reach middle or anterior end of peristomium; antennae similar in thickness 137
Peristomial cirri reach middle or front of prostomium; antennae with A-I thicker than other three . . . . . ***dubitata***

137(136). Subacicular hooks always single (except for replacements); branchiae distinctly longer than notopodial cirri; inflated bases of ventral cirri ovate or spherical; cross-section of aciculae round 138
Subacicular hooks paired in some setigers; branchiae distinctly shorter than notopodial cirri; inflated bases of ventral cirri thick, transverse welts; cross-section of aciculae flattened or knife-edged . . . . . ***thomasiana***

138(137). A-II and III similar in length with A-I shorter; anterior notopodial cirri tapering; notopodial cirri without articulations; ceratostyles tapering . . . . . ***goodsiri***
Length of antennae increasing from A-I to A-III; anterior notopodial cirri basally inflated; notopodial cirri articulated throughout body; ceratostyles digitiform . . . . . ***stanleyi,*** new species

139(135). Peristomial cirri reach middle or anterior end of peristomium; antennae evenly spaced; antennae similar in thickness; branchiae distinctly shorter than notopodial cirri 140
Peristomial cirri reach middle or front of prostomium; antennae with A-I isolated by a gap; antennae with A-I thicker than other three; branchiae distinctly longer than notopodial cirri . . . . . ***lita***

140(139). Eyes present; ceratostyles digitiform; inflated bases of ventral cirri thick, transverse welts; anterior pectinate setae distally furled 141
Eyes absent; ceratostyles tapering; inflated bases of ventral cirri ovate or spherical; anterior pectinate setae distally flat . . . . . ***collini***

141(140). A-II and III similar in length with A-I shorter; antennae in a horseshoe; peristomial cirri tapering; eyes between bases of A-I and A-II . . . . . ***levibranchia***
Length of all antennae similar (short); antennae in a transverse row; peristomial cirri ovate; eyes behind bases of A-I . . . . . ***mutilatoides***

142(129). Branchiae present to near posterior end; ceratostyles without articulations; branchiae distinctly longer than notopodial cirri; inflated bases of ventral cirri thick, transverse welts . . . . . ***gagzoi***
Branchiae terminating well before posterior end; ceratostyles articulated; branchiae distinctly shorter than notopodial cirri; inflated bases of ventral cirri ovate or spherical 143
143(142). Peristomial cirri reach middle or anterior end of peristomium; peristomial cirri without articulations; ceratostyles medially inflated; peristomial cirri medially inflated . . . . . ***rosaurae***
Peristomial cirri reach middle or front of prostomium; peristomial cirri articulated; ceratostyles tapering; peristomial cirri tapering . . . . . ***nicidioformis***
144(66). Branchiae present to near posterior end; branchiae present on more than 65% of total number of setigers; ceratostyle articulations long or short cylinders; branchiae palmate . . . . . ***cirrobranchiata***
Branchiae terminating well before posterior end; branchiae present on less than 55% of total number of setigers; ceratostyle articulations moniliform or drop-shaped distally; branchiae single filaments . . . . . ***rosaurae***
145(65). Ceratostyles articulated; antennae in a transverse row 146
Ceratostyles without articulations; antennae in a horseshoe 148
146(145). Ceratostyle articulations long or short cylinders; antennae evenly spaced; pectinate setae flaring 147
Ceratostyle articulations moniliform; antennae with A-III isolated by a gap; pectinate setae tapering . . . . . ***curticirris***
147(146). Ceratostyles medially inflated; inflated bases of ventral cirri ovate or spherical; anterior notopodial cirri tapering; prostomial median sulcus deep . . . . . ***fuscafasciata***
Ceratostyles digitiform; inflated bases of ventral cirri thick, transverse welts; anterior notopodial cirri medially inflated; prostomial median sulcus shallow . . . . . ***brevis***
148(145). Peristomial cirri tapering . . . . . ***wasinensis,*** new name
Peristomial cirri digitiform . . . . . ***imogena***
Peristomial cirri ovate 149
149(148). Inflated bases of ventral cirri ovate or spherical; narrow tips of ventral cirri short and button-shaped; anterior notopodial cirri basally inflated; pectinate setae tapering . . . . . ***goodei,*** new name
Inflated bases of ventral cirri thick, transverse welts; narrow tips of ventral cirri digitiform; anterior notopodial cirri tapering; pectinate setae flaring . . . . . ***cariboea***

Description of Species

The species are arranged in alphabetic order. The tables comparing similar taxa are grouped at the end of the paper.

1. *Eunice aciculata* (Treadwell, 1922)

FIGURE 3; TABLES 33, 37-39

Leodice aciculata Treadwell, 1922:143-144, figs. 24-25; pl. 3: figs. 7-13.
Eunice afra.—Hartman, 1956:282 [in part, not *Eunice afra* Peters, 1854].

MATERIAL EXAMINED.—Holotype, AMNH 1528, Suva Harbor, Fiji, April 1920, in rocks outside the entrance light, in crevices made by boring echinoids, coll. Treadwell.

DESCRIPTION.—Holotype complete, of unknown sex, with 202 setigers; total length 129 mm; maximal width 4.5 mm at setiger 15; length through setiger 10, 11 mm; width at setiger 10, 4.0 mm. Anterior body ventrally flattened with highly convex dorsum; posterior body ventrally flattened, tapering toward the posterior end. Anal cirri unknown.

Prostomium (Figure 3a) less than half as long and distinctly narrower than peristomium; as deep as 1/2 the depth of the peristomium. Prostomial lobes frontally obliquely truncate; dorsally flattened; median sulcus deep. Prostomium sloping towards front and laterally. Eyes present; behind bases of A-I. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores cylindrical in all antennae, confluent with

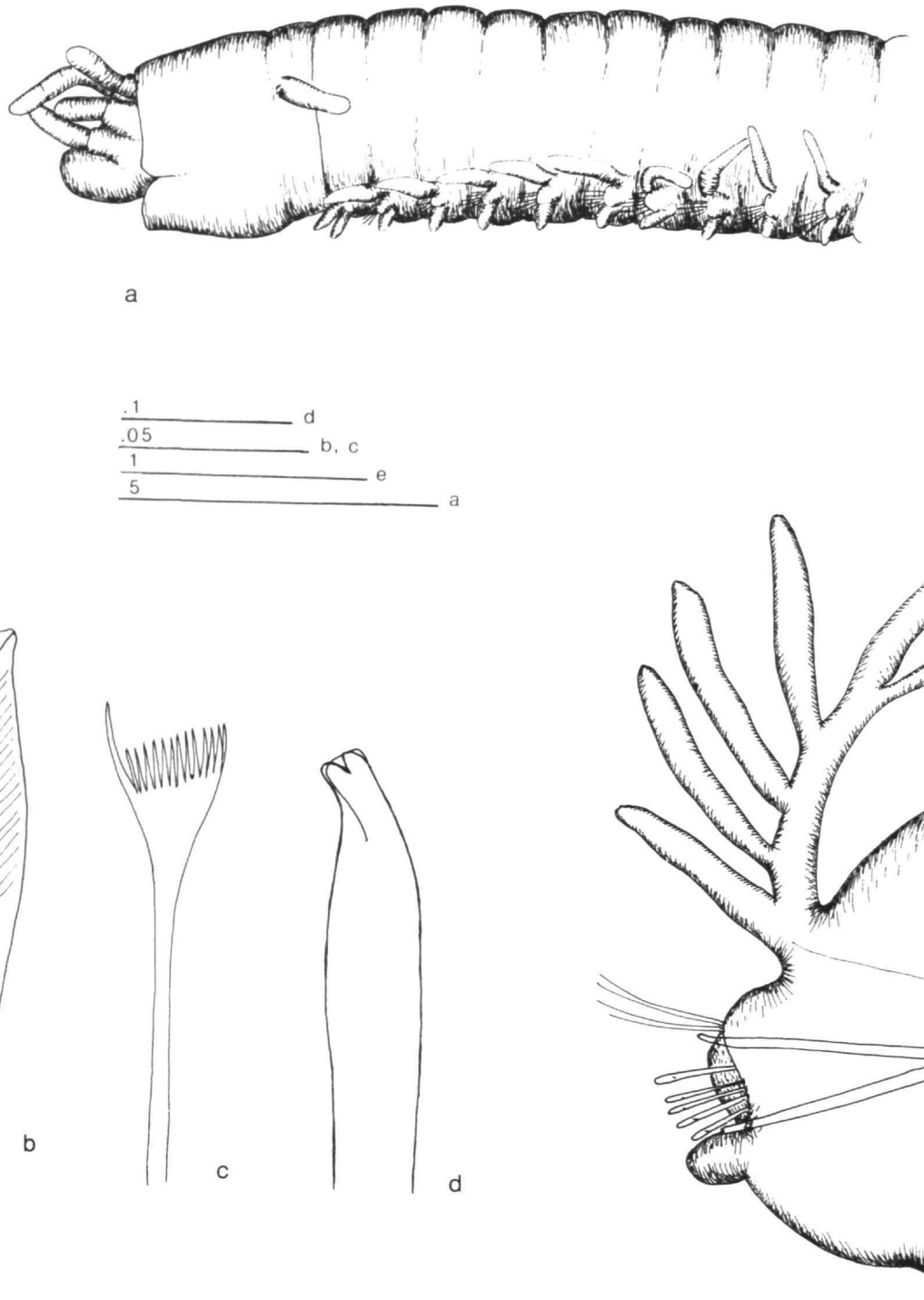

FIGURE 3.—*Eunice aciculata* (holotype, AMNH 1528): a, anterior end, lateral view; b, compound falciger, parapodium 28; c, pectinate seta, parapodium 28; d, subacicular hook, parapodium 28; e, parapodium 28, anterior view. (Scale bars in mm.)

prostomium, without articulations. Ceratostyles short, thick, digitiform; all similar in thickness and shape; wrinkled, but without articulations. A-I to middle of first peristomial ring; A-II to front edge of second peristomial ring; A-III incomplete. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of first peristomial ring, nearly ovate, without distinct articulations.

Jaws not available for examination.

Branchiae present, pectinate, distinctly longer than notopodial cirri (Figure 3e), not reduced in mid-body region, erect. Branchiae from setiger 18 to setiger 190. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and last 10 branchiae single filaments. Maximum number of filaments 5, reached at setiger 32; number of filaments decreasing slowly over next 100 segments. Posterior to setiger 150, 2 filaments in each branchia (except in last 10). Branchial stems tapering, longer than filaments. Filaments digitiform, about as long as notopodial cirri.

Neuropodial acicular lobes distally rounded with aciculae emerging dorsal to midline. Presetal lobes low transverse folds. First 20 postsetal lobes free, triangular, projecting barely beyond acicular lobes. Median and posterior postsetal lobes folds following outline of acicular lobes. Ventral cirri thick and tapering from wide bases in first 15-20 setigers. Median ventral cirri basally inflated; basal inflated region indistinct, ovate, noticeable in setigers 20-50; digitiform free tips present. Posterior ventral cirri without basal inflation, digitiform. Notopodial cirri thick and digitiform in anterior setigers, slowly reduced in thickness, but retaining similar shape in all setigers, without articulations.

Slender, marginally smooth limbate setae projecting beyond compound falcigers in all setigers. All pectinate setae (Figure 3c) flat, distally flaring, with slender, cylindrical shafts; one marginal tooth distinctly longer and thicker than all other teeth; a total of about 15 teeth present. Shafts of compound falcigers (Figure 3b) slender, distally distinctly inflated with distinct distal beaks, marginally finely and indistinctly serrated, with internal oblique striations. Appendages tapering towards distinct head, bidentate. Proximal teeth triangular and directed laterally, as large as distal tooth; distal teeth tapering, directed laterally. Guards distally symmetrically rounded, cutting edge finely serrated, without mucro. Pseudocompound falcigers and compound spinigers absent. Neuropodial aciculae dark brown, distally blunt, geniculate. Separation of acicular cores and sheaths indistinct. Cross-section of aciculae round. Notopodial aciculae clear, slender. Subacicular hooks (Figure 3d) dark brown, bidentate. Separation of cores and sheaths indistinct. Hooks first present from setiger 22, present in all setigers thereafter, always single (except for replacements). Hooks distally obliquely tapering; both teeth directed distally; proximal teeth larger than distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri; jaw structure.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III forming arc with left Mx IV; Mx VI absent.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice aciculata* was referred to *E. afra* by Hartman (1956). The species is a member of group B-4 as the species groups were defined by Fauchald (1970) and is listed with similar species in Tables 33 and 37-39. Among the species in this group, only five have 10 or more anterior branchiated setigers with single filaments only. These species include *E. denticulata, E. guanica, E. lita,* and *E. tenuis,* in addition to *E. aciculata.* Of these species, *E. aciculata* and *E. denticulata* have long, more or less cylindrical ceratophores; the other three have short, ring-shaped ceratophores. Branchiae are first present from setiger 22 in *E. aciculata,* from setigers 18-19 in *E. denticulata,* from setiger 36 in *E. guanica,* from setiger 23 in *E. lita,* and from setiger 124 in *E. tenuis.* The posterior half of the body is abranchiate in *E. lita,* the other species are branchiated (as far as known) to the posterior end.

Treadwell (1922:144) also reported that he had seen specimens from Samoa and Hawaii.

Eunice adriatica Schmarda, 1861

Eunice adriatica Schmarda, 1861:124-125, 12 figs., pl. 32: fig. 257.

REMARKS.—No material is available; the species was referred to *Palola siciliensis* by Grube (1864:79 and 1867:68, see also Ehlers, 1868:358). Nothing in Schmarda's description and illustrations argue against this conclusion and the synonymy is here accepted.

2. *Eunice aedificatrix* (Monro, 1933)

FIGURE 4; TABLES 1, 46, 49

Eunice antennata aedificatrix Monro, 1933:60-61.

MATERIAL EXAMINED.—Six syntypes, BM(NH) ZK 1932 12.4.537-548, Balboa, Panama, coll. Crossland, *St. George* Panama and Galapagos Expedition, 1924.

COMMENTS ON MATERIAL EXAMINED.—Monro (1933:60) gave the following locality data: "Balboa, rocks and rock pools, low tide at Panama (3); and from scrapings off a buoy at canal entrance (3); and from piles of quays (5)." Based on the information on the labels it cannot be determined which of these samples were combined to give the six syntypes examined.

DESCRIPTION.—Syntype complete, of unknown sex, with 270 setigers; total length 128 mm; maximal width 4 mm at setiger 10; length through setiger 10, 7 mm. Anterior body cylindrical, becoming dorsoventrally flattened in midbody, tapering abruptly frontally and slowly towards posterior end,

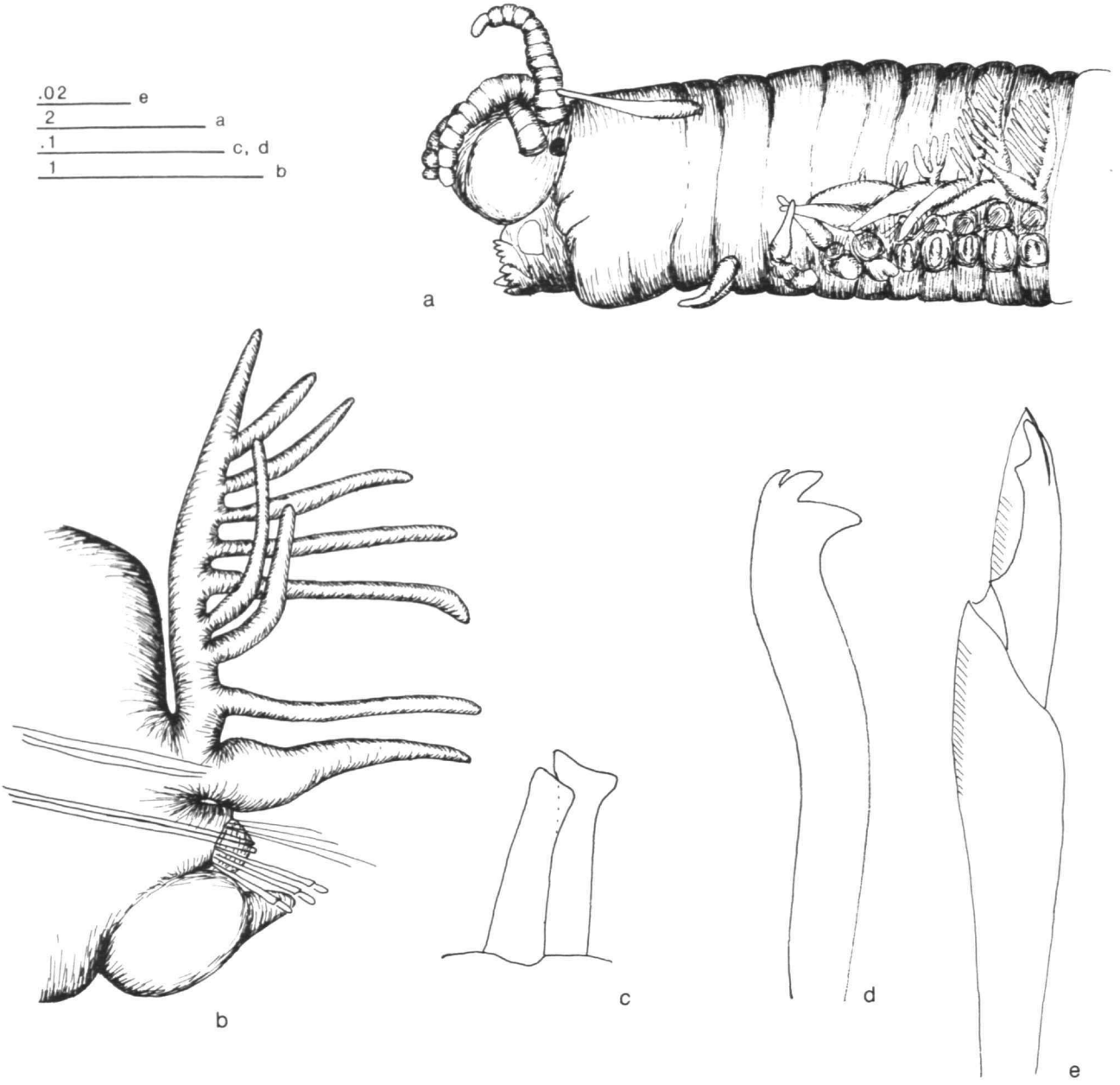

FIGURE 4.—*Eunice aedificatrix* (syntype, BM(NH) ZK 1932:12.24.537-548): a, anterior end, lateral view; b, parapodium 15, anterior view; c, aciculae, parapodium 50; d, subacicular hook, parapodium 50; e, compound falciger, parapodium 15. (Scale bars in mm.)

with short, abruptly tapering tail.

Prostomium (Figure 4a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes posterior to bases of A-I, black. Antennae in a horseshoe, evenly spaced and similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with moniliform articulations to bases; maximum 12 articulations in A-III. A-I to middle of anterior peristomial ring; A-II to posterior edge of posterior peristomial ring; A-III

TABLE 1.—Variable and invariable characters in the type lot of *Eunice aedificatrix* (N = number of individuals examined; SD = standard deviation; measurements in mm; * = SD not calculated).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	2	395	73	234	*
Total length	2	263	24	143.5	*
Maximal width	11	5	2	3.6	1.07
Length through 10	11	9	4	6.27	1.44
No. of antennal articulations	10	18	0	11.09	4.61
No. of peristomial cirral articulations	8	12	0	5.82	3.71
Branchiae from setiger no.	11	5	4	4.36	0.50
Max. no. branchial filaments	10	13	6	8.80	2.30
Ventral cirri inflated through setiger no.	11	100	39	61.73	19.35
No. of articulations in notopodial cirri	9	5	2	4.45	1.04
Subacicular hooks from setiger no.	9	35	24	29.27	3.00

INVARIABLE FEATURES	N=11
Shape of pectinate setae	flat
No. of teeth in pectinate setae	12
Shafts of compound falcigers	inflated
No. of teeth in appendages	2
Color of aciculae	yellow
Acicular tip	hammer-headed to bifid
Color of subacicular hooks	yellow
Teeth in subacicular hooks	3
Core-sheath construction	distinct

to middle of setiger 1. Peristomium cylindrical, twice as long as prostomium and at least 1/3 wider. Peristomial fold with lateral notches; lower lip distinctly muscular and with a median notch. Separation between rings distinct dorsally and ventrally and visible, but less distinct laterally; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, slender, inflated near bases, sometimes with 4 or 5 indistinct articulations.

Summary maxillary formula for 3 syntypes 1+1, 6+7–8, 7–8+0, 6-7+9–11, and 1+1. Mx III long, straight, located behind left Mx II; Mx VI absent.

Branchiae from setiger 4 to setiger 250. First and last 10 branchiae single filaments. All other branchiae erect (Figure 4b), pectinate with maximum 11 filaments at setiger 15. Most branchiae posterior to setiger 35 with 3–4 filaments. No increase in number or length of filaments towards posterior end. Branchiae longer than notopodial cirri in all but first 4 branchial setigers. Filaments as long as notopodial cirri, slender and digitiform. Stems longer than filaments, tapering.

Neuropodial acicular lobes distally rounded or truncate with aciculae emerging near the middle. Pre- and postsetal lobes low transverse folds. First 3 ventral cirri thick and tapering, thereafter basally inflated. Inflated base ovate, reduced from about setiger 45, with distinct tapering narrow tips. Posterior ventral cirri tapering and increasingly slender in far posterior setigers. Notopodial cirri basally inflated, becoming narrower and increasingly digitiform in far posterior setigers; articulations absent.

Limbate setae longer than compound hooks and marginally finely serrated. All pectinate setae tapering, furled, with about 10 coarse teeth. One marginal tooth somewhat longer and distinctly coarser than other teeth. All shafts of compound hooks (Figure 4e) distally inflated and marginally serrated, distinctly slimmer than aciculae and subacicular hooks. Appendages slender and tapering. Proximal tooth triangular and directed laterally; distal tooth gently curved, tapering, longer than proximal tooth. Guards distally symmetrically sharply pointed, but not mucronate; margin serrated. Aciculae yellow, paired, round in cross-section. Superior aciculae hammer-headed; inferior aciculae bent and tapering in anterior setigers, becoming hammer-headed posterior to setiger 25 (Figure 4c). Subacicular hooks (Figure 4d) yellow and tridentate, without distinct separation of cores and sheaths. Hooks first present from setiger 35, thereafter present in all setigers, always single. Hooks curved with teeth decreasing evenly in size from curved main fang.

Tube composed of pliable pergamentaceous flakes.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Anal cirri long, tapering, with moniliform articulations.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—All characters scored.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice aedificatrix* was described as a subspecies of *E. antennata*, with which it agrees in the possession of tridentate yellow subacicular hooks, branchiae distributed along the length of the body, and strongly articulated antennae.

Eunice aedificatrix is listed with similar species in Tables 46

and 49. In addition to *E. aedificatrix*, only *E. aequabilis* among the species listed in Table 49 has ornamented aciculae. In *E. aedificatrix*, both pointed aciculae and hammer-headed aciculae are present; in *E. aequabilis* the aciculae are either distally knobbed or nearly bidentate. In addition, the latter has tridentate appendages in the compound falcigers; the appendages are bidentate in *E. aedificatrix*.

Eunice aenea Blanchard, 1849

Eunice aenea Blanchard, 1849:19-20.
Marphysa aenea.—Augener, 1922c:196; 1923:65.—Hartman, 1944:128.

REMARKS.—*Eunice aenea* was referred to the genus *Marphysa* by Augener (1922c:196, see also Augener, 1923:65), who redescribed the species; additional descriptive detail was added by Hartman (1944:128). There is nothing in Blanchard's original description to indicate that this synonymy is in error and it is here accepted.

3. *Eunice aequabilis* Grube, 1878

FIGURE 5; TABLES 46, 49

Eunice aequabilis Grube, 1878a:102.—Fauchald, 1986:242-243, figs. 1-8.

MATERIAL EXAMINED.—Syntypes, MPW 273, Zool. Mus. Wroclaw, and ZMB 3993, Cape York, Australia, coll. Salmin (the label for the Berlin specimen gives Grube as collector).

DESCRIPTION.—Wroclaw syntype complete with 158 setigers; total length 175 mm; maximum width 7 mm at setiger 15. Length through setiger 10, 16 mm; width at setiger 10, 6 mm. Berlin syntype complete with 151 setigers; 183 mm long. Both syntypes of unknown sex and maturity. Anal cirri long, slender, with 6 articulations.

Prostomium (Figure 5a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomium about 2/3 as wide as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes absent. Antennae in a horseshoe; A-I separated from other antennae by distinct gap, similar in thickness. Ceratophores ring-shaped, without articulations. Ceratostyles slender, tapering, with up to 12 cylindrical articulations in A-II and III. A-I to posterior end of anterior peristomial ring; A-II and III to setiger 3. Peristomium cylindrical; peristomial fold entire; lower lip entire, not distinctly set off from the rest of the peristomium. Separation between peristomial rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to front edge of peristomium, slender and tapering, with 5 articulations.

Maxillary formula of Berlin syntype 1+1, 6+5, 8+0, 5+4, and 1+1. Mx III long, located behind left Mx II. Mx VI missing.

Branchiae present from setiger 6 to end. All branchiae strongly pectinate (Figure 5b); first branchia with 13 filaments; maximum 17 filaments at setiger 20; number decreasing slowly posteriorly, never less than 12 filaments present. Median region with reduced branchiae absent. Stems tapering. Most filaments filiform, about 2/3 as long as stems, shorter than notopodial cirri. Branchiae longer than notopodial cirri.

Neuropodial acicular lobes distally obliquely truncate. Pre-and postsetal lobes low transverse to oblique folds. First 3 ventral cirri tapering, thereafter basally inflated. Inflated bases ovate; long tapering tips present in all setigers, decreasing from about setiger 30. Posterior ventral cirri tapering. Notopodial cirri long, basally inflated, as long as branchial stem in most setigers, without articulations.

Limbate setae longer than compound hooks, marginally frayed, brittle. Pectinate setae (Figure 5h) narrow, tapering, flat. Both marginal teeth longer than other teeth, with about 12 teeth. Shafts of compound hooks (Figure 5e) inflated, with distal beaks, marginally smooth. All appendages short, tridentate. Primary fangs by far largest, triangular, directed laterally. Secondary fangs narrowly triangular, directed obliquely distally. Tertiary fangs very small rounded. Fangs decreasing evenly in size distally. Guards short, narrow, distally symmetrically rounded, marginally serrated, without mucros. Pseudocompound hooks and compound spinigers absent. Aciculae yellow, paired; superior aciculae flattened; inferior ones with round cross-section, without distinct segregation of core and sheath. Superior aciculae laterally distally expanded into rounded tabs; inferior aciculae (Figure 5f,g) bidentate; proximal teeth larger than distal teeth; both directed obliquely distally. Subacicular hooks (Figure 5c,d) yellow, tridentate. First present from setiger 26 in Wroclaw syntype and from setiger 32 in Berlin syntype, thereafter present in all setigers, always single. Hooks straight, tapering. Primary fangs separated from other fangs by a wide gap, tapering, directed laterally or slightly basally. Secondary fangs and tertiary fangs on joint bases. Secondary fangs tapering, directed laterally. Tertiary fangs slender, tapering, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Structure of pygidium; relation between Mx III and IV.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Left Mx IV about as long as right Mx IV and curved only distally.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 56, 58-59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice aequabilis* belongs to the same group as *E. antennata*, from which appears to differ in that the branchiae retain the high number of branchial filaments in all setigers, and that the articulations of the long antennae are cylindrical, rather than moniliform. It is listed with similar species in Tables 46 and 49. It was discussed in relation to *E. aedificatrix* above.

The species apparently has remained unrecorded until Fauchald (1986) redescribed the types in a study of Australian eunicids.

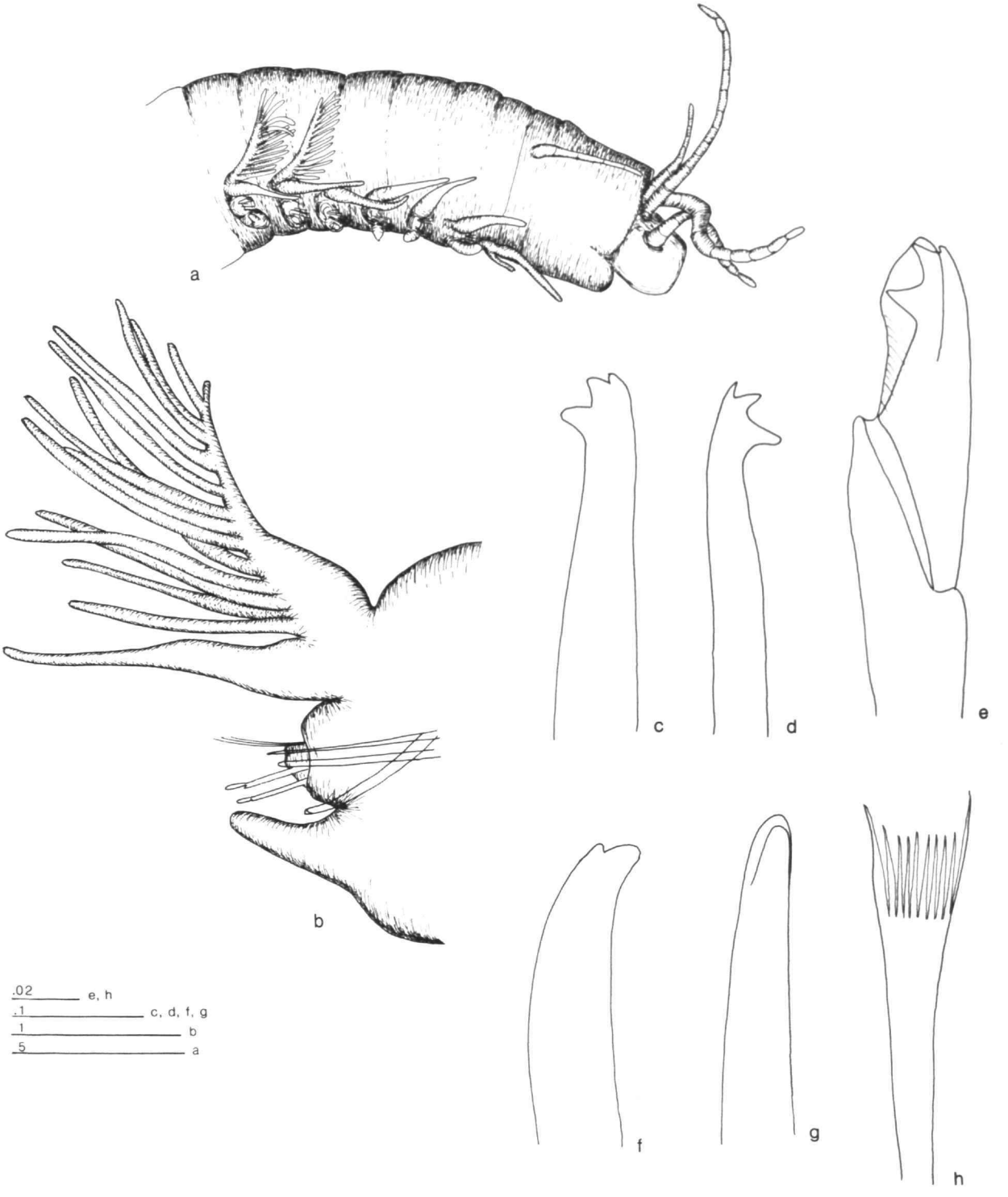

FIGURE 5.—*Eunice aequabilis* (syntype, MPW 273): a, anterior end, lateral view; b, parapodium 55, anterior view; c, subacicular hook, parapodium 55; d, subacicular hook, parapodium 134; e, compound falciger, parapodium 134; f, g, aciculae, parapodium 55; h, pectinate seta, parapodium 134. (Scale bars in mm.)

4. *Eunice afra* Peters, 1854

FIGURE 6; TABLES 33, 35

Eunice afra Peters, 1854:611.—Ehlers, 1897:166.
Eunice collaris Grube, 1869:494-495 [in part, see below].

MATERIAL EXAMINED.—Holotype, ZMB 46, Ibo, Mozambique, coll. Peters; 2 syntypes of *E. collaris*, ZMB F2004 and 2015, Tor, Red Sea, coll. Ehrenberg. One slide marked "Type, BM(NH) ZB 1984.69."

COMMENTS ON MATERIAL EXAMINED.—The description is based on the holotype, with comments on the 2 syntypes of *E. collaris* where appropriate. Peters (1854:611) gave the type locality as "Querimba-Inseln (Ibo)."

DESCRIPTION.—Holotype incomplete of unknown sex, with 43 setigers; total length 32 mm; maximal width 6 mm; length through setiger 10, 10 mm. Anterior body cylindrical; dorsal and ventral surfaces convex, appearing truncate frontally. Body tapering very slowly posteriorly, becoming slightly flattened dorsoventrally, tapering abruptly near pygidium. Anal cirri unknown.

Prostomium (Figure 6a,f) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes posterior to bases of A-I, black. Antennae in a horseshoe, evenly spaced, with A-III slimmer than other four. A-I pyriform; A-II and A-III digitiform; A-III distinctly narrower than other antennae. Ceratophores short, ring-shaped, without articulations. Ceratostyles with up to 5 indistinct cylindrical articulations mostly confined to distal half of A-II and A-III. A-I basally inflated; A-II and A-III digitiform. A-I to front edge of posterior peristomial ring; A-II and III to setiger 1. Peristomium slightly inflated, cylindrical; lower lip distinct and muscular. Separation between rings distinct dorsally and ventrally; anterior ring about 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, thick, digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 6e,j) pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae present from setiger 16 to end of fragment. First branchia with 2 filaments; maximum 6 filaments at setiger 30. Stems tapering, slender. Filaments as long as stems, digitiform, about as long as notopodial cirri.

Median neuropodial acicular lobes distally rounded with aciculae emerging at midline. Anterior and median pre- and postsetal lobes low, transverse or oblique folds. First 5 ventral cirri thick, tapering. Bases of median ventral cirri expanded in long axis of specimen, concave dorsally to form shallow scoop-or cup-shaped structures, containing subacicular hooks. Anterior and median notopodial cirri basally inflated, thickset, tapering to thick tips, without articulations.

Pectinate setae (Figure 6b,g) with slender, cylindrical shafts, most flat, some slightly furled, distally flaring. Marginal teeth about as long as other teeth or slightly longer, slightly thicker than other teeth, up to 20 teeth present. Shafts of compound hooks (Figure 6d,i) distinctly inflated, marginally serrated. All appendages slender, tapering to distinct small heads. Proximal teeth about as large as distal teeth, directed distally. Distal teeth nearly erect in superior hooks, directed laterally in inferior hooks. Guards symmetrically rounded, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single, dark brown, tapering, straight, with round cross-section. Subacicular hooks (Figure 6c,h,k) dark brown, bidentate. Hooks first present from setiger 22, tapering to small heads. Both teeth directed distally; when worn, tips appearing shallowly notched rather than bidentate.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaws; all structures associated with the posterior end, including pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming part of distal arc with left Mx IV. Branchiae continued to near the posterior end. Posterior ventral cirri without inflated bases.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 4 6, 36-38, 40, 47, 50, 57-60, 63, 67, 68, 74, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1; 47,2; 50,2; 57,2; 58,-; 59,-; 60,1; 63,4; 67,2; 68,2; 81,1; 82,1.

REMARKS.—The type lot of *E. afra* consists of the anterior end described above and, in addition, a median fragment of 100 setigers, which does not belong to the same species; it has sessile tufted branchiae and compound spinigers, both features present in species of *Marphysa*. The slide in the collections of BM(NH) contains a single parapodium from the median to posterior part of the body. Branchiae with 6 branchial filaments are present; the subacicular hooks have worn teeth, both of which are pointing distally, and the aciculae are evenly tapering towards a smooth straight tip. Both aciculae and subacicular hooks are brown. These features are consistent with those in the holotype; the slide is here considering as belonging to the type.

The two syntypes of *E. collaris* listed above resemble the holotype of *E. afra* closely, but differ in the following respects. Branchiae are first present from setigers 17 and 19 respectively and subacicular hooks are present from setigers 21 or 23. The shafts of the compound hooks are marginally smooth rather than serrated and the proximal tooth is not bent distally. One marginal tooth on the pectinate setae is longer than the other teeth. Otherwise the specimens agree well. Two other syntypes of *E. collaris* differ distinctly from these and are described separately below.

Eunice afra has been extremely widely reported; it is unclear how many of the reports outside the Indian Ocean represent this, or other, similar species. *Eunice afra* is listed in Tables 33 and 35. In addition to *E. afra*, only *E. ehlersi* has the three

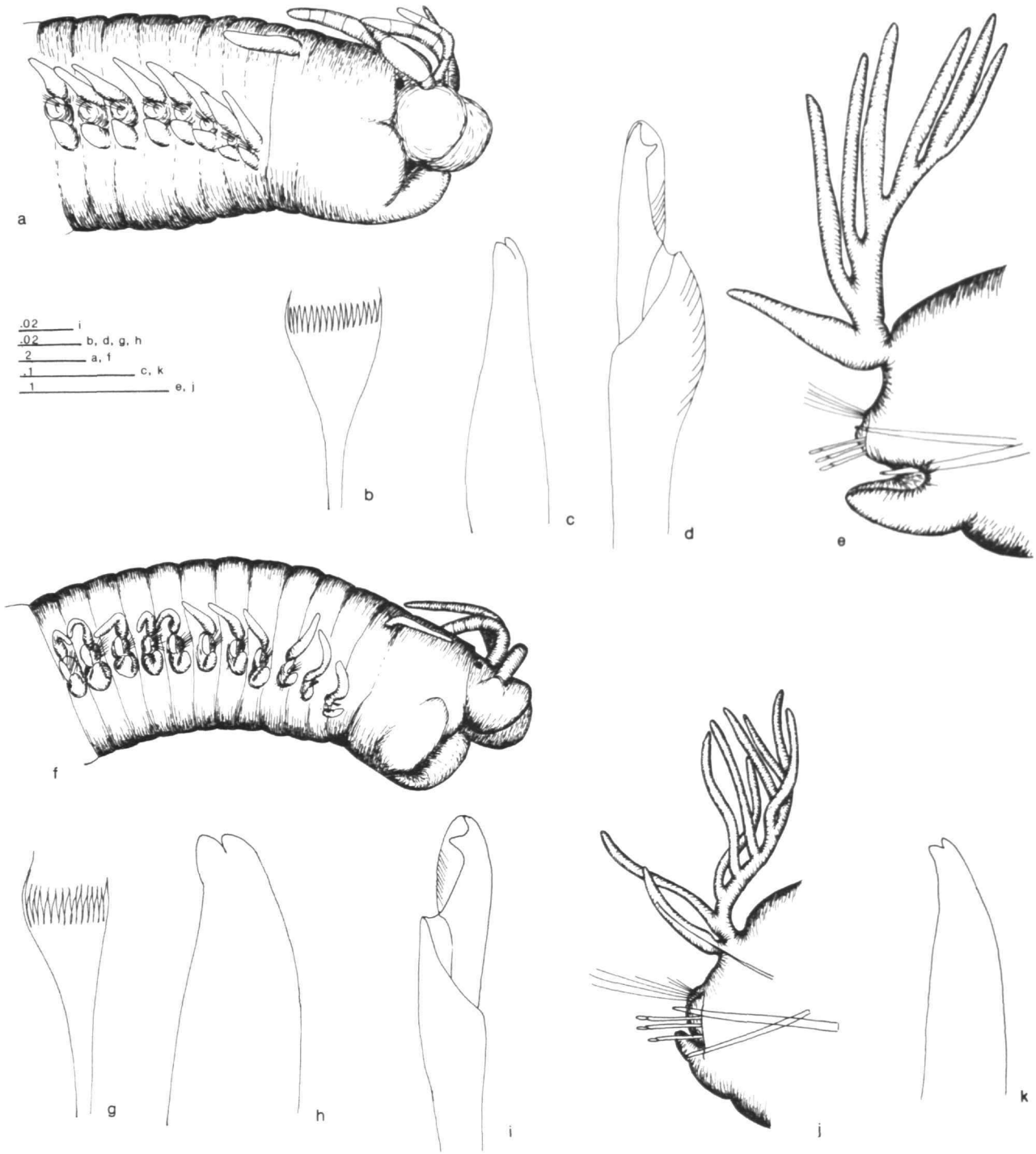

FIGURE 6.—*Eunice afra* (holotype, ZMB 46): a, anterior end, lateral view; b, pectinate seta, parapodium 40; c, subacicular hook, parapodium 40; d, compound falciger, parapodium 40; e, parapodium 40. *Eunice afra* (syntype of *E. collaris* ZMB F2015): f, anterior end, lateral view; g, pectinate seta, parapodium 39; h, subacicular hook, parapodium 39; i, compound falciger, parapodium 39; j, parapodium 39, anterior view. *Eunice afra* (type, BM(NH) ZB 1984.69, slide): k, subacicular hook. (Scale bars in mm.)

median antennae similar in length and clearly outreaching the prostomium. The bases of the median inflated ventral cirri are scoop-shaped in *E. afra* and thick, transverse welts in *E. ehlersi*.

5. *Eunice afuerensis* Hartman, 1944

FIGURE 7; TABLES 52, 53

Eunice afuerensis Hartman, 1944:108-109, pl. 6: figs. 127-134.

MATERIAL EXAMINED.—Holotype, AHF 391-35, Islas Lobos de Afuera, Peru, 6°55'40"S, 80°43'40"W, 17 Jan 1935, shore, rock and algae.

DESCRIPTION.—Holotype complete female with 687 setigers; total length 720 mm; maximal width 12 mm at setiger 15; length through setiger 10, 19 mm; width at setiger 10, 10 mm. Anterior body cylindrical, truncate frontally, tapering slowly posteriorly, becoming dorsoventrally flattened. Anal cirri with moniliform articulations, as long as last 10 setigers; dorsal edge of pygidium crenulated.

Prostomium (Figure 7a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in a straight line, evenly spaced, similar in thickness. All ceratophores short, ring-shaped without articulations. Ceratostyles tapering, with ~20 short articulations; articulations not moniliform, except for distalmost ones. Antennae to middle of anterior peristomial ring. Peristomium ~3 times as long as prostomium with a distinct muscular lower lip. Separation between rings very well marked dorsally and ventrally, indistinct only for a short distance laterally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, medially inflated, without articulations.

Maxillary formula 1+1, 4+5, 4+0, 6+7, and 1+1. Mx III short, located behind left Mx II, forming part of distal arc with left Mx IV. Mx VI absent. Maxillae strongly calcified, brittle.

Branchiae (Figure 7d,e,l) pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to second from last setiger. All branchiae luxuriously pectinate, with up to 25 slender filaments. Stems flexible, slender, cylindrical. Filaments longer than stems in most setigers and longer than notopodial cirri in all but the first 2-3 setigers.

Neuropodial acicular lobes rounded in anterior setigers, obliquely truncate in median and posterior setigers. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 4; free tips tapering in all setigers. Inflated bases retained in all but last setigers, forming broad, transverse welts with tips attached distally. Notopodial cirri medially inflated, with up to 7 articulations in anterior setigers; number and distinctness of articulations lost in first 20 branchial setigers.

Limbate setae longer than other setae, slender, narrow, marginally serrated. Large numbers of pectinate setae present. Anterior pectinate setae (Figure 7b) with thick, cylindrical shafts, furled, tapering; one marginal tooth distinctly thicker and longer than all other teeth; 12 teeth present. Median and posterior pectinate setae (Figure 7f) with wide, flattened shafts. Blades furled, flaring. One marginal tooth longer, but not thicker than other teeth, with 20 teeth. True compound hooks present only in first 25 setigers, replaced by pseudocompound hooks in all other setigers. Shafts of compound hooks (Figure 7c) very coarse, tapering, without serrations. Appendages small, tapering. Both teeth similar in size, directed distally, tapering, slightly curved towards each other. Guards not seen. Pseudocompound hooks (Figure 7h,k) in one preacicular and one postacicular row, up to 5 hooks present in each row; setae oriented roughly in a fan in each row (not well illustrated). Hooks with distinct fused joints, represented by bends on one side and bulges on opposite side. Proximal teeth thicker and more distinctly tapering than distal teeth in most hooks. Distal teeth often distally hooked. All compound and pseudocompound hooks clear yellow. Compound spinigers absent. Aciculae paired, yellow, tapering; cross-sections round. Inferior aciculae coarser than superior aciculae, distinctly bent in anterior setigers. Superior aciculae coarser than inferior aciculae (Figure 7i) in far posterior setigers, but both similar in shape. Subacicular hooks (Figure 7g,j) clear yellow, bidentate. Hooks present from setiger 100, thereafter present singly in all setigers. Hooks slender, smoothly tapering. Proximal teeth much larger than distal teeth, triangular, directed laterally. Distal teeth slender, erect. Guards not seen.

UNKNOWN MORPHOLOGICAL FEATURES.—Guards of compound and subacicular hooks.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Guards of compound hooks asymmetrically bluntly pointed, following outline of appendages closely, marginally smooth.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 13-14, 70.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—70,2.

REMARKS.—*Eunice afuerensis* is very similar to *E. pelamidis* from the same geographical region; both species have the same branchial distribution and similar closely articulated antennae, and the basic setal structures are the same. The two species can be separated on the development of the basal portion of the ventral cirri, which retains an inflated region in most of the body in *E. afuerensis* and is inflated only in anterior setigers in *E. pelamidis* and by the color of the setae, aciculae and subacicular hooks; these are dark amber in *E. pelamidis* and clear yellow in *E. afuerensis*.

Hartman (1944:109) considered the pseudocompound hooks as series of subacicular hooks; the two kinds of hooks are clearly different, both in structure and origin. The pseudocompound hooks originate distal to the subacicular hooks and point distally, whereas the single subacicular hook has the origin and orientation of the subacicular hooks in other eunicids. *Eunice*

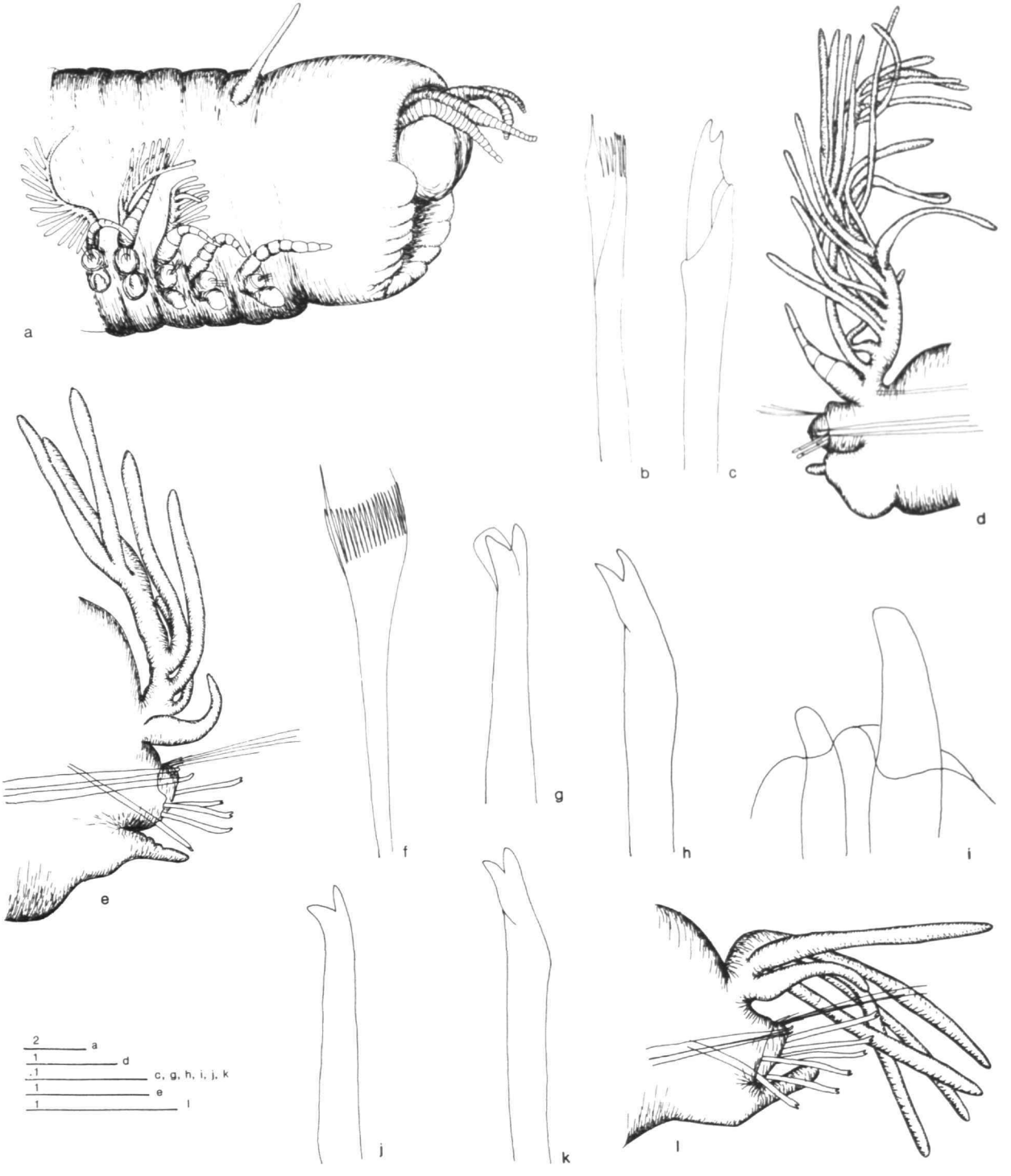

FIGURE 7.—*Eunice afuerensis* (holotype, AHF 391-35): a, anterior end, lateral view; b, pectinate seta, parapodium 11; c, compound falciger, parapodium 11; d, parapodium 11, anterior view; e, parapodium 346, anterior view; f, pectinate seta, parapodium 346; g, subacicular hook, parapodium 346; h, pseudocompound falciger, parapodium 346; i, aciculae, parapodium 346; j, subacicular hook, parapodium 662; k, pseudocompound falciger, parapodium 662; l, parapodium 662. (Scale bars in mm.)

afuerensis and *E. pelamidis* are compared in Tables 52 and 53.

In addition to the types, Hartman (1944:108) also reported the presence of fragments from station 844-38, another intertidal collection at Islas Lobos de Afuera.

6. *Eunice americana* Hartman, 1944

FIGURE 8; TABLES 41, 42

Eunice americana Hartman, 1944:118–121, pl. 8: figs. 164–174, 189.

MATERIAL EXAMINED.—Holotype, AHF Poly 0725, off Redondo Beach, California, 33°49′30″N, 118°26′15″W to 33°49′15″N, 118°26′30″W, 315–249 m, mud and worms or 33°49′15″N, 118°26′20″W to 33°48′45″N, 118°25′55″W, 256–90 m, mud. *Velero* sta 1133-40 (dredge hauls 1 and 2).

COMMENTS ON MATERIAL EXAMINED.—The holotype is very soft. Hartman (1944:121) listed 1130-40 as the type locality; this station was off Newport Beach, rather than Redondo Beach. The labels with the specimens agree with the other information given, so station 1133-40 is here considered the type locality.

DESCRIPTION.—Holotype complete, of unknown sex with 123 setigers; total length 86 mm; maximal width 2 mm at setiger 10; length through setiger 10, 9 mm.

Prostomium (Figure 8a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally truncate, dorsally slightly inflated; median sulcus shallow. Two pairs of black eyes; anterior pair behind bases of A-I; posterior pair near peristomial fold. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles distinctly tapering, with up to 20 vaguely indicated, cylindrical rings. A-I to setiger 1; A-II and III to setiger 4. Peristomium more than twice as long as prostomium, cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 2/3 of total peristomial length. Peristomial cirri nearly to tip of prostomium, basally inflated, tapering to fine tip, without articulations.

Maxillary formula 1+1, 8+8, 9+0, 8+10, and 1+1. Mx III long, located behind left Mx II; Mx VI absent.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 35, terminating well before posterior end, present on less than 55% of total number of setigers. All branchiae, except last 2 pairs, with at least 2 filaments. Maximum 20 filaments at setiger 10–15. Stems slender, erect, longer than filaments. Filaments slender, shorter than stems and notopodial cirri.

Anterior neuropodial acicular lobes distally truncate, symmetrically rounded posteriorly; aciculae emerging at midline. Pre- and postsetal lobes low transverse folds. First 5 ventral cirri thick, digitiform, basally strongly inflated in branchial region. Inflated bases decreasing in postbranchial setigers. Inflated bases ovate; distal tips digitiform. Ventral cirri becoming slender and digitiform in last setigers. Anterior notopodial cirri medially inflated; medial and posterior notopodial cirri increasingly slender and digitiform, shorter than in anterior parapodia. All notopodial cirri articulated, with up to 3 distinct articulations.

Limbate setae longer than compound hooks, slender, marginally serrated. Pectinate setae (Figure 8c) with slender, cylindrical shafts. Blades flaring, flat. Both marginal teeth longer than other teeth; ~15 teeth. Shafts of compound hooks (Figure 8b) inflated, marginally serrated. Appendages very long, narrow, tapering distally; heads very small, bidentate. Proximal teeth small, triangular elevations; distal teeth slender, nearly erect, longer than proximal teeth. Guards very slender, tapering to very long, symmetrically placed mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 8d) paired, yellow, tapering, distally asymmetrically bent; tips slightly flattened. Neither aciculae nor subacicular hooks with distinct separation between sheath and core. Subacicular hooks (Figure 8e) yellow, tridentate. Hooks first present from setiger 25, present in all setigers thereafter, single. Main fangs large, pointed, tertiary fangs often very small.

UNKNOWN MORPHOLOGICAL FEATURES.—Body shape not described (specimens very soft); details of pygidium and anal cirri not described. Shape of left Mx IV not described.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Left Mx IV about as long as right Mx IV; curved distally.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice americana* is listed with similar species in Tables 41 and 42. It is the only species in Table 42 with as many as 20 branchial filaments; the next highest number is 12. Two pairs of eyes have also been reported from *E. gravieri;* however, the latter has dark brown or black, bidentate subacicular hooks.

Hartman (1944:121) listed her new species from a total of 19 stations off western Mexico and southern California in shelf depths.

7. *Eunice amoureuxi* Rullier, 1974

TABLES, 24, 26

Eunice amoureuxi Rullier, 1974:45–47, fig. 3a–k.

MATERIAL EXAMINED.—The original material of this species is not present in the collections in Paris or Angers. The material was collected by Bacescu and Gomoiu in Cuba in 1969. Requests for information about the material sent to Roumania, where the type was deposited (Rullier, 1974:47) went unanswered.

This species was originally described from Bahia de Habana,

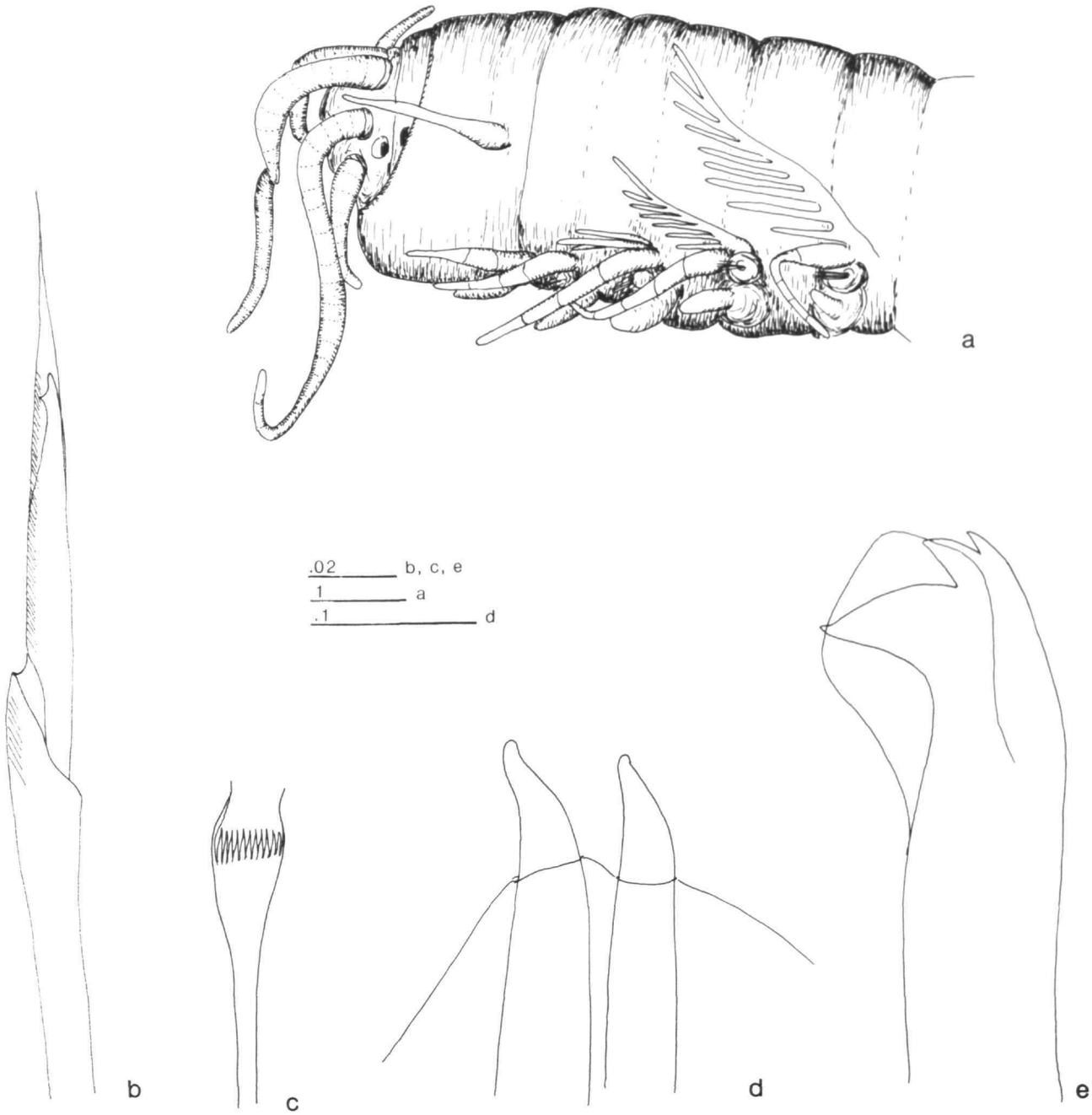

FIGURE 8.—*Eunice americana* (syntype, AHF Poly 0725): a, anterior end, lateral view; b, compound falciger, parapodium 46; c, pectinate seta, parapodium 46; d, aciculae, parapodium 46; e, subacicular hook, parapodium 46. (Scale bars in mm.)

Cuba, in 15 m depth. The following summary of the original description reports all that is known about this species.

DESCRIPTION.—Complete specimen 13 mm long; number of setigers not mentioned.

Prostomium frontally rounded. Eyes present. Antennae evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. A-II and III similar and A-I shorter; none

reaching beyond anterior peristomial ring. Peristomial cirri to posterior end of anterior peristomial ring, without articulations.

The apparent maxillary formula 1+1, 5+5, ?5+0, and ?+4 and 1+1.

Branchiae present, single filaments, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 9 to setiger 24. Branchiae terminating well before posterior end.

Pectinate setae with one marginal tooth heavier than other teeth, with ~10 teeth. Shafts of compound hooks inflated, marginally serrated. Appendages short, tapering, with very large heads, bidentate. Both teeth of about same size, sharply pointed. Distal teeth distinctly curved. Guards symmetrically rounded, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae dark-colored, tapering, straight. Subacicular hooks from setiger 17, dark-colored, bidentate. Hooks strongly curved. Proximal teeth slightly larger than distal teeth, directed laterally. Distal teeth slender, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features unknown.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Species too poorly known to make meaningful predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22. *Unknown Characters:* 1, 3-6, 7-12, 15, 24-26, 28, 34, 38-68, 74, 75, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—This species is very poorly known; it has been listed with similar taxa in Tables 24 and 26, but has not been included in the key. In some features it resembles juveniles recorded from Belize, Central America, but without access to specimens from the type locality, such a relationship cannot be established. *Eunice amoureuxi* is the only species listed in Table 26 with single branchial filaments throughout.

8. *Eunice amphiheliae* Marion in Filhol, 1885

TABLE 27

Eunice amphiheliae Marion in Filhol, 1885:199.—Roule, 1896:446-449, pl. 19: figs. 1, 2, pl. 20: fig. 3, pl. 23: figs. 16-21, pl. 25: figs. 25, 26.

MATERIAL EXAMINED.—No specimens are available. The following description is summarized, with updated terminology, from Roule's description.

DESCRIPTION.—Complete specimens with 140-150 segments; length 180-200 mm; width 7-10 mm.

Prostomium distinctly shorter and distinctly narrower than peristomium. Peristomial lobes frontally truncate, dorsally apparently flattened; median sulcus deep. Eyes absent. Antennae apparently in straight line, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, irregularly articulated. All antennae similar in length; none reaching beyond peristomium. Peristomium massive, cylindrical. Separation between rings distinct on all sides or perhaps interrupted for short distance laterally; anterior ring ~5/6 of total peristomial length. Peristomial cirri to anterior edge of peristomium, tapering, slender, without articulations.

Apparent maxillary formula 1+1. 5+5, ?8+0, ?+5, 1+1. Illustration confused; number of teeth of Mx III and IV and shape of maxillae cannot be determined from description or illustration.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to setigers 140-150, decreasing drastically in size and complexity in posterior 2/3 of body. Branchiae present to near posterior end, in more than 65% of total number of setigers. Maximally 7 filaments present. Stems tapering, longer than filaments. Filaments digitiform, shorter than notopodial cirri.

Median acicular lobes distally rounded to triangular or conical with aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Ventral cirri tapering, thick. Notopodial cirri long, slender, tapering, without articulations. Shafts of compound hooks inflated. Appendages short, tapering, with large heads, bidentate. Proximal teeth triangular, directed laterally. Distal teeth smaller than proximal teeth, nearly erect. Guards symmetrically sharply pointed, mucronate. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black. Subacicular hooks presumably black and bidentate.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features unknown.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Species too poorly known to make meaningful predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14. *Unknown Characters:* 4-6, 12, 16, 39, 40, 42, 53-60, 65-68, 74, 75, 78, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The species was originally named and briefly characterized by Marion in Filhol (1885:199) as having parchment-like tubes attached to stony corals from the Golfe de Gascogne, collected during the 1880 cruise of the *Travailleur;* also specifically mentioned were the eyeless condition of these specimens. Roule (1896:446) redescribed the species on material from the same area, taken during the *Caudan* cruises in 1895. He quoted Marion in Filhol as the author of the species; nevertheless, he proceeded to describe it as new. Clearly, Marion in Filhol (1885) is the author of the species, with Roule (1896) as first revisor.

The species is incompletely known, and without access to the types or material from the type locality, it is impossible to decide if it is valid. It has been considered a synonym of *E. harassii* and of *E. pennata* (Fauvel, 1923:399-401). Based on the available information it is placed in group B-2 and is listed

with similar species in Table 27; it has not been included in the key.

Eunice anceps Pruvot, 1930

Eunice anceps Pruvot, 1930:69.
Eunice afra.—Fauvel in Pruvot, 1930:69 [in part, not *Eunice afra* Peters, 1854].

REMARKS.—*Eunice anceps* was named in a list of synonyms of *E. afra* in a paper written by Pruvot, a paper that Fauvel edited and issued after Pruvot's death. Pruvot was named as the author of the species. The epithet has never been used as a valid name for the taxon and is thus not available as a name. The species is described below as *E. pruvoti;* the new name honors the original author of the species, G. Pruvot.

10. *Eunice annulicornis* Johnston, 1865

FIGURE 9; TABLE 27

Eunice annulicornis Johnston, 1865:131-132.—Baird in Johnston, 1865:340.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1962.6.1. Spinola N.Sy. 23 Feb 1821 (see comment below).

DESCRIPTION.—Holotype complete, of unknown sex, with 145 setigers, last 33 in regeneration; total length 135 mm; maximal width 4 mm; length through setiger 10, 12.5 mm.

Prostomium (Figure 9a) distinctly shorter and narrower than peristomium, as deep as 1/2 the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in a transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 13 moniliform articulations in A-III; articulations limited to distal half of styles. A-I to middle of peristomium; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical. Separation between rings visible only dorsally between bases of peristomial cirri; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of prostomium, slender and digitiform, with 6 articulations.

Jaws not observed.

Branchiae present, pectinate (Figure 9e), distinctly shorter than notopodial cirri in most setigers, longer than the notopodial cirri in the few setigers around setiger 15, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 134, missing in 12 last (regenerating) setigers. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Last 2-3 pairs single filaments; all other branchiae with at least two filaments. Maximum 9 filaments from about setiger 15. Length of branchiae decreasing rapidly from about setiger 25; numbers of filaments reduced to 3-4; this number retained for rest of branchial region. Stems tapering, about as long as filaments. Filaments distinctly shorter than notopodial cirri, digitiform.

Median acicular lobes distally truncate with aciculae emerging dorsal to midline. Pre- and postsetal lobes low, transverse folds. Ventral cirri tapering from narrow bases through setiger 5. Median ventral cirri basally inflated. Bases ovate or spherical, narrow tips digitiform. Inflated bases reduced from about setiger 30. Ventral cirri digitiform in posterior 1/3 of body. All notopodial cirri slightly inflated basally, articulated in all setigers with 3-4 distinct articulations in most segments.

Limbate setae slender. Shafts of pectinate setae (Figure 9c) wide, flat. Blades flaring, flat. One marginal tooth distinctly longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 9b) inflated, with distinct internal striations, marginally smooth; distal beaks present. Appendages short, with wide bases, bidentate. Proximal teeth shorter than distal teeth, broadly triangular, directed laterally. Distal teeth gently curved, directed laterally. Guards symmetrically bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black, tapering, gently curved; cross-section round. Subacicular hooks (Figure 9d) black, bidentate. Hooks first present from setiger 35, present in all setigers thereafter, always single. Hooks distally rapidly tapering. Both teeth of similar size, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri not described; jaws not described.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, located between Mx II and Mx IV, but not part of arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Features:* 4, 6, 13, 14, 75, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—75,1.

REMARKS.—The locality information on the label reads as indicated above. Johnston did not know to what locality the name Spinola referred. Johnston's 1865 work was issued posthumously, and Baird wrote a set of "Addenda" and "Corrigenda" to the volume printed as part of the volume; his comment (Baird in Johnston, 1865:340) reads:

> This is most probably not a British species. It is the *E. annulicornis* of Maximilian Spinola, but not described by him. It is very likely, from the label upon the bottle, to have been sent to the Museum by Spinola, and is perhaps a native of the Gulf of Genoa.

Eunice annulicornis agrees in most respects with *E. torquata* Quatrefages; Fauvel (1923:401) suggested that they might be synonymous. These two species are the only ones listed in Table 27 to have moniliform articulations in the ceratostyles. They differ from each other in some minor details of the setae, including the presence of marginal teeth along the upper end of the shaft in *E. torquata;* such dentition is absent in *E. annulicornis*. The peristomial cirri reach the anterior end of the peristomium in *E. torquata* and to the middle of the prostomium in *E. annulicornis*. The pectinate setae are tapering

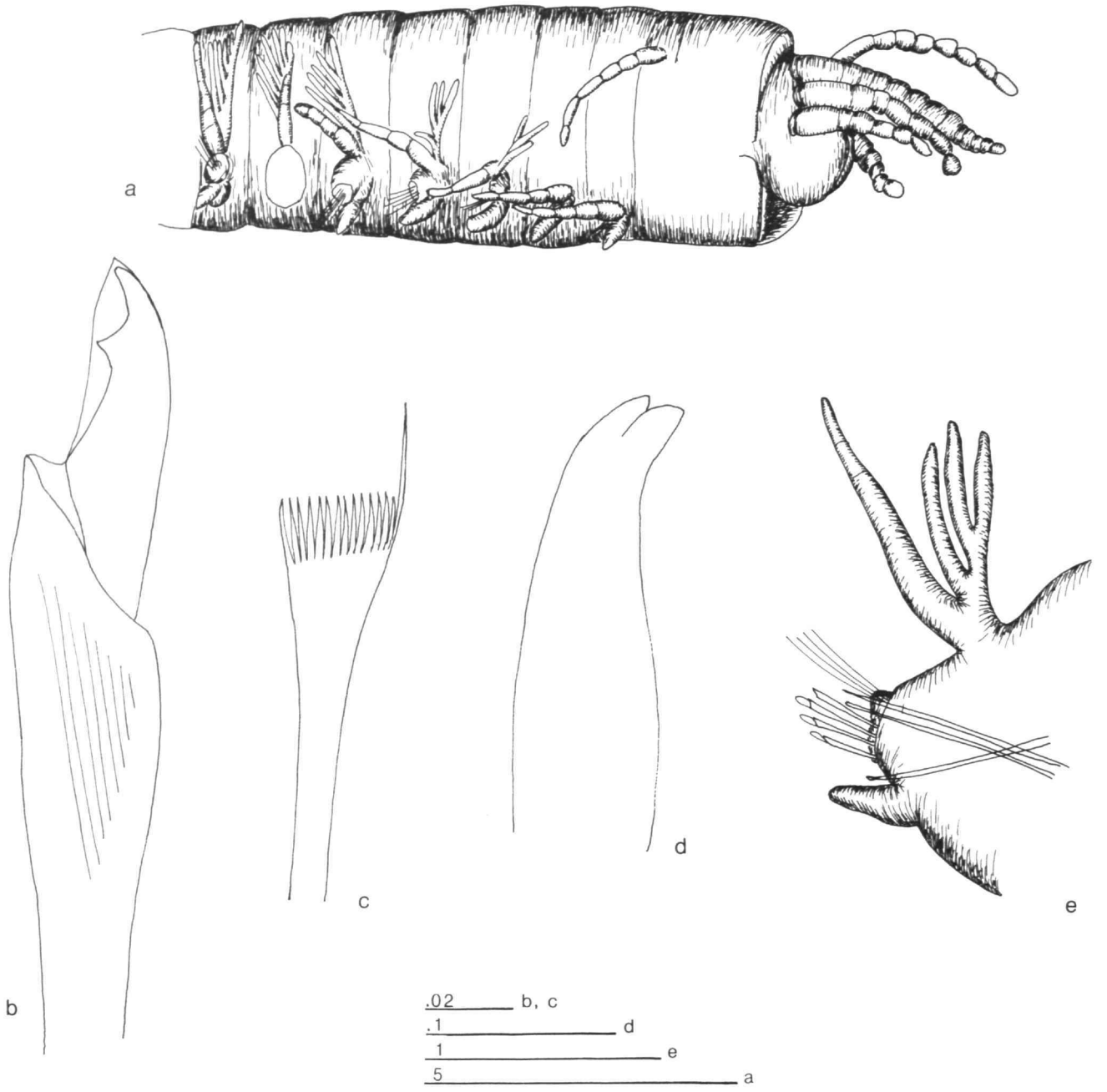

FIGURE 9.—*Eunice annulicornis* (holotype, BM(NH) ZK 1962.6.1): a, anterior end, lateral view; b, compound falciger, parapodium 77; c, pectinate seta, parapodium 77; d, subacicular hook, parapodium 77; e, parapodium 77, anterior view. (Scale bars in mm.)

in *E. torquata* and mildly flaring in *E. annulicornis*. Finally, the subacicular hooks are occasionally paired in *E. torquata* and always single in *E. annulicornis*. All these differences are minor and may well fall within the range of variability of a single species. Johnston's name predates Quatrefages', because Quatrefages' book was not issued until 1866. However, if the two are found to be synonymous, Quatrefages' name is to be preferred for two reasons: It is well known and has been

frequently used and it has a known type locality. Johnston's name does not appear to have been used separately.

11. *Eunice antarctica* Baird, 1869

FIGURE 10; TABLES 19, 21

Eunice antarctica Baird, 1869:348.

Eunice pennata.—Hartman 1964:118 [in part, not *Eunice pennata* Müller, 1776].

MATERIAL EXAMINED.—Three syntypes, BM(NH) ZB 1972.70, Antarctic Seas, *Erebus* and *Terror* Southern Seas Expedition.

COMMENTS ON MATERIAL EXAMINED.—The type material consists of three syntypes and two posterior fragments. Two of the three syntypes are incomplete. The third syntype is complete and is described in detail below.

DESCRIPTION.—Syntype complete, of unknown sex, with 122 setigers; total length 102 mm; maximal width 3.5 mm; length through setiger 10, 11 mm.

Prostomium (Figure 10a) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes not observed. Antennae in a shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped, without articulations. Ceratostyles digitiform, with up to 10 irregular, distinct or very indistinct cylindrical articulations in A-III. A-I to end of peristomium; A-II to setiger 1 (setiger 3 in another syntype); A-III to setiger 3 (setiger 4 in another syntype). Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri to posterior end of prostomium, slender and digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 10b) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 39–44. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 6–7 and last 2 branchiae with single filaments. Maximum 5 filaments at about setiger 15. Stems slender, cylindrical, shorter than filaments. Filaments shorter than notopodial cirri, tapering.

Median acicular lobes distally truncate with aciculae emerging at midline. Pre- and postsetal lobes follow outline of acicular lobes closely. First 3 ventral cirri digitiform, about half as long as notopodial cirri, becoming basally inflated from first branchial setigers. Inflated bases nearly spherical in most of branchial region, retaining digitiform, distally truncate tips. Inflated bases gradually lost in postbranchial region; last 30–40 ventral cirri slender, digitiform, increasing in length posteriorly, remaining less than half as long as notopodial cirri in all segments. Anterior notopodial cirri slender, medially inflated, usually with 1–2 articulations. Median and posterior notopodial cirri (Figure 10g) increasingly slender, digitiform in postbranchial region; articulations increasingly poorly marked; finally represented only by steps in width of cirri.

Limbate setae rather slender, marginally serrated. Shafts of pectinate setae (Figure 10d) wide, cylindrical. Blades tapering, flat. One marginal tooth much longer than other teeth, with ~10 rather coarse teeth. Shafts of compound falcigers (Figure 10c) barely inflated; marginally smooth; distal beaks distinct. Appendages thick, bidentate, with very short teeth. Proximal teeth much smaller than distal teeth, triangular, directed laterally. Distal teeth gently curved, directed laterally. Guards symmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae usually paired, yellow, slender, tapering, gently curved ventrally (Figure 10e); cross-section round. Subacicular hooks (Figure 10f) yellow, bidentate. Hooks first present from setiger 31–44, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering smoothly, with very large heads. Proximal teeth larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, but forming distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice antarctica* has been considered a synonym of *E. pennata* (Hartman, 1964:118). The two species can be separated on several features. *Eunice antarctica* has a maximum of five branchial filaments in branchiae that are shorter than the notopodial cirri; *E. pennata* has up to 12 filaments in branchiae that are distinctly longer than notopodial cirri. In *E. antarctica* the notopodial cirri have at least one distinct articulation throughout the body, but lack distinct cirrophores; in *E. pennata* the notopodial cirri are articulated in prebranchial segments; they lack all articulations in the branchial region and have a distinct basal cirrophore in postbranchial setigers. *Eunice antarctica* is listed with similar species in Tables 19 and 21. It is the only species in Table 21 with branchiae shorter than notopodial cirri and with the notopodial cirri articulated throughout the body.

Baird (1869) suggested that his new species resembled *E. havaica*, one of Kinberg's species; the latter has strongly moniliform antennal articulations and tridentate subacicular hooks. *Eunice antarctica* has cylindrical antennal articulations and bidentate subacicular hooks.

FIGURE 10.—*Eunice antarctica* (syntype, BM(NH) ZB 1972.70): a, anterior end, lateral view; b, parapodium 21, anterior view; c, compound falciger, parapodium 21; d, pectinate seta, parapodium 21; e, acicula, parapodium 106; f, subacicular hook, parapodium 106; g, parapodium 106, anterior view. (Scale bars in mm.)

12. *Eunice antennata* (Lamarck, 1818)

FIGURE 11; TABLES 2, 46, 47

Leodice antennata Lamarck, 1818:322.—Savigny, 1820:49-50, pl. 5: fig. 1.1-27.

Eunice antennata.—Audouin and Milne Edwards, 1833:219.

MATERIAL EXAMINED.—BM(NH) ZH 1869.7.8.6, Gulf of Suez, presented by R. McAndrew, Esq.

COMMENTS ON MATERIAL EXAMINED.—The type material is lost; the largest specimen in ZH 1869.7.8.6 is here described in detail; variability is indicated in Table 2. These specimens were collected a few years after the opening of the Suez Canal. It appears unlikely that the fauna would have been extensively modified compared to the one present during Napoleon I's expedition to Egypt. The material studied by Savigny and Lamarck was collected during the latter expedition.

DESCRIPTION.—Specimen complete, of unknown sex, with 98 setigers; total length 54 mm; maximal width 3 mm; length through setiger 10, 7 mm.

Prostomium (Figure 11a) nearly as long as anterior peristomial ring, distinctly narrower than peristomium, about as deep as 1/2 the depth of peristomium. Prostomial lobes frontally

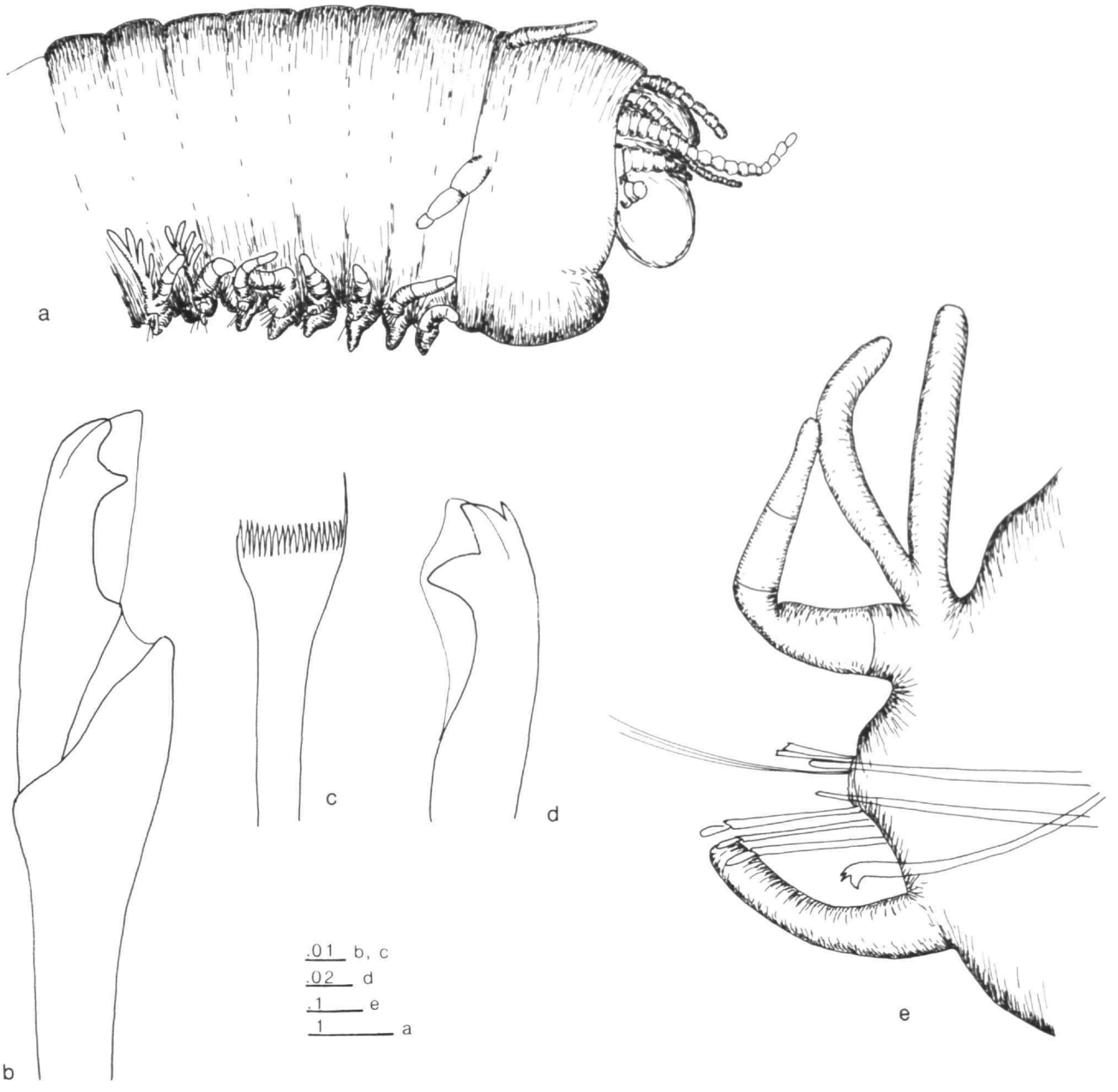

FIGURE 11.—*Eunice antennata* (BM(NH) ZH 1869.7.8.6, large specimen): a, anterior end, lateral view; b, compound falciger, parapodium 66; c, pectinate seta, parapodium 66; d, subacicular hook, parapodium 66; e, parapodium 66, anterior view. (Scale bars in mm.)

rounded, dorsally flattened; median sulcus deep. Eyes posterior to bases of A-I. Antennae in a shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 17 moniliform articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 3. Peristomium cylindrical; lower lip inflated and muscular. Separation between peristomial rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, with 3 long articulations.

Jaws missing.

TABLE 2.—Variable and invariable characters in the material examined of *Eunice antennata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	6	3.5	2	2.58	0.66
Length through 10	6	7.5	4	5.50	1.18
No. of antennal articulations	6	29	16	21.17	4.49
No. of peristomial cirral articulations	6	4	3	3.67	0.52
Branchial start	6	7	5	6.20	0.84
Max. no of branchial filaments	6	11	4	7.50	2.26
Ventral cirri inflated through setiger	6	33	24	30.33	3.27
No. of notopodial articulations	6	5	2	3.83	0.98
No. of teeth in pectinate setae	6	15	12	12.50	1.22
Subacicular hooks first present from setiger	6	29	21	26.33	3.33

INVARIABLE FEATURES	N=6
Length of peristomial cirri	to middle of peristomium
Reduced branchial section	present
Pectinate setae	flared and flat
Shaft of compound falcigers	inflated
Acicular color	yellow
Acicular tips	blunt or pointed
Subacicular color	yellow
Core-sheath construction	invisible
No. of subacicular teeth	3

Branchiae present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region, erect. Branchiae from setiger 7 to setiger 92. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae except the last 3 with at least 2 filaments; first branchia with 4 filaments, maximum 7 relatively short filaments. Stems short, tapering. Filaments (Figure 11e) no longer than notopodial cirri. Number of filaments reduced to 2 or 3 in setigers 50 to 70, increasing to 4 in setigers 75–85, thereafter branchiae decreasing rapidly both in size and numbers of filaments, absent in last 6 setigers.

Anterior neuropodial lobes truncate; posterior acicular lobes somewhat more conical, but retaining broadly transverse shape in all setigers; aciculae emerging near midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering, becoming basally inflated from about setiger 5. Inflated bases relatively modest, ovate, lost by setiger 35; narrow tips digitiform. Posterior ventral cirri increasingly slender, elongated towards the posterior end, digitiform, and longer than notopodial cirri in last 10–15 setigers. All notopodial cirri basally inflated, with 2–3 long, cylindrical articulations. Notopodial cirri increasing by one-third in length in early branchial setigers, decreasing in length towards posterior end, finally being as long as in first setigers.

Limbate setae slender, marginally smooth. Shafts of pectinate setae (Figure 11c) flat, wide. Blades flat, flared. One marginal tooth longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 11b) strongly inflated, marginally smooth; distinct beaks small. Appendages thick, with distinct bosses on cutting edge near base, bidentate. Proximal teeth directed laterally, slightly narrower than distal teeth. Distal teeth thick, curved. Guards asymmetrically bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, tapering, blunt, straight, cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 11d) yellow, tridentate with teeth in a crest. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Fangs decreasing evenly in size from large main fang to small tertiary fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, straight and located behind left Mx II. Distal arc absent; Mx VI absent. Anal cirri long, with moniliform articulations.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—As noted in the introduction, Lamarck is the author of both the genus *Leodice* and this species. Savigny was clearly responsible for recognizing, describing, and illustrating the species, but did not publish his description until 1820; in the meantime, Lamarck and Cuvier both had taken advantage of their access to his manuscript.

Eunice antennata was described from the Gulf of Suez and has been reported from worldwide areas. Restriction of the species implied by the definition given above excludes a large number of morphs reported from other areas. *Eunice antennata*

is listed with similar species in Tables 46 and 47. Four species in Table 47 have reduced branchiae in a median region. In addition to *E. antennata*, this group includes *E. margaritacea*, *E. oliga*, and *E. torresiensis*. *Eunice margaritacea* has tridentate appendages in the compound hooks; the other species have bidentate appendages. *Eunice oliga* has very poorly developed branchiae with a maximum of three filaments; the two other species have seven filaments where the branchiae are best developed. The ceratophores are long in *E. torresiensis* and are short and ring-shaped in *E. antennata*. Other differences can be seen by comparing the illustrations of the two species.

Eunice antennata aedificatrix Monro, 1933

Eunice antennata aedificatrix Monro, 1933:60-61.

REMARKS.—Originally described as a subspecies, this morph is here considered sufficiently different from *E. antennata* to be treated as a distinct species.

Eunice antennata gracilis Grube, 1866

Eunice antennata gracilis Grube, 1866a:65.

REMARKS.—This "variety" is distinctly different from *E. antennata* and is here treated separately as *E. gracilis*.

13. *Eunice antillensis* Ehlers, 1887

FIGURE 12; TABLES 19, 20

Eunice antillensis Ehlers, 1887:84-85, pl. 24: figs. 5-7 [in part].

MATERIAL EXAMINED.—Lectotype, one syntype of *E. antillensis*, MCZ 810, *Blake* sta 45, 25°23'N, 84°21'W, 185 m.

COMMENTS ON MATERIAL EXAMINED.—The original material of *E. antillensis* consists of three specimens. The one described here was illustrated by Ehlers (1887, pl. 24: fig. 6) and is here selected as lectotype for the species; one incomplete specimen consisting of ~35 setigers and devoid of antennae, branchiae, and all but the broken stubs of the setae; and one complete specimen described below as a new species, *E. stanleyi*.

DESCRIPTION.— Lectotype an incomplete female with 62 setigers; total length 30 mm; maximal width 3 mm; length through setiger 10, 7 mm. Body thick, cylindrical, anteriorly truncate.

Prostomium (Figure 12b) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus shallow. Eyes outside bases of A-II, black, overlapped by peristomial fold. Antennae in a deep horseshoe; A-I and II emerging close together, separated by a distinct gap from A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 24 cylindrical, somewhat irregular articulations. A-I to setiger 3; A-II to setiger 10; A-III to setiger 16. Peristomium cylindrical. Separation between rings distinct dorsally, visible ventrally; anterior ring ~4/5 of total peristomial length. Peristomial cirri reaching well beyond prostomium, as long as A-I, slender and digitiform, with 5 articulations.

Maxillary formula 1+1, 4+4, 6+0, 4+9, and 1+1.

Branchiae present, pectinate, distinctly shorter than notopodial cirri (Figure 12c), not reduced in mid-body region, erect. Branchiae from setiger 4 through setiger 36. Branchiae terminating well before posterior end. First and last 2 pairs single filaments, maximum 6 filaments. Stems tapering. Filaments digitiform.

Median acicular lobes distally truncate with aciculae emerging dorsal to midline. Pre- and postsetal lobes low, transverse folds. Ventral cirri without inflation in 3 anterior setigers. Anterior ventral cirri very thick, tapering from narrow bases. Median ventral cirri basally inflated. Bases ovate or spherical; narrow tips tapering. Postbranchial ventral cirri without basal inflations, tapering. Anterior notopodial cirri digitiform, with 4 or 5 articulations. In branchial region notopodial cirri very long, tapering to long slender tips, with 3 or 4 indistinct articulations. Postbranchial notopodial cirri (Figure 12a) considerably shorter than those in branchial region, with 2 or 3 articulations.

Limbate setae slender, marginally serrated. Shafts of pectinate setae (Figure 12g) wide, cylindrical. Blades tapering, flat. Both marginal teeth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 12f) slightly inflated, marginally indistinctly serrated, without distal beaks. Appendages short, bidentate; teeth prominent. Proximal teeth very much larger than distal teeth, tapering, directed basally. Distal teeth tapering, hooked, rather than smoothly curved. Guards symmetrically smoothly rounded, distinctly serrated basally, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow; cross-section of shaft round, distally flattened and expanded into rounded tabs (Figure 12d). Subacicular hooks (Figure 12e) yellow, bidentate. Hooks first present from setiger 33, present in all setigers thereafter, paired in some setigers. Hooks tapering distally; heads large. Proximal teeth very much larger than distal teeth, slender, tapering, directed laterally. Distal teeth slender, tapering, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with the posterior end, such as the shape of posterior parapodial features, pygidium, and anal cirri; the shape of Mx III and its relation to left Mx IV.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 38, 42, 67, 68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice antillensis* as here defined resembles *E.*

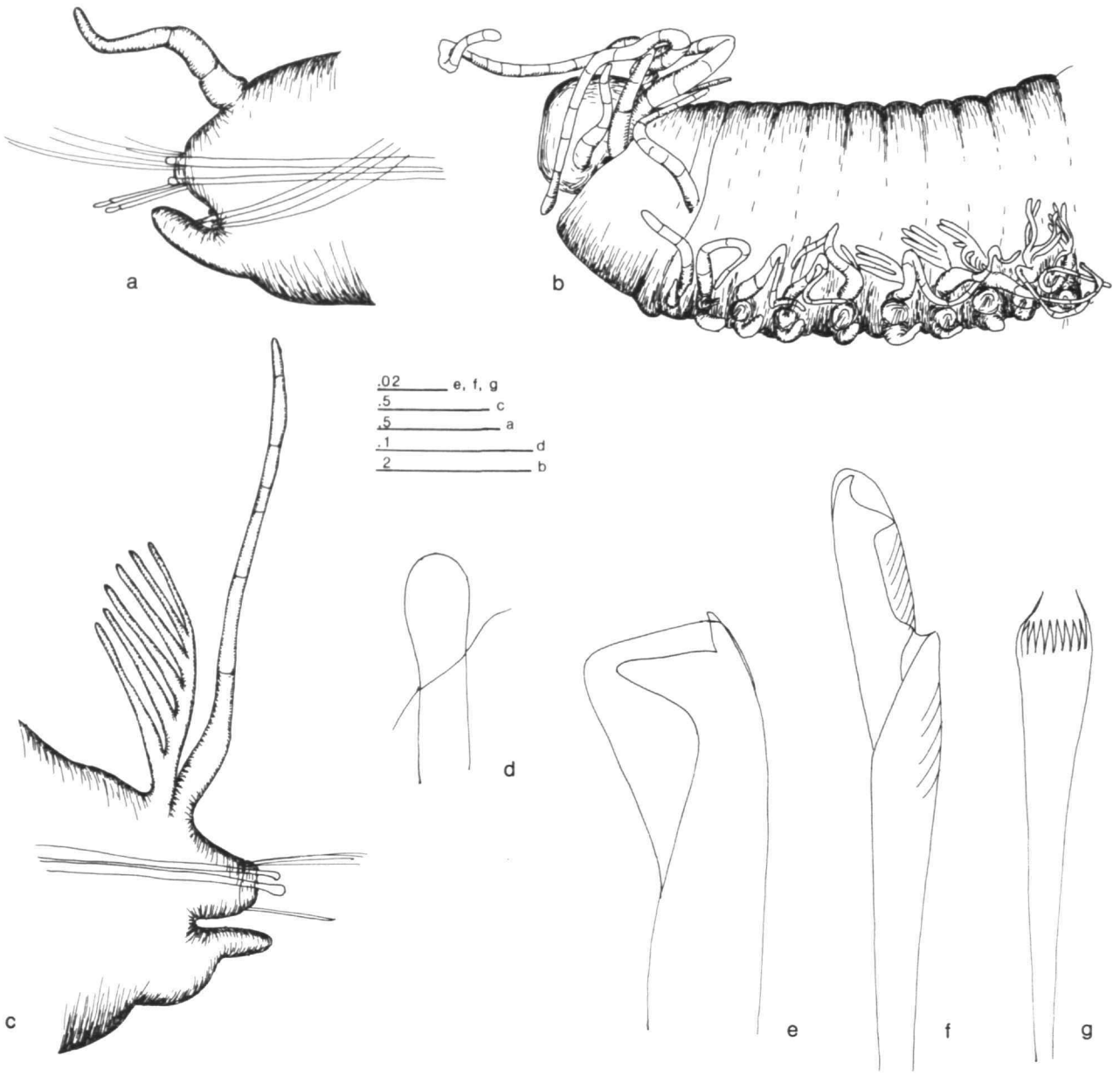

FIGURE 12.—*Eunice antillensis* (MCZ, syntype 1): a, parapodium 55, anterior view; b, anterior end, lateral view; c, parapodium 11, anterior view; d, acicula, parapodium 11; e, subacicular hook, parapodium 55; f, compound falciger, parapodium 55; g, pectinate seta, parapodium 55. (Scale bars in mm.)

websteri and related species. Most species in this group have branchiae from setiger 3; they are present from setiger 4 in *E. antillensis*. *Eunice antillensis* is listed with similar species in Tables 19 and 20. It is the only species in Table 20 with branchiae shorter than the notopodial cirri; and is one of four species in this table with fewer than 10 branchial filaments; the other three being *E. articulata*, *E. biannulata*, and *E. kobiensis*. These three species have articulated notopodial cirri limited to the anterior end; *E. antillensis* has the notopodial cirri articulated throughout the body.

Ehlers (1887:84) remarked that his type specimens differed in some respects; he believed the differences to be a case of

sexual dimorphism. One of the two specimens is of indeterminate sex; there is little evidence in the rest of the group that sexual dimorphism is present and the two specimens differ in most features used to characterize separate species. They are, as indicated above, considered as such here.

14. *Eunice aphroditois* (Pallas, 1788)

FIGURE 13a-d; TABLES 27, 28

Nereis aphroditois Pallas, 1788:229-230, pl. 5: figs. 1-7.
Eunice aphroditois.—Cuvier, 1817:525.—Ehlers, 1868:306-310, pl. 15: figs. 23-29.—Fauvel, 1917:215-220, fig. 18 [in part], pl. 7.
Leodice gigantea Lamarck, 1818:322.—Savigny, 1820:49-50.

MATERIAL EXAMINED.—MNHN, Paris, La Réunion, Indian Ocean, coll. M. Carrière, 1910.

COMMENTS ON MATERIAL EXAMINED.—The type material is lost; it came from Sri Lanka; the specimen here described matches the original description closely.

DESCRIPTION.—Specimen posteriorly incomplete, of unknown sex; with 529 setigers; total length 800 mm; maximal width 22 mm at setiger 25; length through setiger 10, 55 mm. Body cylindrical anteriorly, becoming dorsoventrally flattened by setiger 200, but retaining about same width through setiger 400, tapering from setiger 400 setiger to ~10 mm in width at incomplete posterior end.

Prostomium very short, distinctly narrower than peristomium, withdrawn inside nuchal fold, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes not observed. Antennae arranged in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick, digitiform, tapering slightly, without articulations. Antennae to middle of peristomium; right A-II longest, to middle of posterior peristomial ring. Peristomium massive, cylindrical, about twice as wide as prostomium. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of first peristomial ring, thick, slightly inflated basally, without articulations.

Jaws not examined.

Branchiae (Figure 13c,d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to end of fragment. All branchiae pectinate; maximum ~30 filaments in setigers 30-100. Stems thick, erect, tapering, longer than notopodial cirri through setiger 250. Filaments slender, filiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes truncate to rounded, becoming triangular or slightly conical in far posterior setigers; aciculae emerging at midline. Presetal lobes low, transverse folds. Postsetal lobes forming a collar around acicular lobes, about as high as acicular lobes in anterior and median setigers, projecting beyond acicular lobes in posterior setigers. Anterior ventral cirri thick, tapering from wide, triangular bases, not obviously inflated through setiger 250. Ventral cirri basally inflated in posterior half of fragment. Median and posterior bases first scoop-shaped, becoming triangular welts in last setigers present, retaining short, tapering tips in all setigers. Anterior notopodial cirri basally inflated, tapering to thick tips, becoming very large and very strongly inflated in posterior setigers (Figure 13c), by far dominant parapodial structures in far posterior setigers. All notopodial cirri without articulations.

Limbate setae longer than other setae, slender, marginally finely frayed. Pectinate setae (Figure 13a) in thick fascicles, slender; shafts flattened. Blades tapering, gently furled. Marginal teeth no longer than other teeth, with ~15 teeth. Shafts of compound hooks about as thick as aciculae and subacicular hooks, tapering, marginally smooth; beak indistinct, brass-colored. Appendages not seen. Aciculae paired, with dark brown, rarely black cores and clear sheaths, slender, tapering, distally pointed, usually bent dorsally at tip; cross-section round. Subacicular hooks (Figure 13b) with medium to dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 200, thereafter missing in many setigers, always single (except for replacements). Hooks tapering to very slender, indistinct heads. Proximal teeth larger than distal teeth; both directed distally; both teeth indistinct.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior setigers, pygidium, and anal cirri; jaw structure.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Mx III and IV forming distal arc; Mx VI missing.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 1, 2, 6, 13, 14, 36-38, 40, 57-59, 69, 70.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1; 57,1; 58,2; 59,2; 69,1; 70,2.

REMARKS.—The synonymy of this species was discussed in the introduction. *Eunice aphroditois* has been widely reported and a number of other named taxa has been synonymized with this species. The specimen described above agrees well with current definitions of the species; however, the description represents a restriction of the concept of this species compared to the definition given by Fauvel (1917:215); the species is listed with similar species in Tables 27 and 28.

A series of species lacking articulations in the ceratostyles is listed in Table 28; several of these are known to have simple spine-like, relatively large subacicular hooks only; other species have relatively small, bidentate subacicular hooks. Included among the latter are, in addition to *E. aphroditois*, *E. contingens*, *E. djiboutiensis*, *E. guttata*, *E. investigatoris*, *E. palauensis*, *E. polybranchia*, *E. roussaei*, *E. suviensis*, and *E. rullieri*. *Eunice sebastiani* has been reported to have both simple falcate and bidentate subacicular hooks. Characteristic of *E. aphroditois* and related taxa are the large, medially inflated notopodial cirri; among the species listed above, such cirri are present in *E. contingens*, *E. roussaei*, and *E. rullieri*. *Eunice djiboutiensis* and *E. sebastiani* have basally inflated, basally distinctly pendulous, notopodial cirri. *Eunice aphrodi-*

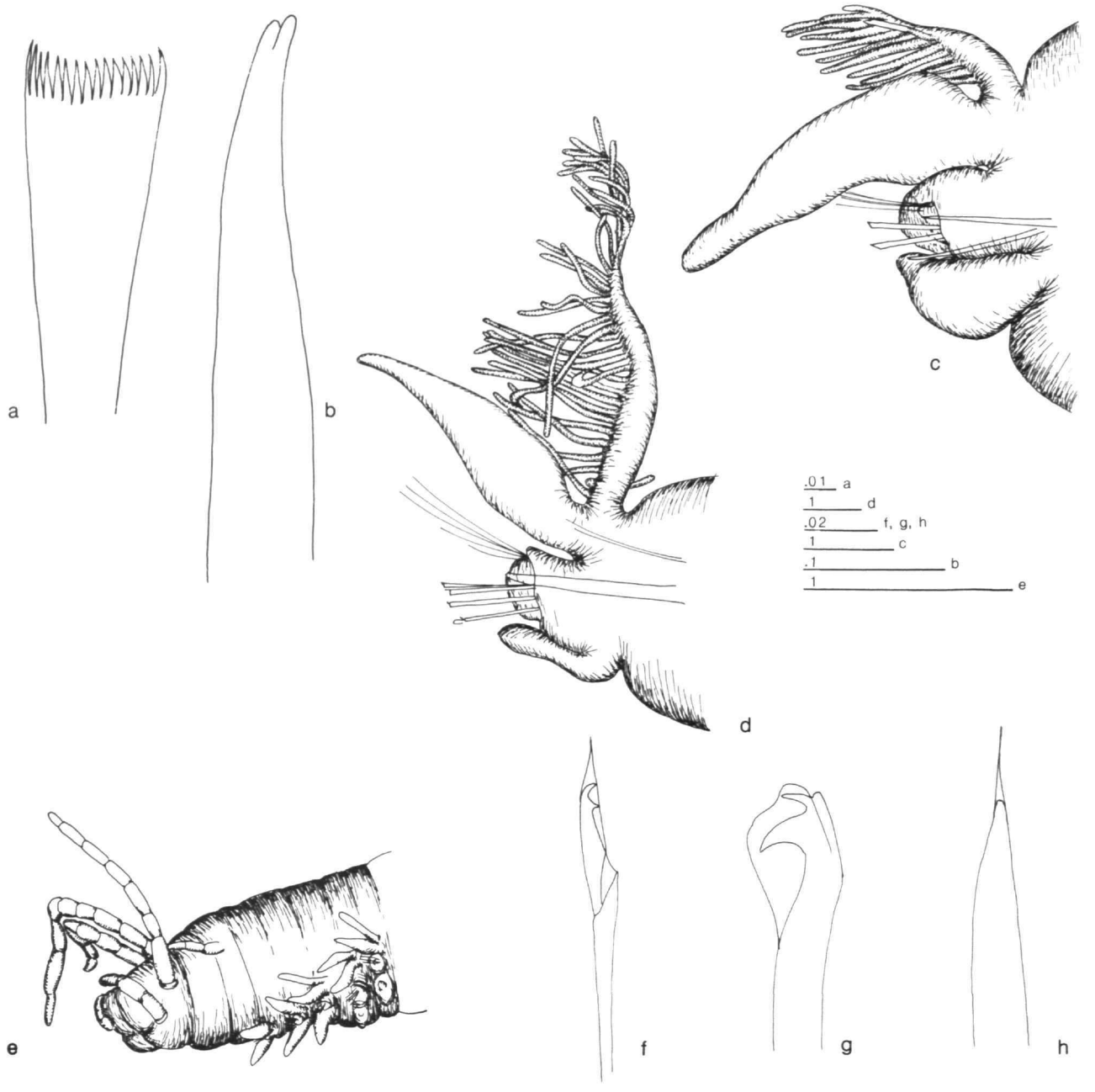

FIGURE 13.—*Eunice aphroditois* (MNHN, Paris): a, pectinate seta, parapodium 150; b, subacicular hook, parapodium 260; c, parapodium 400; d, parapodium 150. *Eunice arenosa* (holotype, RM 426): e, anterior end, lateral view; f, compound falciger, parapodium 23; g, subacicular hook, parapodium 23; h, acicula, parapodium 30. (Scale bars in mm.)

tois and *E. rullieri* have short antennae barely outreaching the prostomium and with A-II and A-III similar in length. *Eunice contingens* and *E. roussaei* have longer antennae; A-III is distinctly longer than A-II and reaches setiger 4.

Eunice aphroditois has slender, tapering subacicular hooks with both teeth directed distally; *E. rullieri* has relatively larger subacicular hooks with distinct heads and the teeth directed laterally.

Eunice aphroditois djiboutiensis Gravier, 1900

Eunice aphroditois djiboutiensis Gravier, 1900:224-229, figs. 73-77; pl. 13: figs. 63-67.

REMARKS.—*Eunice aphroditois djiboutiensis* was separated from the stem species on the structure of the subacicular hooks. It differs from other members of group B-2 in the features that characterize distinct species and it is so considered here.

Eunice aphroditois punctata Fishelson and Rullier, 1969

Eunice aphroditois punctata Fishelson and Rullier, 1969:74-76, fig. 2a-e.

REMARKS.—Originally described from the southern end of the Red Sea, the material currently present in the Zoological Museum, Tel-Aviv University, includes two specimens of a species related to, but different from *E. aphroditois*. The combination *Eunice punctata* is preoccupied; the species is here renamed as *Eunice rullieri*.

15. *Eunice arcturi* (Treadwell, 1928)

TABLES 19, 20

Leodice arcturi Treadwell, 1928:475-477, fig. 178:32-39.

Eunice norvegica.—Hartman, 1956:283 [in part, not *Eunice norvegica* Linnaeus. 1767].

MATERIAL EXAMINED.—Holotype, AMNH 25-VII-1925-3530, Atlantic Ocean, 125° SE of New York City Hall, sta 113:D-1.

COMMENTS ON MATERIAL EXAMINED.—The holotype has been completely dried and no meaningful illustrations can be made.

DESCRIPTION.—Holotype complete with 110 setigers, approximately 80 mm long.

Branchiae from setiger 6 to setiger 42. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximum at least 10 filaments.

Aciculae paired, yellow, tapering; tips conical, distinctly bent dorsally; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, bidentate. Hooks first present from setiger 36.

UKNOWN MORPHOLOGICAL FEATURES.—All features associated with pro- and peristomium; jaws, parapodial features; limbate and pectinate setae and compound falcigers.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—The species is far too poorly known to make meaningful predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* Too poorly known to determine which of the unknown characters might be inappropriate. *Unknown Characters:* 3-29, 31-34, 39, 40, 43-72, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—71,2; 72,2.

REMARKS.—*Eunice arcturi* was considered a synonym of *E. norvegica* by Hartman (1956) after examination of the type of the former. This synonymy cannot be correct: the latter has dark subacicular hooks and branchiae continued to the posterior end. *Eunice arcturi* has branchiae terminating well before the posterior end and yellow subacicular hooks. The species is too poorly known to be adequately characterized; however, it differs from most members in group A-1 by the late start of the branchiae; it is listed with other species in this group in Tables 19 and 20.

16. *Eunice arenosa* Kinberg, 1865

FIGURE 13e-h; TABLES 19, 20

Eunice arenosa Kinberg, 1865:563.—Hartman, 1948:78.

MATERIAL EXAMINED.—Two syntypes, RM 426, Tahiti, 16 m, *Eugenie* expedition.

COMMENTS ON MATERIAL EXAMINED.—Kinberg (1865:563) gives the locality information as "Mare pacificum juxta urbem Papieti insulae Tahiti, fundo arenosa 9 orgyiarum." One syntype is complete; the other is currently in two pieces. The latter specimen is here illustrated and described in detail. Both specimens are mature females with large eggs in the body cavity.

DESCRIPTION.—Complete syntype with 79 setigers; other syntype incomplete, with 60 setigers, 16 mm long, maximal width 0.75 mm at setiger 10; length through setiger 10, 2.5 mm. Body cylindrical anteriorly, dorsoventrally flattened posteriorly.

Prostomium (Figure 13e) about as long as peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes elongated, frontally rounded, dorsally flattened; median sulcus shallow. Palpal region separated by distinct frontal, horizontal grooves. Eyes not observed. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 8 long, cylindrical articulations in A-III. A-I to setiger 1; A-II to setiger 3; A-III to setiger 5. Peristomium tapering towards anterior end. Separation between rings distinct on all sides; anterior ring 1/2 of total peristomial length. Peristomial cirri to middle of prostomium, slender and tapering, with 4 articulations.

Jaws unknown.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 25-26. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 5 and last 2-3 pairs single filaments; maximum 5 filaments first reached at about setiger 15. Filaments short, digitiform, about as long as notopodial cirri where best developed.

Anterior neuropodial acicular lobes truncate, becoming distally rounded in posterior setigers; aciculae emerging at

midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick and tapering. Median ventral cirri basally inflated from about setiger 5 through setiger 20. Bases ovate, narrow tips tapering. Posterior ventral cirri increasingly digitiform, increasing in length, nearly as long as notopodial cirri in far posterior setigers. Anterior notopodial cirri thick and tapering, decreasing in girth, but not in length posteriorly.

Limbate setae longer than all other setae, marginally serrated. Pectinate setae unknown. Shafts of compound falcigers (Figure 13f) slender, distally tapering without distinct marginal serrations; distinct distal beak absent. Appendages long, narrow; head large, bidentate. Anterior proximal teeth short, slender, becoming triangular in posterior setigers, directed slightly basally. Distal teeth longer than proximal teeth, curved, directed laterally. Guards narrow, symmetrical, slender, terminating in distinct mucros. Most guards distally rounded with mucro appended, but mucros appearing as continuations of guards proper in some setae. Pseudocompound falcigers and compound spinigers absent. Aciculae single, yellow, tapering with straight, narrow tips; cross-section round. Some aciculae with narrow sharply pointed guards (Figure 13h). Separation between core and sheath indistinct in aciculae, distinct in subacicular hooks. Subacicular hooks (Figure 13g) yellow, tridentate with teeth in a crest. Hooks first present from setiger 16, present in all setigers thereafter, always single (except for replacements). Main fang curved, strongly tapering; secondary fang curved, rather slender; distal fang very poorly developed, blunt, indistinct in some posterior setigers.

UKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Mx III long, straight, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—A minor discrepancy with the original description can be noted. Kinberg found that the antennae stretched to segment 9 (corresponding to setiger 7); in both specimens the longest antenna, A-III, reaches setiger 5. One specimen had been dissected for the jaws, which are now missing. No attempts were made at examining the jaws in the other, intact specimen.

Eunice arenosa is listed with similar species in Tables 19 and 20. It can be characterized only by a combination of the characters used, including relatively long antennae and peristomial cirri, combined with a total lack of articulations of the notopodial cirri.

17. *Eunice argentinensis* (Treadwell, 1929)

FIGURE 14; TABLES 27, 29

Leodice argentinensis Treadwell, 1929:3-5, figs. 7-12.

MATERIAL EXAMINED.—Three syntypes, USNM 19280, Mar del Plata, Argentina, Felippone # 3008, coll. Florentino Felippone.

COMMENTS ON MATERIAL EXAMINED.—One syntype is in good condition, but is in posterior regeneration; another has been frontally dissected for the jaw apparatus, the third syntype, which is currently in overall the best condition, is described in detail here.

DESCRIPTION.—Specimen incomplete, of unknown sex, with 71 setigers; length 67 mm; maximal width 5 mm at setiger 10; length through setiger 10, 12 mm. Body cylindrical, abruptly tapering frontally.

Prostomium (Figure 14a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes absent. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 7 short, slightly inflated articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 4. Peristomium cylindrical. Separation between rings distinct ventrally, less so dorsally; anterior ring 3/4 of total peristomial length. Peristomial cirri to front edge of peristomium, slender and digitiform, with 3 articulations.

Maxillary formula 1+1, 5+6, 7+0, 7+9, and 1+1 according to Treadwell (1929:5 and his fig. 11). Mx III part of distal arc with left Mx IV; Mx VI missing.

Branchiae (Figure 14b) present, pectinate, distinctly longer than notopodial cirri where best developed, not reduced in mid-body region, erect. Branchiae from setiger 3 to near end of body, present on more than 65% of total number of setigers. All branchiae pectinate except in regenerating posterior end of a complete syntype where branchiae are single filaments, missing in last 15 setigers in this syntype. First branchia with 5 filaments, maximum 10 filaments, first reached at setiger 10. Stems thick, tapering, shorter than notopodial cirri. Filaments digitiform, shorter than notopodial cirri in all branchiae. Number and length of filaments decreasing posteriorly, from about setiger 30, 3-4 short filaments present.

Neuropodial acicular lobes truncate with aciculae emerging dorsal to midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, digitiform. Median ventral cirri basally inflated; inflated bases ovate; narrow tips tapering. Ventral cirri basally inflated through rest of fragments, without basal inflation only in regenerating posterior end in one syntype. Notopodial cirri medially inflated, with at least 1 long distal articulation; some anterior cirri with 2 or 3 articulations. Notopodial cirri large, becoming dominant parapodial feature in posterior segments.

Limbate setae distinctly longer than other setae, slender, marginally serrated. Shafts of pectinate setae (Figure 14f) wide, cylindrical. Blades tapering, flat. One marginal tooth distinctly longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 14c) massive, smoothly tapering, with internal striations (not shown), but without marginal teeth; distal beak

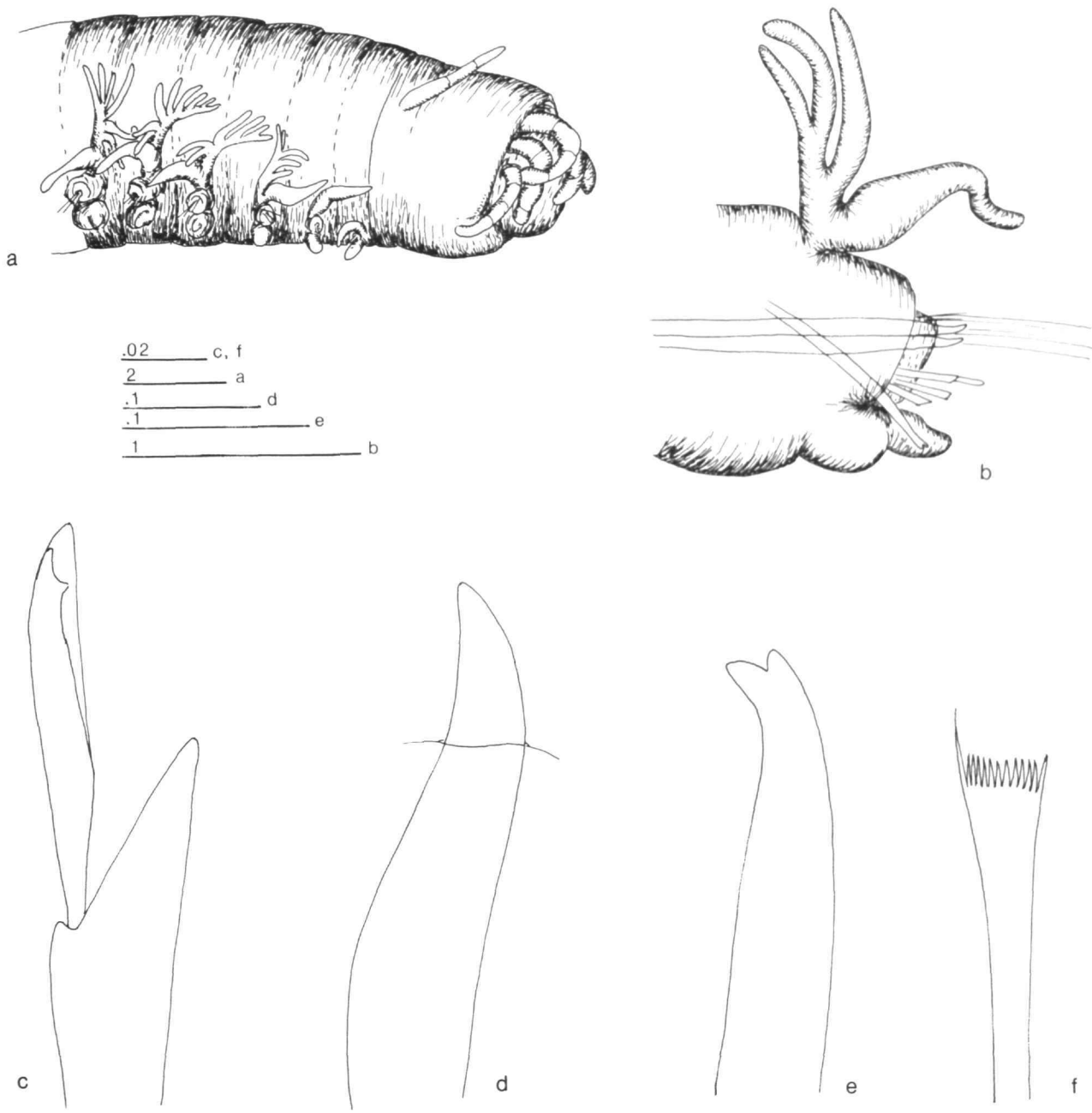

FIGURE 14.—*Eunice argentinensis* (paratype, USNM 19280): a, anterior end, lateral view; b, parapodium 52, anterior view; c, compound falciger, parapodium 52; d, acicula, parapodium 52; e, subacicular hook, parapodium 52; f, pectinate seta, parapodium 52. (Scale bars in mm.)

indistinct. Appendages small, slender; head very small, bidentate. Proximal teeth reduced triangular, directed laterally; distal teeth nearly erect; both teeth of similar size. Guards asymmetrical, bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black; cross-section flattened, knife-shaped (Figure 14d); thickened edge of aciculae ventral. Aciculae considerably heavier than subacicular hooks; tips bluntly pointed, curved.

Subacicular hooks (Figure 14e) black, bidentate, slender and tapering. Hooks first present from setiger 19-22, present in all setigers thereafter, always single (except for replacements). Proximal teeth larger than distal teeth, directed laterally; distal teeth short, blunt, directed distally.

UKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior setigers.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 56. *Unknown Characters:* 1, 2, 36, 37, 57-60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1.

REMARKS.—*Eunice argentinensis* is listed with similar species in Tables 27 and 29. Among the species in group B-2, *E. argentinensis, E. floridana,* and *E. prognatha* have at least in part knife-edged aciculae (*E. argentinensis* is the only one of these in Table 29). *Eunice argentinensis* has subacicular hooks first present from setigers 19-22, *E. floridana* has them from setigers 29-40, and *E. prognatha* from setiger 35. *Eunice floridana* has very long, slender antennae, with A-III distinctly longer than the other antennae; the other two species have short antennae where A-II and A-III are rather similar in size. In *E. prognatha* the first 8-10 branchiae are simple filaments; all anterior branchiae are pectinate with at least five filaments in *E. argentinensis.*

18. *Eunice armillata* (Treadwell, 1922)

FIGURE 15; TABLE 23

Leodice armillata Treadwell, 1922:144-146, figs. 26-29, pl. 3: figs. 14-19.

MATERIAL EXAMINED.—Holotype, AMNH V-1920-1542, Aua or Utile reef, Pago Pago Harbor, Samoa.

DESCRIPTION.—Holotype complete, of unknown sex, with 114 setigers; total length 46 mm; maximal width 2 mm at setiger 15; length through setiger 10, 6 mm; width at setiger 10, 1.75 mm. Anterior body cylindrical, becoming dorsoventrally flattened medially and tapering slowly towards posterior end.

Prostomium (Figure 15a) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in a transverse line, evenly spaced, similar in thickness. Ceratophores erect cylinders in all antennae, without articulations. Ceratostyles tapering, with up to 14 moniliform articulations. A-I to posterior peristomial ring; A-II to setiger 2; A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 4/5 of total peristomial length. Peristomial cirri barely outreaching posterior peristomial ring, slender and digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 15e, f) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 109. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 2 pairs single filaments, thereafter 2 filaments in most setigers to setiger 80; a third, short filament present scattered in a few setigers. From setiger 80, 1 or 2 filaments irregularly scattered in about equal numbers of setigers. Stems short, tapering. Filaments digitiform, longer than notopodial cirri.

Neuropodial acicular lobes truncate with aciculae emerging in upper 1/3 of lobe. Presetal lobes transverse folds. Anterior postsetal lobes longer than acicular lobes, rounded, reduced to transverse folds from setiger 15. Ventral cirri without basal inflation in 5 anterior setigers; anterior ventral cirri digitiform. Median ventral cirri basally inflated. Bases ovate or nearly spherical, narrow tips tapering. Inflation rapidly reduced from setiger 45 and missing posterior to setiger 60. Posterior ventral cirri without basal inflation, becoming increasingly digitiform. Notopodial cirri digitiform, decreasing somewhat in length posteriorly, with up to 3 indistinct articulations in anterior and median setigers. Far posterior notopodial and ventral cirri similar in length and shape.

Limbate setae longer than all other setae, coarsely limbate, marginally serrated. Pectinate setae (Figure 15b) very small; shafts cylindrical, thick. Blades distally narrowly flaring, flat. Both marginal teeth barely longer than other teeth, with about 10 teeth. Shafts of compound falcigers in anterior setigers (Figure 15c) tapering, serrated, with distal beak. In posterior setigers tapering, without serrations and beaks (Figure 15d). Appendages very short, stocky, bidentate. Proximal teeth slightly shorter than distal teeth, narrowly triangular, directed obliquely distally. Distal teeth tapering, directed laterally, distinctly more curved in posterior than in anterior setigers. Guards asymmetrically bluntly pointed, marginally finely serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, very heavy, distally tapering to sharp tips; inferior aciculae gently curved; cross-section of all aciculae round. Separation of core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, bidentate. Hooks present from setiger 34, present in all setigers thereafter, always single (except for replacements); first several slender, becoming increasingly heavy in posterior setigers, very coarse in far posterior setigers (Figure 15f). Hooks slightly tapering subdistally; heads indistinct. Both teeth similar in size, directed laterally.

UKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri; jaw apparatus.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Mx III located immediately in front of left Mx IV; forming part of a distal arc.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14, 40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

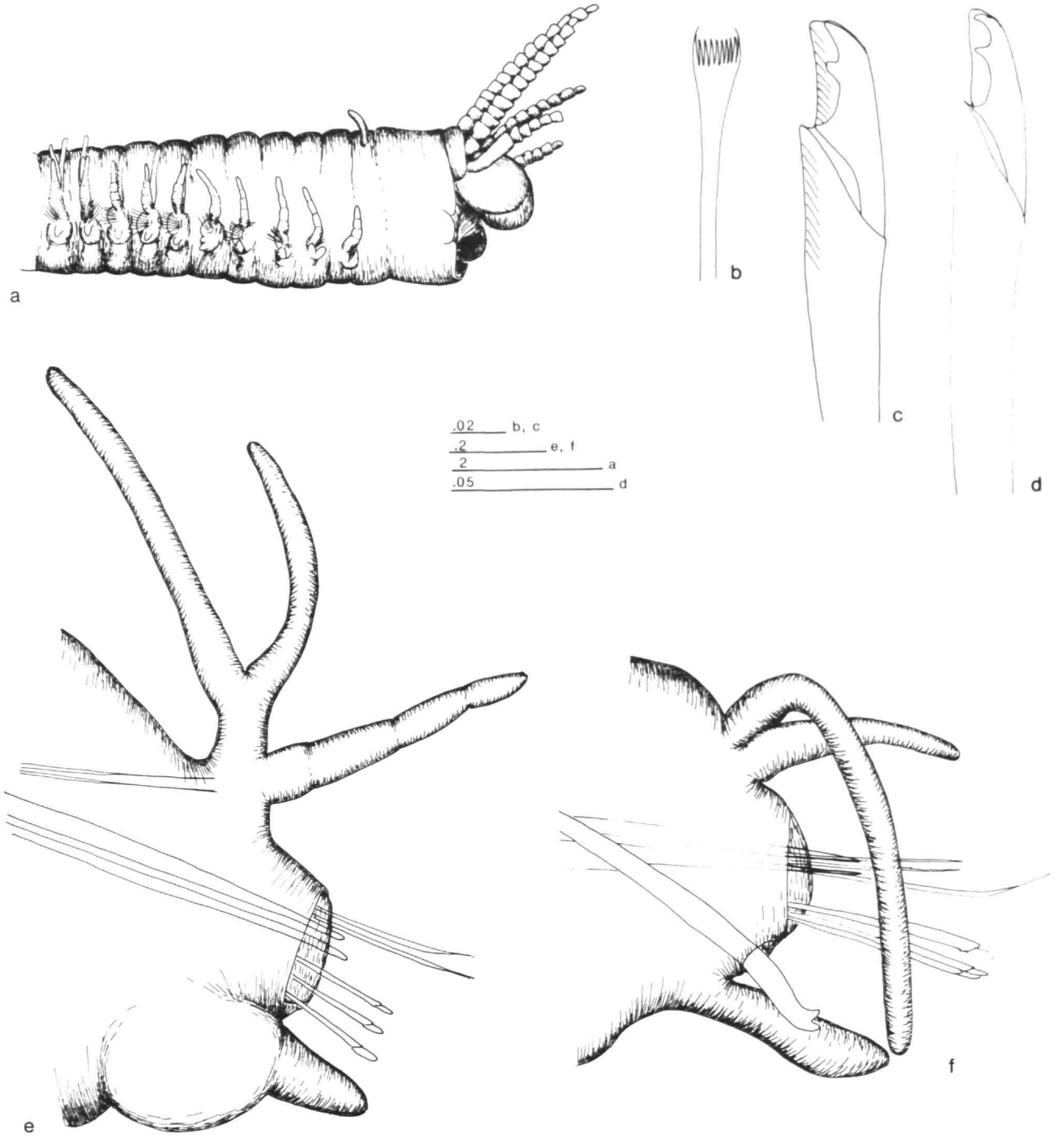

FIGURE 15.—*Eunice armillata* (holotype, AMNH V-1920-1542): a, anterior end, lateral view; b, pectinate seta, parapodium 25; c, compound falciger, parapodium 25; d, compound falciger, parapodium 88; e, parapodium 25, anterior view; f, parapodium 88. (Scale bars in mm.)

REMARKS.—*Eunice armillata* was compared to *E. mindanavensis* by Hartman (1956:282). It is listed with species from group A-2 (Fauchald, 1970) in Table 23, rather than with species in group B-2, to which *E. mindanavensis* belongs, because both subacicular hooks and aciculae are clear yellow, rather than brown or black. In addition to this species, *E. leptocirris, E. schizobranchia,* and *E. stigmatura* have branchiae continued to near the posterior end; the other species in Table 23 have the branchiae terminating posterior to setiger 100, but well before the posterior end. The ceratostyles of *E. leptocirris* and *E. schizobranchia* lack articulations; the other two species have articulated ceratostyles. *Eunice stigmatura* has both bi- and tridentate subacicular hooks, and resembles species listed in Table 46 more closely than the species in Table 22. *Eunice armillata* has only bidentate subacicular hooks and is furthermore characterized by a low number of branchial filaments compared to most other species in the group.

19. *Eunice articulata* Ehlers, 1887

FIGURE 16a-e; TABLES 19, 20

Eunice articulata Ehlers, 1887:83, pl. 24: figs. 8-10.

MATERIAL EXAMINED.—Two syntypes, MCZ 140 and 799, *Blake,* 3 Apr 1869, off French Reef, Cast No. 1, 15 fathoms.

COMMENTS ON MATERIAL EXAMINED.—The two syntypes do not belong to the same taxon; the specimen from MCZ 140 belongs to group B, probably to subgroup 2, the one from MCZ 799 to group A-1. The species has been considered related to *E. websteri* (= *E. longicirrata* Webster) and Ehlers description matches the specimen from MCZ 799; thus the following description is based on this specimen. The specimen from MCZ 140 is briefly characterized at the end of this description. The syntype from MCZ 799 previously has been dry.

DESCRIPTION.—Syntype incomplete, of unknown sex, with 132 setigers; length about 50 mm; width more than 3 mm; length through setiger 10 not determined. Body cylindrical, dorsoventrally flattened medially.

Prostomium (Figure 16a) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium, bent dorsally. Prostomial lobes frontally truncate, dorsally inflated; median sulcus deep. Eyes lateral to bases of A-I. Antennae in transverse row, evenly spaced; A-III distinctly heavier than other antennae. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; articulations cylindrical, becoming increasingly drop-shaped distally; maximum 17 articulations in A-III. A-I to setiger 5; A-II to setiger 7; A-III to setiger 11. Peristomium cylindrical. Separation between rings distinct only dorsally; anterior ring 3/4 of total peristomial length. Peristomial cirri reaching well beyond prostomium, about as long as A-I, extremely slender, nearly filiform, with 6 very long articulations.

Maxillary formula 1+1, 5+6, 5+0, 4+7, and 1+1.

Branchiae (Figure 16e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 through setiger 55. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and last 2 or 3 pairs single filaments; maximum 6 filaments at about setiger 15. Branchiae and filaments shorter than notopodial cirri in anterior branchial region; both longer than notopodial cirri in posterior branchial setigers. Stems thick, tapering, longer than filaments. Filaments digitiform, slender in anterior setigers.

Shape of neuropodia indeterminable. Median ventral cirri basally inflated; postbranchial ventral cirri slender, digitiform. Anterior notopodial cirri long, slender, nearly filiform, with 3 cylindrical articulations, much longer than branchiae. Median and postbranchial notopodial cirri short, tapering, without articulations.

Limbate setae straight, narrowly limbate. Pectinate setae numerous. Shafts of pectinate setae (Figure 16d) cylindrical, slender. Blades tapering, flat. One marginal tooth longer than other teeth; 15 teeth present. Shafts of compound falcigers (Figure 16c) tapering, marginally smooth, without internal striations or distal beak. Appendages large, with parallel sides; basal boss distinct; head large, bidentate. Proximal teeth triangular, directed laterally. Distal teeth larger than proximal teeth, thick, directed obliquely distally. Guards symmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falciger and compound spinigers absent. Aciculae yellow, 2-3 in a parapodium, distally pointed, straight; cross-section round. Separation of core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 16b) yellow, bidentate. Hooks first present from setiger 40, present in all setigers thereafter, always single (except for replacements). Hooks tapering smoothly to tips; heads small. Proximal teeth larger than distal teeth, directed laterally. Distal teeth tapering, directed obliquely distally.

Syntype from MCZ 140 frontally deeply dissected, with 80 setigers; length 55 mm. Maxillary formula 1+1, 4+4, 6+0, 4+7, and 1+1. Branchiae from setiger 5 to end; all branchiae pectinate with erect stems. Shafts of pectinate setae slender, cylindrical; blades distinctly flaring, flat. One marginal tooth longer and thicker than the other teeth; ~25 teeth. Aciculae paired, black, distally bent. Subacicular hooks from setiger 32, black, bidentate.

UKNOWN MORPHOLOGICAL FEATURES.—Characters associated with posterior end; relationship between Mx III and left Mx IV; neuropodial structures.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Mx III long, straight, located behind left Mx II; distal arc absent; Mx VI absent.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4-6, 43-49, 51, 52, 54, 55.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

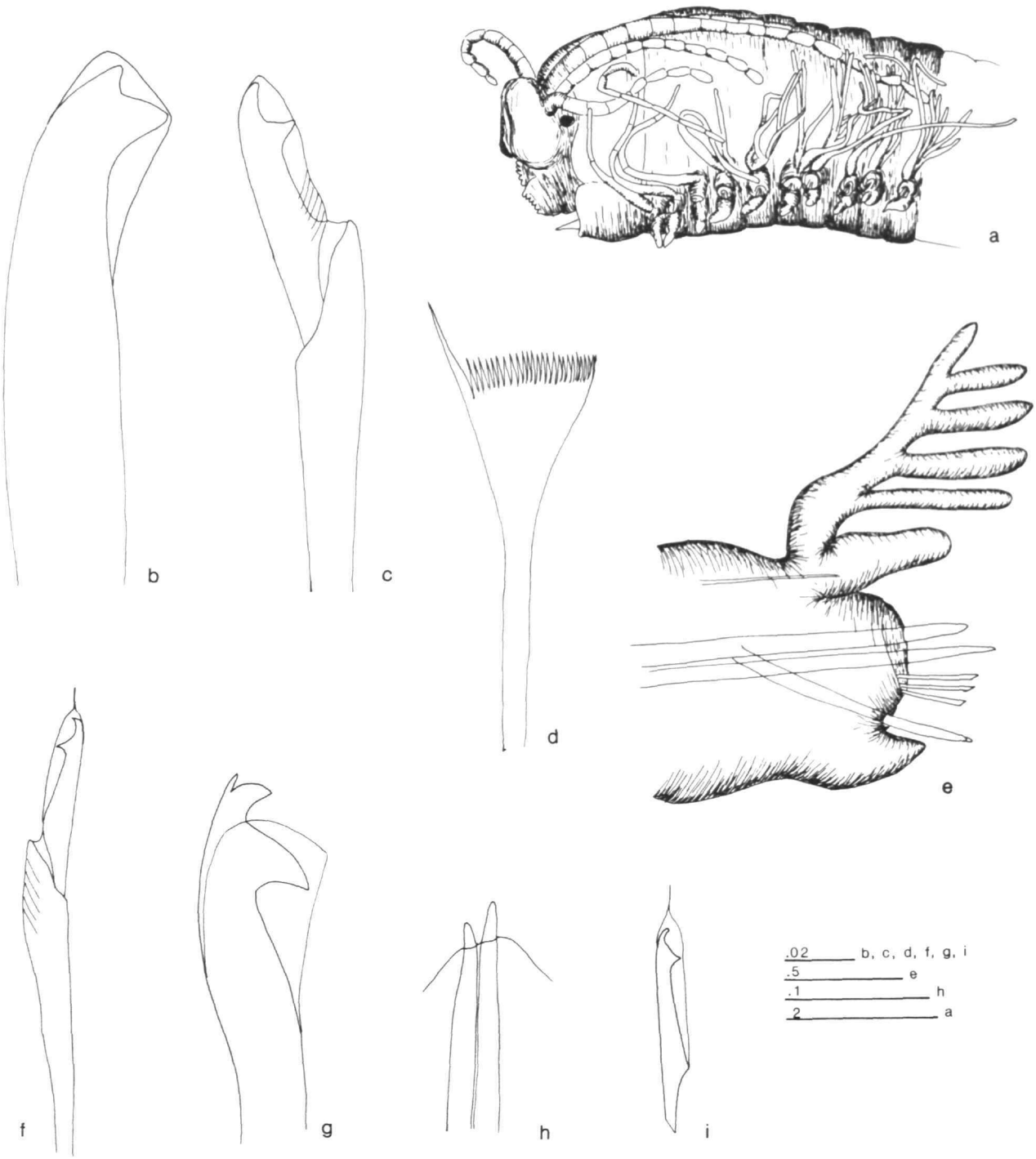

FIGURE 16.—*Eunice articulata* (syntype, MCZ 799) a, anterior end, lateral view; b, subacicular hook, parapodium 40; c, compound falciger, setiger 40; d, pectinate seta, parapodium 78; e, parapodium 78, anterior view. *Eunice atlantica* (holotype, RM 325) f, compound falciger, median parapodium; g, subacicular hook, median parapodium; h, aciculae, median parapodium; i, appendage of compound falciger, parapodium 9. (Scale bars in mm.)

REMARKS.—*Eunice articulata*, as described above, belongs to group A-1 and agree in most details with *E. websteri;* it is listed with similar species in Table 19. The maxillary formula given by Ehlers (1887:83) matches neither of the 2 syntypes.

The other syntype clearly belongs to group B and, judging from the development of the branchiae in the last setigers present, probably to subgroup 2 (forms with branchiae beyond setiger 100). This specimen was seen by Ehlers: a note in his handwriting detailing some of the features of the specimen, including the branchial distribution and the maxillary formula, was present in the vial with the specimen. The specimen is not identifiable because details of the anterior end cannot be determined and is here considered an unidentifiable member of the genus.

Eunice articulata may be separated from other species in the group by having branchiae from setiger 4 rather than from setiger 3; these branchiae are short, with thick, stubby filaments. In addition the antennae and peristomial cirri are unusually long, slender and strongly articulated, without being moniliform. It is listed with similar species in Tables 19 and 20.

Eunice articulata (Hoagland, 1920)

Leodice articulata Hoagland, 1920:615–616, pl. 50: figs. 9–12.
?Eunice articulata.—Hartman, 1959:316.

REMARKS.—The specific name used by Hoagland (1920) is pre-occupied in the combination *Eunice articulata* Ehlers, 1887. The species described by Hoagland, clearly different from Ehlers' species, is here re-named *E. hirschi* (see below).

20. *Eunice atlantica* Kinberg, 1865

FIGURE 16f–i; TABLES 41, 42

Eunice atlantica Kinberg, 1865:563; 1910:42, pl. 16: fig. 18.—Hartman, 1948:79.

MATERIAL EXAMINED.—Holotype, RM 325, Praya Grande near Rio de Janeiro, *Eugenie* Expedition 305.

COMMENTS ON MATERIAL EXAMINED.—The type material consists of 4 fragments, one of which is an anterior end. The 3 other fragments consists of 9 segments, 5 segments, and a single segment; these fragments must be from the median to posterior part of the body in that they lack branchiae and have subacicular hooks, assuming a common configuration of features. The shape of the compound hooks, aciculae, and limbate setae indicate that the median fragments came from a specimen of the same species as the anterior fragment, perhaps from the same specimen.

DESCRIPTION.—Anterior fragment with 9 setigers, of unknown sex; length 4 mm; width 2 mm.

Prostomium distinctly shorter than peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 5 cylindrical articulations. A-I to middle of peristomium; A-II to setiger 1; A-III now broken (to segment 5 according to Kinberg, 1865). Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to posterior third of prostomium, slender and tapering, with 3 cylindrical articulations.

Jaws not examined.

Branchiae from setiger 3; first branchiae single; maximum 5 digitiform filaments.

Parapodial shapes indeterminable.

Limbate setae longer than other setae, slender, marginally serrated. Pectinate setae not seen. Shafts of compound falcigers (Figure 16f) inflated, marginally coarsely serrated; distal beak present. Appendages long, narrow, tapering, bidentate. Proximal teeth short, reduced triangular, directed basally. Distal teeth slender, distally hooked, tapering, directed laterally. Guards distally symmetrically rounded, with distinct, slender mucros (Figure 16f,i), marginally smooth. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, tapering, straight or gently curved (Figure 16h). Subacicular hooks (Figure 16g) yellow, tridentate with teeth in a crest. Primary fangs large, curved basally; 2 distal fangs with common stem; tertiary fangs very small. Distribution of subacicular hooks unknown.

UKNOWN MORPHOLOGICAL FEATURES.—All features associated with mid-body and posterior parts of the body; jaw structure.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—The species is too poorly known to yield meaningful predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* None known. *Unknown Characters:* 1, 2, 4–6, 11–17, 32, 34, 36–38, 40, 42–59, 61–68, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,2; 37,2; 38,2; 53,1; 57,2.

REMARKS.—The anterior end is poorly preserved. Kinberg stated that up to 12 branchial filaments should be present, but this cannot presently be confirmed. The description of the subacicular hooks given above assumes that the median fragments present belong to the same species as the anterior end.

The label in the vial is marked *Eunice atlantica* (var). Kinberg (1865:563) described a variety of his new species, which should differ from the main form basically in the reduced number of branchial filaments. This variety should be present in sandy and rocky shores near the mouth of La Plata. The locality information given for the specimen examined here matches that given for the main form, and the specimen is here considered the type of the species. The difference between the two forms is minor and it is here assumed that both (lots of) specimens belonged to the same species.

Eunice atlantica is listed with similar species in Tables 41 and 42; it is too poorly known to be included in the key.

Eunice attenuata Grube, 1866

Eunice attenuata Grube, 1866b:68; 1878a:99.

REMARKS.—No material is available. It was originally characterized as having branchiae from setiger 6 through setiger 83 (of a total of more than 350 setigers) and with a maximum of 11 filaments. A-III was described as reaching setiger 2 (segment 4). The species was also characterized as resembling *E. prayensis*. Grube (1878a) grouped the species with those that had branchiae terminating in midbody, without articulations in the ceratostyles, and without mucronate hoods on the compound hooks.

The available information is clearly inadequate to characterize the species and it is here considered indeterminable.

21. *Eunice aucklandica* Averincev, 1974

FIGURE 17a-f; TABLES 41, 42

Eunice aucklandica Averincev, 1974:172-173, pl. 35: figs. 9-12.

MATERIAL EXAMINED.—Holotype, ZML 1/15807, Antarctic Ocean, 51°13′1″S, 165°37′7″E. OB sta 74, 6 Apr 1956, 183 m depth, coll. Averincev, Ushakov, Belijaev.

DESCRIPTION.—Holotype complete, of unknown sex, with 79 setigers; total length 18 mm; maximal width 1 mm at setiger 10; length through setiger 10, 3.2 mm. Body cylindrical throughout, anteriorly truncate, tapering posteriorly. Anal cirri articulated, as long as last 10 setigers.

Prostomium (Figure 17a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes large, frontally rounded, slightly dorsally flattened; median sulcus deep. Eyes lateral to bases of A-II, large. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 8 large, short cylindrical articulations in A-III. A-I to second peristomial ring; A-II to setiger 2; A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct on all sides, especially well marked dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of first peristomial ring, slender and tapering, without articulations.

Jaws not examined.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 8 through setiger 21. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Most branchiae single, digitiform filaments; some setigers with paired filaments. Filaments longer than notopodial cirri in middle of branchiated region.

Anterior neuropodial acicular lobes broadly rounded, becoming slightly triangular in far posterior setigers; aciculae emerging at midline (Figure 17f). Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming basally inflated from about setiger 6. Inflated bases ovate, gradually reduced from setiger 25, narrow tips tapering. Posterior ventral cirri thick, abruptly tapering. Notopodial cirri basally slightly inflated, tapering to digitiform tips, without articulations.

Limbate setae marginally smooth. Shafts of pectinate setae (Figure 17e) narrow, cylindrical. Blades tapering, flat. Both marginal teeth thicker and slightly longer than other teeth, with about 7 teeth. Shafts of compound falcigers (Figure 17b,d) distally inflated, marginally smooth; distal beaks absent. Appendages short, slightly tapering with large heads, bidentate or tridentate (Figure 17b,d). Proximal teeth narrow, tapering, directed laterally. Distal teeth about as long as proximal tooth, curved; in some setae third, small teeth present, making distal end of appendage appear nearly furcate. Guards symmetrically bluntly pointed, marginally smooth, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae at least paired in all setigers, yellow, distally tapering, straight, bluntly pointed. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 17c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 18, present in all setigers thereafter, paired in most setigers. Primary fangs large, curved. Both distal fangs emerging from joint, thick bases, short, triangular.

UKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 39, 40, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice aucklandica* is listed with similar species in Tables 41 and 42. A characteristic feature is the presence of paired subacicular hooks in most setigers. The maximum number of branchial filaments is only two; all other species in Table 42 have at least twice as many and have distinct branchial shafts; a branchial shaft is missing in *E. aucklandica*.

Eunice auriculata Treadwell, 1900

Eunice auriculata Treadwell, 1900:342-343; 1901:196-197, figs. 33-36b.
Eunice ariculata Hartman, 1959:308 [lapsus].

REMARKS.—The species was first named and recognizably described in a short paper in which the characteristic rounded smooth glandular organ attached ventrally on the notopodia was mentioned. A more complete description was published the following year and has been considered the original

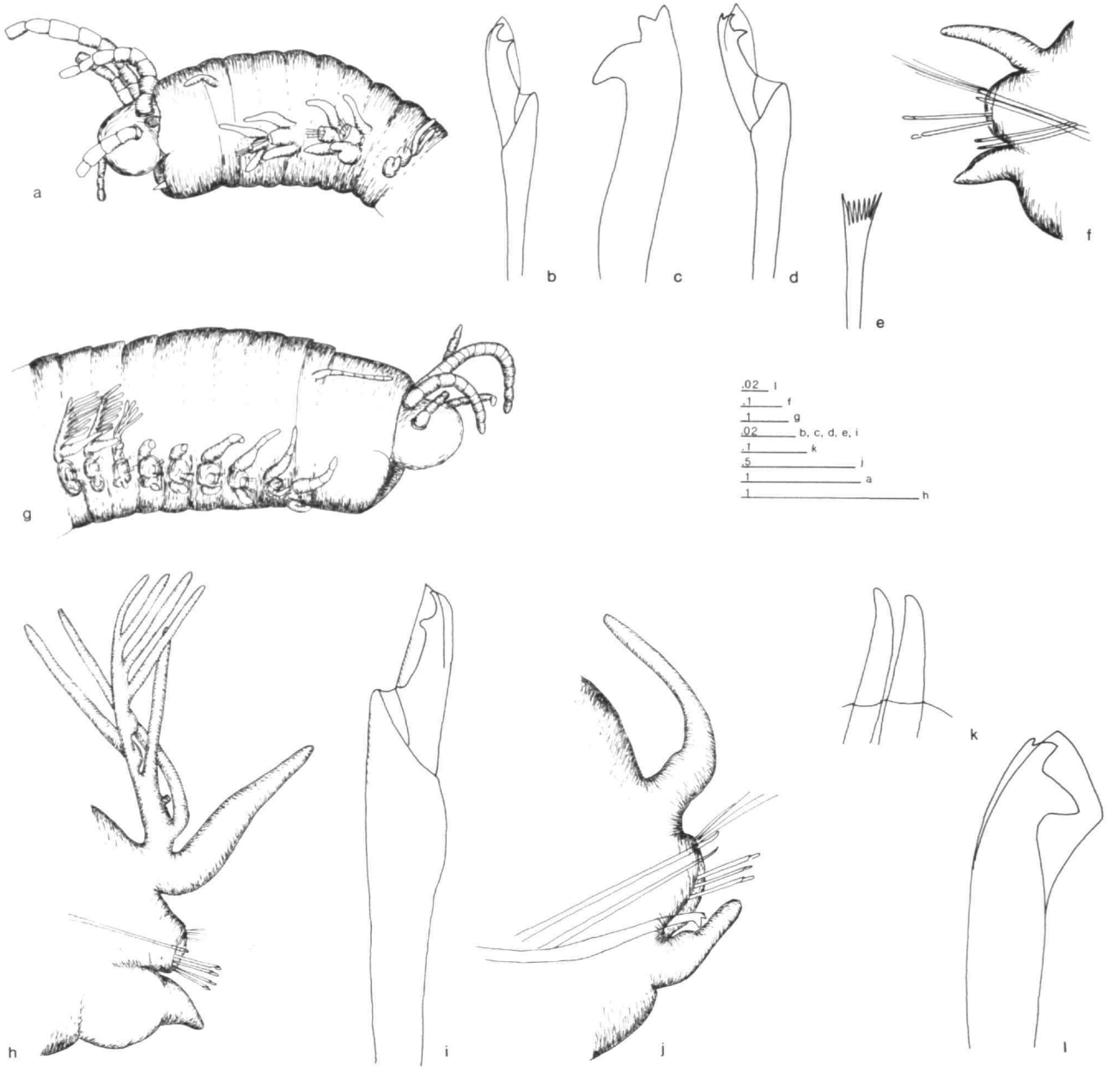

FIGURE 17.—*Eunice aucklandica* (holotype, ZML 1/15807): a, anterior end, lateral view; b, compound falciger, parapodium 40; c, subacicular hook, parapodium 40; d, compound falciger, parapodium 50; e, pectinate seta, parapodium 50; f, parapodium 40, anterior view. *Eunice australis* (holotype, MNHN, A.1(R.)-1868-no. 56a): g, anterior end, lateral view; h, parapodium 21, anterior view; i, compound falciger, parapodium 21; j, parapodium 60, anterior view; k, aciculae, parapodium 60; l, subacicular hook, parapodium 60. (Scale bars in mm.)

description by most authors. Hartman (1959:308) indicated that Treadwell misspelled the specific name in the first publication; this is incorrect.

Eunice auriculata belongs to the genus *Euniphysa* as this genus is currently defined and is here newly referred to that genus.

22. *Eunice australis* Quatrefages, 1866

FIGURE 17g-l; TABLES 41, 43

Eunice australis Quatrefages, 1866:321-322.—Fauchald, 1986:244-245, figs. 9-14.
Eunice leuconuchalis Benham, 1900:21-22.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, A.1(R.)-1868-no. 56a, New Zealand, coll. Quoy and Gaimard.

DESCRIPTION.—Holotype complete, of unknown sex, with 109 setigers, last 10 in regenerating posterior end; total length 70 mm; maximal width 4 mm at setiger 15; length through setiger 10, 9 mm; width at setiger 10, 8.5 mm. Body cylindrical anteriorly, dorsoventrally flattened posteriorly, truncate anteriorly, tapering slowly posteriorly.

Prostomium (Figure 17g) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally slightly flattened; median sulcus deep. Eyes not observed. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; articulations cylindrical basally, increasingly drop-shaped or moniliform distally, especially in A-II and A-III; maximum 15 articulations in A-III. A-I to middle of peristomium; A-II to setiger 1; A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to front 1/3 of peristomium, slender and digitiform, with 7 articulations.

Maxillary formula 1+1, 6+6, 6+0, 6+10, and 1+1.

Branchiae (Figure 17h) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7 through setiger 33. Branchiae terminating well before posterior end, on less than 55% of total number of setigers. Last 2 pairs single filaments; all other branchiae with at least 2 filaments. Maximum 8 filaments by setiger 10. Stems erect, slender, tapering, longer than filaments. Filaments slender, digitiform, about as long as notopodial cirri.

Anterior neuropodial acicular lobes symmetrically truncate, becoming increasingly obliquely rounded posteriorly with aciculae emerging superior to midline. Pre- and postsetal lobes low, transverse folds. Ventral cirri digitiform in pre- and post-branchial setigers, basally inflated with short, strongly tapering tips in branchial region (Figure 17h, j). Inflated bases ovate. Prebranchial notopodial cirri digitiform, basally somewhat inflated, with 2 long articulations. Notopodial cirri of branchial region more distinctly basally inflated without articulations. Postbranchial notopodial cirri increasingly slender, retaining similar lengths in all setigers.

Limbate setae longer than all other setae, slender, marginally serrated. Shafts of pectinate setae cylindrical, slender. Blades flat, flaring. Both marginal teeth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 17i) distally inflated, marginally very finely serrated; distal beak distinct. Appendages short, relatively thick, tapering; head small, bidentate. Proximal teeth reduced triangular, directed laterally or slightly basally. Distal teeth longer and thicker than proximal teeth, abruptly tapering distally, directed laterally. Guards asymmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 17k) paired, yellow, similar in size and shape, tapering, blunt-tipped, bent dorsally; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 17l) yellow, tridentate with teeth in a crest. Hooks first present from setiger 31, present in all setigers thereafter, always single (except for replacements). Primary fangs very large, triangular, curved basally. Distal fangs emerging from common base; tertiary fangs very small, closely appressed to secondary fangs.

UKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri; relationship between Mx III and left Mx IV.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long; located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice australis* is listed with similar species in Tables 41 and 43. It has notopodial articulations limited to the anterior end; other species in Table 43 either have all notopodial cirri articulated or they lack articulations completely.

Justification for accepting the synonymy of *E. leuconuchalis* with *E. australis* as originally suggested by Ehlers (1907) has been given elsewhere (Fauchald, 1986:252-253).

Eunice badia Grube, 1878

Eunice badia Grube, 1878b:148-149, pl. 9: fig. 4.

REMARKS.—Grube had only a single specimen, from the Philippines, which now is lost. Grube's description is summarized, with updated terminology, below.

Prostomial antennae with distinct, but not moniliform articulations. A-III longest, apparently reaching setiger 2. Peristomial cirri short, vaguely articulated. Maxillary formula apparently 1+1, 4+4, 6+0, 3+8, and 1+1. Branchiae from setiger 8, with up to 19 filaments, illustrated as having a strong branchial stem and slender filaments. Ventral cirri pad-shaped posterior to setiger 5; notopodial cirri short. Aciculae black; subacicular hooks black and bidentate.

Eunice badia clearly belongs to group B-2 and resembles *E. aphroditois* and related species. Without access to type material the species is however indeterminable.

Eunice balfouriana (McIntosh, 1885)

FIGURE 18a

Nicidion balfouriana McIntosh, 1885:301-303, figs. 58, 59, pl. 39: figs. 4-6; pl. 20A: figs. 17, 18.

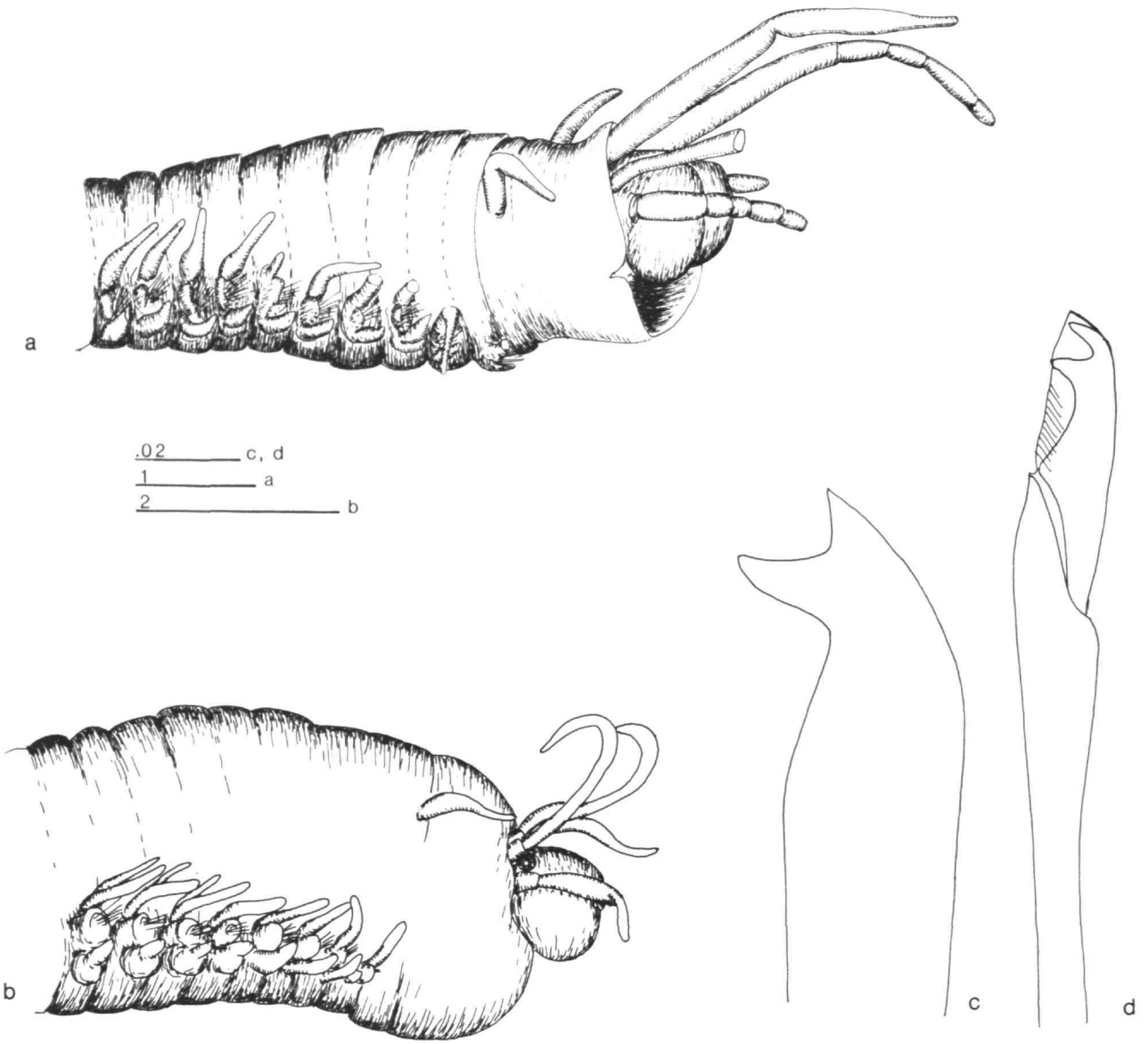

FIGURE 18.—*Eunice balfouriana* (holotype, BM(NH) ZK 1885, 12.1.209): a. anterior end, lateral view. *Eunice barvicensis* (BM(NH) ZK 1885.12.1.203a): b, anterior end, lateral view; c, subacicular hook, parapodium 75; d, compound falciger, parapodium 75. (Scale bars in mm.)

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1885.12.1.209, off Kermadec Islands, 29°55′S, 178°14′W, 978 m, volcanic mud; *Challenger* sta 170, 14 Jul 1874.

COMMENTS ON MATERIAL EXAMINED.—A. Muir (in litt.) pointed out that the official station list for the *Challenger* states that the substrate should be rock, rather than volcanic mud; in addition, two positions were given, one as quoted above, the other 29°45′S, 178°11′W, 1184 m, rock.

The holotype is in two pieces, one anterior end, which has been dissected frontally, and a median piece of about 33 setigers. The two pieces do not match each other. The jaws are missing.

DESCRIPTION.—Anterior end with 17 setigers; length 7.2 mm; maximum width 2.0 mm. Body cylindrical, truncate anteriorly.

Prostomium (Figure 18a) slightly narrower than peristo-

mium, short, posteriorly overlapped by nuchal fold. Prostomial lobes frontally rounded, dorsally inflated; median groove deep. Antennae slender, tapering. A-I and II articulated with long basal articulation and shorter distal articulations; A-III without articulations. A-I with 5 articulations; A-II with 4. A-I to setiger 1; A-II and III to setiger 5. Peristomium cylindrical; anterior ring 4/5 of total peristomial length. Separation between rings distinct dorsally and ventrally. Peristomial cirri to front edge of peristomium, digitiform, without articulations.

Maxillary formula (rewritten from McIntosh) 1+1, 7+6, 8+0, 2+3, and 10+11. Mx-III part of distal arc with left Mx-IV; Mx-VI missing.

Branchiae absent.

Neuropodial acicular lobes symmetrically triangular. All presetal lobes low folds; postsetal lobes about as long as acicular lobes, rounded. Ventral cirri tapering through setiger 8, thereafter basally swollen in remaining setigers. Notopodial cirri basally inflated, without articulations, less than half as long as width of body.

Limbate setae present. Pectinate setae with ~15 teeth. Aciculae black, single. Subacicular hooks not present in anterior fragment.

Median fragment not matching anterior end; at least 20 setigers missing. Fragment abranchiate, with relatively short, tapering notopodial cirri; ventral cirri basally inflated. All segments with black, bidentate subacicular hooks in addition to tapering black aciculae and limbate and pectinate setae.

REMARKS.—The anterior fragment may belong to the same specimen as the median fragment, but too many segments are missing to justify describing the median fragment as belonging to the same species. The distribution of the subacicular hooks remains unknown. *Eunice balfouriana* differs clearly from all other abranchiate species in having short second ring on the peristomium and in the development of the antennae. In abranchiate species (often described as *Nicidion*) the two peristomial rings are similar in length and antennae are short, barely projecting beyond the tip of the prostomium.

The jaw apparatus is currently missing. The very high number of teeth reported by McIntosh for Maxilla V is, as far as known, completely unique in the family. *Eunice balfouriana* is here considered indeterminable.

23. *Eunice barvicensis* McIntosh, 1885

FIGURE 18b–d; TABLES 24, 26

Eunice barvicensis McIntosh, 1885:292–294, figs. 52, 53, pl. 39: fig. 12, pl. 21A: figs. 1–3.

MATERIAL EXAMINED.—One syntype, BM(NH) ZK 1885.12.1.203a, Bermuda, between tidemarks, June 1873.

DESCRIPTION.—Syntype incomplete with 112 setigers; length 41 mm; maximal width 3.5 mm at setiger 10. Length through setiger 10, 6 mm. Syntype frontally dissected, at one time desiccated. Body apparently cylindrical, anteriorly truncate.

Prostomium (Figure 18b) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes large, frontally rounded, dorsally flattened; median groove deep. Eyes large, lensed, between bases of A-I and A-II. Antennae poorly preserved, in a horseshoe, evenly spaced, similar in thickness. Ceratophores long in all antennae, without articulations. Ceratostyles tapering, apparently not articulated (but see McIntosh, 1885:292–293). A-I to posterior margin of peristomium; A-II to setiger 1; A-III to setiger 3. Peristomium short, tapering towards anterior end (artefact?); anterior ring ~3/4 of total peristomial length. Separation between rings distinct dorsally and ventrally. Peristomial cirri to front edge of peristomium, tapering, without articulations.

Jaws present in vial. Maxillary formula 1+1, 5+5, 5+0, 5+8, 1+1. Mx III very short and forming distal arc with left Mx IV and V. Only 3 teeth on left Mx IV well developed; others low tubercles.

Branchiae present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 65, terminating well before the posterior end. First 3 and last 10 pairs single filaments; maximum 4 filaments at setigers 25–30. Branchial stems short, tapering. Filaments shorter than notopodial cirri, short, flattened.

Anterior neuropodial acicular lobes symmetrically rounded, becoming distinctly conical by setiger 60; aciculae emerging at midline. Pre- and postsetal lobes low folds. Ventral cirri digitiform through setiger 4. Ventral cirri basally inflated from setiger 5 through about setiger 25. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri without basal inflation, digitiform. All notopodial cirri digitiform, without articulations. Far posterior notopodial and ventral cirri similar in shape and size.

Limbate setae present. Up to 10 pectinate setae in a parapodium in posterior setigers. Shafts of pectinate setae slender, cylindrical; blades flat, flared. Both marginal teeth longer than other teeth; number of teeth 15. Shafts of compound falcigers (Figure 18d) distally inflated, without serrations; distal beak distinct. Appendages short, tapering; head large, bidentate. Proximal teeth triangular with narrow base, directed laterally; distal teeth as large as proximal teeth, tapering, directed laterally. Guards symmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single in anterior and posterior parapodia, paired in median parapodia, light brown in anterior and posterior setigers, dark brown in median setigers, pointed, straight; cross-sections round. Subacicular hooks (Figure 18c) with dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 19, present in all setigers thereafter, paired in some setigers. Hooks distinctly bent distally, with narrow necks and large heads.

Proximal teeth larger than distal teeth, directed laterally, distally slightly upturned; distal teeth sharply pointed, directed distally.

UKNOWN MORPHOLOGICAL FEATURES.—Features associated with pygidium, anal cirri, and far posterior setigers.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 38.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice barvicensis* was considered a synonym of *E. mutilata* by Hartman (1944:113); however, it has branchiae present only through setiger 65, leaving nearly half of the body abranchiate; branchiae are missing only in the last 15-20 setigers in *E. mutilata;* this number represents less than 15% of the total body length. *Eunice barvicensis* is listed with similar species in Tables 24 and 26. Other species in this group with branchiae from setiger 6 include *E. samoae* and *E. coccinea*. Both these species have articulated ceratostyles; *E. barvicensis* lacks such articulations. The shape of the subacicular hooks resembles the shape present in *E. cariboea* and similar abranchiate species listed in Tables 33 and 40, in that the proximal tooth is tilted up, rather than strongly beaked as is characteristic of *E. mutilata* and related species.

24. *Eunice bassensis* McIntosh, 1885

FIGURE 19; TABLES 46, 47

Eunice bassensis McIntosh, 1885:298, pl. 39: fig. 16, pl. 21A: figs. 8, 9.—Fauchald, 1986:245, figs. 15, 16.

Eunice antennata.—Hartman, 1959:309 [in part, not *Eunice antennata* Lamarck, 1818].

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1885.12.1.207, off East Montcoeur Island, Bass Strait, South Australia, 39°10′S, 146°37′E, 2 Apr 1874, 69-73 m, dredged, sand, *Challenger* sta 162.

COMMENTS ON MATERIAL EXAMINED.—The holotype was reported as anteriorly incomplete when first described. The type locality was corrected by Mr. A. Muir (in litt.)

DESCRIPTION.—Holotype posterior fragment of 55 setigers of which last 22 in regeneration; 50 mm long; 3 mm wide; apparently middle and last third of very large specimen. The integument is light colored and contains a number of whitish granules.

Branchiae (Figure 19b) present except in last 3 setigers, longer than notopodial cirri, erect. All branchiae branching except in regenerating portion where either 1 or 2 filaments present. Maximal number of filaments 9; most branchiae with 6-8 filaments through setiger 33 of fragment. Stems erect, longer than filaments, tapering. Filaments about as long as notopodial cirri, digitiform.

Posterior neuropodial acicular lobes truncate with aciculae emerging in midline. Pre- and postsetal lobes low folds. Ventral cirri moderately basally inflated, becoming digitiform in posterior setigers. Notopodial cirri tapering, with up to 5 distinct articulations.

Compound falcigers with bidentate appendages; guards symmetrically bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, tapering; tips pointed; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 19a) yellow, tridentate with teeth in a crest. Hooks tapering towards distinct head; teeth decreasing evenly in size distally, proximal teeth directed laterally.

UKNOWN MORPHOLOGICAL FEATURES.—All features associated with prostomium and peristomium; jaw structure; distribution of branchiae and subacicular hooks; structure of anterior and median parapodia.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—A-I through A-III with moniliform articulations. Mx III long, located behind left Mx II; distal arc absent. Branchiae from approximately setiger 6; with reduced number of filaments in mid-body region. Subacicular hooks present from about setiger 25.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 58, 59. *Unknown Characters:* 1-29, 33, 35, 36, 39, 40, 42, 45, 46, 48, 49, 51-56, 61, 62, 65-68, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,1.

REMARKS.—*Eunice bassensis* was considered a junior synonym of *E. antennata* by Hartman (1959:309); it resembles that species in having tridentate subacicular hooks and branchiae continued to near the posterior end; however, the very strong articulation of the posterior notopodial cirri, the shape of the branchiae, and the subacicular hooks differ as do the shape of the aciculae.

Eunice bassensis is listed with similar species in Tables 46 and 47; it is too poorly known to be included in the key.

Eunice bellii Audouin and Milne Edwards, 1833

Eunice bellii Audouin and Milne Edwards, 1833:223-224, pl. 10: figs. 1-4, 8-9, table 27.

Marphysa bellii.—Quatrefages, 1866:333-334.

REMARKS.—*Eunice bellii* was referred to the genus *Marphysa* by Quatrefages (1866). As far as known, there has never been any doubt that it belongs to that genus as currently is defined. The earlier use of the name *Eunice bellii* in Cuvier (1830:200) is a nomen nudum, thus the name was available for use by Audouin and Milne Edwards (1833).

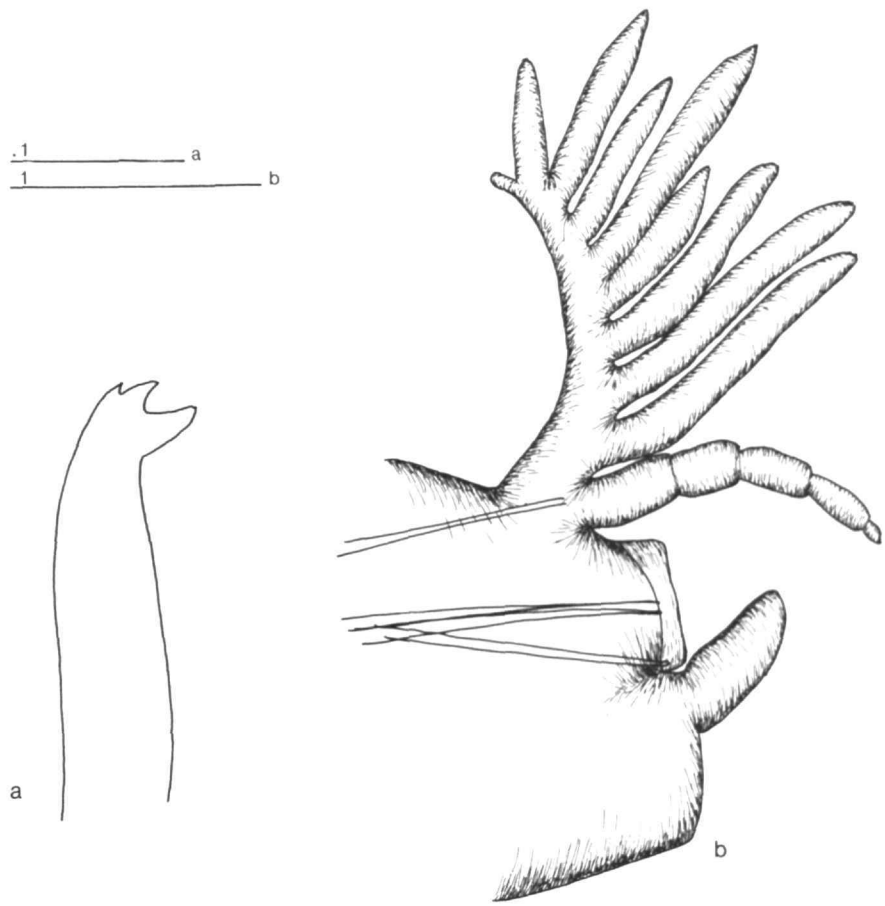

FIGURE 19.—*Eunice bassensis* (holotype, BM(NH) ZK 1885.12.1.207): a, subacicular hook, posterior parapodium; b, posterior parapodium, anterior view. (Scale bars in mm.)

25. *Eunice benedicti* (Verrill, 1885)

FIGURE 20; TABLES 19, 21

Leodice benedicti Verrill, 1885:427–428.
Eunice benedicti.—Hartman, 1942:52, figs. 88–90.

MATERIAL EXAMINED.—Lectotype, YPM 2729, south of Cape Cod, Massachusetts, 40°03′48″N, 70°45′54″W, 130 m, *Fish-Hawk* sta 922, 16 Jul 1881 (1 specimen).

COMMENTS ON MATERIAL EXAMINED.—This specimen was listed as catalog 60-3 in Hartman (1942). It must have been exposed to strong alcohol at one time, because it now appears slightly dehydrated. The two localities listed by Verrill (1885:428) are *Fish Hawk* stations 865 and 943. Hartman (1942:52) found material from stations 922 and 1032 in the Peabody Collections; all specimens are from the same area and similar depths. The specimen from station 922 is not, strictly speaking, part of the type series, because neither station 922 nor station 1032 were mentioned in the original description. However, one label in YPM 2729 is in Verrill's handwriting and names the species as *benedicti;* thus this specimen was identified by Verrill. It came from a set of stations studied by Verrill in preparation for the publication of his new species; for that reason, it is here considered part of the original type series and eligible to be considered a lectotype.

The specimens from *Fish Hawk* station 1032 seen by Hartman (1942) are cataloged in our collections as USNM 14362. USNM 14361, quoted by Hartman for the specimen from station 922, must at one time have been transferred to the Peabody Museum; the number is correctly present in the ledgers, but the corresponding card and the specimen are no longer part of our collections.

DESCRIPTION.—Complete mature female, with 105 setigers; total length 38 mm; maximum width 2.5 mm at setiger 15. Length through setiger 10, 5 mm; width at setiger 10, 2 mm. Body cylindrical throughout, tapering from anterior to poste-

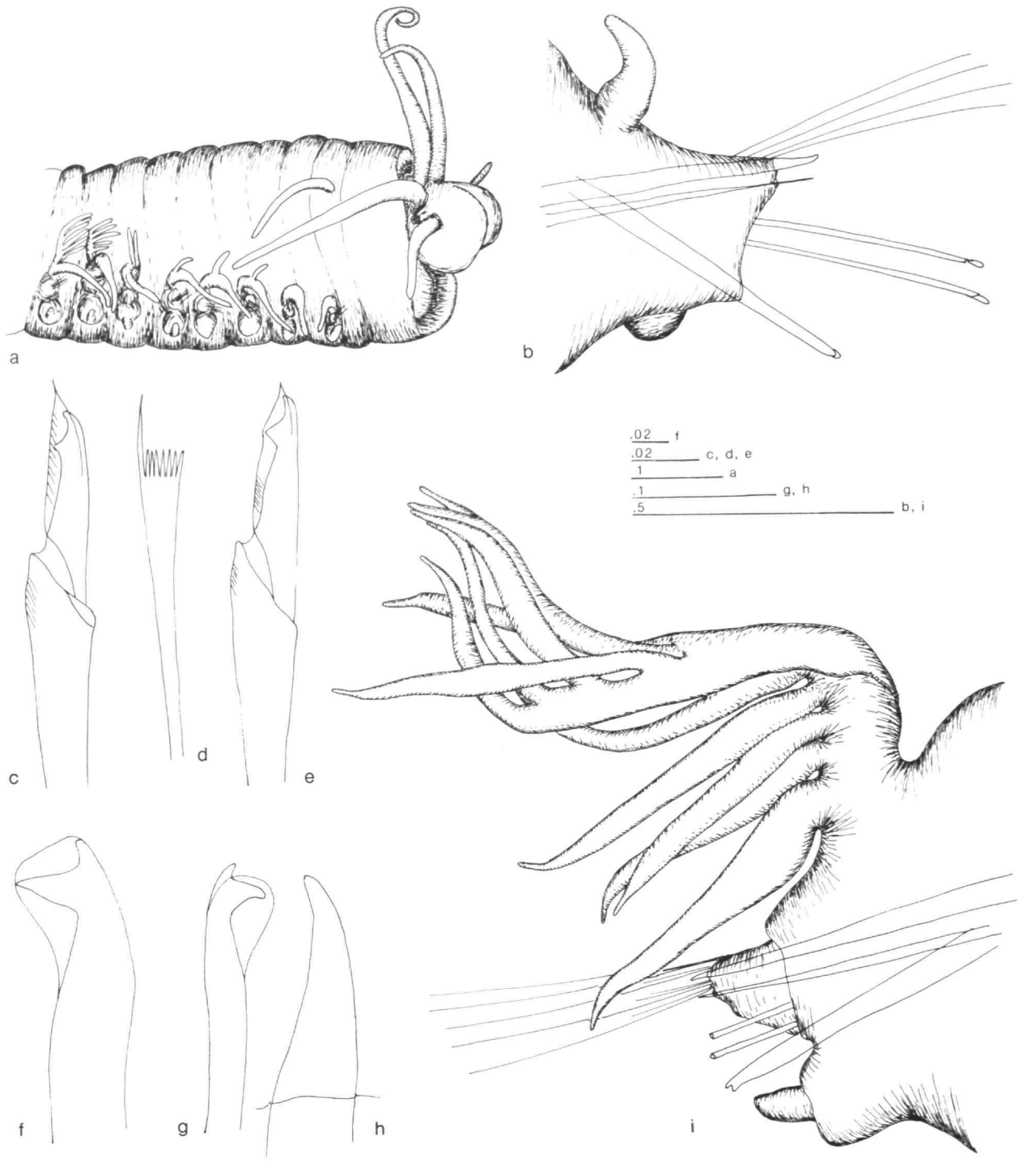

FIGURE 20.—*Eunice benedicti* (holotype, YPM 2729) a, anterior end, lateral view; b, parapodium 76, anterior view; c, compound falciger, parapodium 4; d, pectinate seta, parapodium 76; e, compound falciger, parapodium 76; f, subacicular hook, parapodium 32; g, subacicular hook, parapodium 76; h, acicula, parapodium 76; i, parapodium 32. (Scale bars in mm.)

rior end. Prostomium (Figure 20a) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, inflated dorsally; median sulcus shallow. Eyes faded, posterior to the bases of A-I. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I to second peristomial ring; A-II to setiger 3; A-III to setiger 4. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring roughly 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, without articulations.

Jaws not examined. Hartman (1942:52) reported maxillary formula as 1+1, 6+7, 9+0, 5+11, and presumably 1+1.

Branchiae (Figure 20i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 3 through setiger 39. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Three first pairs single filaments; all other branchiae with 2 or more filaments; maximum number 12, at or near setiger 15. Number of filaments maintained near maximum number to 3 segments before end of branchiated region. Branchial stems longer than filaments, flexible, tapering. Filaments longer than notopodial cirri, tapering distally to slender, nearly translucent tips.

Anterior neuropodial acicular lobes symmetrically truncate; median acicular lobes asymmetrically triangular, with aciculae emerging superior to midline; posterior acicular lobes nearly trapezoidal with aciculae and the subacicular hooks supporting distal corners (Figure 20b). All pre- and postsetal lobes low transverse folds. First 4 ventral cirri thick, tapering from narrow bases. Ventral cirri basally inflated from about setiger 5; inflated bases thick transverse welts in all remaining setigers. Narrow tip of ventral cirri digitiform in anterior and median setigers, becoming reduced from about setiger 40 and completely missing in last 45 setigers. Remnant thick pad-like structure moved to posterior face of parapodia visible only as a modest pad-like swelling on posteroventral edge of neuropodia in far posterior setigers. Anterior notopodial cirri medially inflated, increasing in length through setiger 15, thereafter decreasing through remainder of branchial region, retaining approximately same shape. Far posterior notopodial cirri short and digitiform. Notopodial cirri without articulations.

Limbate setae more than twice as long as other setae in anterior and median setigers, clearly longer than all other setae in all setigers, slender, marginally smooth, very narrowly limbate, appearing nearly capillary. Pectinate setae (Figure 20d) very long, narrow; shafts cylindrical, slender; blades tapering, flat. One marginal tooth distinctly longer than other teeth; total number about 10. Shafts of compound falcigers (Figure 20c,e) extremely long compared to length of appendages, distally inflated with serrated margins; distal beak present. Appendages short, tapering, bidentate. Proximal teeth triangular, directed laterally, larger in posterior than in anterior setigers; distal teeth larger than proximal teeth, tapering, slightly less curved in posterior than in anterior setigers. Guards symmetrically sharply pointed with distinct short mucros, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, tapering; cross-section round. Superior aciculae (Figure 20h) considerably heavier than inferior aciculae, gently curved, sharply tapering. Inferior aciculae similar in shape, but distally straight. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 20f,g) yellow, bidentate. Hooks first present from setiger 21, present in all setigers thereafter, paired in some setigers. Hooks tapering, with distinct head. Proximal teeth large, slender, directed laterally. Distal teeth, small, nearly erect. Guards rounded truncate.

UKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri; relation between Mx III and left Mx IV.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—The number of teeth in Mx III and left Mx IV indicates that Mx III is long and located behind left Mx II rather than as part of a distal arc.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 60. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice benedicti* is listed with similar species in Tables 19 and 21. Species in this group combining branchiae starting from setiger 3 with a lack of articulations of the ceratostyles include *E. hawaiensis*, *E. leptocirris*, *E. megabranchia*, *E. rubrocincta*, and *E. validobranchiata*. All of these species except *E. benedicti* have at least two anterior pairs of branchiae as single filaments; all anterior branchiae are pectinate in *E. benedicti*. The branchiae are folded over, nearly coiled in *E. benedicti*, and erect in all the other species listed. In addition, the bases of the ventral cirri are inflated through the posterior part of the body in *E. benedicti;* the inflated bases are reduced in posterior setigers in all the other species. *Eunice benedicti* has mucronate compound falcigers; the compound falcigers are at best pointed in the other species listed.

Eunice bertolonii (Chiaje, 1828)

Nereis Bertoloni Chiaje, 1828:174, see also p. 163.—Grube, 1850:291.—Quatrefages, 1866: 354.
Eunice Bertoloni.—Audouin and Milne Edwards, 1833:220.
Eunice Bertoloniana.—Fauvel, 1923:451.

REMARKS.—The species has been quoted in the genus *Eunice* due to Chiaje's placement of the species under the genus *Leodice* in his formal diagnosis (1828:174). Chiaje specifically mentions, both in his Latin diagnosis and in the Italian description, the presence of spiralled branchiae. However, Audouin and Milne Edwards (1833:220) stated that although the species "had the appearance of a *Eunice*" they had

been unable to see that the branchiae were pectinate. Grube (1850:291) indicated that this species must belong in the vicinity of the onuphid genus *Diopatra;* similarly Quatrefages (1866:354) indicated that he was inclined to refer it to *Diopatra.* Fauvel (1923:451) in a table listed the species as *Eunice Bertoloniana* [sic] and referred it under doubt to *Diopatra.* As far as can be ascertained, no material of this species exist and it is here considered indeterminable.

26. *Eunice biannulata* Moore, 1904

FIGURE 21a-f; TABLES 19, 20

Eunice biannulata Moore, 1904:487-490, pl. 37: figs. 10-18, pl. 38: fig. 42.—Fauchald, 1969:2-4, fig. 1a-e.

MATERIAL EXAMINED.—Holotype, CAS Type 35 (Inv. cat. no. 019712), San Diego, California, coll. E.C. Starks.

DESCRIPTION.—Holotype complete, with 139 setigers; total length 105 mm; maximum width 3 mm at setiger 15. Length through setiger 10, 12 mm; width at setiger 10, 2.75 mm. Body slender, cylindrical throughout.

Prostomium (Figure 21b) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus deep. Eyes dark, posterior to and between A-I and A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; basal 1/3-1/2 of ceratostyle without articulations; distal portions increasingly articulated; final 5-6 articulations rounded, drop-shaped. A-I to second peristomial ring; A-II to setiger 2; A-III to setiger 4. Peristomium slightly flaring ventrally, with distinct, muscular lower lip. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to front edge of peristomium, basally slightly inflated, with 4 cylindrical articulations.

Jaws not examined. Mandibles strongly calcified.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 50. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and the last 2-3 pairs single filaments, maximum 8 filaments at about setiger 10. Branchial stem erect, tapering, longer than filaments. Filaments slender and digitiform, about as long as notopodial cirri.

Anterior neuropodial acicular lobes symmetrically truncate, becoming asymmetrically rounded with aciculae emerging superior to midline in far posterior setigers (Figure 21a). Pre-and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming distinctly inflated basally from about setiger 6. Inflated bases spherical; narrow tip rather large, digitiform. Inflated bases decreasing posterior to setiger 90, indistinct in last 10-15 setigers. Far posterior ventral cirri digitiform. All notopodial cirri medially inflated; anterior and median ones with 3-4 cylindrical articulations; posterior ones without articulations.

Limbate setae about as long as compound hooks, smooth-edged. Shafts of pectinate setae (Figure 21c) wide, cylindrical; blades furled, tapering. Both marginal teeth distinctly longer than other teeth, ~10 very large teeth present. Shafts of compound falcigers (Figure 21f) tapering in most setigers, slightly inflated distally in a few setigers, marginally smooth; distal beak absent. Appendages thick, barely tapering; heads large, bidentate. Proximal teeth triangular, directed laterally; distal teeth shorter than proximal teeth, bent, directed laterally. Guards distally symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 21d) paired, yellow, tapering to blunt, distinctly curved tips; cross-sections round. Separation of core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 21e) yellow, bidentate. Hooks first present from setiger 38, present in all setigers thereafter, paired in some setigers. Hooks barely tapering; head indistinct. Proximal teeth large, directed laterally; distal teeth short, narrow, directed obliquely distally.

UKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice biannulata* was reviewed in Fauchald (1969); it is listed with similar species in Tables 19 and 20. In common with several other species in Table 20, it has articulated ceratostyles in which the articulations become bead-shaped or moniliform distally; this feature is uniquely exaggerated in this species compared to the other species listed in the table. *Eunice biannulata* can also be separated from other species in the group by the distribution and development of the branchiae as suggested in Fauchald (1969).

Eunice biannulata mexicana Fauchald, 1970

Eunice biannulata mexicana Fauchald, 1970:27-28, pl. 1: figs. f-g.

REMARKS.—Originally described as a subspecies, this form is here considered a distinct species and is discussed below as *E. mexicana.*

27. *Eunice bicirrata* Rullier, 1964

TABLES 41, 42, 46-48

Eunice bicirrata Rullier, 1964:178-180, fig. 15a-h.

COMMENTS ON MATERIAL EXAMINED.—This species was described from a single specimen from the Cape Verde Islands

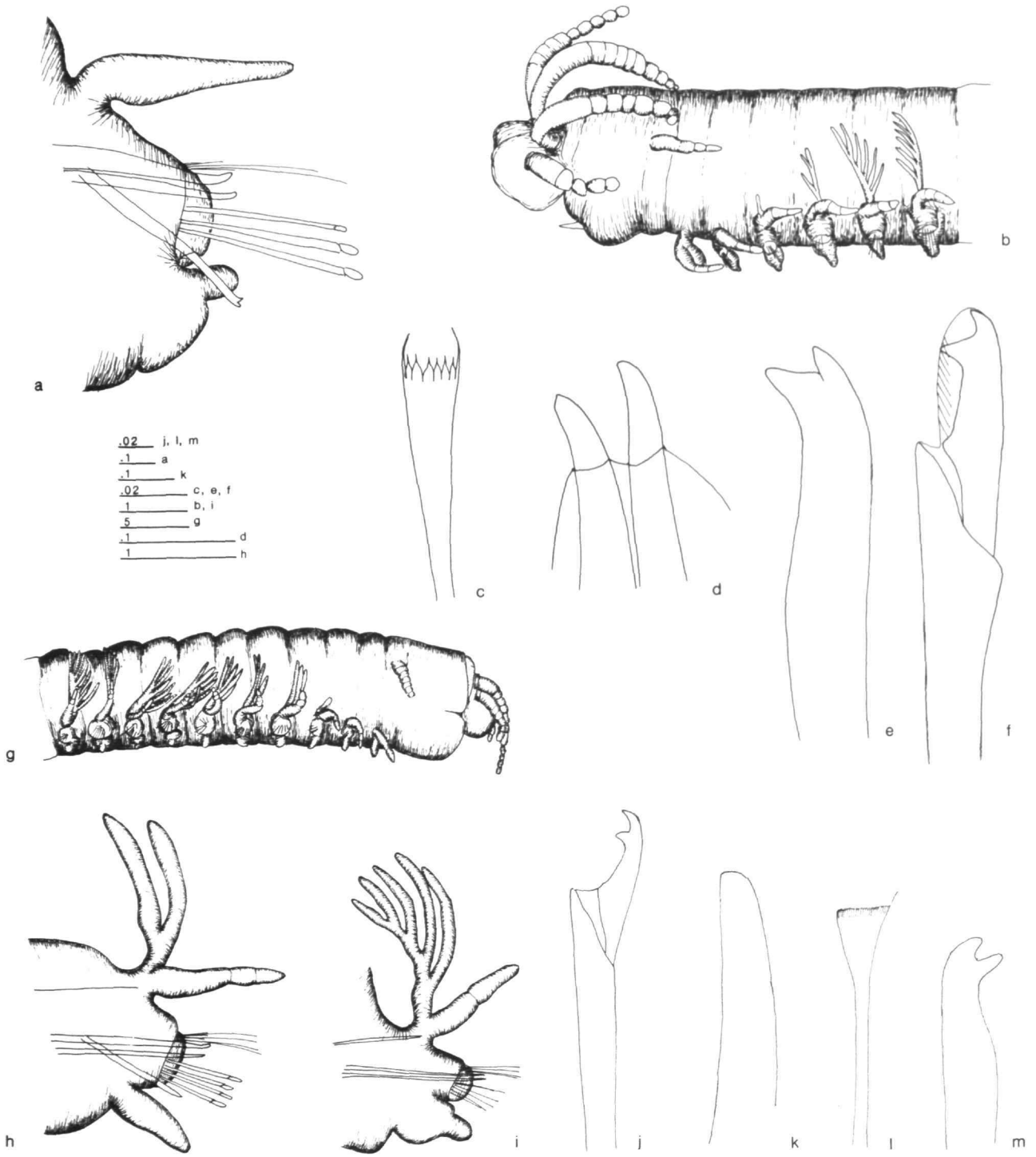

FIGURE 21.—*Eunice biannulata* (holotype, CAS Type series 35 (CAL 019712)): a, parapodium 79, anterior view; b, anterior end, lateral view; c, pectinate seta, parapodium 79; d, aciculae, parapodium 79; e, subacicular hook, parapodium 79; f, compound falciger, parapodium 79. *Eunice biformicirrata* (AMNH 1527): g, anterior end, lateral view; h, parapodium 111, anterior view; i, parapodium 11, anterior view; j, compound falciger, parapodium 111; k, acicula, parapodium 111; l, pectinate seta, parapodium 111; m, subacicular hook, parapodium 111. (Scale bars in mm.)

in 120–150 m depth. The specimen was not available; the description below is summarized from the original description.

DESCRIPTION.—Holotype (and only specimen) incomplete, with 50 setigers; total length 12 mm; maximal width 1 mm.

Ceratostyles slender and digitiform, articulated, especially distally, with long, cylindrical articulations, becoming apparently drop-shaped distally. A-III to setiger 10. Two pairs of peristomial cirri present; outer pair to posterior end of prostomium; medial pair somewhat shorter.

Branchiae present, palmate. Branchiae from setiger 3 through setiger 48. Maximum number of filaments 2.

Limbate setae illustrated as marginally smooth. Pectinate setae absent. Shafts of compound falcigers inflated. Appendages small, linear, bidentate. Proximal teeth triangular; distal teeth slender, curved. Guards illustrated as symmetrically sharply pointed, but not mucronate. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, tapering to blunt tips and distally curved. Subacicular hooks yellow, tridentate with teeth in a crest. Hooks first present from setiger 45. Two distal teeth emerging from common base.

UKNOWN MORPHOLOGICAL FEATURES.—Shape features associated with pro- and peristomium; jaw structure (but see comments below); all parapodial features; setal distribution and shapes must be confirmed; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—The species is too poorly known to make meaningful predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* None known. *Unknown Characters:* 1, 2, 4-19, 24-26, 28, 29, 32-34, 37-68, 74, 75, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Rullier considered the peristomium as two asetigerous segments; the distribution of branchiae and subacicular hooks has been recalculated to the conventions used in this paper; thus the numbers will not agree with those originally stated.

The jaws appear to be highly unusual. Rullier specifically stated that maxillae were absent and that the whole apparatus consisted of two pairs of mandibles. The illustration, seen from the ventral side, shows a pair of very slender forceps and a pair of curved, medially excavated lateral pieces fused to a narrow carrier in the midline posteriorly; the dorsal and distal ends of each half are strongly denticulated with very small, even teeth. These jaws resemble those of juvenile eunicids and onuphids.

The structure of the jaws as illustrated and the other features specified indicate that Rullier had a juvenile specimen, perhaps anteriorly damaged, suggested by the doubled peristomial cirri, of group C-1 or C-2.

Eunice bicirrata is here considered a juvenile, possibly indeterminable. It is listed with similar species in Tables 41 and 42 and in Tables 46–48. It is too poorly known to be included in the key. The description of a new species based on a juvenile does not, per se, make the taxon invalid.

28. *Eunice biformicirrata* (Treadwell, 1922)

FIGURE 21g–m; TABLES 27, 32

Leodice biformi-cirrata Treadwell, 1922:148–149, figs. 34, 35, pl. 4: figs. 6–11.

Eunice grubei Hartman, 1956:282 [not *Eunice grubei* Gravier, 1900].

MATERIAL EXAMINED.—Holotype, AMNH 1527, Suva, Fiji, Apr 1920, coll. A.L. Treadwell.

DESCRIPTION.—Holotype complete male with 137 setigers; total length 217 mm; maximum width 7 mm at setiger 15. Length through setiger 10, 17 mm; width at setiger 10, 6.5 mm. Anterior body cylindrical with strongly convex dorsum, becoming ventrally flattened in median setigers and dorsoventrally flattened in posterior setigers. Anterior end truncate, tapering slowly posteriorly.

Prostomium (Figure 21g) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not seen. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped, without articulations. Ceratostyles tapering; basal 1/3 without articulations; styles increasingly articulated in median 1/3 and articulations distinctly moniliform in distal 1/3 of each antenna. A-I to middle of peristomium; A-II and A-III to setiger 1; maximally ~10 articulations. Peristomium cylindrical. Separation between rings distinct ventrally and at bases of peristomial cirri; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of first peristomial ring, thick and tapering, with about 7 short, moniliform articulations.

Jaws missing; according to Treadwell, maxillary formula 1+1, 5+5, 6+0, ?+8, and 1+1.

Branchiae (Figure 21h,i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 132. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and last 5 branchiae single filaments; maximum number of filaments 7 reached at setiger 10, thereafter number of filaments decreasing slowly; by setiger 100 (Figure 21h) only 2 filaments left. Branchial stems thick, tapering, shorter than filaments. Filaments digitiform.

Anterior neuropodial acicular lobes short, asymmetrically truncate or rounded with aciculae emerging well above midline; median and posterior acicular lobes broadly asymmetrically truncate. All pre- and postsetal lobes low, continuous folds. Anterior ventral cirri digitiform in 3 first setigers. Ventral cirri strongly inflated from about setiger 4. Inflated bases spherical; narrow tips digitiform. Inflation decreasing posterior to setiger 60; far posterior ventral cirri digitiform. All notopodia tapering with 2 or 3 cylindrical articulations.

Limbate setae longer than other setae, marginally serrated. Pectinate setae (Figure 21l) very small; shaft cylindrical, narrow; blades flat, flared. One marginal tooth longer than other teeth; ~20 very fine teeth. Shafts of compound falcigers (Figure 21j) tapering, internally striated, marginally smooth,

with distinct distal beak. Appendages short, tapering with distinct heads, bidentate. Proximal teeth curved, triangular, directed laterally; distal teeth longer than proximal teeth, tapering, curved, directed laterally. Guards asymmetrically bluntly pointed, marginally smooth, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 21k) paired, black, blunt, gently curved in most setigers; cross-section round. Subacicular hooks (Figure 21m) black, bidentate. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Hooks with large heads and narrow necks. Proximal teeth slender, tapering, directed obliquely distally; distal teeth shorter than proximal teeth, but distinctly thicker, directed obliquely laterally.

UKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri; relation between Mx III and left Mx IV.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III part of distal arc with left MX IV; short, curved. Left Mx IV distinctly shorter than right Mx IV, curved.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The specimen is very well preserved; it is a nearly mature male with sperm discs in the coelom.

Eunice biformicirrata is listed with similar species in Tables 27 and 32. In addition to *E. biformicirrata,* two species in Table 32, *E. laurillardi* and *E. longicirris,* have the notopodial cirri articulated throughout the body; the other species either lack such articulations altogether or the notopodial cirri are articulated only in the anterior, usually pre-branchial and early branchial setigers. In *E. biformicirrata,* the peristomial cirri reach the middle of the peristomium; in both the other species the peristomial cirri are longer, reaching at least the middle of the prostomium.

29. *Eunice bilobata* Treadwell, 1906

FIGURE 22; TABLES 27, 29

Eunice bilobata Treadwell, 1906:1168-1169, figs. 47, 48.

MATERIAL EXAMINED.—Holotype, USNM 5212, *Albatross* sta 3871, Auau Channel, between Maui and Lanai islands, 20°52′20″N, 156°41′35″W, 24-79 m, fine white sand, 12 Apr 1902.

COMMENTS ON MATERIAL EXAMINED.—The holotype consists of a well-preserved anterior end and three median fragments, which probably all derive from the same specimen; size and general constitution are similar, but several intermediate sections must be missing, because the fragments do not match well. The description is based on the anterior end only.

DESCRIPTION.—Anterior fragment with 35 setigers; length 18 mm; maximal width 6 mm; length through setiger 10, 7 mm. Head and anterior 5-6 segments cylindrical; remainder of fragment dorsoventrally flattened.

Prostomium (Figure 22a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of the peristomium, nearly hidden under large antennae. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes absent. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 12 irregular, indistinct cylindrical articulations in A-II. A-I to posterior margin of peristomium; A-II reach setiger 7; A-III incomplete; at least as long as A-II. Peristomium strongly flaring anteriorly; with distinct, muscular lower lip. Separation between rings distinct dorsally, possibly also ventrally, but distorted by overlapping fold; anterior ring $^9/_{10}$ of total peristomial length. Peristomial cirri to middle of prostomium, digitiform, without articulations.

Maxillary formula 1+1, 5+6, 6+0, 3+9, and 1+1.

Branchiae (Figure 22e) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 7, present on all fragments. All branchiae pectinate with up to 18 filaments. Branchial stems curved dorsally and twisted posteriorly in most segments. Filaments short, slender.

Neuropodial acicular lobes broadly rounded; aciculae emerging dorsal to midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering, becoming basally inflated from setiger 4. Inflated bases thick, ovate; narrow tips tapering. Anterior notopodial cirri long, basally inflated, tapering to thick, digitiform tips; in branchial region notopodial cirri shorter, tapering from bases. Notopodial cirri with up to 7 articulations anteriorly; number of articulations decreasing posteriorly; median and posterior notopodial cirri with 3 or 4 articulations.

Limbate setae long, narrow. Pectinate setae (Figure 22c) large, tapering, flat. Marginal teeth no longer than other teeth, about 10 long, distally tapering teeth present. Shafts of pectinate setae distinctly punctate. Shafts of compound falcigers (Figure 22b) tapering. Appendages short, bidentate. Both teeth similar in size. Proximal teeth directed laterally. Distal teeth directed obliquely distally. Guards symmetrically rounded, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, dark, superior aciculae bent with irregular knobs (Figure 22d); other aciculae tapering to straight, blunt points; cross-section of aciculae round. Subacicular hooks black, bidentate. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements).

UNKNOWN MORPHOLOGICAL FEATURES.—Relation between Mx III and left Mx IV; features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Branchiae continued to the far posterior end.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 56. *Unknown*

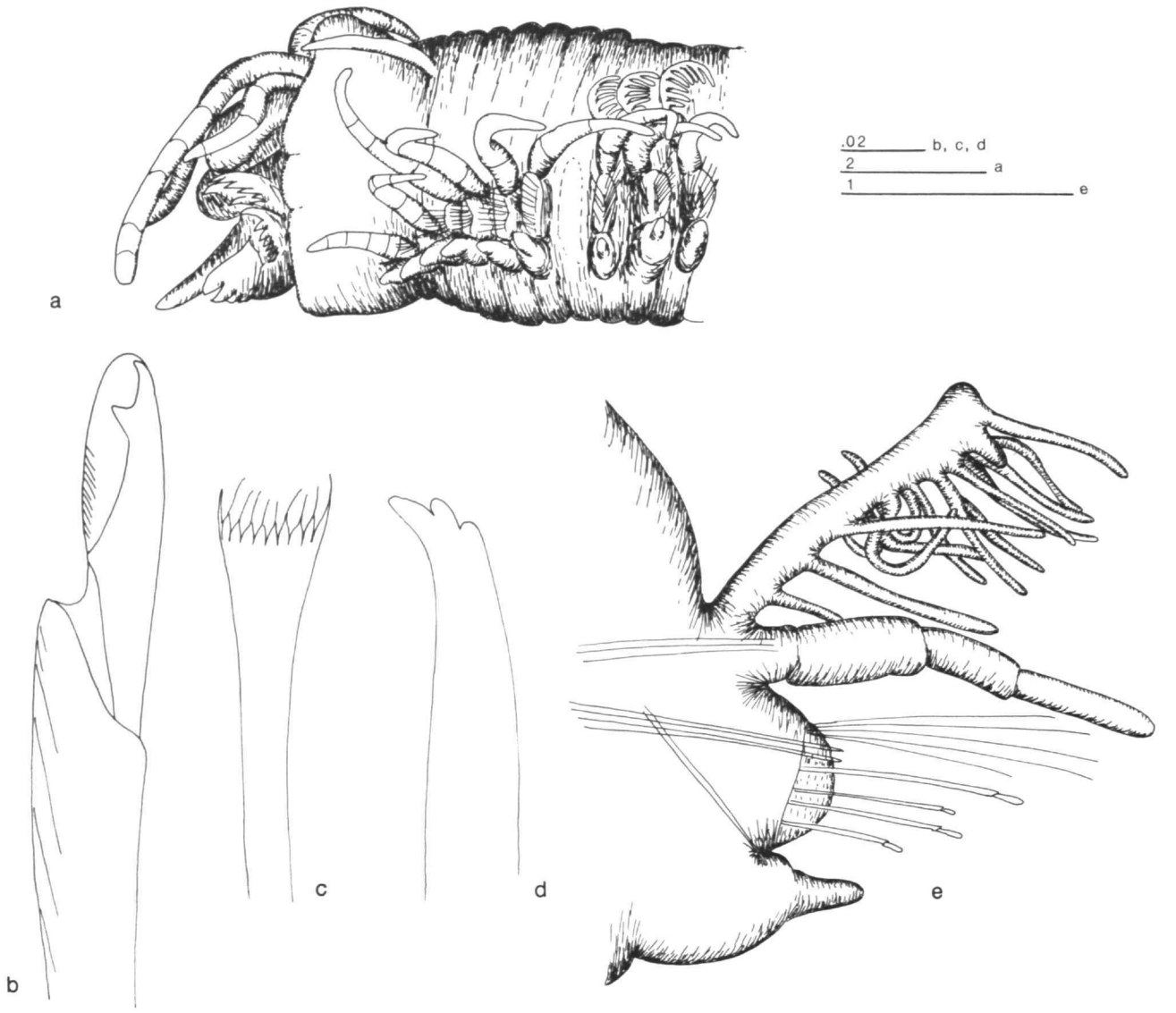

FIGURE 22.—*Eunice bilobata* (holotype, USNM 5212): a, anterior end, lateral view; b, compound falciger, parapodium 32; c, pectinate seta, parapodium 32; d, acicula, parapodium 32; e, parapodium 32, anterior view. (Scale bars in mm.)

Characters: 1, 2, 4, 6, 15-17, 23, 36-38, 40, 42, 57-60, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice bilobata* is listed in Tables 27 and 29. Enough fragments are present to indicate that the branchiae continue beyond setiger 100, but whether the branchiae continue to the end of the body cannot be determined based on the fragmentary type. *Eunice bilobata* is the only species listed in Table 29 with knobbed, distally expanded aciculae.

Eunice binominata Quatrefages, 1866

Eunice binominata Quatrefages, 1866:327.—Ehlers, 1887:85.
Eunice punctata Grube, 1856:59-60 [not *Eunice punctata* Risso, 1826].

REMARKS.—Quatrefages (1866) renamed Grube's species because Grube's name was preoccupied and did not see any material. Grube had a single specimen collected at St. Croix in the West Indies at his disposal. The specimen is now missing. Ehlers did not examine types in his review of the species. The following is a summary of Grube's description:

Type yellow with white punctations, with 96 setigers. Antennae with up to 12 long articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 5.

Branchiae from setiger 3 through setiger 27; all pectinate with up to 9 filaments.

Notopodial cirri about as long as branchiae, vaguely articulated.

Aciculae yellow.

The branchial distribution combined with the information about the antennae and the color of the aciculae indicate that this species might be a member of C-1, but the information is clearly insufficient to identify the species and it is here considered indeterminable.

30. *Eunice bipapillata* Grube, 1866

FIGURE 23; TABLES 27, 30, 31

Eunice bipapillata Grube, 1866a:64.

MATERIAL EXAMINED.—?Part of holotype, ZMB F1993b (marked *Eunice magnifica*, see comment below), Samoa, 3 parapodia.

COMMENTS ON MATERIAL EXAMINED.—G. Hartwich (in litt.) informed me that parapodial preparations of *E. bipapillata* and *E. magnifica* originally were stored together in the same vial; at one time they were split apart into two vials. The three parapodia referred to above agree with *E. bipapillata* and cannot agree with *E. magnifica* due to differences in the distribution of branchiae and the different maximal numbers of branchial filaments reported by Grube for the two species. Therefore, it is assumed that the labels for the two vials were confused. The description given below is a summary of observations on the parapodial preparations and the original description.

DESCRIPTION.—Type copper-colored with white band across setiger 4.

Ceratostyles articulated.

Branchiae (Figure 23d,h,i) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 4 to end of body. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Up to 4 filaments from setiger 8 through setiger 18; paired filaments in setiger 77. Branchial stems short, tapering. Filaments digitiform.

Anterior acicular lobes (Figure 23d,e) asymmetrically truncate, with aciculae emerging above midline, becoming slightly triangular in posterior setigers (Figure 23i). All pre- and postsetal lobes low folds. Ventral cirri distinctly inflated basally in setigers 15 and 18; inflated base lost by setiger 77; narrow tip digitiform in all setigers. Ventral cirrus in setiger 77 digitiform. All notopodial cirri similar in size and shape; bases slightly inflated, tapering to blunt, digitiform tips, without articulations.

Limbate setae longer than other setae, slender, narrowly limbate, marginally serrated. Shafts of pectinate setae (Figure 23b,h) cylindrical, slender; blades slightly flared, flat. One marginal tooth longer than other teeth; up to 15 teeth. Shafts of compound falcigers (Figure 23a,c) tapering, marginally smooth; distal beak indistinct. Appendages short, relatively thickset with large heads, bidentate. Proximal teeth triangular, directed laterally or slightly distally, with distinct distal upturned tip; distal teeth longer than proximal teeth, tapering or blunt, directed obliquely distally. Guards asymmetrically bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black, tapering, straight, blunt-tipped; cross-section round. Subacicular hooks (Figure 23f) black, bidentate. Hooks absent in parapodia 15 and 17, present in parapodium 77. Proximal tooth thicker than distal tooth, but no longer, curved, directed laterally. Distal tooth nearly erect, tapering. Guard short, truncate.

UKNOWN MORPHOLOGICAL FEATURES.—All features associated with prostomium and peristomium; jaw structure; distribution of branchiae and subacicular hooks.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Antennae not reaching beyond peristomium; with cylindrical articulations or without articulations; digitiform. Mx III short; located in front of left Mx IV, forming part of a distal arc. Branchiae continued to far posterior setigers.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1-20, 22-29, 33, 34, 36-40, 51, 52, 74, 78, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—20,3; 22,2; 23,4; 33,2; 37,1; 38,1.

REMARKS.—*Eunice bipapillata* is listed with similar species in Tables 27, 30, and 31; it resembles in certain respects *E. aphroditois*, but cannot be completely identified without access to more material.

Eunice bitorquata Grube, 1870

Eunice bitorquata Grube, 1870b:56.
?Eunice siciliensis.—Grube, 1878a:101.

REMARKS.—The original description contains the following statements (K. Fauchald translation):

> The species is brown with golden to brown cross bars on the peristomium. Branchiae are present from setiger 104 and are present only as single filaments, far outreaching the notopodial cirri. Segments are remarkably short and the median antenna is as long as four segments. The maxillae have coarse teeth; Mx II has 4 teeth.

Grube (1878a:101) referred this species questionably to his own *Eunice siciliensis*, but gave no comment or any supportive statements.

The original description is wholly inadequate to characterize the species; the information given is consistent with the synonymy suggested by Grube (1878a), but is not sufficient to be conclusive. *Eunice bitorquata* is here considered indeterminable.

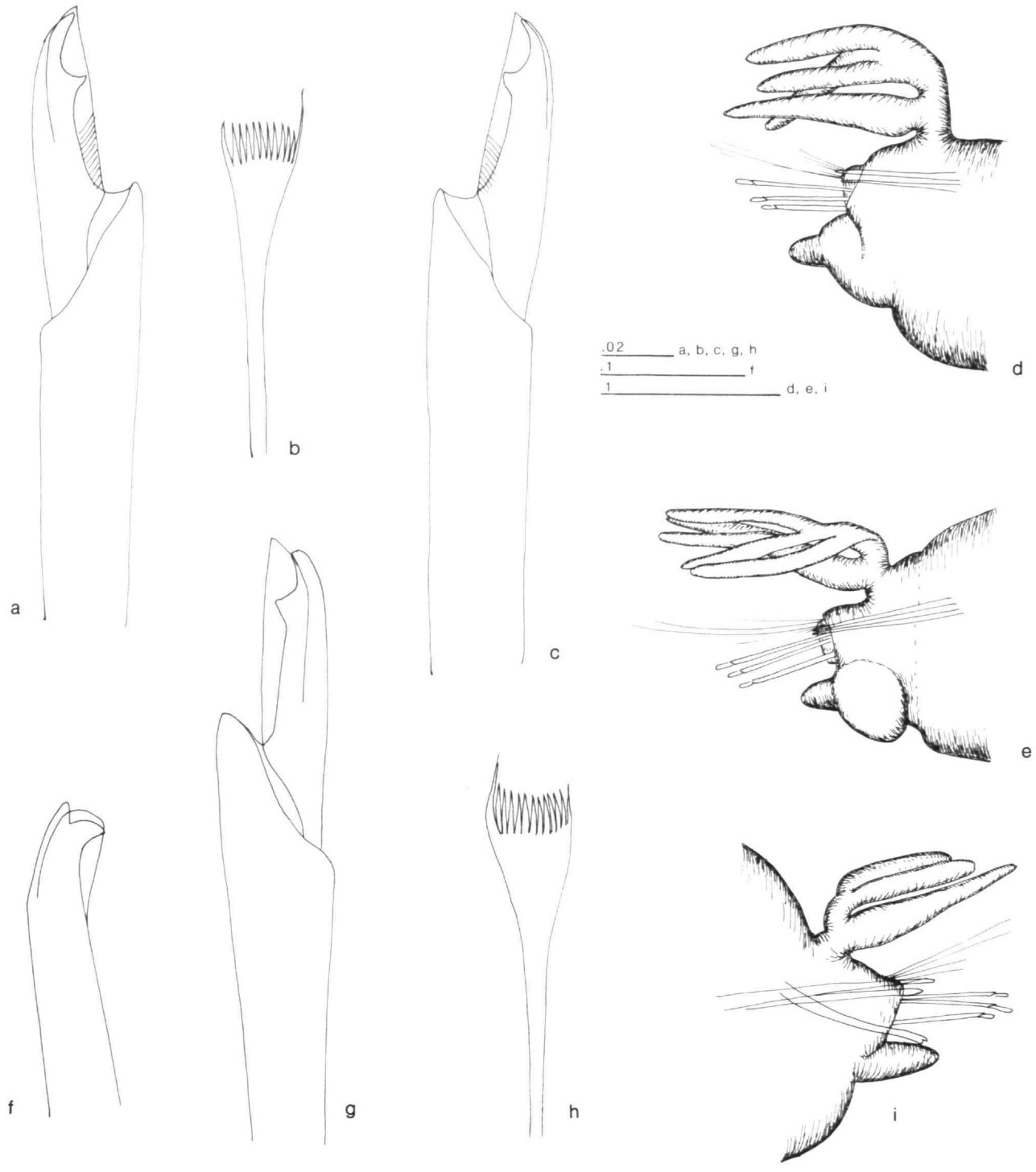

FIGURE 23.—*Eunice bipapillata* (type, ZMB F1993b): a, compound falciger, parapodium 15; b, pectinate seta, parapodium 15; c. compound falciger, parapodium 18; d, parapodium 15; e, parapodium 18; f, subacicular hook, parapodium 77; g, compound falciger, parapodium 77; h, pectinate seta, parapodium 77; i, parapodium 77. The parapodium numbers indicated do not appear to be entirely accurate (see text). (Scale bars in mm.)

31. *Eunice borneensis* Grube, 1878

FIGURE 24; TABLES 27, 31

Eunice (Eriphyle) borneensis Grube, 1878a:102.

MATERIAL EXAMINED.—Three syntypes, ZMB F2033, North Borneo.

COMMENTS ON MATERIAL EXAMINED.—All three syntypes are complete, one is in two pieces; they vary from 103 to 129 setigers and from 40 to 64 mm in length. The syntype described is the largest of the complete syntypes.

DESCRIPTION.—Syntype with 120 setigers; total length 42 mm; maximum width 6 mm at about setiger 50. Length through setiger 10, 7 mm; width at setiger 10, 4.5 mm. Anterior body up to about setiger 30 cylindrical, becoming dorsoventrally flattened, strongly flattened near posterior end.

Prostomium (Figure 24a) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus deep. Eyes not observed. Antennae in a shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; maximum 6 cylindrical articulations in A-II and A-III. A-I to middle of peristomium; A-II and A-III to setiger 2. Peristomium massive and muscular; cylindrical. Separation between rings distinct dorsally and ventrally, indistinct only in narrow section laterally; anterior ring 6/7 of total peristomial length. Lower lip scalloped. Peristomial cirri to middle of anterior peristomial ring, slender and tapering, with 3 indistinct, cylindrical articulations (not shown in illustration).

Maxillary formula 1+1, 4+4, 7+0, 5+11, and 1+1. Teeth of Mx II very large and coarse compared to other teeth.

Branchiae (Figure 24b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 6 to setiger 120. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchia with 3 filaments; maximal number of filaments 9 by setiger 15; last 10 setigers with single filaments. Branchial stem as thick as filaments, short, flexible, tapering. Filaments digitiform, longer than notopodial cirri.

Anterior acicular lobes (Figure 24c) broadly, asymmetrically truncate with aciculae emerging above midline. Median and posterior neuropodial acicular lobes narrowly, asymmetrically rounded with aciculae emerging above midline. All presetal lobes low truncate folds. Anterior postsetal lobes free, truncate, longer than acicular lobe, becoming rounded in posterior setigers, but remaining longer than acicular lobes in all setigers. Four first ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases thick, transverse welts in all remaining setigers; narrow tips of ventral cirri small, nearly button-shaped. All notopodial cirri basally inflated with distinct rounded basal tubercular protuberance, without articulations.

Limbate setae longer than other setae, slender, nearly straight, limbations narrow, marginally smooth. Pectinate setae (Figure 24g) short; shafts slender, cylindrical; blades flaring, flat. One marginal tooth longer than other teeth; total of ~15 teeth. Shafts of compound falcigers (Figure 24e) distally inflated, marginally smooth, with distinct distal beak. Appendages short, thick, barely tapering; heads large, bidentate. Proximal teeth tapering, directed laterally; distal teeth about as long as proximal teeth, but thicker, tapering, directed laterally. Guards asymmetrically bluntly pointed, marginally smooth, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired anteriorly; 3 aciculae from about setiger 50, black, tapering, with narrowly blunt tips (Figure 24d), gently curved or straight; cross-section round. Subacicular hooks black (Figure 24f), bidentate. Hooks first present from setiger 30–35, present in all setigers thereafter, single in most setigers, up to 3 in a few setigers. Both teeth directed distally; proximal teeth slightly larger than distal teeth.

UKNOWN MORPHOLOGICAL FEATURES.—Relation between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, located in front of left Mx IV; forming part of distal arc.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice borneensis* is listed with similar species in Tables 27 and 31. It appears to differ from other species listed in Table 31 especially in the presence of well-developed postsetal lobes, in the shape of the notopodial cirri, and in having the ventral cirri basally inflated to the posterior end.

32. *Eunice bottae* Quatrefages, 1866

FIGURE 25; TABLES 46, 47

Eunice bottae Quatrefages, 1866:320.—Grube, 1870a:292.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, A.1(R.)-1868-no. 55b, Red Sea, coll. Botta.

DESCRIPTION.—Holotype incomplete with 60 setigers; length 28 mm; maximum width 2 mm at about setiger 40. Length through setiger 10, 7 mm; width at setiger 10, 1.75 mm. Body slender, cylindrical, becoming somewhat dorsally flattened towards posterior end.

Prostomium (Figure 25a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes irregularly rounded, dorsally flattened; median sulcus shallow; frontal groove marking off palpal region present. Eyes not seen. All antennae incomplete, except left A-I, in a shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform with maximum 15 moniliform articulations in A-III.

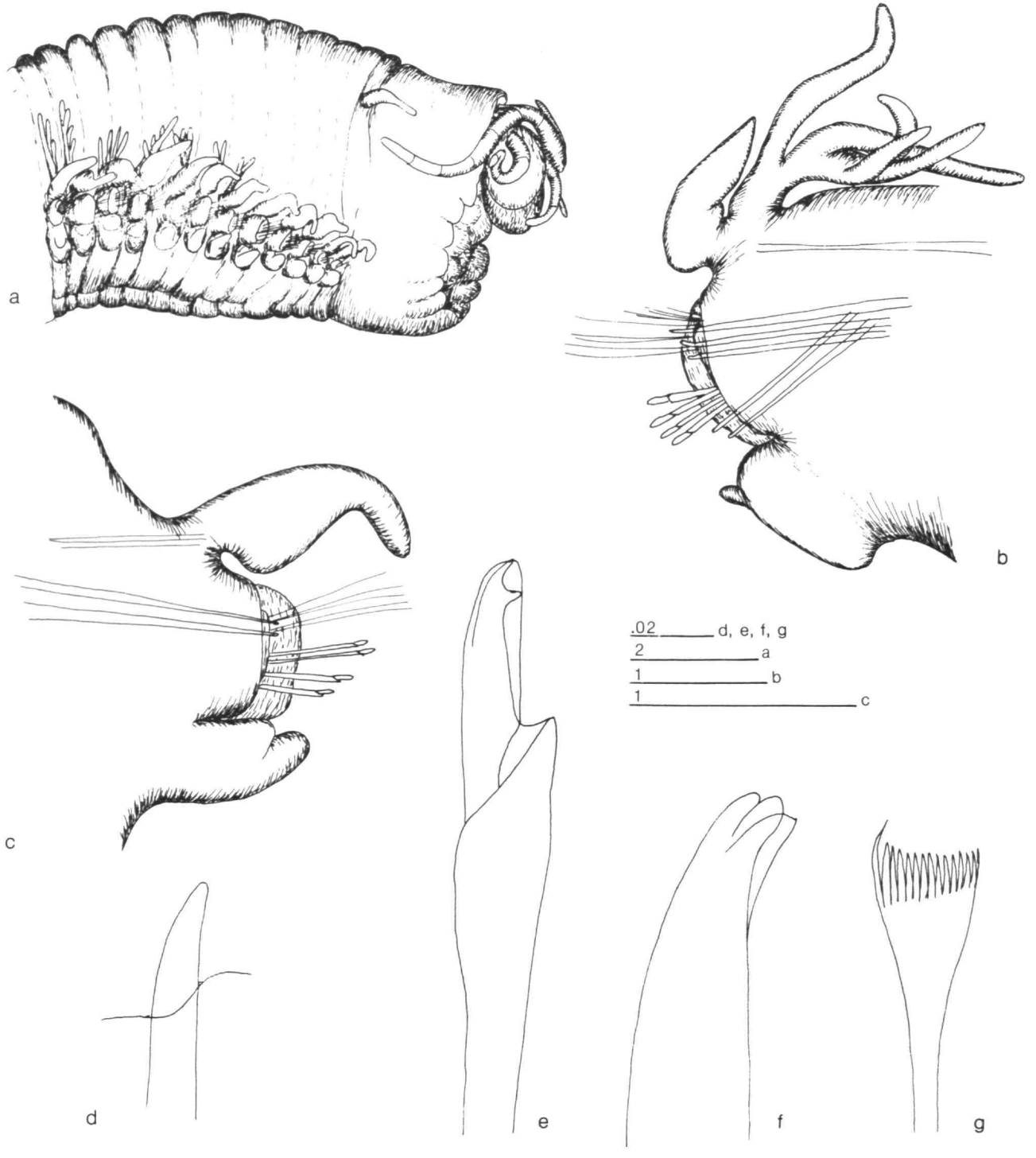

FIGURE 24.—*Eunice borneensis* (ZMB F2033): a, anterior end, lateral view; b, parapodium 42, anterior view; c, parapodium 3, anterior view; d, acicula, parapodium 42; e, compound falciger, parapodium 42; f, subacicular hook, parapodium 42; pectinate seta, parapodium 42. (Scale bars in mm.)

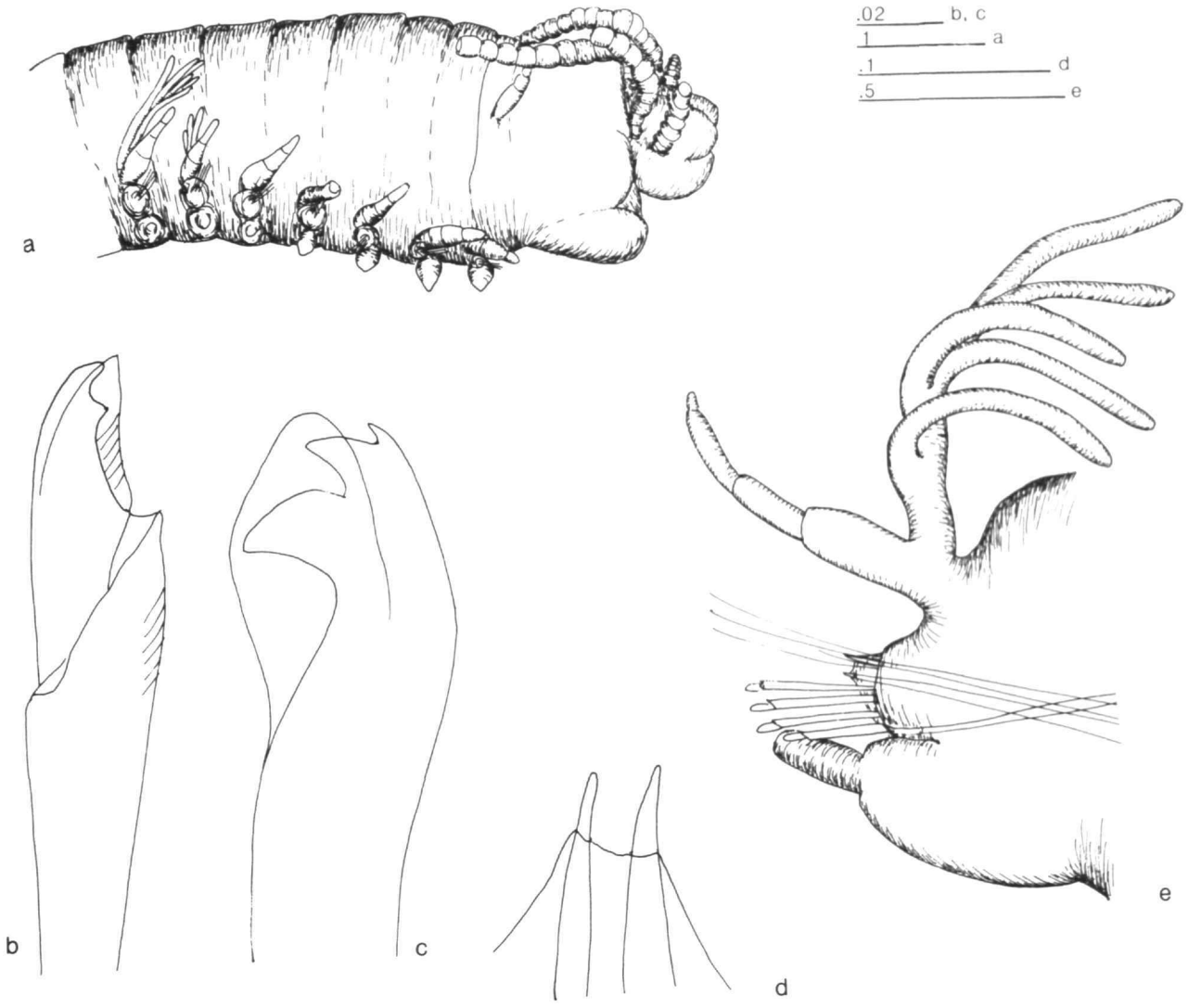

FIGURE 25.—*Eunice bottae* (type, MNHN, Paris, A.1(R.)-1868-no. 55b): a, anterior end, lateral view; b, compound falciger, parapodium 28; c, subacicular hook, parapodium 28; d, aciculae, parapodium 28; e, parapodium 28, anterior view. (Scale bars in mm.)

A-I to second peristomial ring; A-II to setiger 4 and A-III to setiger 3. Peristomium cylindrical with flaring lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of first peristomial ring, tapering, with 4 long, cylindrical articulations.

Jaws not examined.

Branchiae (Figure 24e) present, pectinate, distinctly longer than notopodial cirri, erect. Branchiae from setiger 6 to end of fragment. First and last branchiae with 3 filaments; maximum number of filaments 8 by setiger 15. Filaments shorter than notopodial cirri. Branchial stems slender, erect, tapering, longer than filaments. Filaments digitiform.

All neuropodial acicular lobes distally asymmetrically truncate or rounded with aciculae emerging above midline. All pre- and postsetal lobes low folds. Anterior and posterior ventral cirri thick, tapering. Median ventral cirri distinctly, nearly spherically basally inflated, with long, distally truncate narrow tips. Notopodial cirri distinctly basally inflated in anterior and early median setigers, becoming tapering and slender towards the posterior end. All notopodial cirri with 4 or 5 long, cylindrical articulations.

Limbate setae longer than other setae, marginally serrated. Pectinate setae present, but not observed in detail. Shafts of

compound falcigers (Figure 24b) slightly inflated, marginally serrated, with distinct distal beak. Appendages short, thick with short, nearly truncate heads, bidentate. Proximal teeth triangular, directed laterally; distal teeth larger than proximal teeth, bent, blunt, directed laterally. Guards asymmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 24d) paired, yellow, tapering, with narrow, straight or gently curved tips; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 24c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Teeth decreasing rather evenly in size from proximal to distal. All 3 teeth distinctly curved.

UKNOWN MORPHOLOGICAL FEATURES.—Presence and location of eyes; jaw structure; various features associated with the incomplete nature of the type such as the detailed distribution of branchiae.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long, located behind left Mx II; not part of distal arc.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 16, 33, 36-38, 40, 47, 50, 51, 64-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice bottae* has not been reported since the original description and the review of the original material given by Grube (1870a). It is listed with similar species in Tables 46 and 47. The anterior and posterior rings of the peristomium are completely distinct in *E. bottae* and *E. lucei;* in all other species in Table 47, the separation is indistinct laterally. The inflated bases of median ventral cirri are ovate in *E. bottae* and form thick, transverse welts in *E. lucei*.

33. *Eunice bowerbanki* Baird, 1869

FIGURE 26; TABLES 27, 32

Eunice bowerbanki Baird, 1869:349-350.—Fauchald, 1986:245-246, figs. 17-23.

MATERIAL EXAMINED.—Holotype, BM(NH) ZH 1863.923.41, Australia, coll. Dr. Bowerbank.

DESCRIPTION.—Holotype complete, with 142 setigers; total length 95 mm; maximal width 7 mm at about setiger 20. Length through setiger 10, 11 mm; width at setiger 10, 6.5 mm. Body anteriorly cylindrical, becoming dorsoventrally flattened.

Prostomium (Figure 26a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in a transverse line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, distinctly articulated; inner articulations cylindrical; outermost articulations moniliform; maximal number of articulations 8 in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 1. Peristomium massive, cylindrical, with distinct muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 6/7 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 4 articulations.

Maxillary formula 1+1, 4+4, 5+0, 5+8, and 1+1. Mx III curved, forming part of distal arc with left Mx IV. Mx VI absent.

Branchiae (Figure 26b) present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region, flexible. Branchiae from setiger 5 to setiger 136. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Posterior half of branchiated setigers with single filaments only; first branchia with 3 filaments; maximum number of filaments 15 by setiger 12; number and length of filaments rapidly decreasing posteriorly; by setiger 25, 5-6 short, digitiform filaments present. Branchial stems erect, tapering, longer than filaments. Filaments thick, digitiform, longer than notopodial cirri.

Neuropodial acicular lobes triangular, nearly symmetrical. All presetal lobes low folds. Anterior postsetal lobe free, as long as acicular lobes, rounded; postsetal lobes reduced to low folds by setiger 20. Ventral cirri thick, digitiform in all setigers; basal inflation indistinct. Notopodial cirri supported by paired aciculae, increasing in length through setiger 3, decreasing in length through next several setigers. Prebranchial and early branchial notopodial cirri digitiform, with 2 to 3 articulations, tapering, becoming more pyriform; basal inflation decreasing posteriorly; by setiger 20 notopodial cirri, thick, digitiform, without articulations.

Limbate setae longer than other setae, marginally serrated. Pectinate setae (Figure 26e) short. Shafts coarse, flattened; blades tapering, flat. Both marginal teeth somewhat thicker than the other teeth, but no longer than other the teeth; ~15 teeth present. Shafts of compound falcigers (Figure 26f) tapering, with internal striations, marginally smooth; distal beak indistinct. Appendages short, tapering, with large head, bidentate. Proximal teeth triangular, directed laterally; distal teeth longer than proximal teeth, tapering, nearly erect. Guards asymmetrically bluntly pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae usually paired, black; superior aciculae slender, tapering to straight tips; inferior aciculae (Figure 26c) thicker than superior aciculae, distinctly bent ventrally; cross-section round. Subacicular hooks (Figure 26d) black, bidentate. Hooks first present from setiger 31, present in all setigers thereafter, paired in some setigers. Hooks tapering smoothly to tips; teeth similar in length; proximal teeth thicker than distal teeth; both directed distally; guards not observed.

UKNOWN MORPHOLOGICAL FEATURES.—Presence and position of eyes; pygidium and anal cirri.

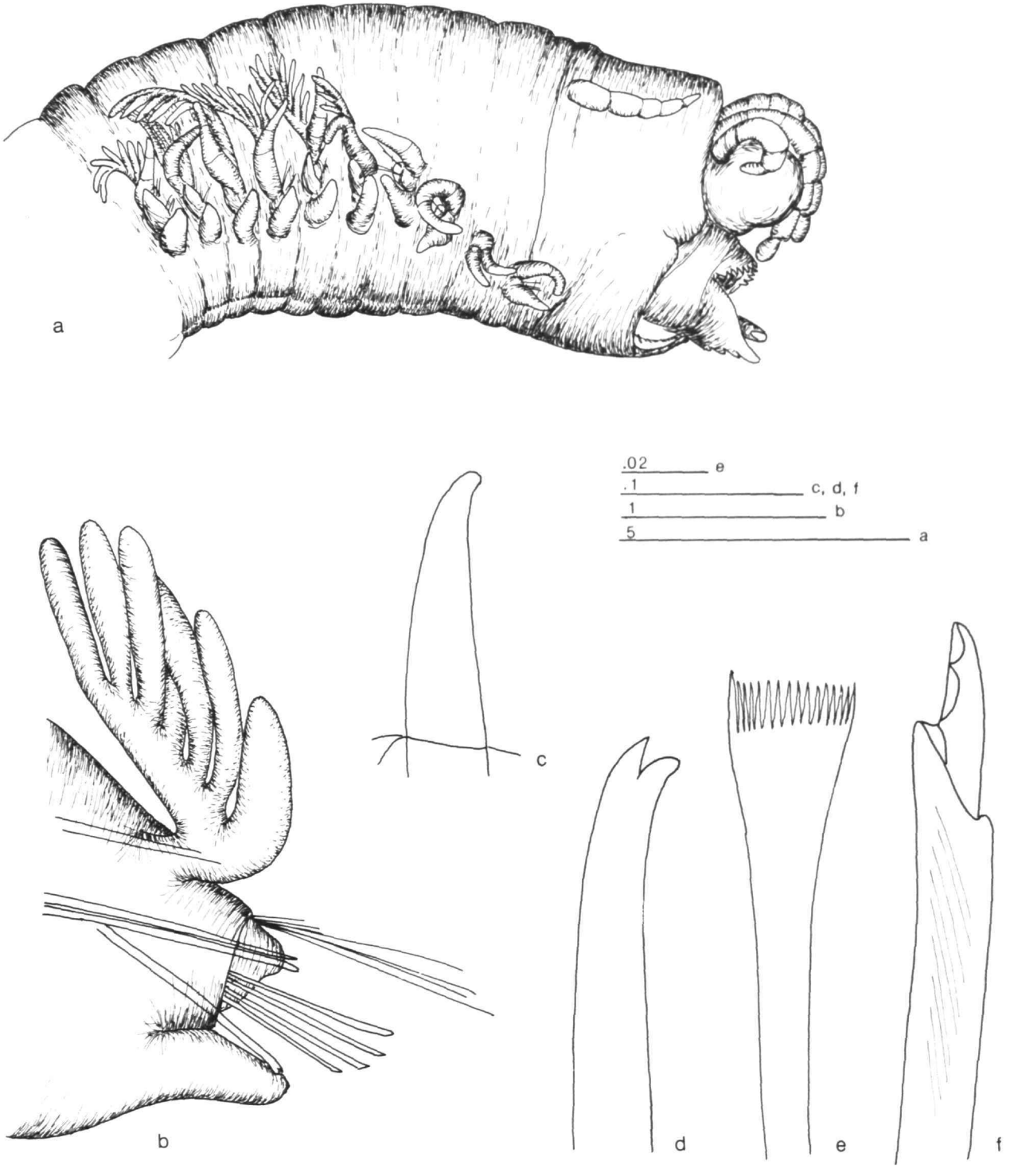

FIGURE 26.—*Eunice bowerbanki* (holotype, BM(NH) ZH 1863.9.23.41): a, anterior end lateral view; b, parapodium 34, anterior view; c, acicula, parapodium 34; d, subacicular hook, parapodium 34; e, pectinate seta, parapodium 34; f, compound falciger, parapodium 34. (Scale bars in mm.)

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 51, 54, 55, 58, 59. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS—*Eunice bowerbanki* is listed with similar species in Tables 27 and 32. Of the species listed in Table 32, *E. bowerbanki, E. laurillardi,* and *E. multipectinata* have 10 or more branchial filaments where the branchiae are best developed. In *E. laurillardi* the notopodial cirri are articulated throughout the body; in the other two species, only anterior notopodial cirri are articulated. In *E. bowerbanki* the appendages of the compound falcigers are tapering; the proximal teeth are reduced and the distal teeth nearly erect. In *E. multipectinata* the appendages do not taper appreciably; the proximal teeth are much larger than the distal teeth and the distal teeth are distinctly bent.

Eunice brasiliensis Kinberg, 1865

Eunice brasiliensis Kinberg, 1865:563; 1910:42, pl. 16: fig. 19.

REMARKS.—*Eunice brasiliensis* was not reviewed by Hartman (1948) nor does any material exist in Riksmuseet, Stockholm, where the rest of Kinberg's types were deposited (R. Oleröd, in litt.).

Kinberg's description and illustrations are of a species with strongly moniliform, slender antennae and peristomial cirri.

Branchiae start between setigers 4 and 10; at the latter segment Kinberg's illustrations shows that nine filaments are present. The notopodia are articulated at least through the first 30 segments.

The species, originally reported from Pernambuco, Brazil, in 30–36 m depth, is not identifiable based on the descriptions and illustrations alone and is here considered indeterminable.

34. *Eunice brevis* (Ehlers, 1887)

FIGURE 27; TABLES 33, 40

Nicidion brevis Ehlers, 1887:98–99, pl. 28; figs. 9–14, pl. 29: figs. 1, 2.

MATERIAL EXAMINED.—Holotype, MCZ 833, Key West, Florida, 2–3 m, *Blake* cruises.

COMMENTS ON MATERIAL EXAMINED.—The holotype has been dried out at one time and is somewhat distorted.

DESCRIPTION.—Holotype complete with 130 setigers; total length 18 mm; maximal width 1.5 mm wide at about setiger 10. Length through setiger 10, 2.5 mm. Anterior part of body inflated with highly convex dorsum, becoming flattened in posterior setigers; ventrum flattened in whole specimen.

Prostomium (Figure 27a) distinctly shorter than and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes irregularly truncate, dorsally somewhat flattened; median sulcus shallow. Eyes not observed. Antennae in nearly straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with 2 to 3 irregular, cylindrical articulations. All antennae to posterior peristomial ring. Peristomium ventrally flaring, with distinct muscular lower lip. Separation between rings distinct dorsally only; anterior ring less than 2/3 of total peristomial length. A transverse crease along ventral surface not matching dorsal separation into rings. Peristomial cirri barely to first peristomial ring, slender and digitiform, without articulations.

Jaws now missing. Maxillary formula 1+1, 5+5, 4+0, 3+4, and 1+1. Ehlers (1887:98, pl. 29: fig. 1) illustrated the jaws as symmetrical; probably Mx III form distal arc with left Mx IV.

Branchiae absent.

Anterior neuropodial acicular lobes symmetrically rounded or truncate, becoming symmetrically triangular in posterior setigers; aciculae emerging at midline. All pre- and postsetal lobes low folds. Ventral cirri thick, tapering. Median ventral cirri basally strongly inflated in setigers 8 and 28 according to Ehlers' illustrations; inflated bases thick, transverse welts. Posterior ventral cirri without basal inflation, tapering. All notopodial cirri short, medially inflated, without articulations.

Limbate setae (Figure 27c) longer than other setae, narrowly limbate, marginally smooth, geniculate. Pectinate setae (Figure 27e) large; shafts cylindrical, slender; blades strongly flared, flat. One marginal tooth longer than other teeth; about 15 teeth present. Shafts of compound falcigers (Figure 27b) distally inflated, marginally smooth, without distal beaks. Appendages short, slightly tapering, with large heads, bidentate. Proximal teeth slender, tapering, directed laterally, but curved distally. Distal teeth about the same size as the proximal teeth, slender, tapering, directed obliquely distally. Guards symmetrically rounded, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 27f) single, black, tapering, sharply pointed, straight; posterior aciculae thick; cross-section round. Subacicular hooks (Figure 27d) black, bidentate. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Hooks with narrow neck, distinct head; proximal teeth larger than distal teeth, curved; distal teeth slender, tapering; both teeth directed distally.

UKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, curved, and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 31–42, 56, 58, 59. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice brevis* is listed with similar species in Tables 33 and 40. Among the abranchiate species, three have

FIGURE 27.—*Eunice brevis* (holotype of *Nicidion brevis*, MCZ 833): a, anterior end, lateral view; b, compound falciger, parapodium 100; c, limbate seta, parapodium 100; d, subacicular hook, parapodium 100; e, pectinate seta, parapodium 100; f, acicula, parapodium 100. (Scale bars in mm.)

articulated ceratostyles; in addition to *E. brevis*, these species are *E. curticirris* and *E. fuscafasciata*. *Eunice curticirris* has moniliform articulations; the other two species have cylindrical articulations. In *E. brevis* the inflated bases of median ventral cirri forms thick, transverse welts; in *E. fuscafasciata*, they are ovate.

35. *Eunice bucciensis* (Treadwell, 1921)

FIGURE 28; TABLES 33, 39

Leodice bucciensis Treadwell, 1921:54-56, figs. 174-183.
Eunice afra.—Hartman, 1956:282 [in part, not *Eunice afra* Peters, 1854].

MATERIAL EXAMINED.—Holotype, AMNH IV-1918-1286, Buccoo Bay, Tobago Island, Mar 1918.

COMMENTS ON MATERIAL EXAMINED.—The anterior end had been deeply dissected and the illustration is somewhat distorted; especially, the lower lip may be expanded over the normal condition.

DESCRIPTION.—Holotype incomplete, currently in 3 pieces, with a total of 226 setigers; anterior fragment with 66 setigers; length 41 mm; maximal width 3.5 mm at about setiger 15. Length through setiger 10, 7.5 mm; width at setiger 10, 3.25 mm. Body anteriorly cylindrical, becoming dorsoventrally flattened, truncate anteriorly, tapering posteriorly.

Prostomium (Figure 28a) distinctly shorter and narrower

FIGURE 28.—*Eunice bucciensis* (holotype, AMNH IV-1918-1286): a, anterior end, lateral view; b, acicula, parapodium 58; c, subacicular hook, parapodium 58; d, parapodium 58, anterior view; e, compound falciger, parapodium 58; f, pectinate seta, parapodium 58. (Scale bars in mm.)

than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with thickened rim; median sulcus deep, directed ventrally. Eyes not observed. Antennae in a shallow horseshoe, evenly spaced; A-III slimmer than other antennae. Ceratophores long in all antennae, without articulations. Ceratostyles digitiform, without articulations. No antennae reaching beyond first peristomial ring; A-I shortest; A-III longest, but difference in length less than one-third of length of longest antenna. Peristomium flared anteriorly, with distinct, muscular lower lip. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri to posterior 1/3 of first peristomial ring, without articulations, tapering, less than half as long as A-I.

Jaws now missing. Maxillary formula 1+1, 3+3, 6+0, 6+4, and 1+1 according to Treadwell (1921:56).

Branchiae (Figure 28d) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 18 to end of fragments. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 3 branchiae single filaments; most branchiae with paired filaments; in a posterior fragment up to 3 filaments present. Branchial stems very short and truncate. Filaments long, strap-like.

All neuropodial acicular lobes asymmetrically truncately rounded; aciculae emerging above midline. All presetal lobes low folds. All postsetal lobes free, rounded to truncate projecting lobes, visible behind acicular lobes. First 20 ventral cirri thick, tapering. Median ventral cirri moderately inflated basally; narrow tips digitiform. Posterior ventral cirri tapering, digitiform. Notopodial cirri of first setiger short, digitiform, without articulations. All other notopodial cirri basally inflated, without articulations.

Limbate setae longer than all other setae, coarse, gently curved, marginally serrated. Shafts of pectinate setae (Figure 28f) cylindrical, slender; blades flared, flat. Both marginal teeth slightly longer than other teeth; total of ~15 teeth present. Shafts of compound falcigers (Figure 28e) distinctly inflated, internally striated, marginally nearly smooth, with distinct distal beak. Appendages long, tapering; head large, bidentate. Proximal teeth triangular, directed laterally; distal teeth slightly shorter than proximal teeth, sharply tapering, directed laterally. Guards symmetrically rounded, marginally smooth, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 28b) single, with dark cores and clear sheaths, tapering towards blunt, slightly curved tips. Subacicular hooks (Figure 28c) with dark cores and clear sheaths, bidentate (nearly bifid). Hooks first present from setiger 34, present in all setigers thereafter, always single (except for replacements). Hooks tapering abruptly just below head. Proximal teeth narrower than distal teeth; both teeth directed distally.

UKNOWN MORPHOLOGICAL FEATURES.—Presence and position of eyes; relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 36, 40, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice bucciensis* was considered a synonym of *E. afra* by Hartman (1956). In *E. bucciensis* branchiae are palmate with very long filaments; in *E. afra* branchiae are distinctly pectinate. The antennae lack articulations in *E. bucciensis* and have distinct, cylindrical articulations in *E. afra*. *Eunice bucciensis* is listed with similar species in Tables 33 and 39. Among the species in Table 39, *E. bucciensis* and *E. denticulata* stand out for having elevated, long ceratophores. *Eunice bucciensis* has A-III slimmer than the other antennae and branchiae first present from setiger 18; in *E. denticulata*, all antennae are similar and branchiae are not present until setiger 27.

Eunice burmeisteri Grube, 1878

Eunice (Marphysa) Burmeisteri Grube, 1878a:101.

REMARKS.—Grube listed this species as a possible synonym of *Marphysa sanguinea* and indicated that it was named by Fritz Müller in a letter to him. As far as can be ascertained, no description of the species was ever issued, nor does any material exist. Due to the reference by Grube (1878a) of the possible synonymy with *Marphysa sanguinea*, the species must be considered indeterminable rather than a nomen nudum; the issue will be considered further in a planned review of the genus *Marphysa*.

36. *Eunice caeca* Shisko, 1981

FIGURE 29a–f; TABLES 19, 20

Eunice caeca Shisko, 1981:968–971, fig. 1a–f, table 1.

MATERIAL EXAMINED.—Holotype, USNM 63065, Bureau of Land Management sta 24774BFI, off Tanner Bank, California, 32°49.8′N, 119°29.86′W, 1357 m, trawl.

DESCRIPTION.—Holotype complete with 90 setigers; last 7 in regeneration; total length 103 mm; maximal width 6 mm at setiger 10. Length through setiger 10, 14 mm. Body ventrally flattened, dorsally moderately inflated throughout, slightly wider in branchial region than in postbranchial region, abruptly tapering anteriorly, slowly tapering posteriorly; regenerating end abruptly narrower than remainder of body. Anal cirri slender, digitiform, without articulations.

Prostomium (Figure 29a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median

FIGURE 29.—*Eunice caeca* (holotype, USNM 63065): a, anterior end, lateral view; b, parapodium 9, lateral view; c, compound falciger, parapodium 9; d, pectinate seta, parapodium 9; e, pectinate seta, parapodium 75; f, subacicular hook, parapodium 75. *Eunice cariboea* (ZMB 4004, syntype): g, anterior end, lateral view; h, pectinate seta, parapodium 16; i, acicula, parapodium 16; j, compound falciger, parapodium 16; k, parapodium 16, anterior view; l, parapodium 75, anterior view; m, subacicular hook, parapodium 75; n, pectinate seta, parapodium 75. *Eunice cariboea* (holotype of *Nicidion incerta*): o, subacicular hook, parapodium 127; p, compound falciger, parapodium 127; q, anterior end, lateral view. (Scale bars in mm.)

sulcus deep. Diffuse eye spots present near bases of A-I. Antennae in a horseshoe; median 3 in a group, well separated from A-I, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; maximum 10 cylindrical articulations in left A-II. A-I to setiger 1; A-II to setiger 3; A-III incomplete. Peristomium inflated cylindrical with distinct muscular lower lip. Separation between rings distinct on all sides, especially deeply marked dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to posterior 1/3 of prostomium, slender and tapering, with 7 cylindrical articulations.

Maxillary formula 1+1, 6+8, 9+0, 7+8, and 1+1. Mx III long straight, located behind left Mx II. Mx VI absent.

Branchiae (Figure 29b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 48. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First branchiae single filaments; all other branchiae very strongly pectinate; maximum 24 filaments by setiger 15. Branchial stem slim, tapering, erect, longer than filaments; in last branchiated setigers branchial stems shortening rapidly. Filaments about as long as notopodial cirri where branchiae best developed, slender, nearly filiform; branchial filaments remaining long and slender throughout the branchial region.

Anterior neuropodial acicular lobes asymmetrically rounded with aciculae emerging above the midline. Median and posterior neuropodial acicular lobes symmetrically triangular with superior aciculae emerging from apex. All presetal lobes low transverse folds. Anterior postsetal lobes free, evenly rounded, as long as acicular lobe, becoming reduced by midbranchial setigers to low folds. Ventral cirri tapering; thick in first 3 setigers. Ventral cirri in branchial region basally inflated. Inflated bases ovate; narrow tips tapering. Postbranchial ventral cirri gradually becoming short, tapering. Anterior notopodial cirri long, slender, with 4 to 5 irregular, indistinct cylindrical articulations. Articulations lost in first branchiated setigers. Posterior notopodial cirri short; slender.

Limbate setae barely longer than other setae in most setigers, slender, marginally smooth. Pectinate setae (Figure 29d,e) nearly as long as limbate setae, very narrow; shafts relatively wide, flattened; blades tapering, flat. One marginal tooth longer and thicker than other teeth; up to 8 teeth present; anterior and posterior pectinate setae similar. Shafts of compound falcigers (Figure 29c) distally inflated, marginally smooth, with distinct distal beaks. Appendages narrow, with parallel sides; head indistinct, bidentate. Proximal teeth low triangular protuberance, directed laterally; distal teeth longer, blunt, erect. Guards symmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in anterior setigers; up to 4 in a parapodium in posterior setigers, yellow, tapering to blunt, nearly straight tips; cross-sections round. In posterior setigers 2 aciculae emerge distally; 2 aciculae emerge along ventral edge of parapodia. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 29f) yellow, bidentate. Hooks first present from setiger 42, present in all setigers thereafter, always single (except for replacements). Shafts of hooks thick, tapering distally to very small heads. Proximal teeth very much larger than distal teeth, curved, directed laterally; distal teeth small, tapering, erect.

UKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 23.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice caeca* is listed with similar species in Tables 19 and 20. An unusual feature of this species is the emergence of two of the four aciculae along the ventral edge of the neuropodia rather than distally. *Eunice caeca* is the only species listed in Table 20 with more than 20 branchial filaments in each branchia where the branchia are best developed.

Eunice capensis Schmarda, 1861

Eunice capensis Schmarda, 1861:126, 8 figs.
Marphysa capensis.—Willey, 1904:263.—Day, 1967:400.

REMARKS.—The original description, while vague, fits species of *Marphysa*.

Eunice capensis (Kinberg, 1865)

Eriphyle capensis Kinberg, 1865:561; 1910:41, pl. 15: fig. 16.
Eunice kinbergi Ehlers, 1868:306.

REMARKS.—As pointed out by Ehlers (1868:306), the species name proposed by Kinberg is preoccupied in the combination *Eunice capensis* Schmarda (1861), because the generic name originally used by Kinberg is a junior synonym of *Eunice;* the species is further discussed as *E. kinbergi*.

37. *Eunice cariboea* Grube, 1856

FIGURE 29g-q; TABLES 3, 33, 40

Eunice cariboea Grube, 1856:57.
Eunice gagzoi Augener, 1922b:45 [in part, see also *E. gagzoi* below].
Nicidion incerta Hansen, 1882:8, pl. 2: figs. 19-21.
Eunice (Nicidion) incerta.—Hartman, 1959:313.

MATERIAL EXAMINED.—Lectotype and 3 paralectotypes, ZMC, and 5 paralectotypes, ZMB 4004, Christiansted, St. Croix, Virgin Islands, coll. A.S. Örsted and H. Kröyer.

Holotype of *Nicidion incerta*, Leiden no. 1510, Rio de Janeiro. coll. E. v. Beneden.

COMMENTS ON MATERIAL EXAMINED.—Six of the types of *E. cariboea* are complete. The lectotype consists of 157 setigers

TABLE 3.—Variable and invariable features of the type lot of *Eunice cariboea* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	4	157	113	125.75	21.00
Total length	4	30	18	22.25	5.32
Maximum width	4	1.5	1	1.13	0.25
Length through 10	4	3	2	2.38	0.48
Subacicular hooks first present from setiger no.	4	32	26	28.5	2.52

INVARIABLE FEATURES	N=4
A-I reach	middle of peristomium
A-II reach	front of peristomium
A-III reaches	middle of prostomium
Antennal articulations	absent
Peristomial cirri reach	middle of peristomium
Peristomial cirral articulations	absent
Branchiae	absent
Acicular color	black
Acicular tip	blunt or pointed
Subacicular color	black
Number of subacicular teeth	2
Teeth in pectinate setae	12
Compound shafts	tapering
Teeth of compound setae	2

and is 30 mm long and 1 mm wide, and the length through setiger 10 is 2 mm. The larger of the two complete paralectotypes in ZMB is here illustrated and described in detail. The holotype of *Nicidion incerta* is presently in two parts; it is, however, complete and in good condition. In order to account for minor differences between the two described taxa, the descriptions are presented separately.

DESCRIPTION.—Paralectotype of *E. cariboea* complete with 127 setigers; total length 24 mm; maximal width 1.2 mm wide at setiger 10. Length through setiger 10, 2.5 mm. Body anteriorly inflated, otherwise cylindrical throughout.

Prostomium (Figure 29g) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally obliquely truncate; lobes triangular, dorsally flattened; median sulcus shallow. Eyes small, indistinct, posterior to bases of A-I. Antennae in a deep horseshoe; A-I and A-II close together, separated from A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, stout, nearly sausage-shaped, without articulations. A-I to middle of first peristomial ring; A-II and A-III to middle of second peristomial ring. Peristomium slightly flaring anteriorly; lower lip distinct, muscular. Separation between rings distinct dorsally and ventrally, indistinct only for a short distance laterally; anterior ring 3/4 of total peristomial length. Peristomial cirri to posterior end of first peristomial ring, nearly ovate, without articulations.

Jaws examined in a ZMC paralectotype. Maxillary formula 1+1, 5+5, 6+0, 4+9, and 1+1. Mx III long; located behind Mx II; Mx VI absent.

Branchiae absent.

Anterior neuropodial lobes (Figure 29k) symmetrically rounded, becoming symmetrically sharply pointed in posterior setigers (Figure 29l); aciculae emerging at midline. Presetal lobes low, transverse folds; postsetal lobes following outline of acicular lobes closely. Four or 5 first ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases transversely elongated, welt-like; narrow tips digitiform. Inflated base decreasing in size from about setiger 50. Last 40 ventral cirri without inflated bases, short, nearly tubercular. All notopodial cirri tapering, decreasing in length from anterior to posterior end, without articulations. Anterior notopodial cirri emerging close to parapodial bases; posterior notopodial cirri emerging from dorsum well above parapodial bases.

Limbate setae short, stout, geniculate, marginally serrated. Two to 3 short pectinate setae (Figure 29h) in fascicle anteriorly; shafts coarse, cylindrical; blades tapering; flat. One marginal tooth longer than other teeth; ~10 teeth present in a seta. In far posterior setigers up to 10 long pectinate setae (Figure 29n) in a fascicle; shafts slender, cylindrical; blades flaring, flat. One marginal tooth longer than other teeth; up to 15 teeth in a seta. Shafts of compound falcigers (Figure 29j) distally inflated, marginally serrated; beak indistinct. Appendages very small, delicate; head small, bidentate. Proximal teeth curved, tapering, directed obliquely distally; distal teeth longer than proximal teeth, blunt, erect. Guards symmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single; cross-sections round. Anterior aciculae tapering to sharp tips, light brown to dark yellow. Aciculae mucronate (Figure 29i), bluntly pointed, dark brown or black from about setiger 30. Subacicular hooks (Figure 29m) dark brown or black,

bidentate. Hooks first present from setiger 24–31, present in all setigers thereafter, always single (except for replacements). Hooks subdistally curved; head large; both teeth strongly curved, directed laterally. Proximal teeth about twice as large as distal teeth. Guards truncate.

DESCRIPTION OF *Nicidion incerta*.—Holotype complete, of unknown sex, with 158 setigers; total length 38 mm; maximal width 1.5 mm at setiger 20; length through setiger 10, 2.75 mm; width at setiger 10, 1.25 mm. Body ventrally flattened anteriorly, becoming cylindrical medially and retaining that shape for the rest of body. Truncate anteriorly, slowly tapering posteriorly. Pygidium is dorsally smooth; only the short anal cirri are present.

Prostomial lobes (Figure 29q) frontally rounded, dorsally slightly inflated; median sulcus shallow. Eyes not observed (illustrated as being behind and between A-I and A-II in Hansen, 1882). Antennae in shallow horseshoe, evenly spaced and similar in thickness. Ceratophores short, ring-shaped. Ceratostyles thick, digitiform, without articulations. A-I to middle of anterior peristomial ring; A-II to middle of posterior peristomial ring; A-III to middle of posterior peristomial ring, slightly outreaching A-II. Nuchal fold with lateral notch; lower lip entire. Peristomium tapering anteriorly. Separation between rings distinctly dorsally and ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri barely outreaching posterior peristomial ring, thick, ovate, without articulations.

Jaws not examined.

Branchiae absent.

Neuropodial acicular lobes symmetrically rounded. Pre- and postsetal lobes low, transverse folds. Ventral cirri tapering through first 9 setigers, distinctly inflated from about setiger 10. Inflated bases large, spherical; distal tips digitiform. Inflated bases decreasing in size from about setiger 60 and totally missing posterior to setiger 100. Posterior ventral cirri short, thick, tapering; distinctly shorter than notopodial cirri. Notopodial cirri well separated from neuropodial acicular lobes, thick, without articulations. Anterior neuropodial cirri digitiform. Median and posterior neuropodial cirri tapering.

Limbate setae medially thick, marginally serrated, slightly longer than other setae. Pectinate setae not seen. Shafts of posterior compound falcigers (Figure 29p) distally inflated, without distinct beaks, marginally serrated, without internal striations. Appendages short, tapering, with distinct heads. Proximal teeth about as large as distal teeth, narrowly tapering, directed slightly to distinctly distally. Distal teeth tapering, directed obliquely distally, slender. Guards of posterior compound hooks symmetrically rounded, without mucros or marginal serrations. Posterior aciculae single, about as thick as subacicular hooks, brown, without distinct separation between sheath and core, tapering to blunt tips, straight. Subacicular hooks (Figure 29o) single, brown, without separation into sheath and core, bidentate. Hooks abruptly tapering to distinct, bent necks. Proximal teeth longer than distal teeth, erect, straight or slightly tilted distally, erect. Distal teeth short, thick, blunt, erect.

UKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 31–42, 56, 58, 59. *Unknown Characters:* 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—According to G. Hartwich (in litt.), a label in the vial indicated that three of these specimens should be the types of *E. gagzoi* Augener (1922b). This label reads (in translation from German): "*Eunice Gagzoi* n.sp. (*cariboea* Gr. partim). 2 complete specimens without, one complete specimen with a few scattered branchiae." The original description of *E. gagzoi* is very brief and contains no discussion of the relationship between *E. cariboea* and *E. gagzoi*.

One clue to the identity of the specimens that he considered types of his new species is available. Augener indicated that one of the types should consist of 161 segments and be 32 mm long. No such specimen is present in the Berlin material. Two posteriorly branchiated specimens in the Hamburg collections are labeled as original material of *E. gagzoi*, and one of these matches the size and length mentioned by Augener closely. These two specimens were selected as lectotypes of *E. gagzoi* and are described below. No specimens from ZMB belong to *E. gagzoi;* they are *E. cariboea* as here defined or go to *E. excariboea* (see below).

Specimens of *E. cariboea* may be confused with small specimens of *E. filamentosa* from which they clearly differ in the shape of the subacicular hooks, by the total absence of branchiae, and by the tapering, rather than hammer-headed acicula. *Eunice cariboea* can be separated from *E. gagzoi* on a similar set of characters, except that in the latter the aciculae are abruptly tapering with a short, bent tip, rather than hammer-headed as in *E. filamentosa* or smoothly tapering and gently curved as in *E. cariboea*. As indicated, *E. cariboea* is here restricted to include only abranchiate forms; the two other species confounded with *E. cariboea* in the type lot are both branchiated, but are otherwise dissimilar. One of these species, *E. gagzoi*, was discussed above; the other one is herein newly recognized as *E. excariboea* (see below).

Eunice cariboea is listed with similar species in Tables 33 and 40. Five abranchiate species lack antennal articulations, in addition to *E. cariboea;* these include *E. cincta, E. goodei, E. imogena,* and *E. wasinensis*. Of these, *E. imogena* has subacicular hooks first present from about setiger 50; the other four species have hooks present from about setiger 15 through setiger 31. *Eunice cincta* lacks inflated bases to the median cirri; the other species listed all have inflated bases. These bases are thick, transverse welts in *E. cariboea* and *E. wasinensis* and ovate in the other two species. *Eunice cariboea* and *E. wasinensis* can be separated on various differences in soft-body

characters, best explored by comparing the illustrations of the two species.

Hansen's complete description of *Nicidion incerta* consisted of the following statement (1882:8):

> The animal resembles *N. gallopagensis* Kinberg closely; the dorsal cirri are however slightly longer and the setae appear different from those illustrated by Kinberg.
>
> [Original in French, translation by K. Fauchald.]

Hansen's illustration of the anterior end shows the prostomium as shallowly incised; the antennae are short; none reaching beyond the peristomium and without articulations. His illustration of the parapodium shows the ventral cirrus to be basally spherically inflated with a digitiform tip.

Augener reviewed the type at one time and left a note in the vial: "Presumably the abranchiate form of *Eunice cariboea* Gr. (Kr.)."

Hansen's species is here considered a synonym of *E. cariboea*.

38. *Eunice cedroensis* Fauchald, 1970

FIGURE 30a-e; TABLES 41, 42

Eunice cedroensis Fauchald, 1970:29-31, pl. 2: figs. a-e.

MATERIAL EXAMINED.—Holotype, AHF Poly 0336, Baja California, Mexico, 4 miles N of Isla Todos Santos, 31°53′20″N, 116°48′15″W, 75 m, shell, mud, gray sand, 24 Feb 1941, *Velero III*, sta 1245-41.

DESCRIPTION.—Holotype incomplete with 32 setigers; length 10 mm; maximum width 2 mm at setiger 10. Length through setiger 10, 3 mm. Body cylindrical, becoming slightly ventrally flattened posteriorly. Anterior end abruptly tapered; body tapering slowly posteriorly from about setiger 10.

Prostomium (Figure 30a) about as long and wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally truncate, dorsally slightly inflated; median sulcus shallow. Eyes black, posterior to bases of A-I. Palpal region marked by 2 shallow circular grooves frontally on each prostomial lobe. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with maximum 5 long, cylindrical articulations in A-III. A-I to setiger 1; A-II to setiger 7; A-III to setiger 13. Peristomium tapering towards anterior end, longer ventrally than dorsally. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, slender and tapering, without articulations.

Maxillary formula 1+1, 7+8, 9+0, 8+10, and 1+1. Mx VI absent; Mx III long, located behind left Mx II.

Branchiae (Figure 30b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 27. First 2 and last 3 pairs single filaments; all others with 3 or more filaments; maximum 10 filaments by setiger 10. Branchial stems tapering. Filaments longer than notopodial cirri except in first 2 and last 3 branchiated setigers; filaments digitiform, relatively slender.

Anterior neuropodial acicular lobes obliquely truncate, with aciculae emerging at midline but ventral to high point; acicular lobes becoming symmetrically rounded in first branchial setigers, retaining that shape in rest of body. Anterior and median pre- and postsetal lobes low, transverse folds. Ventral cirri tapering in first 5 setigers. Ventral cirri basally inflated in branchial region, retaining modestly inflated, ovate bases in remainder of specimen; narrow tips tapering. Anterior and median notopodial cirri tapering, with 3 or 4 articulations.

Limbate setae longer than other setae, slender, marginally smooth. Pectinate setae (Figure 30d) small; shafts coarse, cylindrical; blades tapering, flat. One marginal tooth longer and thicker than other teeth; a total of 10 teeth in a seta. Shafts of compound falcigers (Figure 30c) distally inflated, marginally serrated, with distinct distal beak. Appendages long, narrow, tapering; head very small, but distinct, bidentate. Proximal teeth triangular, directed laterally, about twice as large as distal teeth. Distal teeth tapering, erect, slender. Guards symmetrically tapering, with long, narrow mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single, yellow, tapering to blunt, straight tips; cross-section round. Separation of core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 30e) yellow, tridentate with teeth in a crest. Hooks first present from setiger 17, present in all setigers thereafter, always single (except for replacements). Hooks slightly tapering. All teeth curved; teeth decreasing evenly in size distally.

UKNOWN MORPHOLOGICAL FEATURES.—All features associated with the posterior setigers.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 37, 38, 47, 50, 57-60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,2; 38,2.

REMARKS.—*Eunice cedroensis* is listed with similar species in Tables 41 and 42. Of the species in Table 42, five have the three median antennae similar in length. In addition to *E. cedroensis*, these species are *E. americana*, *E. multicylindri*, *E. rubrivittata*, and *E. unifrons*. Of these five, two species have 10 or more branchial filaments, *E. cedroensis* and *E. americana*. The latter has up to 20 filaments; the former 10 filaments.

Eunice challengeri McIntosh, 1885

Eunice challengeri McIntosh, 1885:293.

REMARKS.—This species is known only from the following quote in McIntosh's discussion of *E. barvicensis* (1885:293): "The hook somewhat approaches that of *Eunice challengeri*, but the other differences between the species are sufficiently

FIGURE 30.—*Eunice cedroensis* (holotype, AHF Poly 0336): a, anterior end, lateral view; b, parapodium 20, anterior view; c, compound falciger, parapodium 20; d, pectinate seta, parapodium 20; e, subacicular hook, parapodium, 20. *Eunice cincta* (holotype, RM 418): f, pectinate seta, parapodium 30; g, compound falciger, parapodium 40; h, subacicular hook, parapodium 50. (Scale bars in mm.)

diagnostic."

As indicated elsewhere, *E. barvicensis* is similar to *E. filamentosa*, so presumably the name *E. challengeri* was used by McIntosh as a manuscript name for another, similar species from the *Challenger* expedition, which species cannot now be identified and no material is available under this name in BM(NH) (A. Muir, in litt.).

39. *Eunice cincta* (Kinberg, 1865)

FIGURE 30f-h; TABLES 33, 40

Nicidion cincta Kinberg, 1865:564; 1910:43, pl. 16: fig. 21.
Eunice (Nicidion) cincta.—Hartman, 1948:80-81.

MATERIAL EXAMINED.—Holotype, RM 418, Eimeo, Society Islands, 0.3-1 m, *Eugenie* Expedition 1159. Kinberg (1865:564) gave the locality information as "Mare pacificum inter corallia mortua taeniarum exteriorum insulae Eimeo, summa aqua vel fundo 1-4 pedum."

COMMENTS ON MATERIAL EXAMINED.—The anterior end has been deeply dissected and the shape of the prostomium cannot be determined accurately. The last 15 setigers are extremely poorly preserved.

DESCRIPTION.—Holotype incomplete with 65 setigers (last 15 extremely poorly preserved); length through setiger 50 15 mm; maximal width 1.1 mm; length through setiger 10, 3 mm.

Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform, wrinkled, but without articulations. All antennae to posterior peristomial ring. Separation between peristomial rings distinct on all sides; anterior ring ~1/2 of total peristomial length. Peristomial cirri to posterior part of anterior peristomial ring, ovate, without articulations.

Jaws missing.

Branchiae absent.

Neuropodial acicular lobes rounded; aciculae emerging at midline. Presetal lobes low, transverse folds. Anterior postsetal lobes following outline of acicular lobes closely, becoming low, transverse folds from about setiger 25. Anterior and median ventral cirri thick, tapering. Anterior notopodial cirri medially inflated, becoming digitiform in last distinct segments in fragment, without articulations.

Limbate setae slender, marginally serrated. Shafts of pectinate setae (Figure 30f) very slender. Pectinate setae flaring, flat. Both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 30g) distinctly inflated, marginally coarsely serrated. Appendages slender with nearly parallel sides, bidentate. Proximal teeth shorter than distal teeth, sharply pointed, directed basally. Distal teeth slender, directed laterally. Guards asymmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae brown, bluntly conical, straight; cross-section round. Subacicular hooks (Figure 30h) brown, bidentate. Hooks first present from setiger 21, present in all setigers thereafter, single at least through median setigers. Hooks with distinctly bent necks. Proximal teeth slightly larger than distal teeth, directed laterally. Distal teeth curved, directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with the posterior setigers and with the poor state of preservation.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 31-42, 54, 55. *Unknown Characters:* 1, 2, 4, 6-17, 24, 47, 50, 51, 57-60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice cincta* is listed with similar species in Tables 33 and 40. The shape of the subacicular hook resembles the condition in *E. mutilata;* however, the latter is always branchiated, even as a juvenile. Among the abranchiate species, *E. cincta* is unusual in that it wholly lacks inflated bases in median ventral cirri.

Eunice cingulata Claparède, 1868

Eunice cingulata Claparède, 1868:444-445, pl. 7: fig. 1.
Eunice purpurea.—Grube, 1878a:100.

REMARKS.—No type material exists of this or any other species of *Eunice* described by Claparède. The following summary is based on his description.

Prostomium deeply bilobed. Antennae short, with moniliform articulations. Anterior peristomial ring very nearly as long as posterior ring. Peristomial cirri to front edge of peristomium, with moniliform articulations.

Branchiae present from setiger 8. First few single filaments, all others strongly pectinate; maximum number of filaments unknown. Presumably, branchiae continue to end of body.

Limbate setae marginally serrated. Pectinate setae with marginal tooth very much longer and thicker than all other teeth. Shafts of compound hooks inflated. Appendages short, tapering. Proximal teeth triangular. Distal teeth curved. Guards distally asymmetrically bluntly pointed. Aciculae and subacicular hooks with dark cores and clear sheaths; aciculae tapering distally to blunt, gently curved tips. Subacicular hooks tapering to distinct heads. Proximal teeth directed laterally.

Eunice cingulata was well characterized by Claparède, who, in addition to the description summarized above, emphasized the dark violet color and the violet-and-white banding of the anterior end and appendages. The species clearly is a member of group B-2, but, based on the available information, cannot be separated from a series of other species. It is here considered indeterminable.

Eunice cirribranchis Grube, 1870

Eunice cirribranchis Grube, 1870b:55; 1878a:99.

REMARKS.—Grube characterized this species briefly as having strongly articulated, moniliform antennae; branchiae present from setiger 6 through 72 (of 123 segments present) and with only a single branchial filament. Peristomial cirri and notopodial cirri lacked articulations. Branchiae and notopodial cirri were similar in length.

Grube (1878a:99) listed the species among those that had branchiae limited to some anteromedian setigers, and distinctly articulated antennae, in his subgenus *Leodice;* most other members in this grouping are now considered members of group C-1.

Eunice cirribranchis is, however, so poorly characterized that without access to the types and additional material, it must be considered indeterminable. It was originally described from Fiji.

40. *Eunice cirrobranchiata* McIntosh, 1885

FIGURE 31a–h; TABLES 33, 36, 52, 53

Eunice cirrobranchiata McIntosh, 1885:277–278, pl. 38: figs. 9–11, pl. 19A: figs. 21–24.

MATERIAL EXAMINED.—Two syntypes, BM(NH) ZK. 1885.12.1.196a. Bermuda, between tidemarks, Jun 1873.

COMMENTS.—Both syntypes are incomplete; the larger one has been frontally dissected and most setae are broken.

DESCRIPTION.—Large syntype with 123 setigers; length 30 mm; maximal width 3 mm; length through setiger 10, 6 mm. Small syntype with 45 setigers; length 18 mm; maximal width 3 mm; length through setiger 10, 5.5 mm. All segments very short and crowded; parapodia supported on high triangular lateral ridges in posterior ends of both fragments.

Prostomium (Figure 31a, illustration of small syntype) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of the peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus shallow. Eyes posterior to bases of A-I, black. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform, with up to 3 irregular, cylindrical articulations each, in addition to wrinkles. Antennae to middle or posterior end of peristomium; A-I shortest; A-III longest. Peristomium cylindrical with distinct muscular lower lip. Separation between rings distinct dorsally; anterior ring $^9/_{10}$ of total peristomial length; a shallow crease dividing ventral side with anterior part $^5/_6$ of total length of ventral side. Dorsal and ventral grooves not matching. Peristomial cirri to middle of peristomium, without articulations.

Maxillary formula 1+1, 5+5, 6+0, 1+6, and 1+1. Mx VI absent. Mx III short, part of distal arc with Mx IV and V.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 22 in small and from setiger 30 in large syntype, continued to ends of fragments. Maximally 2 long, narrow branchial filaments present; most segments with single filaments.

Anterior neuropodial acicular lobes truncate, from about setiger 25, acicular lobes reduced, represented by single, large aciculae emerging directly from body wall (Figure 31f); aciculae emerging at midline. Body wall forming high transverse ridges on both sides of the body. Pre- and postsetal lobes follow outline of acicular lobes closely. First 4 ventral cirri thick and digitiform. Bases of ventral cirri increasingly elongated from setiger 5, with short digitiform tips in all setigers. From about setiger 20 ventral cirri elongated, glandular ridges making up lower edge of fleshy ridges supporting setae. All notopodial cirri medially inflated, without articulations, longer in posterior than in anterior setigers.

Shafts of pectinate setae (Figure 31d) slender, cylindrical. Blades flared, furled, forming an open scoop. Both marginal teeth slightly longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 31c,h) inflated, marginally smooth; distal beaks and internal striations absent. Appendages short; heads relatively large, bidentate. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth short, tapering, directed obliquely distally or laterally. Guards symmetrically rounded, marginally frayed in most hooks, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single (Figure 31b,g), very heavy, with light to dark brown cores and clear sheaths, with distinct narrow neck, asymmetrically hammer-headed distally; distal ends of acicular shafts curved in some parapodia; cross-sections round. Subacicular hooks (Figure 31e) with dark brown cores and clear sheaths, bidentate or tridentate with teeth in tandem. Hooks first present from setiger 17 or 24, present in all setigers thereafter, always single (except for replacements). Hooks strongly curved, strongly beaked in appearance. Main fangs very large and curved, with paired lateral denticles in some hooks; distal fangs smaller but similar in shape.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 60. *Unknown Characters:* 1, 2, 4, 6, 36–40, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice cirrobranchiata* is usually considered a synonym of *E. filamentosa* (see Hartman, 1959) and little in the description of the two species differs. McIntosh stated that he had only a single 30 mm anterior fragment at his disposal and that specimen had been dried out. The larger of the two specimens is certainly the one described by McIntosh; all information given matches the specimen closely. It does not appear to have been seriously dried out. The provenance of the

FIGURE 31.—*Eunice cirrobranchiata* (holotype, BM(NH) ZK 1885 12.1.196a): a, anterior end, lateral view; b, acicula, parapodium 30; c, compound falciger, parapodium 30; d, pectinate seta, parapodium 30; e, subacicular hook, parapodium 30; f, parapodium 30, anterior view; g, acicula, parapodium 40; h, compound falciger, parapodium 40. *Eunice coccinea* (syntype, ZMB 866): i, pectinate seta, parapodium 10; j, compound falciger, parapodium 10; k, acicula, parapodium 10; l, pectinate seta, parapodium 55; m, subacicular hook, parapodium 55; n, parapodium 10, anterior view; o, anterior end, lateral view; p, parapodium 55, anterior view. (Scale bars in mm.)

smaller syntype is unclear; it matches the other specimen closely and is here considered a second syntype.

Eunice cirrobranchiata is listed with similar species in Tables 33 and 36. *Eunice cirrobranchiata* and *E. conglomerans* have modified acicular tips; however, *E. cirrobranchiata* is the only species listed in Table 36 to have subacicular hooks with the teeth in tandem.

Eunice rosaurae also has the teeth in tandem in the subacicular hooks. The species with this characteristic (compared in Tables 52 and 53) can be separated as suggested in the discussion of *E. rosaurae*.

Eunice claparedii Quatrefages, 1866

Eunice claparedii Quatrefages, 1866:652–653.
Eunice harassii.—Claparède, 1864:578–580, pl. 2: fig. 5 [not *Eunice harassii* Audouin and Milne Edwards, 1833].
Eunice torquata.—Grube, 1878a:99.

REMARKS.—Quatrefages based his species on specimens from Port-Vendres, Mediterranean Sea, identified by Claparède as *E. harassii*. As far as I can see, Quatrefages based his description solely on Claparède's written report and never saw any specimens. Quatrefages differential diagnosis emphasized that the antennae in Claparède's form were placed in a semicircle and were short and had relatively few articulations. The notopodial cirri should be articulated.

Claparède's description and illustration indicates that his specimens belong to group B-2. The prostomial antennae are short and are divided into seven articulations, reaching the posterior end of the peristomium. The peristomial cirri do not outreach the peristomium and are divided into five articulations. The notopodial cirri are also articulated with about five articulations. Branchiae are present from setiger 3 according to the illustration (Claparède, 1864, pl. 2: fig. 5) and may have seven filaments where best developed. Aciculae and subacicular hooks have black cores and clear sheaths; the subacicular hooks are illustrated as being very strongly curved, with a large, laterally directed proximal tooth and a small, erect distal tooth. The aciculae are tapering and apparently gently curved. Details of the other setae cannot be determined, nor can the distribution of the subacicular hook be determined.

Claparède left no material identified by him, so the validity of this species depends solely on the description furnished. Grube (1878a:99) synonymized Quatrefages species with *E. torquata*, also described by Quatrefages. This synonymy appears unproblematic and is here accepted.

41. *Eunice coccinea* Grube, 1878

FIGURE 31i–p; TABLES 24, 25, 27, 30

Eunice coccinea Grube, 1878b:153–155, pl. 9: fig. 1.

MATERIAL EXAMINED.—Two syntypes, ZMB 866, Singapore, coll. v. Martens.

COMMENTS ON MATERIAL EXAMINED.—Grube (1878b:153) gave the Philippines (Bohol) as type locality; the specimens described here are marked types in the collections of the Berlin Museum. The large syntype is very soft and flabby; the small syntype is in excellent condition and forms the base for the re-description.

DESCRIPTION.—Large syntype incomplete, of unknown sex, with 241 setigers; length 242 mm long. Small syntype incomplete; with 80 setigers; length 55 mm; maximal width 5 mm; length through setiger 10, 10 mm.

Prostomium (Figure 31o) distinctly shorter than peristomium, nearly as wide as peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 5 long, indistinctly marked, cylindrical articulations in A-III. A-I to middle of peristomium; A-II to setiger 1; A-III to setiger 2. Peristomium flaring anteriorly; lower lip expanded into thick bolster-like structure, wider than rest of peristomium. Separation between rings distinctly dorsally and ventrally; anterior ring $^5/_6$ of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 2 articulations.

Maxillary formula of large syntype 1+1, 4+4, 7+0, 5+8, and 1+1.

Branchiae (Figure 31n) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to end of small syntype, to setiger 138 in large syntype, leaving about half of incomplete specimen abranchiate. Branchiae terminating well before posterior end. First branchia with 3 filaments; maximum 10 filaments at about setiger 15. Number of filaments reduced from about setiger 30; from about setiger 45 rest of branchial region with 1 or 2 filaments present. Stems longer than notopodial cirri, tapering, erect. Filaments longer than notopodial cirri, digitiform, relatively slender.

Anterior neuropodial acicular lobes truncate with aciculae emerging at superior corner; median and posterior acicular lobes (Figure 31p) short, rounded. Pre- and postsetal lobes low, transverse folds; postsetal lobes unusually low in relation to acicular lobes. First 4–5 ventral cirri thick, tapering. Median ventral cirri basally inflated from early branchial setigers; narrow tips absent. Inflated bases nearly spherical in setigers 15–25, decreasing in size slowly posteriorly, developing a broad transverse shape and eventually a dorsal depression. Far posterior ventral cirri scoop-shaped, curving around emerging subacicular hooks, relatively narrow, nearly digitiform in anterior and posterior outline; narrow tips tapering. Anterior notopodial cirri tapering, with 2 or 3 indistinct, cylindrical articulations. Notopodial cirri loosing articulations, becoming shorter and more distinctly tapering from branchial region, retaining that shape to last segments.

Limbate setae slender. Anterior pectinate setae (Figure 31i)

very short. Shafts slender and cylindrical. Blades flat, flaring. One marginal tooth longer and thicker than other teeth; with ~15 teeth. In median and posterior setigers number and size of pectinate setae increasing, by setiger 50 dominant kind of setae in dorsal fascicles. Shafts of median and posterior pectinate setae (Figure 31l) slender, cylindrical. Blades flaring, flat. One marginal tooth longer, but not thicker than other teeth; about 25 teeth present. Shafts of compound falcigers (Figure 31j) tapering, marginally smooth, without internal striations or distal beaks. Appendages wide-based, triangular, bidentate. Proximal teeth a slight elevation on side of appendage. Distal teeth distinctly larger than proximal teeth, nearly erect, thick. Guards fit appendages closely, visible only on cutting edge, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, amber to dark brown; anterior superior aciculae (Figure 31k) tapering distally to fine slender tips; other aciculae taper distally to blunt, truncate tip; cross-section round. Superior aciculae gently curved dorsally; inferior aciculae straight. Fine amber-colored notopodial aciculae present. Subacicular hooks (Figure 31m) amber-colored to dark brown, bidentate. Hooks first present from setiger 38-39, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering to distinct heads. Proximal teeth shorter, but wider than distal teeth, blunt, erect. Distal teeth tapering, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; distribution of branchiae on posterior end; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming a distal arc with left Mx IV. Branchiae absent on posterior half of body.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 36, 38, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice coccinea* is listed with similar species in Tables 24 and 25. It is also listed in Tables 27 and 30, because the branchiae continue beyond setiger 100 (one of the defining characters of group B-2 in Fauchald, 1970).

Among the species in Table 25, *E. rosaurae* and *E. coccinea* have basally inflated ventral cirri continued to the posterior end. *Eunice rosaurae* has both bi- and tridentate subacicular hooks of which the latter have the teeth in tandem; *E. coccinea* has only bidentate subacicular hooks. In addition, *E. rosaurae* has only single branchial filaments; *E. coccinea* has pectinate branchiae with up to 10 filaments.

Of species listed in Table 30, *E. coccinea, E. fimbriata,* and *E. reducta* have the branchiae terminating well before the posterior end. Of these three species, only *E. coccinea* has basally inflated ventral cirri in the posterior end; in both the other species, the inflated region is missing in the posterior end.

42. *Eunice coccinioides* Augener, 1922

FIGURE 32; TABLES 24, 26

Eunice coccinioides Augener, 1922b:45.

Eunice fucata.—Augener, 1918:316-319, fig. 31 [not *Eunice fucata* Ehlers, 1887].

MATERIAL EXAMINED.—Two syntypes, ZMH V-5693, Isla Annobon, Angola, 7 Oct 1911, coll. Arn. Schultze

COMMENTS ON MATERIAL EXAMINED.—Augener (1918) gives a detailed description of the specimens from Isla Annobon; the description fits rather well with the specimens listed as types and Isla Annobon is here considered the type locality.

The sample contains two anterior ends and a series of median and posterior ends; of these one median piece and three posterior ends fit the anterior ends. One posterior end belongs to a species in group B-2; it is strongly branchiated even in the last setigers present and has dark brown or black subacicular hooks. Five median and posterior fragments lack subacicular hooks entirely and may belong to a species of *Palola.* The longer of the syntypes is described in detail.

DESCRIPTION.—Longer syntype incomplete, of unknown sex, with 133 setigers; length 80 mm long; maximal width 5 mm at setiger 20; length through setiger 10, 8 mm. Short syntype incomplete, of unknown sex, with 56 setigers; total length 32 mm; maximal width 4.5 mm at setiger 15; length through setiger 10, 7 mm.

Prostomium (Figure 32a) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes on ceratophores of A-I, black. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores of A-I short, truncate cones; A-II and A-III with ring-shaped ceratophores; all ceratophores without articulations. Ceratostyles tapering, without articulations. A-I to middle of anterior peristomial ring; A-II to setiger 2; A-III to setiger 3. Peristomium massive, slightly flaring anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, medially inflated, without articulations.

Maxillary formula of large syntype 1+1, 6+6, 10+0, 6+12, and 1+1; maxillary formula of small syntype 1+1, 5+6, 10+0, 5+10, and 1+1. Mx III part of distal arc with left Mx IV. Mx VI absent.

Branchiae (Figure 32g) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setigers 7 or 8, continued to setiger 78 on large syntype, leaving roughly half of body abranchiate. Maximum 9 filaments. Stems much longer than notopodial cirri, tapering, slender, erect. Filaments longer than notopodial cirri, digitiform, slender.

Anterior neuropodial acicular lobes rounded; posterior acicular lobes truncate; aciculae emerging dorsal to midline.

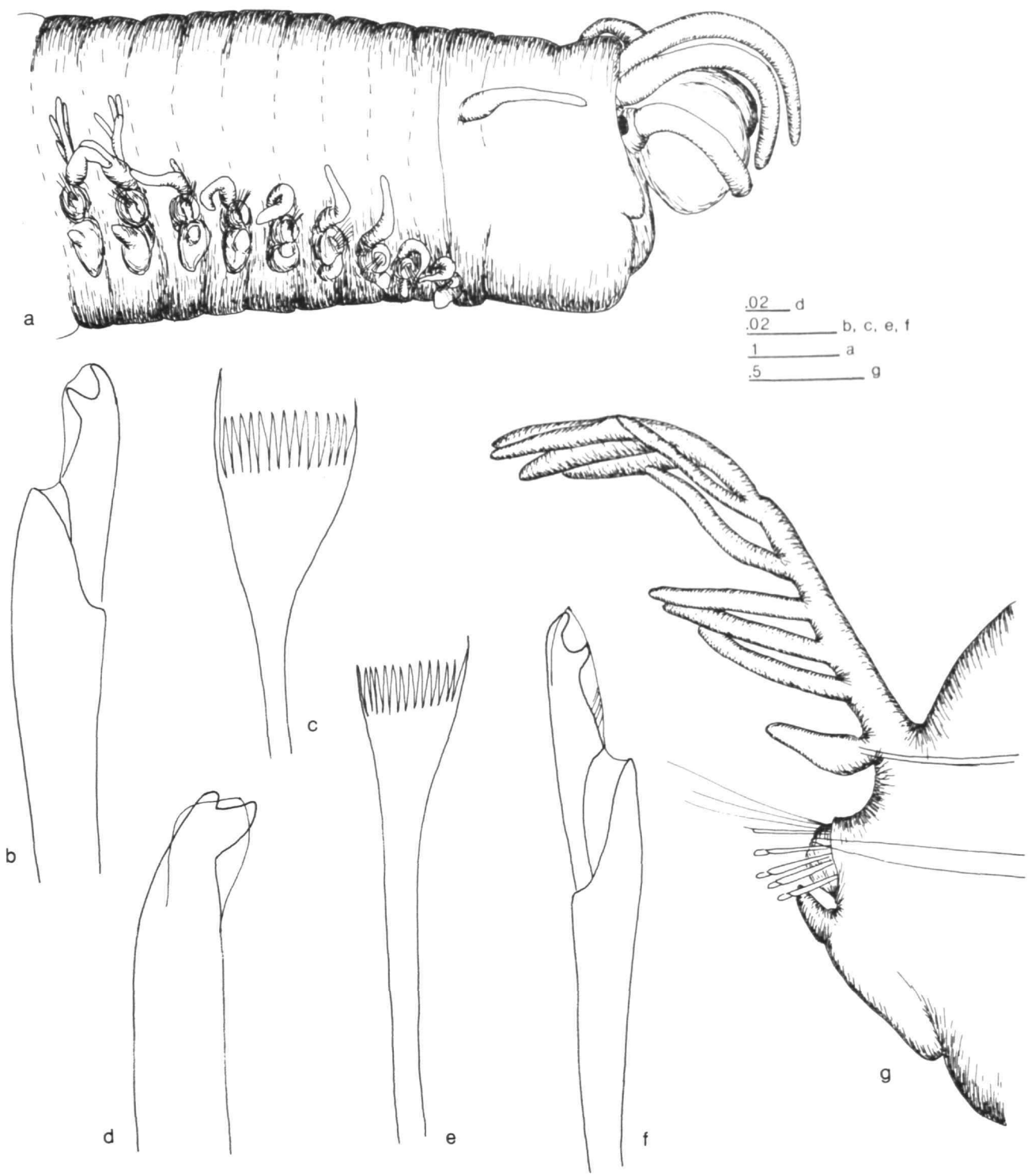

FIGURE 32.—*Eunice coccinoides* (holotype, ZMH V-5693): a, anterior end, lateral view; b, compound falciger, parapodium 129; c, pectinate seta, parapodium 129; d, subacicular hook, parapodium 129; e, pectinate seta, parapodium 19; f, compound falciger, parapodium 19; g, parapodium 19, anterior view. (Scale bars in mm.)

Presetal lobes low, transverse folds. Anterior postsetal lobes as high as acicular lobes, projecting as free lobes on ventral sides of acicular lobes, becoming reduced to low, transverse folds from about setiger 25. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5; inflated portion forming thick transverse ridges; narrow tips tapering. Inflated bases becoming reduced from about setiger 55; ventral cirri from about setiger 70 slender, tapering, about as thick as notopodial cirri. Notopodial cirri supported by internal aciculae in all setigers. Anterior notopodial cirri basally inflated, short, tapering, becoming slightly longer and distinctly narrower in the last 50 setigers present. All notopodial cirri without articulations, relatively short.

Limbate setae marginally smooth. Shafts of pectinate setae slender, cylindrical. Blades of anterior pectinate setae (Figure 32e) slightly flaring, becoming more distinctly flaring in posterior setigers (Figure 32c). One marginal tooth slightly longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 32b,f) slightly inflated, marginally smooth, without internal striations or distal beaks. Appendages short, tapering, with large heads, bidentate. Proximal teeth larger than distal teeth, narrow-based triangular, directed laterally, but tilted distally in anterior setigers (Figure 32f), directed distally (Figure 32b) in posterior setigers. Distal teeth tapering, distinctly bent in anterior setigers and gently curved in posterior setigers. Guards symmetrically bluntly pointed in and marginally serrated anterior setigers, rounded and marginally smooth in posterior setigers, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single, light copper-colored in anterior setigers, becoming distinctly darker brown in posterior setigers, distinctly projecting, thick, tapering, straight, cross-section round. Subacicular hooks (Figure 32d) copper- to chestnut-colored, bidentate. Hooks first present from setiger 28 or 30, present in all setigers thereafter, always single (except for replacements). Hooks tapering to narrow, bent necks and distinct head. Proximal teeth larger than distal teeth, directed laterally, but tilted distally. Distal teeth shorter than proximal teeth, blunt, directed obliquely laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Branchiae missing on posterior half of body.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 38-40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice coccinioides* is listed with similar species in Tables 24 and 26. It is characterized by the copper-chestnut colored aciculae and subacicular hooks, which sets it apart from other species in the group. The subacicular hooks have a distinctly bent neck and the proximal teeth of the subacicular hooks are distally tilted up, resembling the condition in some of the abranchiate species in group B-4.

43. *Eunice collaris* Grube, 1869

FIGURE 33; TABLES 33, 35

Eunice collaris Grube, 1869:494-495 [in part].

MATERIAL EXAMINED.—Three syntypes, ZMB F500, F501, and F2035, Tor, Red Sea, among corals, coll. Ehrenberg.

COMMENTS ON MATERIAL EXAMINED.—None of the syntypes are complete, two are very soft and generally in bad shape, but are sufficiently complete, and so distributional features can be identified as can the shapes of the setae. The syntype from F500 is in very good condition and is here described in detail.

DESCRIPTION.—Syntype from F500 incomplete with 56 setigers; length 44 mm; maximal width 6 mm at setiger 10; length through setiger 10, 12 mm. Anterior end cylindrical, frontally truncate; body becoming dorsally flattened towards posterior end of fragment.

Prostomium (Figure 33a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes present posterior to bases of A-I. Antennae evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform; maximum 8 articulations in A-III; articulations cylindrical basally, becoming drop-shaped, nearly moniliform distally. A-I to setiger 1; A-II to setiger 2 and A-III to setiger 4. Peristomium cylindrical; lower lip slightly inflated, distinctly muscular. Separation between rings well marked dorsally and ventrally and faintly visible laterally; anterior ring ~3/4 of total peristomial length. Peristomial cirri short and digitiform; articulations absent.

Jaws not examined.

Branchiae (Figure 33f) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 17 (18 in other specimens) to end of incomplete specimens. All branchiae pectinate with up to 12 filaments at about setiger 50. Branchial stem weak, flexible. Branchial filaments long, slender.

Neuropodial acicular lobes symmetrically rounded; aciculae emerging at midline. All presetal lobes low folds. Anterior postsetal lobes distinct ridges behind acicular lobe; median and posterior postsetal lobes low, transverse folds. First 3-4 ventral cirri thick and tapering. Median ventral cirri slightly inflated basally. Inflated bases ovate; narrow tips tapering. Inflated bases totally lost by setiger 50; posterior ventral cirri thick and tapering. All notopodial cirri distinctly inflated basally, and tapering to long tips; basal inflated region especially distinct in setigers 5-25, without articulations.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 33e), numbering up to 12 in a parapodium, tapering, furled into shallow scoops; 1 marginal tooth distinctly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 33d) slightly inflated, very finely marginally serrated. Appendages long, tapering; head distinct, bidentate.

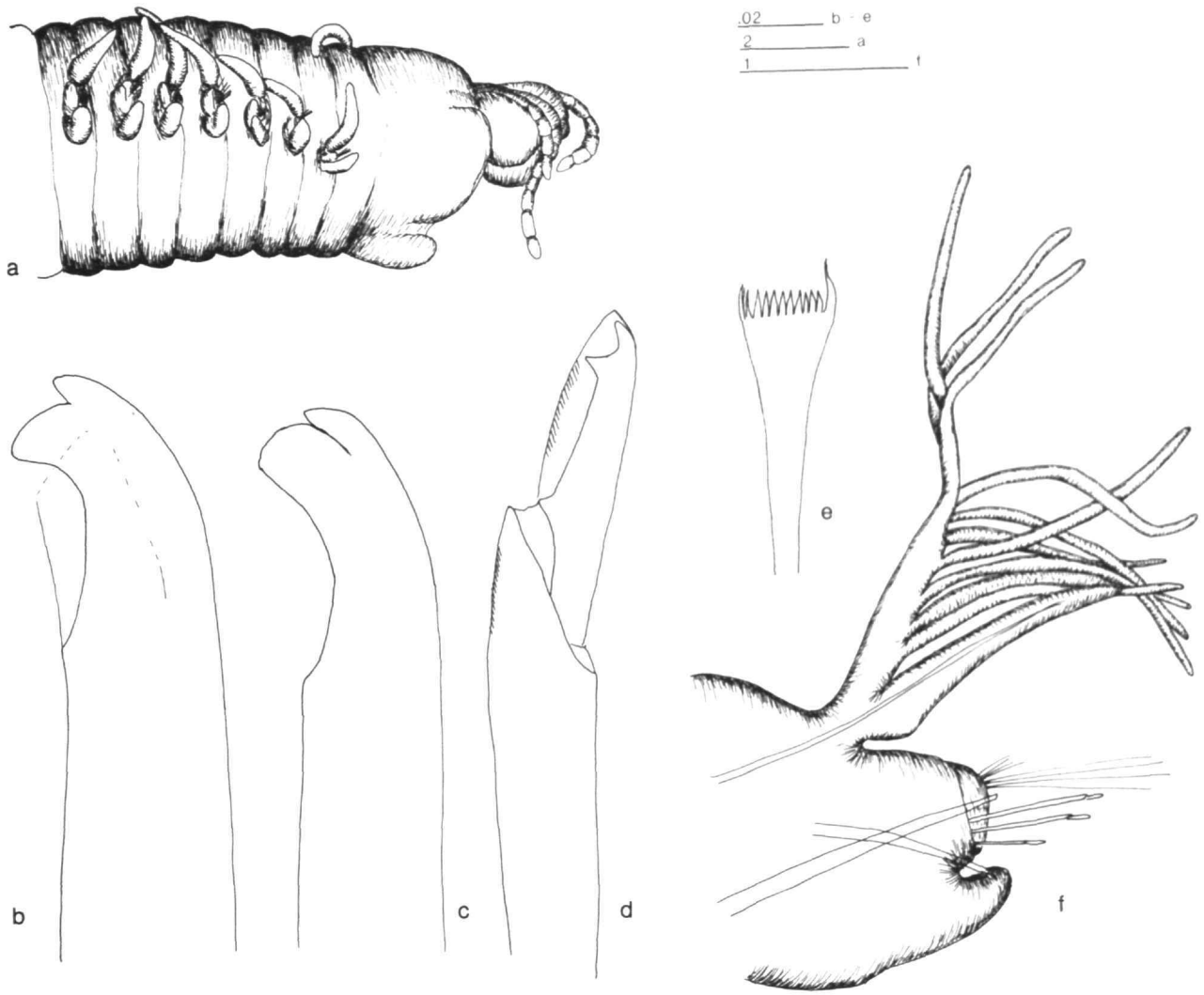

FIGURE 33.—*Eunice collaris* (holotype, ZMB F500): a, anterior end, lateral view; b, subacicular hook, parapodium 49; c, subacicular hook, parapodium 51; d, compound falciger, parapodium 51; e, pectinate seta, parapodium 51; f, parapodium 51, anterior view. (Scale bars in mm.)

Proximal teeth narrow, directed basally, distal teeth distally blunt, curved. Guards symmetrically bluntly pointed, marginally serrated, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single, dark brown, bluntly pointed and straight; cross-section round. Subacicular hooks (Figure 33cb,c) brown, bidentate. Hooks first present from setiger 27 or 33, present in all setigers thereafter, always single (except for replacements). Hooks abruptly tapered, with distinct head at right angles to long axis. Proximal teeth very large, blunt; distal teeth short and rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 15, 37, 38, 40, 47, 50, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—Two additional syntypes differ at the species level from those listed above and are here referred to *E. afra*. *Eunice collaris* has been considered a synonym of *E. afra* since Crossland (1904:289) first referred it to that species. As indicated above, the type material contains two species, both of

which are similar to *E. afra* in that they have dark subacicular hooks and branchiae starting at a relatively late segment.

Eunice collaris is listed with similar species in Tables 33 and 35. It is one of two species in Table 35 with more than six branchial filaments: *Eunice collaris* has 12 filaments and *E. fauveli* has 14 filaments. The latter has mucronate guards in the compound falcigers; *E. collaris* has blunt guards.

44. *Eunice collini* Augener, 1906

FIGURE 34a-k; TABLES 33, 37-39

Eunice collini Augener, 1906:133-135, pl.4: figs. 66-73.
Eunice rosaurae Monro, 1939:351-352, fig. 28a-f [in part].

MATERIAL EXAMINED.—Holotype, MCZ 2011, *Blake* sta 288, off Barbados, 730 m. One syntype of *E. rosaurae*, BM(NH) ZK 1941.1.1.217-221, off St. George, Grenada, 12°05'N, 61°49'W, 720-800 m, 27 Nov 1937, trawled, *Rosaura* Expedition, Atlantic, 1937-1938, sta 34.

DESCRIPTION.—Holotype of *E. collini* incomplete with 94 setigers; length 45 mm; maximal width 4 mm at about setiger 15; length through setiger 10, 7 mm. Syntype of *E. rosaurae* complete with 76 setigers; total length 42 mm; maximal width 5 mm at about setiger 15; length through setiger 10, 9 mm. Body anteriorly inflated; posterior end wide and dorsoventrally flattened; anterior and posterior ends abruptly tapered.

Prostomium (Figure 34a,e) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus very deep. Eyes absent. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations, smooth or irregularly wrinkled. A-I to second peristomial ring; A-II to setiger 2; A-III incomplete in both specimens. Peristomium flaring anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to front margin of peristomium, slender and digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 34k) present, palmate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 16 to setiger 85 in holotype; from setiger 12 to setiger 70 in syntype of *E. rosaurae*. Branchiae terminating well before posterior end. Most branchiae short, thick, single filaments; scattered along branchiated region, especially posteriorly, short, nearly tubercular second filaments present.

All neuropodial acicular lobes truncate or gently rounded; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick and tapering. Ventral cirri basally inflated from setiger 5. Inflated bases ovate, narrow tips tapering. Inflated bases reduced from about setiger 50; free tips elongating and becoming digitiform (Figure 34d). In far posterior setigers ventral cirri about twice as long as notopodial cirri but otherwise similar (Figure 34k). Anterior notopodial cirri basally inflated, distally slender; posterior notopodial cirri similar in shape but somewhat longer, without articulations.

Limbate setae slender; margins smooth. Shafts of pectinate setae slender (Figure 34f); blades distinctly flaring, flat. One marginal tooth slightly longer than other teeth; about 10 teeth present. Shafts of compound falcigers (Figure 34c,i) tapering from wide distal end; margins smooth. Appendages thick, tapering; heads distinct, bidentate. Proximal teeth about twice as large as distal teeth, directed laterally; distal teeth nearly erect or gently curved, tapering. Guards symmetrically rounded; cutting edge frayed rather than serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single in anterior parapodia, paired in all median and posterior parapodia. Superior aciculae (Figure 34h) with knife-shaped cross-section, light to dark brown, distally pointed. Inferior aciculae (Figure 34g) with round cross-section, distally tapering to straight tips, dark brown to jet-black. Both aciculae projecting (Figure 34d,k), for nearly half their length in median and posterior setigers, nearly half width of body represented by projecting aciculae in far posterior setigers. Posterior notopodial cirri supported by internal black aciculae; notopodial aciculae absent in anterior setigers. Subacicular hooks (Figure b,j) black, bidentate. Hooks first present from setiger 26-27, present in all setigers thereafter, always single (except for replacements). Hooks tapering, with distinct heads; proximal teeth much larger than distal teeth, directed laterally; distal teeth directed distally. Thin, pergamentaceous tube associated with syntype of *E. rosaurae*.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 22, 56, 58, 59. *Unknown Characters:* 1, 2, 6, 23, 38-40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice collini* resembles *E. floridana*, but can be separated on the structure of the aciculae and the late start of the branchiae. Branchiae are present from setigers 7-10 in *E. floridana* and from setiger 12 or not until setiger 16 in *E. collini*.

The differences between the syntype of *E. rosaurae* and the holotype of *E. collini* are minor; some may be due to the state of preservation, such as the projecting aciculae in the former, and other differences are well within the normal variability encountered in the genus.

Eunice collini is listed with similar species in Tables 33 and in Tables 37-39. It is one of the few species in Table 33 in which the branchiae terminate well before the posterior end.

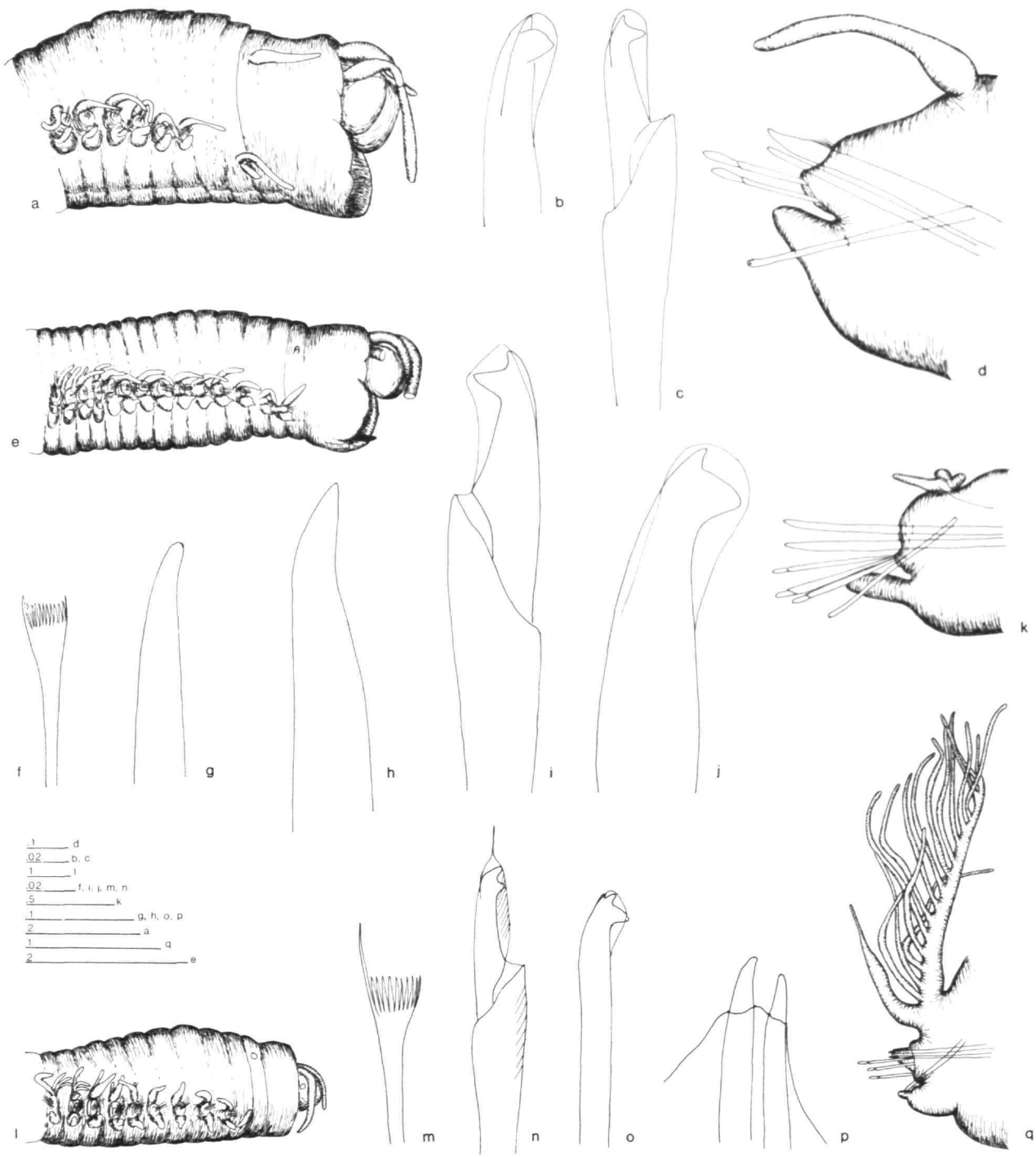

FIGURE 34.—*Eunice collini* (holotype, MCZ 2011): a, anterior end, lateral view; b, subacicular hook, parapodium 91; c, compound falciger, parapodium 91; d, parapodium 91, anterior view. *Eunice collini* (1 syntype of *Eunice rosaurae* BM(NH) ZK 1941.1.1.217-221): e, anterior end, lateral view; f, pectinate seta, parapodium 66; g, inferior acicula, parapodium 66; h, superior acicula, parapodium 66; i, compound falciger, parapodium 66; j, subacicular hook, parapodium 66; k, parapodium 66. *Eunice congesta* (holotype, ZMW, Inv. no. 1042): l, anterior end, lateral view; m, pectinate seta, parapodium 40; n, compound falciger, parapodium 40; o, subacicular hook, parapodium 40; p, acicula, parapodium 40, q, parapodium 40, anterior view. (Scale bars in mm.)

45. *Eunice complanata* Grube, 1877

TABLES 33, 37-39

Eunice complanata Grube, 1877:529-530.—Fauchald, 1986:246-247.

MATERIAL EXAMINED.—Holotype, ZMB, type 880, Timor, Atapupa, coral reef and Salawatti, coral reef.

COMMENTS ON MATERIAL EXAMINED.—The type is now completely dry and clearly has been dry for some time.

DESCRIPTION.—Holotype with about 100 setigers; reported length, 72 mm, probably correct.

Prostomium completely shrunken. Black eyes present between bases of A-I and A-II. All antennae apparently outreaching tip of prostomium, without obvious articulations. Separation between peristomial rings distinct dorsally and ventrally; anterior ring more than 5/6 of total peristomial length. Peristomial cirri at least as long as antennae, reaching well beyond frontal margin of peristomium, without obvious articulations.

Maxillary formula 1+1, 5+5, 5+0, 4+8, and 1+1. Mx III forming distal arc with short, curved Mx IV. Mx VI missing.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 19, well developed on last setigers present (setiger 100). First 2 pairs possibly with single filaments only; all other branchiae pectinate; maximum 6 filaments. Branchial stems strong, erect.

Ventral cirri apparently basally inflated in some anteromedial setigers; narrow tips tapering.

Limbate and pectinate setae present. Appendages of compound hooks bidentate. Guards without mucros. Aciculae and subacicular hooks dark brown. Aciculae tapering to blunt tips; cross-section of aciculae round. Subacicular hooks bidentate; first present from setiger 28, rather thick in relation to aciculae.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features, jaw structure; most parapodial structures.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Species too poorly known to make predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56. *Unknown Characters:* 3, 12, 15-20, 23, 24, 28, 34, 36-38, 40, 42-52, 54, 57-68, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—Unless the branchial distribution was highly unusual, the branchiae must have continued for at least another 20 setigers beyond the end of the incomplete specimen.

The parapodia are well developed and distinct, but are so distorted that they cannot be described in any additional detail. Due to the distribution of branchiae, color of the aciculae and subacicular hooks, and the dentition of the latter, *E. complanata* is here considered related to *E. afra* and similar species and is listed with these in Table 33 and Tables 37-39. It is too poorly known to be included in the key.

Eunice concinna (Verrill, 1900)

Leodice concinna Verrill, 1900:643.—Hartman, 1942:8.

REMARKS.—The type is not present in the collections of the Peabody Museum and has not been present since before 1940 (Hartman, 1942; W. Hartman, in litt.). The only information of any value in the original description is the mention of the strongly beaded antennae and the presence of branchiae only on the anterior part of the body starting at setiger 3.

Verrill stated that the species resembled *E. stigmatura*, which in turn has been considered synonymous with *E. vittata* (but see below). The branchial distribution is consistent with a membership in group C-1, but the strongly beaded antennae mentioned for *E. concinna* would differentiate the species from *E. vittata* and *E. stigmatura*.

The information is clearly insufficient to identify *E. concinna* and, whereas the types are lost, cannot be improved. The species is here considered indeterminable.

46. *Eunice congesta* Marenzeller, 1879

FIGURE 34l-q; TABLES 41, 45

Eunice congesta Marenzeller, 1879:134-135, pl. 4: fig. 2a-d.

MATERIAL EXAMINED.—Holotype, ZMW Inv. no. 1042, East coast of Eno-shima, Japan, coll. C. Koerbl.

COMMENTS ON MATERIAL EXAMINED.—The type lot consists of an anterior end of 50 setigers, here considered the holotype, and one anterior fragment missing the head and perhaps the first 10 setigers and two midposterior fragments. Only the anterior end is here described in detail; the other fragments present agree with this anterior end, but neither of the two mid-posterior fragments can unequivocally be associated with the anterior end.

DESCRIPTION.—Holotype with 50 setigers; length 22 mm; maximal width 4 mm at setiger 10; length through setiger 10, 6 mm. Body cylindrical, truncate anteriorly.

Prostomium (Figure 34l) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Dark purple eyes present between bases of A-I and A-II. Antennae in a horseshoe. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, without articulations. A-I missing; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri missing, but scar visible.

Maxillary formula 1+1, 6+8, 6+0, 6+7, and 1+1 according to Marenzeller (1879:135, pl. 4: fig. 2C). Mx III long, located behind left Mx II. Mx VI missing.

Branchiae (Figure 34q) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7 to setiger 47. Only first branchia with single filaments; all other branchiae pectinate with up to 18 filaments. Branchial stems strong, erect. Filaments tapering to

slender tips, at least as long as notopodial cirri in all except first few branchiated setigers.

Anterior neuropodial acicular lobes rounded, from about setiger 10 becoming increasingly obliquely conical with aciculae emerging dorsal to midline. All presetal lobes low, transverse folds. Anterior postsetal lobes about as high as acicular lobes following outline of acicular lobes closely; median and posterior postsetal lobes low folds. First 8 or 9 ventral cirri thick and tapering. Median ventral cirri basally inflated. Inflated bases spherical; narrow tips short, nearly button-shaped. Inflated bases reduced posterior to setiger 35, absent in mid-posterior fragments; ventral cirri tapering in posterior setigers. All notopodial cirri slender and tapering, without articulations.

Limbate setae slender, nearly capillary with very narrow, smooth limbations. Pectinate setae (Figure 34m) very small, flat, flaring. One marginal tooth larger than other teeth; total of 10 teeth present. Shafts of compound falcigers (Figure 34n) distally very slightly inflated and marginally serrated. Appendages slender, with a very large head, bidentate. Proximal teeth triangular, directed laterally; distal teeth sharply bent, truncate. Guards symmetrically rounded, with sharply pointed mucros, serrated along the cutting edge. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 34p) paired, slender, yellow, tapering distally to slender, slightly curved or bent tips; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 34o) yellow, tridentate with teeth in a crest. Hooks first present from setiger 33, present in all setigers thereafter, always single (except for replacements). Hooks slender, with large, triangular main fangs and smaller teeth decreasing relatively evenly in size distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 16, 17, 23, 27-29, 37, 38, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice congesta* was considered a synonym of *E. vittata* by Imajima and Hartman (1964:258); it is listed with similar species in Tables 41 and 45. In addition to *E. congesta*, *E. mucronata* has more than 15 branchial filaments. The two species are very similar and cannot be safely separated on the characters used in the key.

47. *Eunice conglomerans* Ehlers, 1887

FIGURE 35a-i; TABLES 33, 36

Eunice conglomerans Ehlers, 1887:93-95, pl. 23: figs. 1-9, pl. 24: figs. 1-4.

MATERIAL EXAMINED.—One syntype, MCZ 706, *Blake* sta 10, 24°44'N, 83°26'W, 68 m. Two syntypes, ZMB 6730, Key West, 2-3 m, coll. A. Agassiz.

DESCRIPTION.—MCZ syntype complete with 166 setigers; total length 163 mm; maximal width 3.5 mm at setiger 10; length through setiger 10, 6.5 mm. Ventrum flattened in anterior $^2/_3$ of body; dorsum strongly convex, especially in anterior $^1/_3$ of body except cylindrical prostomium and peristomium. ZMB syntypes both incomplete with 228 and 223 setigers; a posterior fragment encased in thick, pergamentaceous tubes also present.

Prostomium (Figure 35a) distinctly shorter than peristomium, about as wide as peristomium, as deep as $^1/_2$ of the peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes small, black, posterior to bases of A-I. Six antennae present; A-III apparently duplicated. Antennae arranged in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with 5 articulations in A-II and A-III and 4 in A-I; all articulations cylindrical. All antennae similar in length, barely reaching posterior margin of peristomium. Peristomium cylindrical with scoop-shaped projecting lower lip. Separation between rings distinct dorsally; ventrally peristomium also divided into 2 rings, but connection between dorsal and ventral transverse grooves uncertain; anterior ring $^4/_5$ of total peristomial length. Peristomial cirri short and tapering, without articulations.

Maxillary formula of both ZMB specimens 1+1, 5+5, 6+0, 2+6, and 1+1. Left Mx IV very small, curving around Mx III, appearing nearly fused to Mx III.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 29 (from setigers 23 and 27 in other specimens) to setiger 165. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Most branchiae with 2 filaments; maximum 4 filaments from about setiger 130. Branchial stems short, flexible and conical. Filaments long, robust, strongly wrinkled with very large internal blood vessels. Anterior neuropodial acicular lobes asymmetrically rounded with aciculae emerging from distal end above midline; median and posterior acicular lobes (Figure 35b,c) becoming symmetrically conical posteriorly. All pre- and postsetal lobes low folds. First 4 ventral cirri thick and tapering. Ventral cirri becoming inflated with large, transverse welt-like glandular bases from about setiger 5; narrow tips tapering. From about setiger 100, basal inflations decreasing in importance. Far posterior ventral cirri thick, digitiform and held curved up along the posterior face of parapodia (Figure 35c); glandular contents of ventral cirri retained (apparently) even in these posterior segments. Anterior notopodial cirri thick, basally inflated and tapering, becoming distinctly digitiform from beginning of branchial region; far posterior notopodial cirri slender and digitiform; all notopodial cirri without articulations.

Limbate setae long, slender, rare in posterior setigers. Most

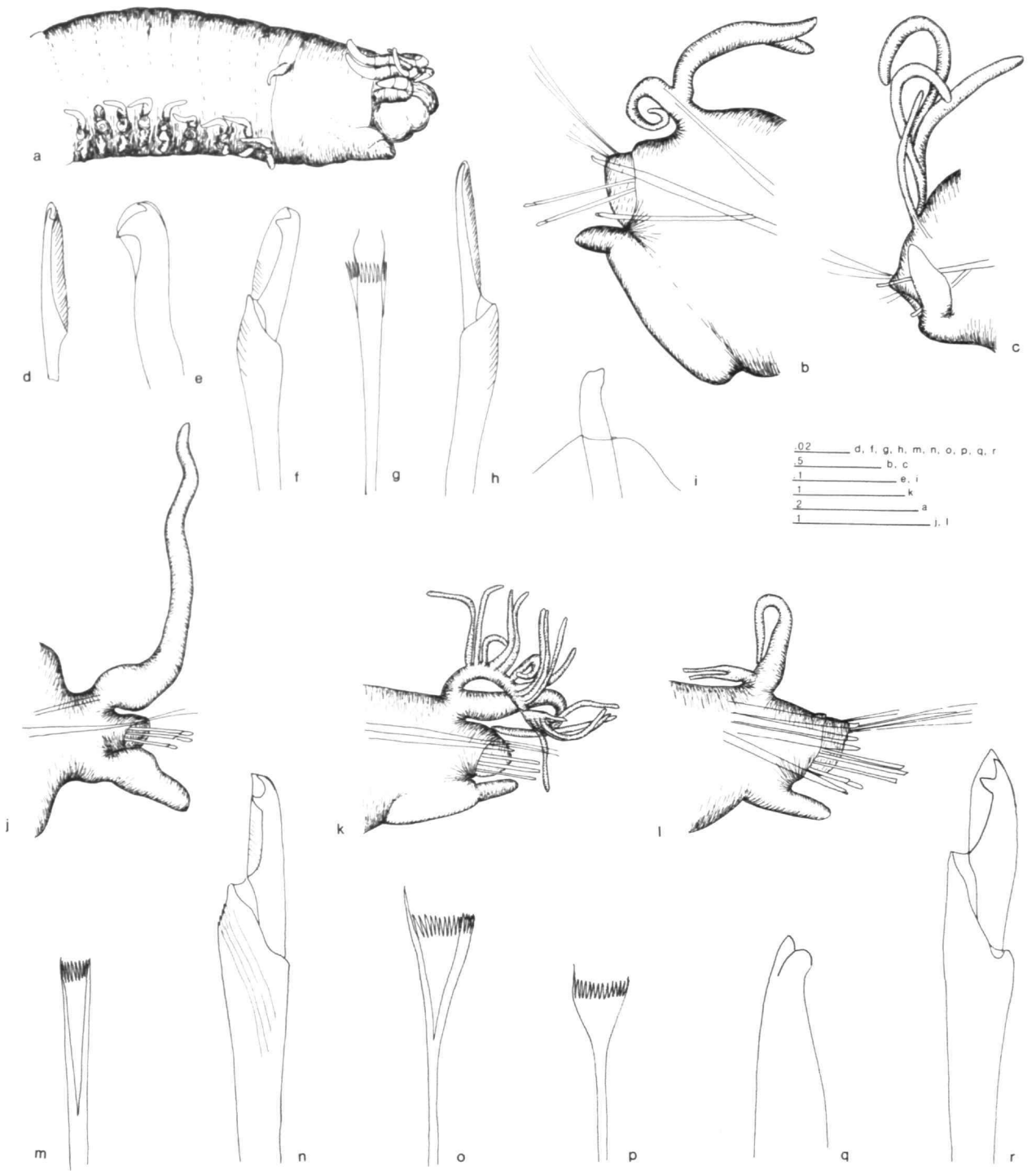

FIGURE 35.—*Eunice conglomerans* (syntype, MCZ 706): a, anterior end, lateral view; b, parapodium 35, anterior view; c, parapodium 134, posterior view; d, appendage, compound falciger, parapodium 10; e, subacicular hook, parapodium 35; f, compound falciger, parapodium 35; g, pectinate seta, parapodium 35; h, compound falciger, parapodium 10; i, acicula, parapodium 35. *Eunice contingens* (holotype, USNM 19394): j, parapodium 3, anterior view; k, parapodium 19, anterior view; l, parapodium 40, anterior view; m, pectinate seta, parapodium 3; n, compound falciger, parapodium 3; o, pectinate seta, parapodium 19; p, pectinate seta, parapodium 40; q, subacicular hook, parapodium 40; r, compound falciger, parapodium 40. (Scale bars in mm.)

dorsal fascicles numerically dominated by very long, slender pectinate setae. Pectinate setae (Figure 35g) tapering, furled. Both marginal teeth longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 35f,h) distinctly inflated, marginally strongly serrated. Appendages of superior hooks (Figure 35h) in anterior setigers, apparently nearly unidentate in that both teeth, but especially proximal teeth reduced and the distal teeth nearly erect. Inferior hooks (Figure 35d) in same fascicle distinctly bidentate with small teeth; appendages narrower and somewhat longer than in posterior setigers. In posterior setigers all appendages (Figure 35f) similar; each appendage with both teeth well developed; proximal teeth very large. Guards distally symmetrically rounded, marginally strongly serrated in all hooks; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 35i) single, black, distally bent dorsally, with slightly, but distinctly knobbed appearance, nearly bidentate in some setigers; cross-section round. First few subacicular hooks increasingly darker brown, from about setiger 30 hooks black, bidentate. Hooks first present from setiger 22, present in all setigers thereafter, always single (except for replacements). Hooks (Figure 35e) with distinct curved heads with very large, parrot-beaked main fangs and much smaller, curved distal teeth. Guards distally rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 39, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice conglomerans* is listed with similar species in Tables 33 and 36. Two species in Table 36 have knobbed aciculae; all other species have tapering, more or less pointed acicula. In addition to *E. conglomerans*, *E. cirrobranchiata* has such aciculae. In *E. conglomerans* the bases of the ventral cirri are inflated only in median setigers; in *E. cirrobranchiata* the bases are inflated also through the posterior setigers.

48. *Eunice contingens* (Chamberlin, 1919)

FIGURE 35j-r; TABLES 27, 28

Leodice contingens Chamberlin, 1919a:260–263, pl. 57: figs. 1–5.

MATERIAL EXAMINED.—Holotype, USNM 19394, *Albatross*, sta 3642, Galapagos Islands, near Hood Island, Ripple Point, 1°30′5″S, 89°35′W, 549 m, 7 Nov 1904, broken shells and *Globigerina*.

COMMENTS ON MATERIAL EXAMINED.—The type is a complete mature female with large eggs in the body cavity. It has been dried out and no meaningful measurements can be made. It appears to agree with Chamberlin's description.

DESCRIPTION.—Anterior end described, but not illustrated by Chamberlin. Ceratophores ring-shaped in all antennae. Ceratostyles without articulations, or vaguely wrinkled. A-I to setiger 1; A-II to setiger 4; A-III to setiger 6. Peristomium cylindrical; separation between rings distinct at least ventrally. Peristomial cirri long and slender, reaching well beyond frontal margin of peristomium, without articulations. Maxillary formula according to Chamberlin (1919a:263; see also pl. 57: fig. 1) 1+1, 6+7, 7+0, 4+9, 1+1.

Branchiae (Figure 35k-l) present, pectinate, shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to end of specimen. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchia single filaments; all others, except possibly far posterior ones, pectinate; 18-19 filaments present at or near setiger 15.

Neuropodial acicular lobes (Figure 35j-l) distally rounded or truncate; aciculae emerging at midline. All pre- and postsetal lobes low folds. Anterior ventral cirri tapering from wide, triangular bases. Median ventral cirri basally inflated; inflated bases transverse welts; narrow tips digitiform. Posterior ventral cirri digitiform, without basal inflations. Anterior notopodial cirri long and slender, basally somewhat inflated; median notopodial cirri somewhat shorter; the basal inflated region more distinct. Far posterior notopodial cirri slender and shorter than in anterior end. Notopodial cirri without articulations

Anterior pectinate setae (Figure 35m) furled, tapering, with 1 marginal tooth longer than other teeth; ~10 teeth present. Median and posterior pectinate setae (Figure 35o,p) flaring, furled; ~15 teeth present. Shafts of compound falcigers (Figure 35n,r) distinctly to slightly flaring; anterior shafts slightly serrated; beaks present. Appendages short with both teeth well developed and directed laterally, bidentate. Proximal teeth tapering, tilted distally. Guards asymmetrically bluntly pointed in anterior setigers, symmetrically bluntly pointed in posterior setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black, straight and tapering; inferior one somewhat heavier than superior one; cross-sections round. Subacicular hooks black, bidentate; first present from setiger 30. Hooks (Figure 35q) tapering evenly from the middle; head indistinct; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Structure of prostomium; relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1-17, 19, 20, 23, 25, 26, 28, 36, 40, 51, 54, 65-68, 74, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice contingens* is listed with similar species in Tables 27 and 28; it has not been included in the key.

Numbers of teeth for Mx III and left Mx IV are listed in the opposite order by Chamberlin, which would lead to a highly unusual distribution of teeth. It is here assumed that the more customary arrangement was present, because in other descriptions that could be checked by specimens, Chamberlin had confused the order of the jaws.

Eunice contingens is the only species listed in Table 28 with branchiae shorter than the notopodial cirri.

49. *Eunice crassitentaculata* (Treadwell, 1922)

FIGURE 36a–e; TABLES 33, 38

Leodice crassi-tentaculata Treadwell, 1922:146–148, figs. 30–33, pl. 4: figs. 1-5.

MATERIAL EXAMINED.—Holotype, AMNH 1526, Pago Pago, Samoa.

COMMENTS ON MATERIAL EXAMINED.—The holotype is an anterior fragment and a median fragment of 88 segments, which may have belonged to the same specimen. The anterior end is described in detail.

DESCRIPTION.—Anterior fragment with 158 setigers; 135 mm long; maximum width, near posterior end of fragment, 3.5 mm; length through setiger 10, 9.5 mm; width at setiger 10, 2 mm. Anterior part of body cylindrical, becoming dorsoventrally flattened and expanded from about setiger 20.

Prostomium (Figure 36a) distinctly shorter than peristomium, distinctly narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Black eyes present between bases of A-I and A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores long and cylindrical in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I to middle of peristomium; A-II to setiger 4; A-III to setiger 7. Peristomium about twice as wide as prostomium, barrel-shaped. Separation between rings distinct dorsally and ventrally; anterior ring slightly more than 1/2 of total peristomial length. Peristomial cirri short and tapering, without articulations.

Jaws not seen. Maxillary formula according to Treadwell (1922:147) 1+1, 4+5, 7+0, 5+8, and 1+1.

Branchiae (Figure 36b) present, palmate, distinctly longer than notopodial cirri. Branchiae from setiger 28 as single filaments. Maximally 2 filaments present. Branchiae present to end of body according to Treadwell, present on more than 65% of total number of setigers.

Neuropodial acicular lobes distally triangular or rounded with single prominent aciculae emerging at midline. All presetal lobes low folds. Anterior postsetal lobes project as free lobes; median and posterior postsetal lobes low, transverse folds. First 4 ventral cirri tapering or digitiform. Ventral cirri basally inflated from setiger 5; inflated bases ovate, distinct in all setigers present in fragment; narrow tips tapering. Notopodial cirri thick and basally inflated in anterior setigers, becoming medially inflated in branchial region. Notopodial cirri without articulations.

Limbate setae slender with very narrow limbation. Pectinate setae (Figure 36c) flat, flaring. Both marginal teeth longer than other teeth; about 15 teeth present. Shafts of compound falcigers (Figure 36e) distally inflated, smooth. Appendages large; heads distinct, bidentate. Both teeth of same size, directed laterally. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks with black cores and clear sheaths. Aciculae single, tapering to blunt tips; cross-section round. Subacicular hooks (Figure 36d) bidentate. Hooks first present from setiger 32, present in all setigers thereafter, always single (except for replacements). Hooks with both teeth well developed; proximal teeth directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 60. *Unknown Characters:* 1, 2, 6, 33, 34, 36, 40, 42, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice crassitentaculata* resembles *E. afra* as indicated by Hartman (1956); however, it has much longer antennae than that species and the shape of the subacicular hooks is also distinctly different. It is listed with similar species in Tables 33 and 38. The long, cylindrical ceratophores in all antennae are rare among species of the genus.

Eunice culebra Treadwell, 1901

Eunice culebra Treadwell, 1901:197, fig. 37.—Hartman, 1956:249.

REMARKS.—The original description was based on a small, incomplete specimen with about 50 anterior setigers.

The antennae were slender. A-III was three times the length of the prostomium; A-II 3/4 of the length of the prostomium and A-I only a little shorter than A-II. A-III was thus described as being considerably longer than the other antennae. A single branchia is present from one of the last segments present.

The type was deposited in the USNM according to Hartman (1956); this is not the case and there is no evidence to show that it was ever present. The USNM collections contains a specimen identified by Treadwell as *E. culebra,* but it was collected about 15 years after this species was described. This specimen belongs to *E. cariboea* as defined in this paper and disagrees with the description of *E. culebra* in the shape and size of the antennae.

Eunice culebra is here considered indeterminable.

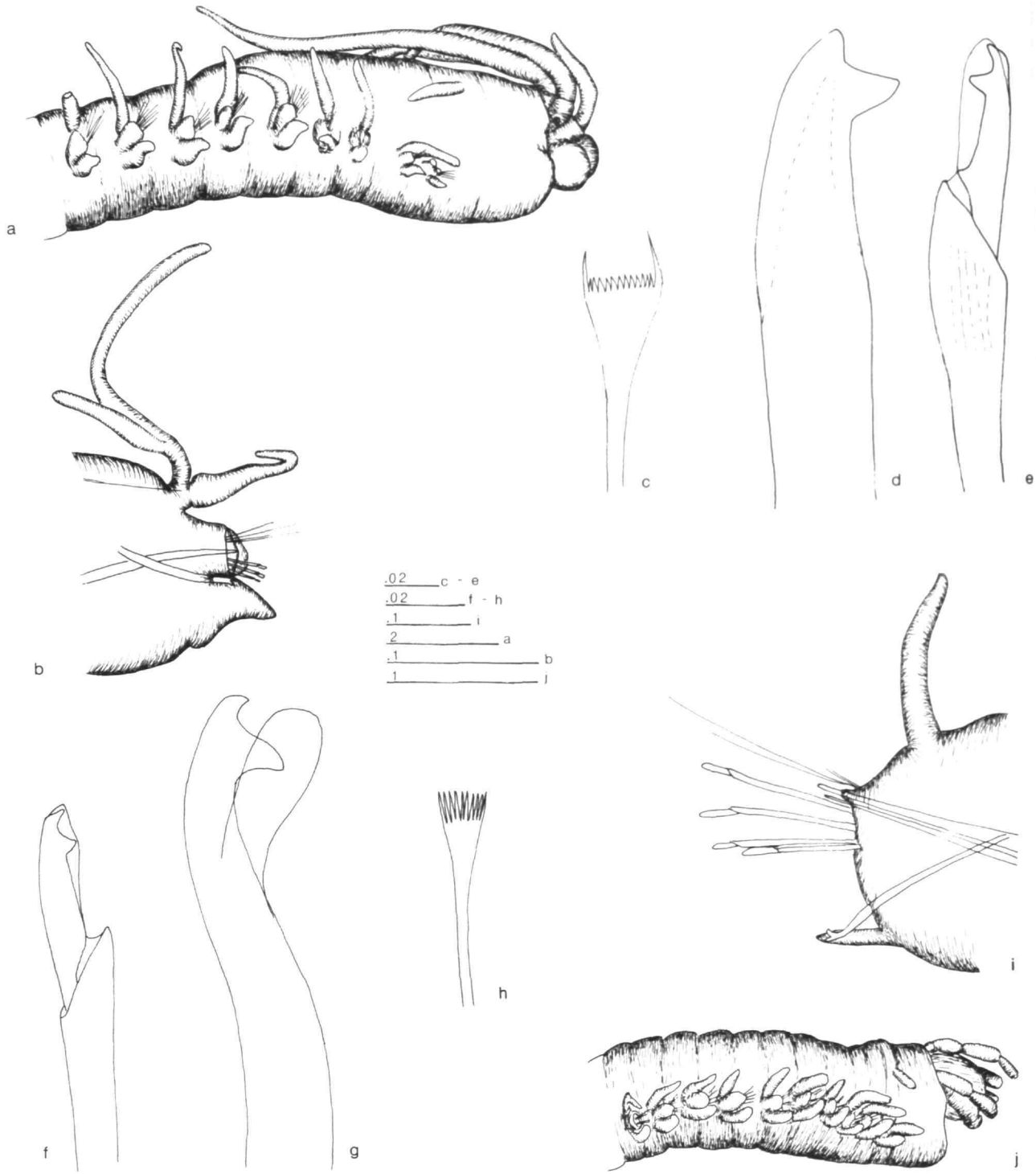

FIGURE 36.—*Eunice crassitentaculata* (holotype, AMNH 1526): a, anterior end, lateral view; b, parapodium 69 anterior view; c, pectinate seta, parapodium 69; d, subacicular hook, parapodium 69; e, compound falciger, parapodium 69. *Eunice curticirrus* (holotype): f, compound falciger, parapodium 35; g, subacicular hook, parapodium 35; h, pectinate seta, parapodium 35; i, parapodium 35, anterior view; j, anterior end, lateral view. (Scale bars in mm.)

50. *Eunice curticirrus* Knox, 1960

FIGURE 36f-j; TABLES 33, 40

Eunice (Nicidion) curticirrus Knox, 1960:125-126, figs. 190-195.
Eunice curticirris [sic].—Fauchald, 1986:247, figs. 24-28.

MATERIAL EXAMINED.—Holotype, Canterbury Museum, Chatham Islands, 43°36.2'S, 176°48.5'W, S of the Sisters, 69 m, coarse shell, sand, gravel, Chatham Island Expedition sta 24.

DESCRIPTION.—Holotype complete with 55 setigers; total length 12 mm; maximal width 1 mm at setiger 10; length through setiger 10, 2.25 mm. Body cylindrical, tapering slowly posteriorly.

Prostomium (Figure 36j) about as long as peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median groove invisible dorsally; ventral longitudinal groove present. Large, reddish eyes between bases of A-I and A-II. Antennae in a straight line; with A-III isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform; each with 3 or 4 very large, angular articulations. All antennae of same length, reaching setiger 1. Peristomium about as long as prostomium, flaring, especially anteroventrally. Separation between rings distinct dorsally and visible ventrally; anterior ring roughly 3/4 of total peristomial length. Peristomial cirri to middle of peristomium, digitiform, without articulations.

Maxillary formula unknown.

Branchiae absent.

First 20 neuropodial acicular lobes symmetrically truncate, thereafter reduced so aciculae emerge directly from body-wall; aciculae emerging at midline (Figure 36i). All pre- and postsetal lobes low folds. Anterior ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 12. Bases ovate; narrow tips tapering. Posterior to setiger 25 ventral cirri again becoming tapering, nearly triangular in outline. Anterior notopodial cirri thick and digitiform, becoming slender and digitiform posterior to setiger 20. Notopodial cirri without articulations.

Pectinate setae (Figure 36h) tapering, flat. Marginal teeth no longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 36f) slightly inflated, marginally smooth. Appendages bidentate. Proximal teeth large, triangular, directed laterally; distal teeth smaller than proximal teeth, angularly bent and laterally directed. Guards symmetrically truncate, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks with black cores and clear sheaths; cross-section round. Aciculae paired, smoothly tapering and distally pointed. Subacicular hooks (Figure 36g) bidentate. Hooks first present from setiger 16, present in all setigers thereafter, always single (except for replacements). Hooks distinctly S-shaped with tapering necks and very large, curved distal and proximal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 31-42, 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Knox (1960) mentioned that tridentate hooks with the distal tooth divided laterally were present in this species. No such hooks were observed in the specimen, but several parapodia are missing and such hooks could have been present in at least a few parapodia. *Eunice curticirrus* can be separated from all other abranchiate species of the genus by the extremely strongly beaded antennae; it is listed with similar species in Tables 33 and 40.

The species name was misspelled by Fauchald (1986:247).

51. *Eunice denticulata* Webster, 1884

FIGURE 37; TABLES 33, 39

Eunice denticulata Webster, 1884:316-317, pl. 10: figs. 41, 41a-b, 42-45.

MATERIAL EXAMINED.—Two syntypes, plus 9 slide preparations of parapodia, USNM 4790, Bermuda, coll. G. Brown Goode, 1876 or 1877.

DESCRIPTION.—Large syntype incomplete, with 125 setigers; length 35 mm; maximal width 3 mm at setiger 10; length through setiger 10, 7 mm. Small syntype incomplete, with 76 setigers; length 25 mm; maximal width 3 mm at setiger 10; length through setiger 10, 6 mm. Anterior end inflated; rest of body slightly dorsoventrally flattened, but basically cylindrical.

Prostomium (Figure 37d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Dark eyes posterior to bases of A-I. Ceratophores long in all antennae, without articulations. Ceratostyles tapering, without articulations; A-III slightly longer than other antennae; none reaching beyond peristomium. Peristomium massive, cylindrical, with distinct, muscular lower lip. Separation between rings distinct ventrally, visible, but poorly marked dorsally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations, slender and tapering.

Maxillary formula of large syntype 1+1, 6+6, 6+0, 3+9, and 1+1. Mx III part of distal arc with left Mx IV. Left Mx IV with reduced dentate portion and relatively long wing overlapping Mx III.

Branchiae (Figure 37h) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 27 in both specimens. First 10-12 pairs single filaments; where best developed, towards end of fragments, branchiae with up to 3 filaments. Filaments digitiform, about as long as notopodial cirri.

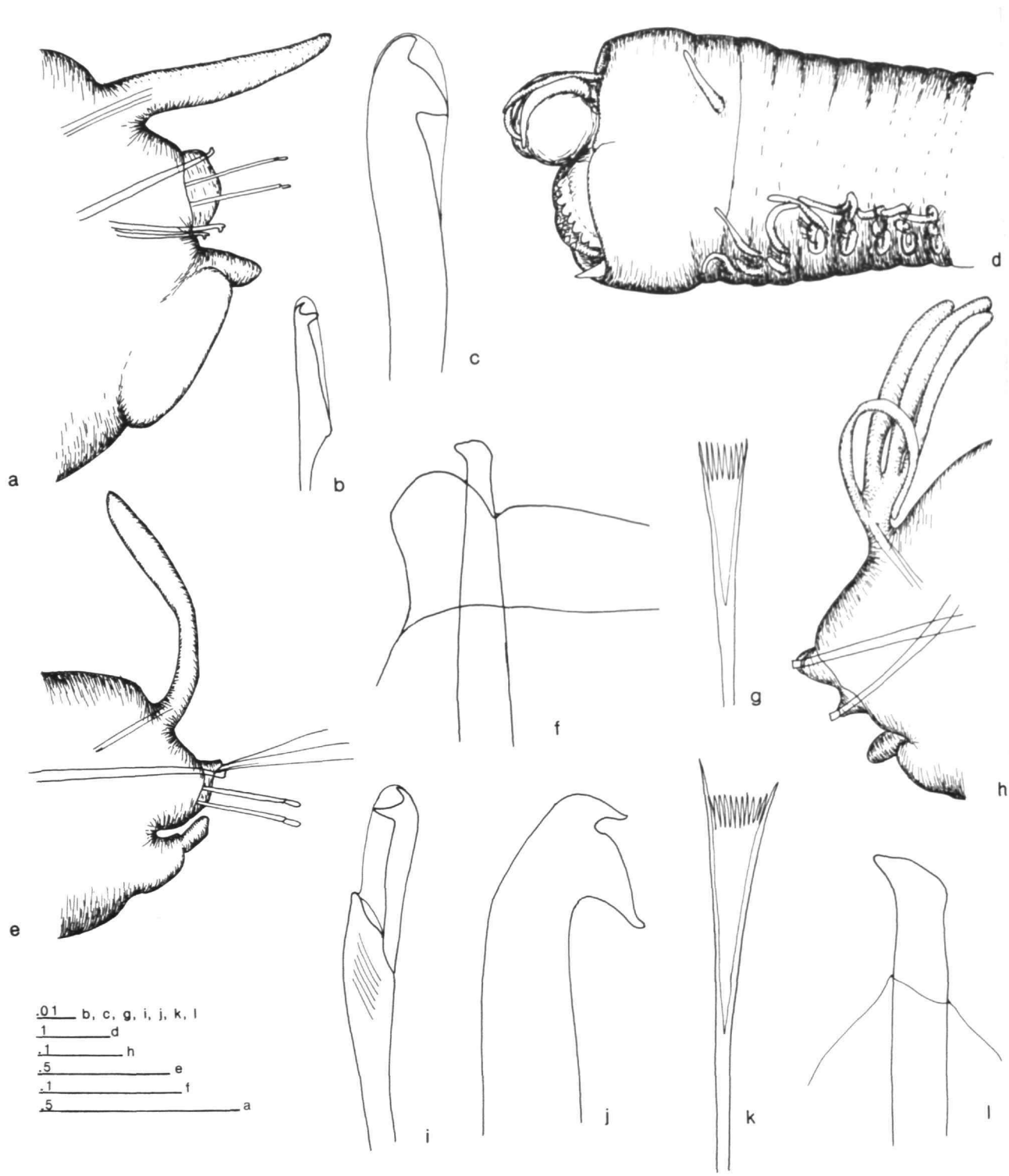

FIGURE 37.—*Eunice denticulata* ((holotype, USNM 4790): a, anteromedian parapodium; anterior view; b, appendage of compound falciger, anteromedian parapodium; c, subacicular hook, anterio-median parapodium; d, anterior end, lateral view; e, parapodium 17, anterior view; f, acicula, parapodium 17; g, pectinate seta, parapodium 17; h, posterior parapodium, anterior view; i, compound falciger, posterior parapodium; j, subacicular hook, posterior parapodium; k, pectinate seta, posterior parapodium; l, acicula, posterior parapodium. (Scale bars in mm.)

Anterior neuropodial acicular lobes (Figure 37e) broadly asymmetrically truncate with aciculae emerging near upper edge; small elevated tabs present superior to acicula; median and posterior acicular lobes without the elevated tabs (Figure 37a). All presetal and postsetal lobes low folds. Anterior ventral cirri thick and tapering, becoming basally inflated from about setiger 10. Inflated bases elongated transverse welts; narrow tips tapering. Inflated bases reduced from about setiger 65 and absent from about setiger 85. Posterior ventral cirri short and digitiform. Anterior notopodial cirri long and digitiform, becoming slender in branchial region, but retaining similar length throughout, without articulations.

Limbate setae narrow and marginally frayed. Pectinate setae (Figure 37g,k) narrow, tapering and furled. Both marginal teeth thicker and slightly longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 37i) distally inflated, some marginally serrated, others with smooth margins. Appendages (Figure 37b,i) slender, varying in length, bidentate. Proximal teeth very much larger than distal teeth, directed laterally or slightly basally. Distal teeth short and bent. Guards distally symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. All aciculae single; anterior aciculae dark yellow, darkening to brown from about setiger 15, distally slightly expanded, slightly hammer-headed (Figure 37f,l), bent towards anterior end; cross-section round. Subacicular hooks (Figure 37c,j) brown, bidentate. Hooks first present from setiger 18-19, present in all setigers thereafter, always single (except for replacements). Shafts strongly curved; head very distinct; proximal teeth large, curved, directed laterally or basally. Distal teeth smaller, strongly curved and directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Posterior termination of branchiae; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Branchiae continued to near posterior end.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 1, 2, 36-38, 40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice denticulata* belongs to group B-4 and is compared to similar species in Tables 33 and 39. Among the species in Table 39, it most closely resembles *E. flavapunctata* in that the inflated bases of median ventral cirri form thick, transverse welts in both species. *Eunice denticulata* has expanded, slightly hammer-headed aciculae; the aciculae are tapering in *E. flavapunctata*.

Eunice depressa Schmarda, 1861

Eunice depressa Schmarda, 1861:127-128, 11 figs.
Marphysa depressa.—Grube, 1878a:101.—Augener, 1924:409.

REMARKS.—This species was referred to *Marphysa* by Grube (1878a:101). Augener (1924:409) redefined the species. The original description clearly indicates that Schmarda had a species of *Marphysa*.

52. *Eunice dilatata* Grube, 1877

FIGURE 38a-f; TABLES 33, 38

Eunice dilatata Grube, 1877:530-531.—Fauchald, 1986:248-249, figs. 29-34.

MATERIAL EXAMINED.—Holotype, ZMB 896, Salavatti, Timor, coll. Exp. Gazelle.

COMMENTS ON MATERIAL EXAMINED.—The prostomium had been laterally dissected, so the lower outline of the peristomium has been reconstructed in the illustration.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 92 anterior setigers; length 70 mm; maximal width 10 mm at setiger 85; length through setiger 10, 16 mm; width at setiger 10, 5 mm. Anterior end cylindrical, becoming strongly dorsoventrally flattened by setiger 30; segments becoming very short and crowded near posterior end.

Prostomium (Figure 38b) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes between bases of A-I and A-II, black. Antennae in a horseshoe; A-I and A-II separated by gap from A-III; A-III located well forward of other antennae; A-III half as thick as A-I and A-II. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without obvious articulations. A-I to posterior peristomial ring; A-II to end of setiger 1, and A-III to end of setiger 2. Peristomium about twice as long as prostomium, cylindrical. Separation between peristomial rings visible, but indistinct dorsally, possibly also ventrally, but specimen damaged; anterior ring 3/4 of total peristomial length. Peristomial cirri short, digitiform, without articulations.

Maxillary formula 1+1, 5+5, 8+0, 6+7, and 1+1; Mx II with unusually large and heavy teeth compared to other maxillae.

Branchiae (Figure 38c) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 19 to end of fragment. First 5 pairs single filaments; maximum 6 filaments; most branchiae with 5 filaments; this number of filaments continued to end of fragment. Branchial stems slender, longer than notopodial cirri. Filaments digitiform, longer than notopodial cirri, increasing in length posteriorly.

Anterior neuropodial acicular lobes (Figure 38a) symmetrically rounded; median and posterior acicular lobes distally truncate; aciculae emerging at midline. Presetal lobes low, transverse folds. Anterior postsetal lobes free, rounded, about as high as acicular lobes, reduced to low folds from median setigers. Median and posterior parapodia on high ridges thus all parapodial structures, including aciculae, free of body wall, resembling large, flattened paddles with parapodial features carried at distal end. Anterior ventral cirri large, tapering from

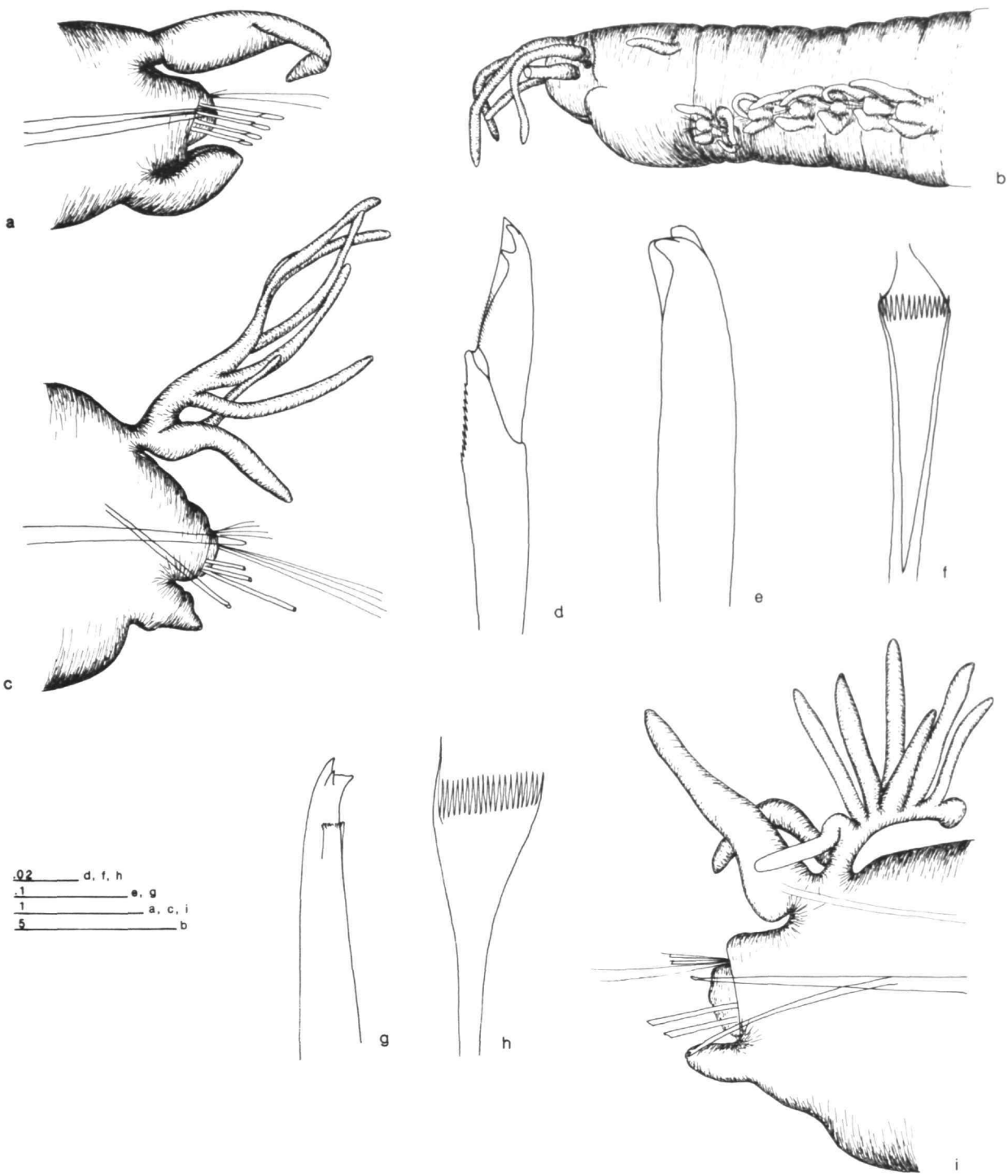

FIGURE 38.—*Eunice dilatata* (holotype, ZMB 896): a, parapodium 6, anterior view; b, anterior end, lateral view; c, parapodium 81, anterior view; d, compound falciger, parapodium 6; e, subacicular hook, parapodium 81; f, pectinate seta, parapodium 81. *Eunice djiboutiensis* (syntype, MNHN, Paris): g, subacicular hook, parapodium 260; h, pectinate seta, parapodium 260; i, parapodium 260, anterior view. (Scale bars in mm.)

a wide triangular base, nearly scoop-shaped. Ventral cirri basally inflated in branchial region; bases ovate; narrow tips tapering. Anterior notopodial cirri basally distinctly inflated with a narrowed attachment to body wall. Notopodial cirri decreasing in length in branchial region, retaining similar shape in all setigers. Notopodial cirri without articulations.

Limbate setae slender, nearly capillary. Pectinate setae (Figure 38f) in thick fascicles. Shafts wide, cylindrical. Blades narrow, tapering, furled. Both marginal teeth longer than other teeth; with ~15 teeth. Prebranchial setigers with compound falcigers in thick fascicles; numbers of falcigers decreasing posteriorly; in last segments present only 4 or 5 in each parapodium. Shafts (Figure 38d) tapering and marginally serrated, with distinct beaks. Appendages large, head distinct, bidentate. Proximal teeth smaller than distal teeth, narrowly tapering, directed laterally. Distal teeth long, slender, blunt-tipped, directed obliquely distally. Guards symmetrically bluntly pointed, marginally coarsely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, dark yellow in anterior setigers, darkening to dark brown in last segments, tapering to smooth, sharp tips; cross-section round. Subacicular hooks (Figure 38e) brown, bidentate. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks distally abruptly tapered. Proximal teeth larger than distal teeth, directed laterally. Distal teeth erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; features associated with far posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III forms part of distal arc with left Mx IV; branchiae continued to near posterior end.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56. *Unknown Characters:* 1, 2, 36, 38, 40, 42, 47, 50, 51, 57–60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The strongly flattened body and the large numbers of compound hooks in anterior setigers are features often present in the genus *Marphysa*. Other features, most importantly the presence of peristomial cirri, align the species with the genus *Eunice*. It is listed with similar species in Tables 33 and 38 and can be separated from all other species in these tables by the body form.

53. *Eunice djiboutiensis* Gravier, 1900

FIGURE 38g–i; TABLES 27, 28

Eunice aphroditois djiboutiensis Gravier, 1900:224–229, figs. 73–77, pl. 13: figs. 63, 67.

MATERIAL EXAMINED.—One syntype, MNHN, Paris, Djibouti, coll. Jousseaume and Goudieu, 1897.

COMMENTS ON MATERIAL EXAMINED.—The anterior end has been flattened and details of the prostomium and peristomium are difficult to distinguish. Gravier originally had two specimens.

DESCRIPTION.—Syntype with 318 setigers, missing a few setigers posteriorly; length 320 mm; maximal width 10 mm at setiger 10; length through setiger 10, 20 mm. Body cylindrical, very stiff, dark reddish brown.

Prostomium distinctly shorter than peristomium. Prostomial lobes apparently frontally rounded, dorsally slightly inflated; median sulcus deep. Eyes at bases of A-I. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles incomplete, apparently digitiform, rather thick, without articulations. No antennae projecting beyond peristomium. Peristomium massive, cylindrical; lower lip and nuchal folds scalloped. Separation between rings distinct dorsally and ventrally; anterior ring $^{8}/_{9}$ of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations, basally inflated, tapering to thick, digitiform tips, without articulations.

Maxillary formula according to Gravier (1900:227–228) 1+1, 5+6, 6+0, 4+8, and 1+1.

Branchiae (Figure 38i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to end of specimen. All branchiae with two or more filaments; maximum 25 filaments; number of filaments reduced slowly posteriorly to about 5. Branchiae longer than notopodial cirri in anterior $^{2}/_{3}$ of body; posterior notopodial cirri clearly longer than branchiae. Total length of branchiae is less than $^{1}/_{2}$ body width in all setigers. Anterior stems short, thick, tapering stiff; posterior stems slender, digitiform. Filaments thick, digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes wide and truncate; posterior acicular lobes also truncate, but narrower with aciculae emerging above midline. Pre- and postsetal lobes low folds. First 5 ventral cirri thick, tapering, thereafter modestly basally inflated through next 20–30 setigers. Inflated bases ovate, narrow tips digitiform. Inflated bases gradually reduced; ventral cirri broadly transversely attached tapering to digitiform tips in last 150 setigers. Notopodial cirri basally inflated, tapering to thick, digitiform tips, without articulations.

Limbate setae frayed marginally. Pectinate setae (Figure 38h) numbering up to 25 in a parapodium. Shafts wide, cylindrical. Blades flat, flaring. One marginal tooth longer than other teeth; with 15–25 teeth. Shafts of compound falcigers at least as thick as aciculae, tapering, marginally smooth, copper-colored. All appendages lost, illustrated by Gravier (1900, fig. 76) as short, triangular, bidentate. Proximal teeth short, directed obliquely distally; distal teeth nearly erect; small bosses apparently present between proximal and distal teeth. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Acicu-

lae single in most parapodia, with dark brown to black cores and clear sheaths, distally tapering to slender, gently curved tips; cross-section round. Subacicular hooks (Figure 38g) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setiger 81, present in less than half the next 100 setigers, becoming more frequent in posterior half of body and present in all setigers near posterior end of specimen, always single (except for replacements). Hooks slender, tapering smoothly, with very small heads. Proximal teeth triangular and directed laterally; distal teeth nearly erect and sharply tapered; at junction between teeth small, sharply pointed bosses on both sides of hooks, making hooks appear quadridentate in frontal view.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; all features associated with far posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III forms a distal arc with left Mx IV; branchiae continued to near the posterior end.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 11, 12, 36–38, 40, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—11,2; 12,2; 37,1; 38,1.

REMARKS.—*Eunice djiboutiensis* was distinguished from *E. aphroditois* on the structure of the subacicular hooks. It is listed with similar species in Tables 27 and 28. In contrast to *E. aphroditois*, it lacks inflated bases to the posterior ventral cirri. As usual in the genus, the very large specimens often lose the subacicular hooks over large fractions of the body regions in which they would be expected to be present. Gravier had two specimens; the other specimen must have dissected for the jaw structure because the specimen examined for this study had not been dissected.

Eunice dubia Woodworth, 1907

Eunice dubia Woodworth, 1907:11–12, pl. 1: figs. 4–6, pl. 2: fig. 15.
Lysidice falax Woodworth, 1903:881.

REMARKS.—The name *Eunice dubia* was proposed for the epitokous spawning ends of a palola by Woodworth. He had previously referred to the same specimens as *Lysidice falax*. No material is available and the illustration of the parapodia indicates that no subacicular hooks or pectinate setae were present. The species is here considered belonging to the genus *Palola*.

54. *Eunice dubitata* Fauchald, 1974

FIGURE 39a–g; TABLES 4, 24, 25

Eunice dubitatus Fauchald, 1974b:18–21, fig. 2a–f [note original, incorrect ending of species name].

MATERIAL EXAMINED.—Holotype and 3 paratypes, ZM Bergen, 55042 and 55043, Hardangerfjorden, S of Huglhamaren, 59°48′42″N, 05°35′10″E, 260–180 m, coral bottom, Hardangerfjords-undersökelsene St. Z13/59, Square H48-18, 6 Jun 1959.

COMMENTS ON MATERIAL EXAMINED.—Body shape and parapodial structures are difficult to identify properly because of the poor fixation of the specimens.

DESCRIPTION.—Holotype incomplete, of unknown sex, with ~113 setigers; length 120 mm; maximal width 7 mm at setiger 10; length through setiger 10, 16 mm. Paratypes of unknown sex; with 48 and 92 setigers; length 52 and 134 mm; maximal width and length through setiger 10 about as in holotype. All specimens basically cylindrical, with slightly flattened dorsum.

Prostomium (Figure 39c) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes between bases of A-I and A-II. Antennae in shallow horseshoe, evenly spaced; A-I thicker than A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles of A-I basally slightly inflated; other ceratostyles tapering, with up to 10 irregular articulations; articulations basally cylindrical, becoming drop-shaped distally. A-I to posterior peristomial ring; A-II to setiger 1 in holotype and setiger 3 in one paratype; A-III to setiger 3 in holotype and setiger 5 in one paratype. Antennal length of other paratype resembling holotype closely. Peristomium cylindrical; lower lip deeply scalloped. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to posterior edge of prostomium in holotype and middle of prostomium in paratypes, slender and digitiform, with 4 to 7 articulations.

Maxillary formula of large paratype 1+1, 7+7, 6+0, 6+8, 1+1, and 1+1. Mx VI present. Mx III relatively long, but forming distal arc with left Mx IV.

Branchiae (Figure 39g) present, palmate, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 3 (4 and 5 in paratypes) to setiger 38 (38 and 48 in paratypes). Branchiae terminating well before posterior end, on less than 55% of total number of setigers. First several branchiae very short, button-shaped; occurrence of branchiae from about setiger 25 very irregular. First 5–6 and last 10–15 branchiae single filaments; maximum 3 filaments at about setiger 10–20; even in this region most branchiae with 2 filaments only. Branchial stems reduced to short, basal area. Filaments digitiform, shorter than notopodial cirri.

Neuropodial acicular lobes truncate or rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Ventral cirri without inflation in ~10 setigers. Bases inflated from about setiger 10. Bases ovate; narrow tips tapering. Inflated bases reduced from about setiger 35 and lost by setiger 40. Remainder of ventral cirri thick, digitiform. Anterior notopodial cirri basally inflated, tapering to long, slender tips, with 5 to 7 articulations. Notopodial cirri without articulations by setiger 20, reaching nearly middle of body in most setigers.

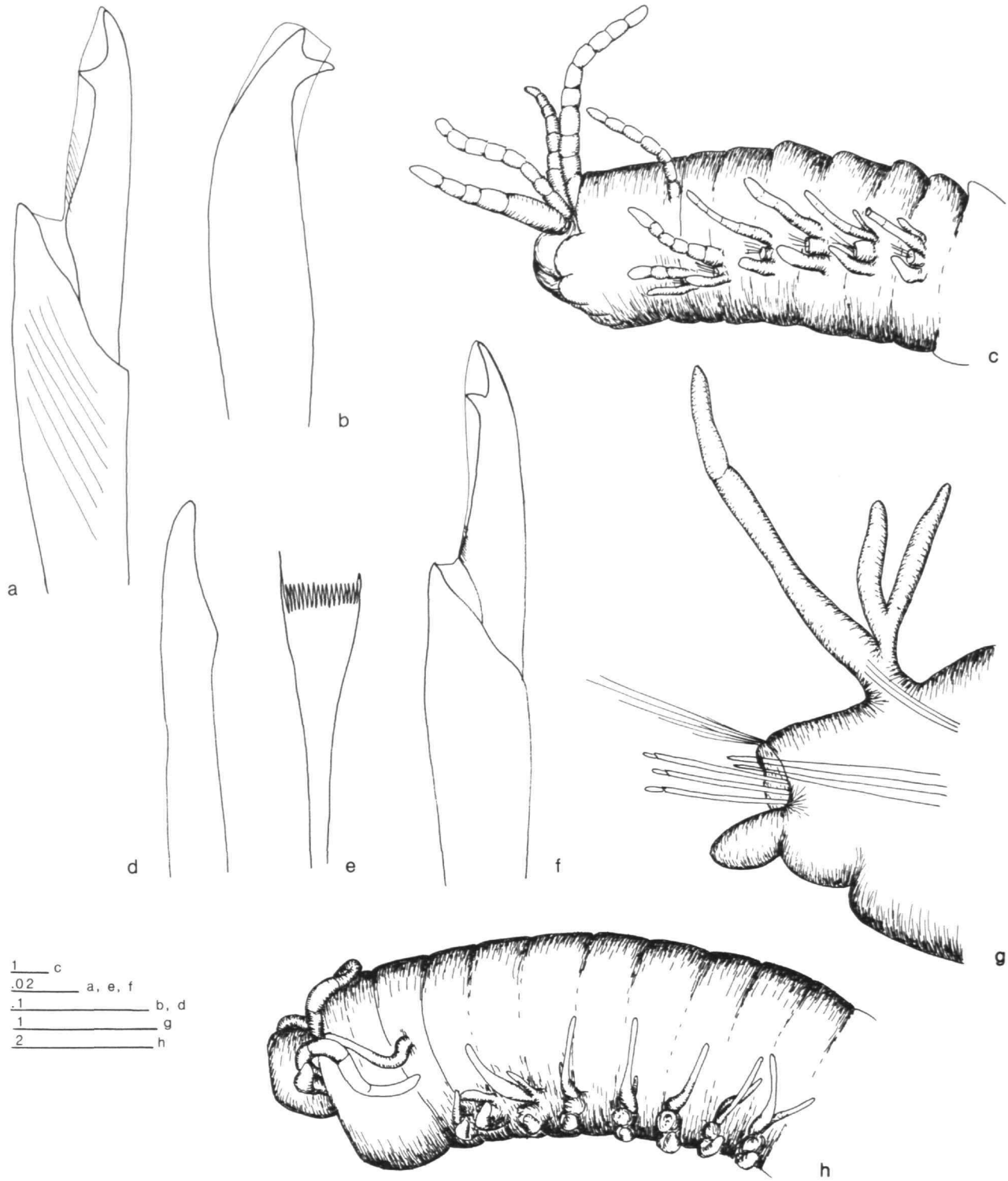

FIGURE 39.—*Eunice dubitata* (holotype, ZM Bergen, 55042): a, compound falciger, parapodium 110; b, subacicular hook, parapodium 110; c, anterior end, lateral view; d, acicula, parapodium 14; e, pectinate seta, parapodium 110; f, compound falciger, parapodium 14; g, parapodium 14, anterior view. *Eunice edwardsi* (holotype, BM(NH) ZK.1885.12.1.3): h, anterior end, lateral view. (Scale bars in mm.)

TABLE 4.—Variable and invariable features in the type lot of *Eunice dubitata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	4	7	6	6.6	0.55
Length through 10	4	17	15	15.8	0.84
No. of antennal articulations	4	12	10	10.4	0.89
No. of peristomial cirral articulations	4	7	4	5.2	1.30
Branchial start	4	5	3	4	0.71
Last branchia on setiger no.	4	48	35	39.6	4.93
Max. no. of branchial filaments	4	3	2	2.8	0.45
Ventral cirri inflated through setiger no.	4	40	38	39.2	1.10
No. of articulations in notopodial cirri	4	6	4	5.4	0.89
Subacicular hooks first present from setiger no.	4	38	35	36.2	1.64

INVARIABLE FEATURES	N=4
Anterior and posterior peristomial rings distinct	both dorsally and ventrally
Peristomial cirri reach	mid-prostomium
Notopodial cirri articulated	anteriorly only
Shape of pectinate setae	tapering; flat
No. of teeth in pectinate setae	20
Acicular color	dark brown
Acicular tips	tapering; bent
Color of subacicular hooks	dark brown
No. of teeth in subacicular hooks	2
Core-sheath construction	indistinct

Limbate setae marginally serrated. Shafts of pectinate setae (Figure 39e) wide, cylindrical. Blades tapering, flat. One marginal tooth distinctly longer than other and both marginal teeth longer than other teeth, with about 20 very fine, slender teeth. Shafts of compound falcigers (Figure 39a,f) slightly inflated, internally striated at least in posterior setigers, without serrations; distal beaks indistinct. Appendages tapering with rather large head, bidentate. Proximal teeth shorter than distal teeth, triangular, directed laterally or slightly distally. Distal teeth gently curved or nearly erect. Guards tight fitting, symmetrically rounded or bluntly pointed; margin serrated near bases; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks with indistinctly marked dark brown to black cores and clear sheaths. Aciculae (Figure 39d) at least paired, tapering with slightly bent tips; cross-section round, sometimes with a subdistal boss. Subacicular hooks (Figure 39b) bidentate. Hooks first present from setiger 35–38, present in all setigers thereafter, always single (except for replacements). Hooks gently inflated subdistally, tapering to narrow necks and small heads. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth triangular, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 1, 2.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The species name as originally proposed is grammatically incorrect as pointed out by Inger Winsnes (in litt.). The species is listed with similar species in Tables 24 and 25. Species in this group with poorly developed, palmate branchiae include *E. palauensis*, *E. stanleyi*, and *E. thomasiana*, in addition to *E. dubitata*. Among these species *E. palauensis* lacks ceratostyle articulations; the other three species have articulated ceratostyles with the distalmost articulations drop-shaped or moniliform. The type of *E. dubitata* is about twice as large as those of the two remaining species. The last branchiae are present on setiger 79 in *E. thomasiana*, on setiger 33 in *E. stanleyi*, and on setigers 38–48 in the much larger *E. dubitata*. *Eunice stanleyi* has maximally two branchial filaments; *E. dubitata* has three; other differences between these two species are discussed below in the "Remarks" section on *E. stanleyi*.

Eunice ebranchiata Quatrefages, 1866

Eunice ebranchiata Quatrefages, 1866:316–317.
Eunice siciliensis.—Ehlers, 1868:353.—Grube, 1870a:296.

REMARKS.—The original description is brief, but includes the information that branchiae are missing; that the mandibles are very large and encloses the other jaws; and that the antennae are short. Grube (1870a:296) examined the type and declared it completely in agreement with many specimens he had seen of *Eunice siciliensis*. The species is here considered a member of the genus *Palola*.

55. *Eunice edwardsi* McIntosh, 1885

FIGURE 39h; TABLES 19, 21

Eunice edwardsi McIntosh, 1885:280-282, figs. 39-40, pl. 38: figs. 14, 15, pl. 20A: figs. 4-7.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK. 1885.12.1.3., off Prince Edward Island, Indian Ocean, 46°40'S, 37°50'E, 567 and 274 m, 27 Dec 1873, *Challenger* sta 145.

COMMENTS ON MATERIAL EXAMINED.—The holotype has at one time been dried out and the setae are all broken; it is in two pieces and has been deeply dissected frontally; the jaw apparatus is now missing.

DESCRIPTION.—Holotype complete, of unknown sex, with 118 setigers; total length about 70 mm; maximal width 3.5 mm wide at setiger 10; length through setiger 10, 8 mm. Body circular in cross-section, tapering posteriorly.

Prostomium (Figure 39h) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes between bases of A-I and A-II, black. Antennae in transverse row; A-I and A-II grouped together, separated by gap from A-III; all antennae similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 5 cylindrical articulations in A-III. A-I to middle of anterior peristomial ring; A-II to setiger 1; A-III to setiger 3. Peristomium about twice as long as prostomium, cylindrical. Separation between rings especially distinct dorsally and ventrally, but also visible laterally; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, digitiform, without articulations.

Maxillary formula (1+1), 8+8, 10+0, 6+12, and 1+1 according to McIntosh (1885, fig. 39). Mx I missing in illustration.

Branchiae present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 34; to setiger 41 according to McIntosh (1885). Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 5 and last 2 branchiae single filaments, between setiger 10 and 20 number of filaments increasing to 5 or 6.

Neuropodial acicular lobes distally rounded, becoming conical in last segments present; aciculae emerging at midline. Pre- and postsetal lobes visible only as low folds. First 5 ventral cirri thick, tapering, becoming distinctly inflated basally from about setiger 6. Inflated bases ovate; narrow tips tapering. Inflated bases reduced from about setiger 25. Posterior ventral cirri somewhat shorter and thicker than notopodial cirri, tapering. Notopodial cirri basally somewhat inflated, rather thick in first 20 setigers, becoming increasingly digitiform posteriorly, without articulations.

All setae broken. According to McIntosh's illustrations (1885, pl. 20A: figs. 5-8), pectinate setae with few teeth and 1 marginal tooth distinctly longer than other teeth. Compound falcigers bidentate; both teeth well developed. Guards blunt without marginal serrations; mucros absent. Aciculae yellow, apparently bluntly rounded distally; cross-section round. Subacicular hooks yellow, bidentate. Hooks first present from setiger 28. Hooks tapering. Both teeth directed distally. Proximal teeth very much larger than distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; details of setal structures; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long and located behind left Mx II. Pseudocompound falcigers and compound spinigers absent.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 65-68, 71, 72, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—71,2; 72,2.

REMARKS.—*Eunice edwardsi* is listed with similar species in Tables 19 and 21. It does not appear to be characterized by a single unique feature, but rather by a combination of a whole set of minor features.

46. *Eunice ehlersi* Gravier, 1900

FIGURE 40a-e; TABLES 33-35

Eunice ehlersi Gravier, 1900:248-251, figs. 110-113, pl. 13: figs. 75, 76.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, Djibouti, 1897, coll. Coutière, no. 29.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 53 setigers; length 25 mm; maximal width 4 mm at setiger 10; length through setiger 10, 6 mm. Body cylindrical.

Prostomium (Figure 40a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes present posterior to A-I, dark. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped, without articulations. Ceratostyles digitiform, with up to 8 short, cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 3. Peristomium flaring slightly ventrally. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length on dorsal side and ~3/4 on ventral side. Peristomial cirri to front edge of peristomium, digitiform, without articulations.

Maxillary formula 1+1, 5+6, 8+0, 3+9, and 1+1. Distal tooth on right Mx II very small. Mx III long, located in part behind Mx II, however forming arc with very short left Mx IV. Mx VI absent.

Branchiae (Figure 40e) present, pectinate, distinctly longer than notopodial cirri, flexible. Branchiae from setiger 14 to end of fragment. First branchiae single filaments, maximum 6

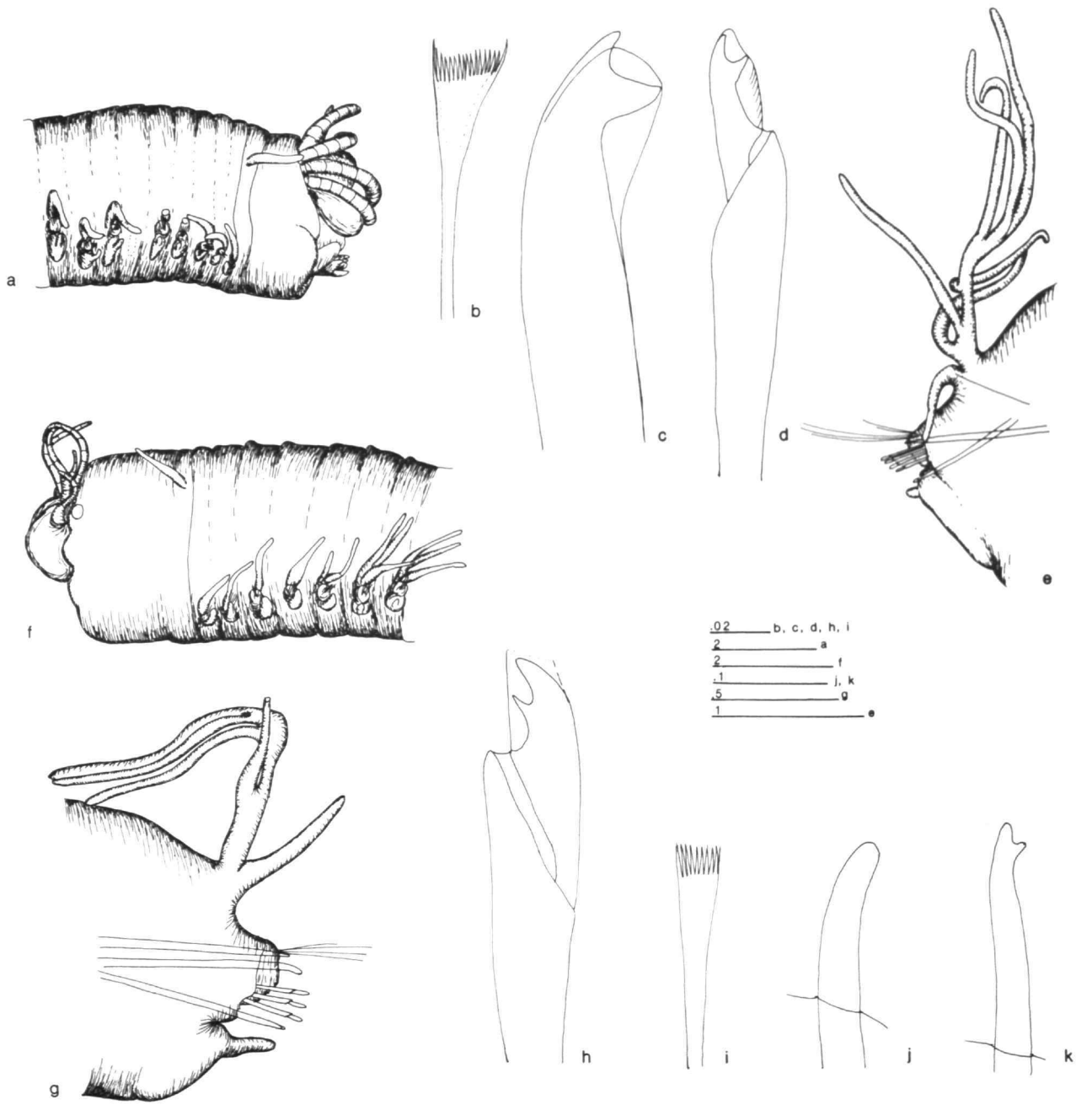

FIGURE 40.—*Eunice ehlersi* (holotype, MNHN, Paris): a, anterior end, lateral view; b, pectinate seta, parapodium 32; c, subacicular hook, parapodium 32; d, compound falciger, parapodium 32; e, parapodium 32, anterior view. *Eunice eimeorum*, new species (holotype, part of RM 310): f, anterior end, lateral view; g, parapodium 49, anterior view; h, compound falciger, parapodium 49; i, pectinate seta, parapodium 49; j, acicula, parapodium 49; k, subacicular hook, parapodium 49. (Scale bars in mm.)

filaments. Branchial stems very slender, pliable, longer than notopodial cirri. Filaments slender, longer than notopodial cirri.

Neuropodial acicular lobes symmetrically rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Median ventral cirri with inflated bases forming elongated ventral ridges along lower edge of neuropodia; narrow tips short and button-shaped. Posteriormost ventral cirri distinctly tapering inflated base

reduced, but still visible as a ridge. Anterior notopodial cirri basally inflated, becoming tapering in branchial region; articulations absent.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 40b) with narrow, cylindrical shafts. Blades slightly furled, flaring. One marginal tooth distinctly longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 40d) thick, slightly inflated, marginally smooth; beaks indistinct. Appendages short, tapering, with very large heads, bidentate. Proximal and distal teeth similar in size. Proximal teeth tapering, directed obliquely distally. Distal teeth tapering, nearly erect. Guards distally symmetrically bluntly pointed, nearly rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, anteriorly pale honey-colored, becoming brown to dark brown, sharply and symmetrically pointed, straight; cross-section round. Notopodial aciculae honey-colored. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 40c) bidentate. Hooks first present from setiger 27. Proximal teeth larger than distal teeth, directed laterally, upturned distally. Distal teeth narrowly triangular, erect. Guards distally rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Parapodial and branchial features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 36–38, 40, 42, 57–60, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,2; 37,1; 38,1.

REMARKS.—*Eunice ehlersi* is listed with similar species in Tables 33–35. Of the species in these tables, *E. ehlersi* and *E. sonorae* have the separation between the peristomial rings distinct on all sides. *Eunice ehlersi* has bidentate subacicular hooks; *E. sonorae* has simple, spine-like subacicular hooks. *Eunice ehlersi* is otherwise characterized by a combination of features, including strongly articulated antennae and honey-colored to brown aciculae and subacicular hooks, rather than the black hooks common in the group.

57. *Eunice eimeorum*, new species

FIGURE 40f–k; TABLES 27, 31

Eunice pacifica Kinberg, 1865:562 [in part]; 1910:41–42, pl. 15: fig. 15 [in part].—Hartman, 1948:75–76 [in part].

MATERIAL EXAMINED.—Holotype, part of RM 310, Eimeo (= Moorea), Society Islands (Tahiti Islands), *Eugenie Expedition.*

COMMENTS ON MATERIAL EXAMINED.—The holotype has been dried at one time and the last 20 setigers have been strongly flattened; thus an accurate count of setigers is impossible.

DESCRIPTION.—Holotype incomplete with ~110 setigers; length 70 mm; maximal width 3.5 mm; length through setiger 10, 7.5 mm.

Prostomium (Figure 40f) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes posterior to bases of A-I, dark. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 8 long, cylindrical, well-marked articulations in A-III. Three median antennae to posterior peristomial ring; A-III longer than A-II; A-I to middle of anterior peristomial ring. Peristomium massive, cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, medially inflated, without articulations.

Jaws missing.

Branchiae (Figure 40g) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to end of fragment. Maximum 5 filaments from about setiger 20; in last setigers present branchiae with 2–3 filaments. Branchial stems short, tapering. Filaments long, slender.

Anterior neuropodial acicular lobes distally truncate; posterior acicular lobes rounded; aciculae emerging at midline. All pre- and postsetal lobes very low, transverse folds, considerably shorter than acicular lobes. Anterior ventral cirri thick, tapering, becoming basally inflated in median setigers. Bases ovate, narrow; tips long and digitiform. Inflated bases apparently reduced posterior to setiger 60–65. All notopodial cirri medially inflated, relatively long, less distinctly basally inflated posteriorly, digitiform in last setigers present, without articulations.

Limbate setae slender, marginally serrated. Shafts of pectinate setae (Figure 40i) thick, cylindrical. Blades narrow, flat, tapering. Marginal teeth no longer than other teeth; about 10 teeth present. Compound falcigers very large (Figure 40h). Shafts tapering, marginally smooth. Appendages very short, truncate, with large heads, bidentate. Proximal teeth very much smaller than distal teeth, slender, tapering, directed distally. Distal teeth distinctly curved or bent, thick, directed obliquely distally. Guards short, asymmetrically bluntly pointed, frayed in most hooks; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 40j) paired, clear amber, barely tapering, blunt, curved; cross-section of aciculae round. Subacicular hooks (Figure 40k) clear amber, bidentate. Hooks first present from setiger 38. Hooks slender; neck distinct; head large. Proximal teeth much smaller than distal teeth, triangular, directed obliquely laterally. Distal teeth triangular, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 1, 2, 4, 6, 33, 36–40, 51, 58, 59, 74, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,2; 37,1; 38,1.

REMARKS.—*Eunice eimeorum* differs clearly from *E. pacifica* in the distribution of branchiae, which are present from setiger 5 in *E. eimeorum* and from setiger 17–21 in *E. pacifica*. Clear amber subacicular hooks are present from setiger 38 in *E. eimeorum* and dark brown, nearly black subacicular hooks present from setigers 23–28 in *E. pacifica*. The specimens of the two species are similar in size.

Eunice eimeorum is listed with similar species in Tables 27 and 31. The appendage of compound hooks resembles the compound hooks of *E. pelamidis*.

58. *Eunice elegans* (Verrill, 1900)

FIGURE 41a–k; TABLES 24, 25

Leodice elegans Verrill, 1900:640–641.

Leodice longicirrata.—Treadwell, 1921:11–14, figs. 3–12, pl. 1: figs. 1–4 [not *Eunice longicirrata* Webster, 1884].

Eunice longicirrata.—Hartman, 1942:9 [not *Eunice longicirrata* Webster, 1884].

MATERIAL EXAMINED.—Holotype, YPM 2730, Bermuda, low [shallow] water, Apr 1898, coll. A.E. Verrill and party.

DESCRIPTION.—Holotype complete, of unknown sex, with 133 setigers; total length 75 mm; maximal width 3 mm at setiger 10; length through setiger 10, 8 mm. Body cylindrical anteriorly, becoming ventrally flattened posteriorly.

Prostomium (Figure 41b) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate, flattened dorsally and ventrally; median sulcus very shallow. Eyes between bases of A-I an A-II. Antennae in a horseshoe, evenly spaced. Ceratophores long in all antennae, without articulations. Only left A-II present (Figure 41a), now detached, digitiform, with 9 short, but distinctly cylindrical articulations, to setiger 2. Peristomium cylindrical, about twice as long as prostomium. Separation between rings distinct on all sides, but especially well marked dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, with 4 indistinct articulations.

Jaws not examined.

Branchiae (Figure 41c) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setiger 33. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and last branchiae single filaments; maximum 10 filaments at setiger 10–15. Branchiae covering dorsum where best developed. Stems slender, erect. Filaments trim, slender, shorter than notopodial cirri.

Anterior neuropodial acicular lobes rounded, becoming increasingly conical posteriorly (Figure 41d); aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri tapering. Ventral cirri basally inflated from setiger 5 through about setiger 50. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri broadly attached, tapering to blunt tips, forming very shallow, open scoops around ventral margin of neuropodia. Notopodial cirri supported by aciculae; anterior notopodial cirri basally inflated and indistinctly separated into 4 articulations. Articulations lost in first few setigers of branchial region; notopodial cirri becoming slender and tapering from first postbranchial setigers, retaining that shape to the end.

Limbate setae slender, marginally finely serrated. Pectinate setae (Figure 41e,j) tapering, flat. One marginal tooth longer than other teeth, about, 10 teeth present; anterior pectinate setae somewhat asymmetrical, becoming symmetrical in postbranchial region. Shafts of anterior compound falcigers (Figure 41k) tapering, becoming gently inflated (Figure 41f) in postbranchial setigers, marginally smooth; beaks indistinct. Anterior appendages tapering; heads indistinct, bidentate. Proximal teeth very much shorter than distal teeth, triangular. Distal teeth tapering, nearly erect. Guards asymmetrically bluntly pointed. Postbranchial appendages short, with large heads. Proximal teeth and distal teeth similar in size; proximal teeth tapering, directed basally. Distal teeth smoothly curved. Guards symmetrically rounded; all guards marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Neuropodial aciculae paired, dark yellow to amber-colored; anterior aciculae (Figure 41i) distally expanded into rounded knobs; postbranchial aciculae (Figure 41h) sharply tapered; superior aciculae gently curved dorsally; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 41g) amber-colored, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, usually 2–3 hooks in a parapodium. Hooks with narrow necks and distinct heads. Proximal teeth twice as large as the distal teeth, triangular, directed laterally. Distal teeth tapering, erect. Guards distally truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 17, 23.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice elegans* resembles *E. websteri* (= *E. longicirrata* Webster) but differs in the changing shape of the aciculae and compound hooks in different parts of the body, and also in the maximum number of branchial filaments and

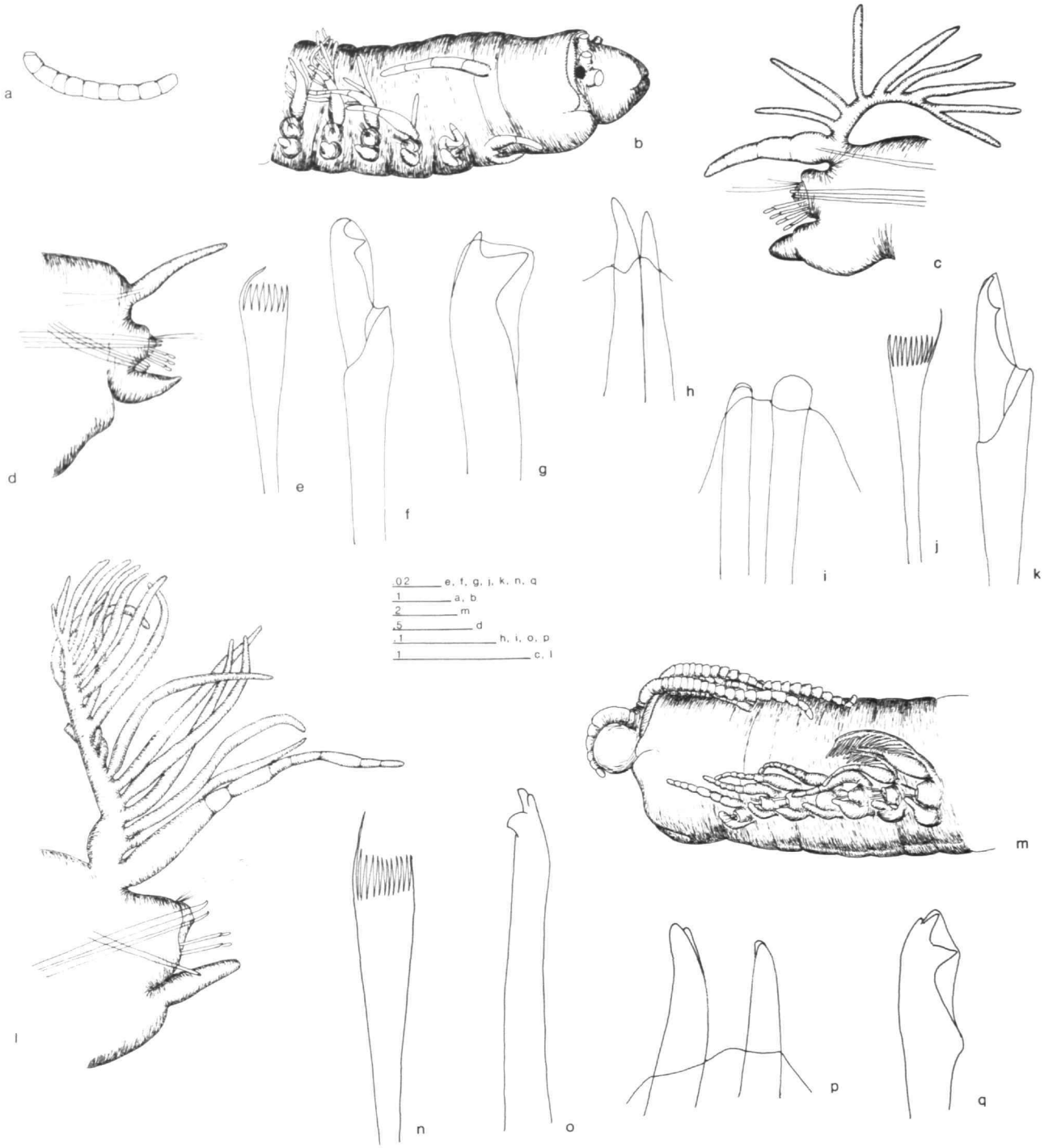

FIGURE 41.—*Eunice elegans* (holotype, YPM 2730): a, detached ceratostyle; b, anterior end, lateral view; c, parapodium 7, anterior view; d, parapodium 53, anterior view; e, pectinate seta, parapodium 53; f, compound falciger, parapodium 53; g, subacicular hook, parapodium 43; h, aciculae, parapodium 53; i, aciculae, parapodium 7; j, pectinate seta, parapodium 7; k, compound falciger, parapodium 7. *Eunice elseyi* (syntype, BM(NH) ZH 1857.11.18.249): l, parapodium 103, anterior view; m, anterior end, lateral view; n, pectinate seta, parapodium 103; o, subacicular hook, parapodium 103; p, aciculae, parapodium 103; q, appendage of compound falciger, parapodium 103. (Scale bars in mm.)

numbers of branchial setigers present and in the much darker color of the subacicular hooks and aciculae. The latter makes it, by definition, a member of group B-1 rather than of group A-1. It is listed with similar species in Tables 24 and 25. It is the only species listed in Table 25 that has two or three subacicular hooks in most segments and has the aciculae distally expanded and tab-shaped at least in some setigers.

59. *Eunice elseyi* Baird, 1869

FIGURE 41l–q; TABLES 46, 47, 52, 53

Eunice elsyi Baird, 1869:344.

Eunice elseyi.—McIntosh, 1885:286–287, figs. 46, 47, pl. 39: figs. 1–3, pl. 20A: figs. 14–16.—Fauchald, 1986:249–250, figs. 35–40.

MATERIAL EXAMINED.—Two syntypes, BM(NH) ZH 1857.11.18.249, and in addition 2 mounted slides with parapodia and 1 slide with the jaws. North Australia, coll. J.R. Elsey, North Australia Exploring Expedition, 1855–56.

COMMENTS ON MATERIAL EXAMINED.—One syntype is in two pieces; the anterior end has been deeply dissected and the jaws removed. The other syntype consists of 48 anterior setigers. Three short fragments in the vial do not belong to the same species; they were briefly described by Fauchald (1986).

DESCRIPTION.—Syntype described complete, of unknown sex, with 120 setigers; last 16 in regeneration; total length 64 mm; maximal width 7 mm; length through setiger 10, 13 mm.

Prostomium (Figure 41m) distinctly shorter than and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 22 moniliform articulations in A-III. A-I to posterior edge of anterior peristomial ring; A-II to setiger 3; A-III, when stretched, to setiger 5. Peristomium massive, cylindrical. Separation between rings well marked ventrally and less distinct dorsally; anterior ring 4/5 of total peristomial length. Peristomial cirri to front edge of peristomium, slender and tapering, with ~10 articulations.

Maxillary formula 1+1, 5+7, 6+0, 5+10, and 1+1.

Branchiae (Figure 41l) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 104, missing in regenerating portion. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae strongly pectinate; most branchiae with at least 10 filaments, maximum 18 filaments. Branchial stems erect, tapering, shorter than notopodial cirri, decreasing in length posteriorly. Filaments slender, digitiform, shorter than notopodial cirri. Numbers of filaments remaining high even in last branchiated segments.

Neuropodial acicular lobes symmetrically truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 5 ventral cirri digitiform. Median ventral cirri basally inflated. Inflated bases ovate; narrow tips digitiform. Ventral cirri slender and digitiform from the last branchiated segments. Notopodial cirri (other than those in the regenerate) long, basally somewhat inflated, with up to 9 articulations. Most notopodial cirri reaching nearly midway across body.

Limbate setae slender. Shafts of pectinate setae (Figure 41n) wide, cylindrical. Blades tapering, flat. One marginal tooth longer than other teeth, with ~10 teeth. Shafts of compound falcigers inflated, marginally smooth. Appendages (Figure 41q) tapering, tridentate with small third teeth closely appressed to second teeth. Proximal teeth triangular, directed laterally. Second teeth larger than proximal teeth, directed obliquely distally. Guards bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 41p) yellow, bent dorsally, shallowly bidentate in anteroposterior axis; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 41o) yellow, tridentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Primary fangs large; secondary fangs small; tertiary fangs small, appended laterally to secondary fangs rather than emerging dorsally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 13, 14, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The status of this species was explored in Fauchald (1986); it is listed with similar species in Tables 46 and 47. It has bidentate or bifid aciculae and the subacicular teeth are tridentate with the teeth in tandem; this combination is unique in Table 47. It is compared to other species with the teeth in tandem in Tables 52 and 53.

Eunice enteles (Chamberlin, 1918)

Leodice enteles Chamberlin, 1918:175–176.

Eunice enteles.—Hartman, 1938:97.

?Eunice antennata.—Hartman, 1944:115–117, pl. 7: figs. 154–156 [in part, not *Eunice antennata* Lamarck, 1818].

REMARKS.—No material is currently available of this species at MCZ where Chamberlin indicated that his types were deposited.

It was originally described with branchiae from setiger 6–7 to the end of the body with a maximum of five filaments and no indication of an intermediate region with a reduced number of filaments. All antennae had moniliform articulations. A-III reached setiger 4 and A-II reached setiger 3. The peristomial

cirri did not reach beyond the peristomium and were nearly or completely smooth. The notopodial cirri had weakly indicated articulations.

The maxillary formula was 1+1, 13+13, 11+0, 10–11+11, and presumably 1+1. The number of teeth indicated is confused; if the above interpretation is correct, the species would have a maxillary formula similar to species in group C-2, with which it was associated by Hartman (1944).

No information is given about the structure or distribution of the setae.

The species may belong to group C-2, but is insufficiently characterized to allow accurate designation. The type has been lost for a long time. Hartman (1938) did not include it in her annotated list of types in the Museum of Comparative Zoology, nor is there any evidence available that she saw the type at a later stage. The species is here considered indeterminable.

Hartman (1938) indicated that the type was collected at Mendocino, California; however, in Chamberlin (1918) the type locality is not specified. A statement in the introduction to Chamberlin's paper indicates that his material came from Pacific Grove, California, in shallow water or intertidally, rather than from Mendocino.

Eunice equibranchiata McIntosh, 1885

FIGURE 42

Eunice equibranchiata McIntosh, 1885:291–292, pl. 39; fig. 11, pl. 20A: figs. 23, 24.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK. 1885.12.1.202. Brazil, 9°5′–9°10′S, 34°49′–34°53′W, 640, 219, 59, and 732 m, mud, 10 Sep 1873, *Challenger* sta 202.

DESCRIPTION.—Holotype and only known specimen is a middle piece of about 300 segments; length 250 mm.

Prostomium, peristomium and jaws unknown.

Branchiae long, slender; up to 3 filaments of similar lengths; all segments present branchiated.

Neuropodial acicular lobes (Figure 42d) conical. Pre- and postsetal lobes follow outline of acicular lobes closely. Ventral cirri digitiform with distinct, but low basal inflations on adjoining body wall. Notopodial cirri tapering, slender, without articulations, at least twice as long as ventral cirri.

Most setae broken. Shafts of compound hooks distally inflated. Appendages (Figure 42a) short. Both teeth very well developed, directed laterally. Guards symmetrically rounded, marginally serrated. Aciculae (Figure 42b) single, with dark cores and clear sheaths, distally asymmetrically hammer-headed. Subacicular hooks (Figure 42c) with dark cores and clear, translucent heads. Hooks strongly curved, with large heads. Both teeth curved, directed laterally.

REMARKS.—The structures of *E. equibranchiata* that can be examined resemble the corresponding features in *E. filamentosa* and related species, but the exact relationship cannot be determined. The species is here considered indeterminable.

60. *Eunice eugeniae*, new species

FIGURE 43a–h. TABLES 41, 45

Eunice havaica Kinberg, 1865:562 [in part].

MATERIAL EXAMINED.—Holotype, part of RM 430, Honolulu, Hawaii, *Eugenie* Expedition 1087-89 (one specimen from type lot of *E. havaica*).

DESCRIPTION.—Holotype incomplete, of unknown sex, with 55 setigers; length 18 mm; maximal width 1 mm at setiger 10; length through setiger 10, 4 mm.

Prostomium (Figure 43a) about as long as peristomium, about as wide as peristomium, deeper than 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Peristomial fold forming 2 transverse yokes across back of prostomium. Eyes absent. Antennae in shallow horseshoe, evenly spaced; A-I thicker than A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slightly tapering, without articulations. A-I to middle of anterior peristomial ring; A-II antennae to setiger 1; A-III to setiger 4. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring little more than 1/2 of total peristomial length. Peristomial cirri to front margin of peristomium, digitiform, without articulations.

Jaws not examined.

Branchiae present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 through setiger 44. Branchiae terminating well before posterior end. First 4 and last 2 or 3 branchiae single filaments; maximum 5 filaments. Stems strong, erect, shorter than notopodial cirri. Filaments digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes distally truncate, rounded in last segments present; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Ventral cirri basally inflated from first branchial segments through about setiger 25. Bases ovate; narrow tips tapering. Ventral cirri digitiform in last setigers present. Prebranchial notopodial cirri basally inflated and tapering, becoming increasingly digitiform through branchial region and in postbranchial setigers.

Limbate setae slender. Pectinate setae (Figure 43f) flaring, flat. Both marginal teeth longer than other teeth, with about 15 teeth. Shafts of compound falcigers (Figure 43b,g) inflated distally, marginally finely or coarsely serrated; distal beaks distinct. Appendages tapering, with small heads, bidentate. Proximal teeth smaller than distal teeth, triangular to reduced triangular, directed laterally. Distal teeth short, gently curved or erect. Guards distally pointed, with distinct mucros, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 43d,h) single, yellow, tapering, gently curved; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks.

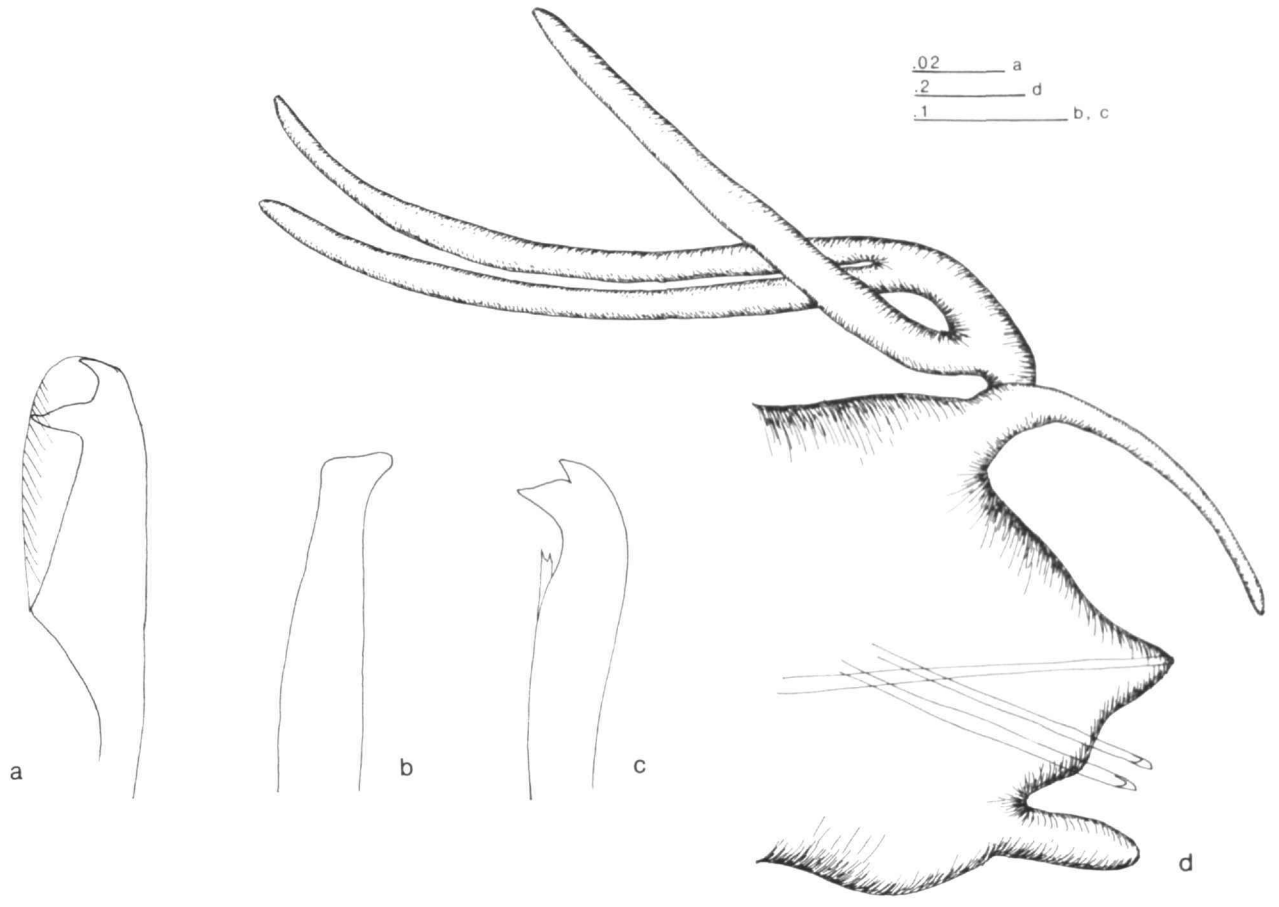

FIGURE 42.—*Eunice equibranchiata* (holotype, BM(NH) ZK.1885.12.1.202): a, appendage of compound falciger; b, acicula; c, subacicular hook; d, parapodium; all from medium setigers. (Scale bars in mm.)

Subacicular hooks (Figure 43c,e) yellow, tridentate with teeth in a crest. Hooks first present from setiger 18, present in all setigers thereafter, always single (except for replacements). Hooks with large curved main fangs. Secondary fangs triangular. Tertiary fangs very small, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 22, 56, 58, 59. *Unknown Characters:* 1, 2, 38, 42, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice eugeniae* is listed with similar species in Tables 41 and 45. It is the only species in Table 45 in which the branchiae are no longer than the notopodial cirri; in the other species the branchiae distinctly outreach the notopodial cirri.

61. *Eunice excariboea*, new species

FIGURE 43i–o; TABLES 33, 36

Eunice cariboea Grube, 1856:57 [in part].

MATERIAL EXAMINED.—Holotype and 1 paratype, ZMC (uncataloged), St. Croix, West Indies, coll. H. Kröyer (part of original material of *E. cariboea* Grube).

COMMENTS ON MATERIAL EXAMINED.—The holotype is the larger of the two specimens examined.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 136 setigers; length 34 mm; maximal width 2 mm at setiger 10; length through setiger 10, 3.7 mm. Anterior part of body including prostomium and peristomium cylindrical. Body widening rapidly through first few setigers, becoming nearly twice as wide as prostomium by setiger 10, slightly dorsoventrally flattened with parapodia elevated on low lateral ridges.

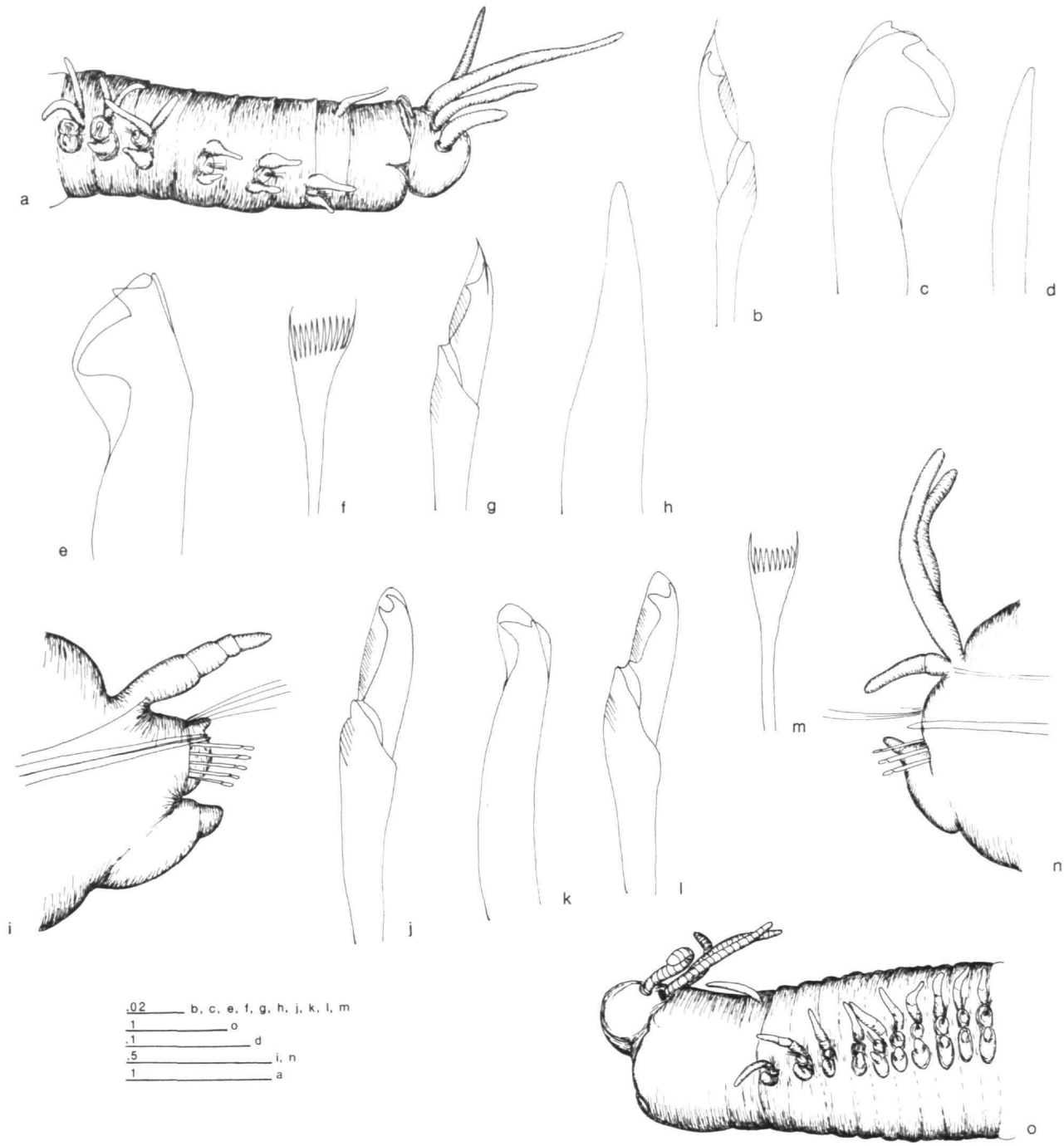

FIGURE 43.—*Eunice eugeniae*, new species (holotype, part of RM 310): a, anterior end, lateral view; b, compound falciger, parapodium 27; c, subacicular hook, parapodium 27; d, acicula, parapodium 27; e, subacicular hook, parapodium 40; f, pectinate seta, parapodium 40; g, compound falciger, parapodium 40; h, acicula, parapodium 40. *Eunice excariboea*, new species (holotype, ZMC): i, parapodium 10, anterior view; j, compound falciger, parapodium 10; k, subacicular hook, parapodium 133; l, compound falciger, parapodium 133; m, pectinate seta, parapodium 133; n, parapodium 133, anterior view; o, anterior end, lateral view. (Scale bars in mm.)

Prostomium (Figure 43o) ~1/2 as deep, very nearly as wide as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes behind bases of A-I, dark. Antennae in a horseshoe; A-I and A-II emerging close together, near outer edges of prostomium, separated by gap from A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 14 closely spaced, indistinct articulations in A-III, articulated to bases of ceratostyles. A-I to posterior peristomial ring; A-II and A-III to setiger 2. Peristomium slightly flaring anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 43n) present, palmate, about as long as notopodial cirri, not reduced in mid-body region. Branchiae from setiger 78–79 to end of fragments. Most branchiae with 2 long, narrow filaments emerging from joint bases at dorsal edge of notopodial cirri; up to 3 filaments present. Stems reduced. Filaments longer than notopodial cirri.

Neuropodial acicular lobes (Figure 43i) rounded; anterior setigers with small rounded tabs dorsal to emergence of aciculae; tabs absent in posterior setigers; aciculae emerging at midline. Lateral body wall forming low ridges with acicular lobes at distal ends from about setiger 25. Pre- and postsetal lobes low folds; anterior presetal lobes distinctly lower than acicular lobes; in posterior setigers all 3 lobes paralleling each other closely. First 4 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases distinct, inflated ridges along ventral side of neuropodia in all later setigers; narrow tips tapering or digitiform. Anterior notopodial cirri tapering with 4 articulations; number of articulations reduced to one in posterior setigers; notopodial cirri becoming digitiform in far posterior setigers.

Limbate setae slender, very finely serrated. Pectinate setae (Figure 43m) very small, with slender shafts. Blades furled, flaring. Both marginal teeth longer than other teeth, with ~12 teeth. Shafts of compound falcigers distinctly inflated and marginally serrated; beaks distinct. Anterior appendages (Figure 43j) tapering, bidentate. Proximal teeth larger than distal teeth; both teeth tapering, distally curved towards each other, forming a crabclaw-like distal end. Posterior appendages (Figure 43l) shorter and more abruptly tapering than anterior ones, bidentate. Proximal teeth much larger than distal teeth, triangular, directed laterally. Distal teeth slender, tapering and nearly erect. Guards symmetrically rounded and marginally serrated in all setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired anteriorly, single posteriorly, amber-colored, tapering to straight tips; cross-section round. Subacicular hooks (Figure 43k) pale amber, bidentate. Hooks first present from setiger 87 (78 in paratype), missing in many setigers, always single (except for replacements). Hooks gently sigmoid, tapering, with distinct head. Proximal teeth larger than distal teeth, directed laterally. Distal teeth very small, directed obliquely distally. Guards distally rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 60. *Unknown Characters:* 1, 2, 36–40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The original material of *E. cariboea* consisted of three species; most of the type lots, four specimens in ZMC and five in ZMB, belong to an abranchiate species with dark brown to black subacicular hooks and aciculae and smooth antennae. These specimens are here considered as *E. cariboea*, for which a lectotype was designated above. Some specimens, currently in ZMH, were designated as types of *E. gagzoi* by Augener (1922b). Finally, two specimens from ZMC are here described as *E. excariboea*.

Eunice excariboea is listed with similar species in Tables 33 and 36. Perhaps the most outstanding feature of this species is the very late start of both branchiae and subacicular hooks. It can be separated from all other species listed in Table 36 by having the notopodial cirri articulated throughout; the other species in this table lack notopodial articulations.

Eunice fasciata (Risso, 1826)

Leodice fasciata Risso, 1826:421.
Eunice fasciata.—Heider, 1925:55–59, figs. 3–6.
?Eunice torquata.—Grube, 1878a:99.—Fauvel, 1923:401.

REMARKS.—No material is available; the species was referred doubtfully to *Eunice torquata* by Grube (1878:99) and Fauvel (1923:401). Heider (1925), in a brilliant study of the anterior anatomy of two species from the Mediterranean, gave a detailed description of a species he called *E. fasciata*. His arguments for identifying his material as Risso's species amounts to an assertion that "there can be no doubt that his (Ehlers, 1868:312, of *E. harassii*) description... refers to *Eunice fasciata*" (Heider, 1925:59). There is nothing in Risso's original description to support this assertion. The material Heider studied belongs to *Eunice torquata*.

Risso's species is insufficiently known to assign it even to group and is here considered wholly indeterminable.

62. *Eunice fauveli* Gravier, 1900

FIGURE 44; TABLES 33, 35

Eunice fauveli Gravier, 1900: 236–239, figs. 89–93, pl. 12: fig. 60.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, Obock, Red Sea, coll. J. Jousseaume, 1894.

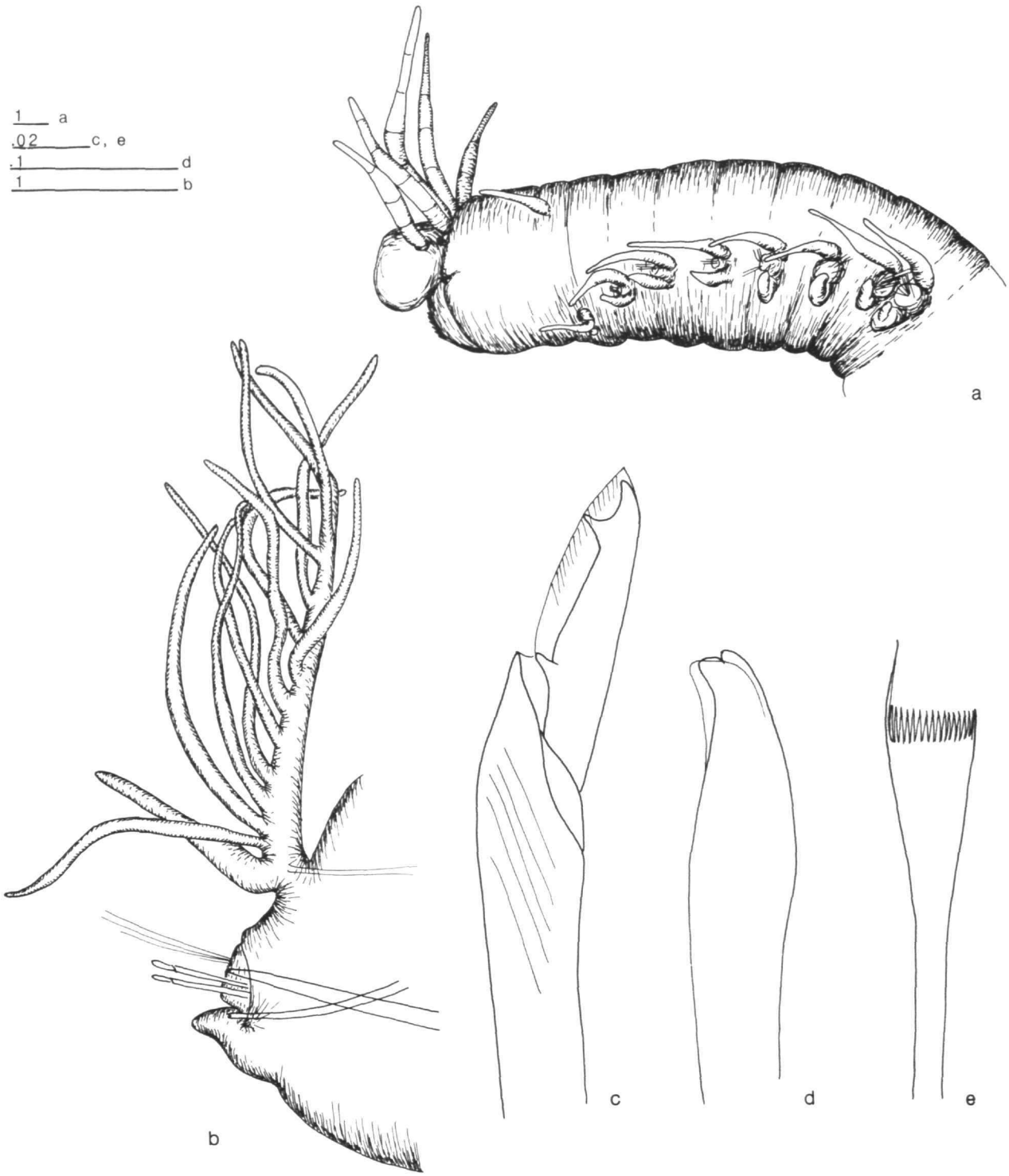

FIGURE 44.—*Eunice fauveli* (holotype, MNHN): a, anterior end, lateral view; b, parapodium 75, anterior view; c, compound falciger, parapodium 75; d, subacicular hook, parapodium 75; e, pectinate seta, parapodium 75. (Scale bars in mm.)

DESCRIPTION.—Holotype complete, of unknown sex, with 216 setigers; total length 302 mm; maximal width 8 mm at about setiger 20; length through setiger 10, 18 mm; width at setiger 10, 7.5 mm. Body through setiger 10 cylindrical; remainder dorsoventrally flattened with short, crowded, wide segments. Anal cirri as long as last 10 setigers, without articulations.

Prostomium (Figure 44a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally slightly flattened; median sulcus deep. Eyes on lateral sides of bases of A-II, dark. Antennae in deep horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering to relatively slender tips, with up to 7 cylindrical articulations in one A-II. A-I to setiger 1; A-II to setiger 3; A-III to setiger 4 (incomplete). Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~4/5 of total peristomial length. Peristomial cirri to anterior 1/3 of anterior peristomial ring, slender and tapering, without articulations.

Maxillary formula 1+1, 5+5, 6+0, 4+9, and 1+1. Left Mx IV short with reduced teeth, forming a distal arc with Mx III. Mx VI missing. Jaws strongly calcified, rather brittle.

Branchiae (Figure 44b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 18 to setiger 216. Branchiae present to near posterior end, more than 65% of total number of setigers. First branchiae single filaments; maximum 14 filaments from about setiger 35. First 5–6 pairs shorter than notopodial cirri; all other branchiae, including last ones, clearly longer than notopodial cirri. Stems slender, tapering, longer than notopodial cirri. Filaments slender, nearly filiform, longer than notopodial cirri. Branchiae increasingly conspicuous towards posterior end.

Neuropodial acicular lobes distally truncately rounded, becoming slightly conical near posterior end; aciculae emerging at midline. Presetal lobes low, transverse folds. Postsetal lobes higher than acicular lobes and rounded in first 20 setigers, becoming low, transverse folds by setiger 25. First 9 ventral cirri tapering. Ventral cirri becoming modestly basally inflated from about setiger 10. Inflated bases ovate; narrow tips tapering. Inflated bases decreasing in importance posteriorly. From about setiger 100 ventral cirri tapering. Anterior notopodial cirri slender, basally distinctly inflated, with 3–4 articulations. Articulations are lost by first branchial segments; basally inflations and slender, tapering tips retained in all setigers.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 44e) tapering, furled. One marginal tooth longer than all other teeth, with ~16 teeth. Shafts of compound falcigers (Figure 44b) very gently inflated, or tapering without inflated region, marginally smooth; internal striations present; beaks distinct. Appendages rather large, tapering, with large, distinct heads and distinct basal bosses, bidentate. Teeth similar in size, tapering. Proximal teeth directed slightly distally. Distal teeth nearly erect. Guards symmetrically bluntly pointed, rarely with very short mucros, marginally frayed. Pseudocompound falcigers and compound spinigers absent. Aciculae mostly single, rarely paired in posterior setigers, brown, deepening to dark brown in posterior setigers, tapering, distally straight, blunt; cross-section round. Subacicular hooks (Figure 44d) light to medium brown, bidentate. Hooks first present from setiger 41, present in all setigers thereafter, always single (except for replacements). Hooks tapering to small heads. Teeth small. Proximal teeth larger than distal teeth, directed laterally. Distal teeth directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice fauveli* was originally erroneously described as having unidentate subacicular hooks; the hooks are distinctly, if shallowly bidentate; the species belongs to group B-4 rather than to D-2 as assumed by Fauchald (1970).

Eunice fauveli is listed with similar species in Tables 33 and 35. It is the only species in Table 35 other than *E. collaris* with more than six branchial filaments. It has sharply pointed guards in the compound falcigers rather than blunt guards as present in *E. collaris*.

Eunice fijiensis Baird, 1869

Eunice fijiensis Baird, 1869:347.
?Eunice antennata.—Grube, 1878a:99.

REMARKS.—No material labeled as *E. fijiensis* is currently present in the British Museum (Natural History) (now the Natural History Museum, London) (Alex Muir, in litt.). The species was briefly characterized by Baird as having branchiae from setiger 7 and a total of 98 setigers, bidentate compound hooks, and tridentate subacicular hooks. The aciculae were described as being stout, swollen in the middle of their length and slightly curved at the point. Furthermore, Baird stated that "it approaches somewhat to the *Eunice gracilis* of Grube, from Tahiti." This statement is presumably the reason why Grube listed *E. fijiensis* as a possible synonym of *E. antennata*. The species is clearly insufficiently characterized and is here considered indeterminable.

63. *Eunice filamentosa* Grube, 1856

FIGURE 45a–g; TABLES 33, 37

Eunice filamentosa Grube, 1856:56.

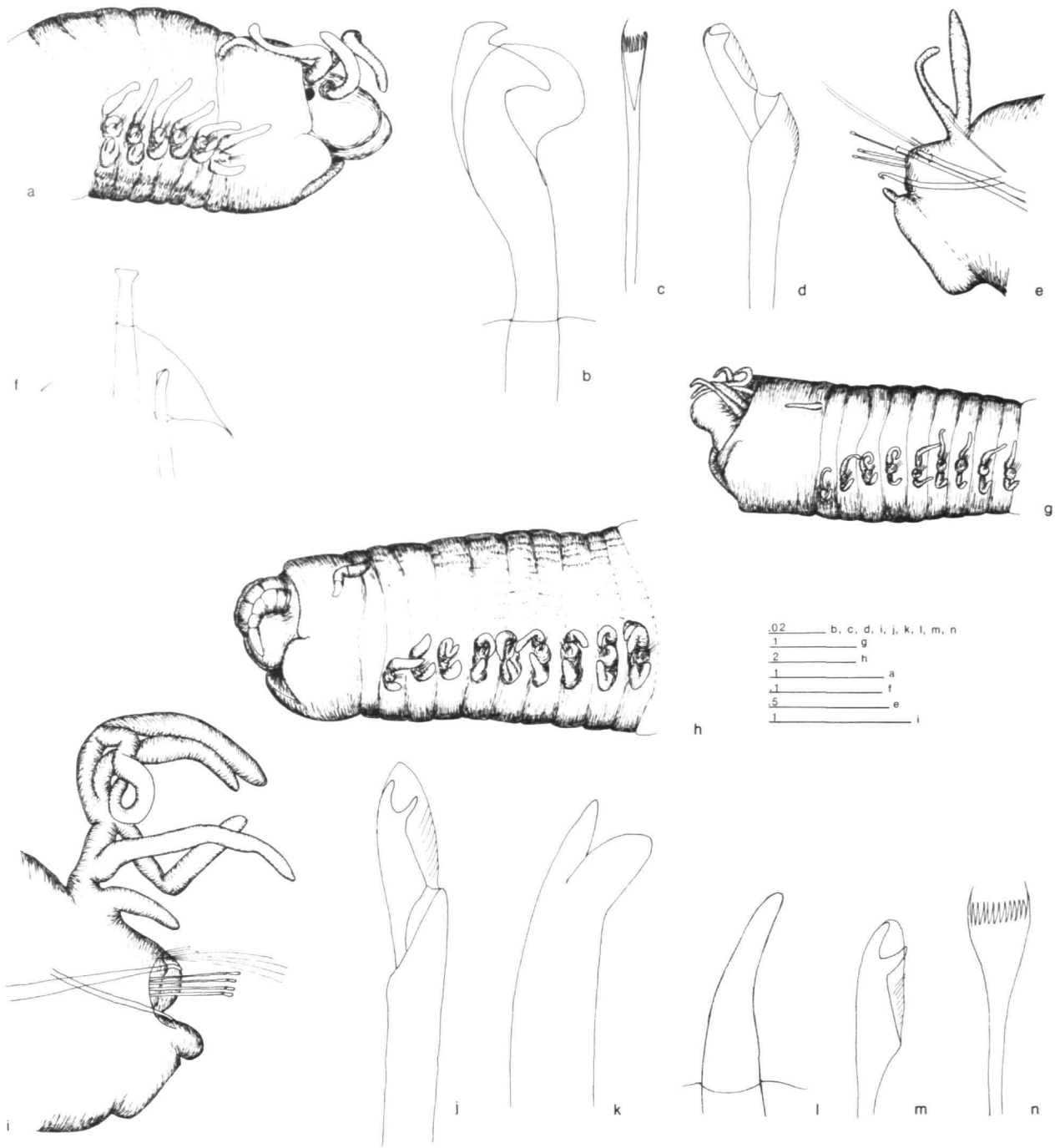

FIGURE 45.—*Eunice filamentosa* (lectotype, ZMC): a, anterior end, lateral view; b, subacicular hook, parapodium 29; c, pectinate seta, parapodium 29; d, compound falciger, parapodium 29; e, parapodium 29, anterior view; f, aciculae, parapodium 29. *Eunice filamentosa* (paralectotype, ZMB 1855): g, anterior end, lateral view. *Eunice fimbriata* (paratype, ZMB Q2262): h, anterior end, lateral view; i, parapodium 33, anterior view; j, compound falciger, parapodium 33; k, subacicular hook, parapodium 33; l, acicula, parapodium 33; m, appendage of compound falciger, parapodium 33; n, pectinate seta, parapodium 33. (Scale bars in mm.)

MATERIAL EXAMINED.—Lectotype, ZMC (uncataloged), and paralectotype, ZMB 1855, St. Croix, Virgin Islands, coll. Kröyer.

COMMENTS ON MATERIAL EXAMINED.—The lectotype is very soft and nearly translucent. Because of the condition of the specimen, some parapodial features were not clearly visible. The paralectotype from Berlin is dry and has been dry for some time; it is nevertheless in recognizable condition.

DESCRIPTION.—Lectotype complete, of unknown sex, with 119 setigers; length 25 mm; maximal width 1.5 mm at about setiger 10; length through setiger 10, 3 mm. Anterior part of body is strongly inflated with highly convex dorsum and flattened ventrum; median and posterior part of body is flattened and evenly wide from about setiger 20 to near abruptly tapered posterior end.

Prostomium (Figure 45a,g) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, tapering, dorsally flattened; median sulcus deep. Eyes between bases of A-I and A-II. Antennae in horseshoe; A-I and A-II emerging close together near sides of prostomial lobes, well separated from bases of A-III; all similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. A-I to middle of anterior peristomial ring; A-II and A-III to setiger 1. Peristomium tapering anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 7/8 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and digitiform, without articulations.

Jaws not examined.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 23 (27 in paralectotype) to setiger 119. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Most branchiae single, flattened filaments (Figure 45e); some posterior branchiae with 2 filaments. Filaments increasing in length posteriorly, being nearly as long as body is wide in several far posterior setigers, and distinctly longer than notopodial cirri.

Anterior neuropodial acicular lobes rounded; posterior ones conical; aciculae emerging above midline. Pre- and postsetal lobes are low folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases thick ventral ridges in setigers 15–50; narrow tips short and button-shaped. Inflated bases rapidly reduced in setigers 50–60. Ventral cirri digitiform in posterior setigers. Notopodial cirri slender and tapering, probably originally basally inflated in anterior setigers, definitely becoming more slender in posterior setigers, articulations absent.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 45c) with very long, thick, cylindrical shafts. Blades distinctly furled; tapering. One marginal tooth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 45d) very long, strongly inflated, marginally serrated; distal beaks distinct. Appendages very short with nearly parallel sides, bidentate. Proximal teeth much larger than distal teeth, triangular, directed basally. Distal teeth very short, strongly bent, tapering, directed obliquely distally. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 45f) paired, amber, slender, distally symmetrically hammer-headed; cross-section round. Subacicular hooks (Figure 45b) amber, bidentate. Hooks first present from setiger 17 (22 in paralectotype), present in all setigers thereafter, always single (except for replacements). Hooks strongly beaked with inflated region below distinct heads. Proximal teeth larger than distal teeth, strongly curved. Distal teeth bent or curved, directed laterally. Guards truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 39-40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—A second specimen present in the vial from ZMC is an unidentifiable member of the genus *Palola*. The described specimen from ZMC is here named as lectotype and the dried specimen from ZMB as paralectotype. *Eunice filamentosa* has been reported widely from the western Atlantic Ocean; some of the many records may belong to related species; these species are listed in Tables 33 and 37. It is the only species in Table 37 with hammer-headed aciculae.

64. *Eunice fimbriata* Grube, 1870

FIGURE 45h–n; TABLES 27, 30

Eunice fimbriata Grube, 1870b:55–56.

MATERIAL EXAMINED.—Holotype, ZMH V-793; paratype ZMB Q2262, Viti Islands (Fiji) Mus. Godeffroy.

COMMENTS ON MATERIAL EXAMINED.—The holotype was originally described as consisting of 322 segments and being 230 mm long. The Hamburg specimen is complete with 362 setigers and is 230 mm long and is here considered the holotype. The Berlin specimen is incomplete and consists of 72 setigers.

DESCRIPTION.—Holotype of unknown sex, with 362 setigers, total length 230 mm; maximal width 7 mm at setiger 30; length through setiger 10, 11 mm; width at setiger 10, 6 mm. Paratype incomplete with 72 setigers; length 42 mm; maximal width 7 mm around setiger 30; length through setiger 10, 10 mm. Body cylindrical, dorsally covered with rugosities, mostly as short, longitudinal folds.

Prostomium (Figure 45h) distinctly shorter than peristomium, nearly as wide as peristomium, as deep as 1/2 of

peristomium. Prostomial lobes frontally rounded, dorsally excavate with thickened rim; median sulcus shallow. Antennae in transverse row, evenly spaced, similar in thickness, emerging from shallow depressions on prostomial face. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles short, digitiform, with 5 distinct articulations. All antennae to front edge of setiger 1. Peristomium cylindrical, with distinct muscular lower lip. Separation between rings distinct on all sides; anterior ring ~4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 3 articulations.

Maxillary formula of paratype 1+1, 4+4, 7+0, 5+8, and 1+1.

Branchiae (Figure 45i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 9 to setiger 122, thus absent on posterior half of body, present on less than 55% of total number of setigers. All branchiae except last 10–12 pairs with 2 or more filaments, maximum 5 filaments at about setiger 15. Branchial stems pliable, shorter than notopodial cirri. Filaments digitiform, much longer than notopodial cirri. Number of filaments reduced to 3 from about setiger 30, retaining same length and shape in all remaining branchial setigers.

Neuropodial acicular lobes asymmetrically rounded with high point above midline; aciculae emerging above midline. Presetal lobes low, transverse folds. Anterior postsetal lobes truncate folds, becoming symmetrically rounded in median and posterior setigers, outreaching acicular lobes. First 4 to 5 ventral cirri thick, tapering. Ventral cirri basally inflated in branchial region. Inflated bases transverse welts; narrow tips short and button-shaped. Postbranchial ventral cirri short, nearly tubercular, nearly invisible in last 100 setigers. Anterior notopodial cirri thick, digitiform, with 3 indistinct articulations. Articulations lost in branchial region. Notopodia decreasing in size towards posterior end of body, retaining similar shape.

Limbate setae slender, nearly straight; limbation marginally fraying in most setae. Pectinate setae (Figure 45n) short, with slender, cylindrical shafts. Blades flaring, flat. Both marginal teeth longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 45j) long, slender, tapering, marginally smooth; beaks indistinct. Appendages (Figure 45j,m) short; heads distinct, bidentate. Proximal and distal teeth similar in length. Proximal teeth slender, tapering, directed obliquely distally, upturned near tips. Distal teeth curved, directed obliquely distally, nearly claw-like. Guards symmetrically rounded, marginally finely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 45l) single, black, distally sharply bent ventrally; cross-section round. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 45k) black, bidentate. Hooks first present from setiger 26, present in all setigers thereafter, always single (except for replacements). Hooks tapering towards large heads. Proximal teeth larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice fimbriata* has remained unreported since its brief mention by Grube (1870b); it belongs, by definition, to group B-2 and is listed with similar species in Tables 27 and 30. In *E. fimbriata, E. coccinea,* and *E. reducta,* the branchiae terminate well before the posterior end, in contrast to all other species listed in Table 30. *Eunice reducta* has ~21 branchial filaments, *E. coccinea* has 10, and *E. fimbriata* has five. In *E. coccinea* the bases of the ventral cirri are inflated to the posterior end; in the other two species, they are inflated only in the median body region.

65. *Eunice flaccida* Grube, 1869

FIGURE 46a–e; TABLES 41, 44, 46, 49, 52, 53

Eunice flaccida Grube, 1869:491–492.

MATERIAL EXAMINED.—Holotype, ZMB 496, Tor, Red Sea, coll. Ehrenberg, Sep ?year.

COMMENTS ON MATERIAL EXAMINED.—The pectinate setae were somewhat difficult to study due to the amount of debris attached.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 43 setigers; length 27 mm; maximal width 2.5 mm at setiger 10; length through setiger 10, 8.5 mm. Anterior part of body through setiger 15 cylindrical; remainder dorsoventrally flattened.

Prostomium (Figure 46a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes not observed. Antennae in a horseshoe with A-I anterior to A-II and III, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, articulated to bases, with up to 18 short, moniliform articulations in A-III. A-I to bases of peristomial cirri; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical with strongly jutting, muscular lower lip. Separation between rings distinct only ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 6 articulations.

Jaws not examined.

Branchiae (Figure 46b) present, pectinate, distinctly shorter than notopodial cirri, erect. Branchiae from setiger 7 to end of fragment. All branchiae pectinate; maximum 9 filaments at setiger 12; numbers of filaments decreasing posteriorly, at end of fragment 2 or 3 filaments. Branchial stems stout, cylindrical,

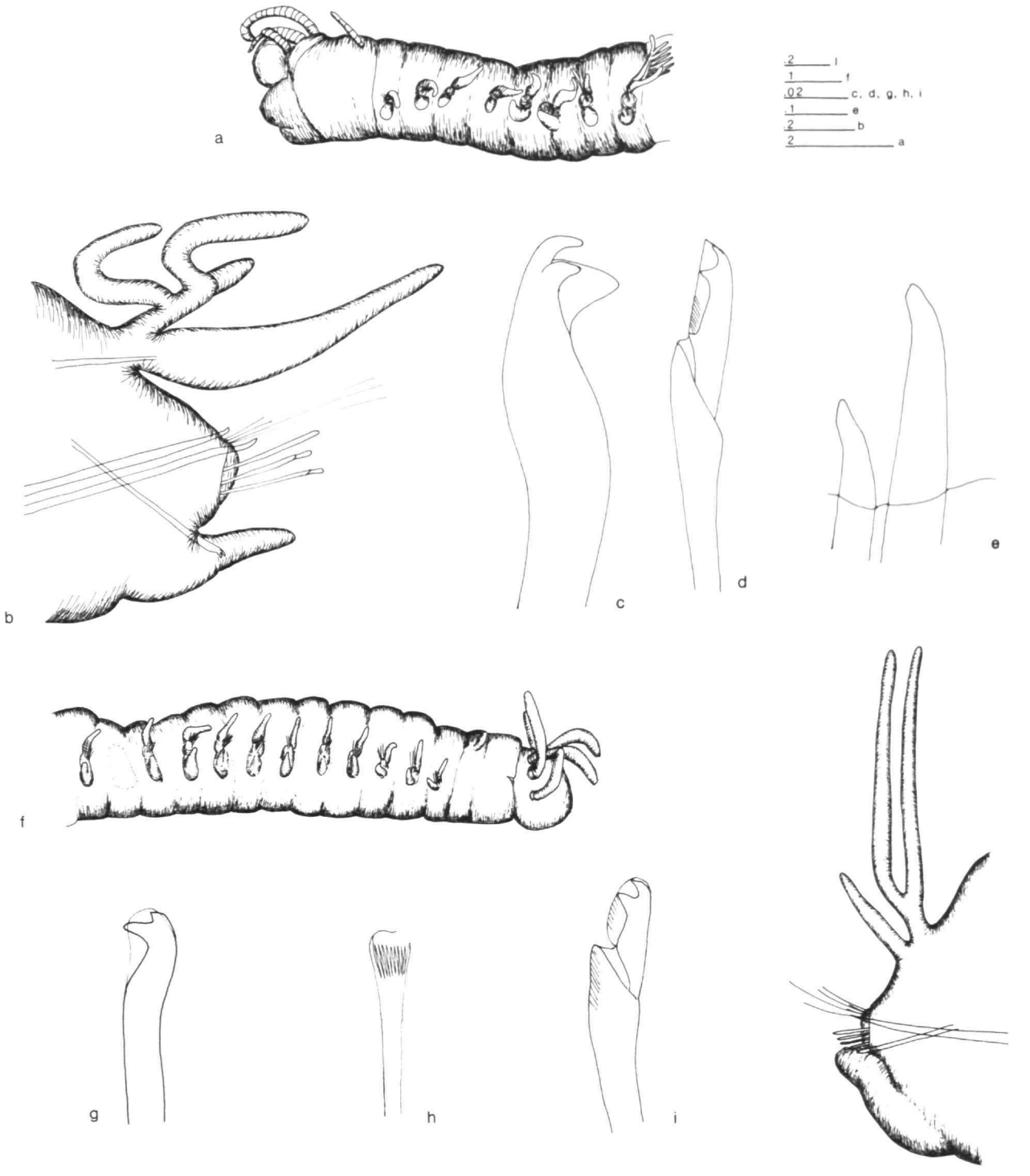

FIGURE 46.—*Eunice flaccida* (holotype, ZMB 496): a, anterior end, lateral view; b, parapodium 35, anterior view; c, subacicular hook, parapodium 35; d, compound falciger, parapodium 35; e, aciculae, parapodium 35. *Eunice flavapunctata* (holotype, AMNH 1532): f, anterior end, lateral view; g, subacicular hook, parapodium 29; h, pectinate seta, parapodium 29; i, compound falciger, parapodium 29; j, parapodium 29, anterior view. (Scale bars in mm.)

shorter than filaments. Filaments digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes symmetrically truncate, becoming asymmetrically rounded with aciculae emerging above midline. Presetal lobes low, somewhat asymmetrical folds with low side ventrally. Postsetal lobe low asymmetrical folds with low side dorsally. Ventral cirri thick and rounded in all setigers, developing long digitiform tips in posterior setigers present, possibly distorted in fixation. Anterior notopodial cirri short, inflated, becoming longer posteriorly, but retaining distinct inflated basal section, without articulations.

Limbate setae slender, marginally smooth. About 5 pectinate setae in a parapodium. Pectinate setae tapering, flat. Marginal teeth about as long as other teeth, with 15 teeth. Shafts of compound falcigers (Figure 46d) gently inflated, marginally smooth; beaks indistinct. Appendages large; heads large, bidentate. Teeth similar in size. Proximal teeth narrowly triangular, directed laterally. Distal teeth tapering, directed obliquely distally. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 46e) paired, yellow; exposed portion twisted in double curve, sharp tipped; distal end when worn slightly knobbed; cross-section round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 46c) yellow, tridentate with teeth in tandem. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Shafts strongly curved distally, tapering. Two lower fangs, including largest and smallest arranged on either side of middle fang, which clearly outreach other fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; characters associated with posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 51, 54, 55. *Unknown Characters:* 1, 2, 13, 14, 33, 36–38, 40, 47, 50, 57–60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice flaccida* was considered a synonym of *E. antennata* by Crossland (1904:312). It may be a member of either group C-1 or C-2, because the type is posteriorly incomplete; thus it has been included in Tables 41 and 44 as well as in Tables 46 and 49. It has tridentate hooks with the teeth in tandem as does *E. elseyi* in addition to two species with dark subacicular hooks; these are compared in Tables 52 and 53. It differs from *E. elseyi* in that it has distally entire aciculae and bidentate compound falcigers; in *E. elseyi* the aciculae are bidentate and the compound hooks distally tridentate.

66. *Eunice flavapunctata* (Treadwell, 1922)

FIGURE 46f–j; TABLES 33, 39

Leodice flava-punctata Treadwell, 1922:136–138, figs. 8–11, pl. 2: fig. 1–7.
Eunice afra.—Hartman, 1956:282 [not *Eunice afra* Peters, 1854].

MATERIAL EXAMINED.—Holotype, AMNH 1532, Breaker Point, Pago Pago, Samoa, 1920.

COMMENTS ON MATERIAL EXAMINED.—The anterior end has been deeply dissected frontally and the illustration of the anterior end is a reconstruction (all antennae were present however).

DESCRIPTION.—Holotype incomplete, of unknown sex, with 80 setigers; length 47 mm; maximal width 2 mm at setiger 10; length through setiger 10, 7 mm.

Prostomium (Figure 46f) about as long as peristomium, about as wide as peristomium, as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in transverse row; A-I separated by gap from A-II and A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, irregularly wrinkled, without articulations. A-II and A-III similar in length, barely outreach peristomium. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring ~$^2/_3$ of total peristomial length. Peristomial cirri barely reaching beyond posterior peristomial ring, digitiform, without articulations.

Jaws now missing.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 13 to end of fragment. Maximum 6 filaments, reached at about setiger 50. Most segments with 2 or 3 long, digitiform filaments (Figure 46j). Branchial stems cylindrical, shorter than notopodial cirri. Branchiae located well above neuropodial cirri on body wall.

Neuropodial acicular lobes truncate; aciculae emerging above midline. Pre- and postsetal lobes low folds. First 4 ventral cirri tapering, nearly digitiform. Ventral cirri basally inflated from about setiger 5; bases inflated in all remaining parapodia. Inflated bases thick, transverse welts; narrow tips tapering. Anterior notopodial cirri relatively short, digitiform, becoming increasingly slender and longer in branchial region; articulations absent.

Limbate setae long, narrowly limbate, marginally dentate. Shafts of pectinate setae (Figure 46h) wide, cylindrical. Blades narrow, tapering, flat. One marginal tooth very much longer than other teeth, with 10 narrow, slender teeth. Shafts of compound falcigers (Figure 46i) inflated, marginally serrated; beaks distinct. Appendages short; heads large, bidentate. Proximal teeth larger than distal teeth, narrowly triangular, directed obliquely distally. Distal teeth abruptly tapering, directed obliquely distally. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae black, tapering to narrow tips, straight; cross-sections round. Subacicular hooks (Figure 46g) black, bidentate. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Hooks tapering, curved. Proximal teeth very much larger than distal teeth, directed laterally. Distal teeth blunt, directed nearly laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure;

features associated with posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV. Branchiae terminating well before the posterior end.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56. *Unknown Characters:* 1, 2, 13, 14, 36-40, 47, 50, 57-60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,2; 38,1.

REMARKS.—*Eunice flavapunctata* was considered a synonym of *E. afra* by Hartman (1956). It is listed with similar species in Tables 33 and 39. Of the species in Table 39 only *E. denticulata* and *E. flavapunctata* have the inflated bases of the median ventral cirri forming thick transverse welts. The former has hammer-headed aciculae; the latter has pointed aciculae.

Treadwell stated that branchiae were missing on the last 100 segments; this statement cannot be confirmed because the holotype is incomplete; Treadwell may have had another fragment of the holotype or additional material at his disposal.

67. *Eunice flavocuprea* Grube, 1869

FIGURE 47a-c; TABLES 41-42

Eunice flavocuprea Grube, 1869:493-494.

MATERIAL EXAMINED.—Holotype, ZMB 498, Tor, Red Sea, coll. Ehrenberg.

COMMENTS ON MATERIAL EXAMINED.—The holotype is in rather poor condition; it appears to have been in posterior regeneration.

DESCRIPTION.—Holotype complete with 100 setigers; total length 17 mm; maximal width 1 mm; length through setiger 10 about 2 mm.

Prostomium (Figure 47c) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes not observed. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with 2 or 3 long, cylindrical articulations. A-I to setiger 1; A-II to setiger 3; A-III missing. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri very short, nearly ovoid, without articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to setiger 34. Branchiae terminating well before posterior end. First 5 and last 10 branchiae single filaments; maximum 4 filaments at about setiger 15. All branchiae outreaching notopodial cirri, even in first branchiated segment. Branchial stems reduced. Filaments very long, slender.

Shape of neuropodia indeterminable in detail without destroying specimen. Ventral cirri basally inflated from about setiger 5 through setiger 40. Inflated bases ovate; narrow tips short and button-shaped. Notopodial cirri distinctly medially inflated anteriorly, becoming digitiform in posterior setigers, articulations absent.

Limbate setae marginally serrated. Pectinate setae not observed in detail. Shafts of compound falcigers distinctly inflated, marginally smooth. Appendages (Figure 47a) very long and narrow, bidentate. Proximal teeth very short, triangular projections, directed basally. Distal teeth longer than proximal teeth, slender, curved. Guards symmetrically rounded; some guards with distinct, narrow mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae tapering, yellow. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 47b) yellow, tridentate. Hooks first present from setiger 17, present in all setigers thereafter, sometimes paired. Main fangs large, curved; 2 distal fangs in crests; very small tertiary fangs closely appended to secondary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; most parapodial features; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 4, 6, 13, 14, 38, 43-50, 52, 57-60, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—In the vial, a small handwritten label reads as follows: *"Eunice flavocuprea* Gr. (nomen nudum) Nach v. Marenzeller Brief = *E. murrayi* M'Int." *Eunice flavocuprea* belongs to the same group as *E. murrayi* but differs sharply from that species in the structure of the antennae, which are nearly smooth in the former and strongly articulated in the latter. Grube's description, while brief, is certainly adequate to avoid labeling the name as a nomen nudum. *Eunice flavocuprea* is listed with similar species in Tables 41 and 42. It can be identified only by a combination of character states, rather than by a single, unique character state.

Eunice flavofasciata Grube, 1878

Eunice flavo-fasciata Grube, 1878b:155-156, pl. 9: fig. 2.

REMARKS.—Grube had a single complete specimen, which now has been lost. The following is a translation of the description supplemented with interpretations of Grube's illustrations.

Specimen chestnut-colored with lighter anterior transverse bands and cirri. Antennae without articulations. A-III distinctly longer than other antennae, reaching roughly setiger 5. Peristomial cirri reaching posterior part of prostomium. The maxillary formula is 1+1, 3+3, 6+0, 2+7, and 1+1. Branchiae present from setiger 5 to far posterior end, where best developed, from about setiger 5 through setiger 24, with up to

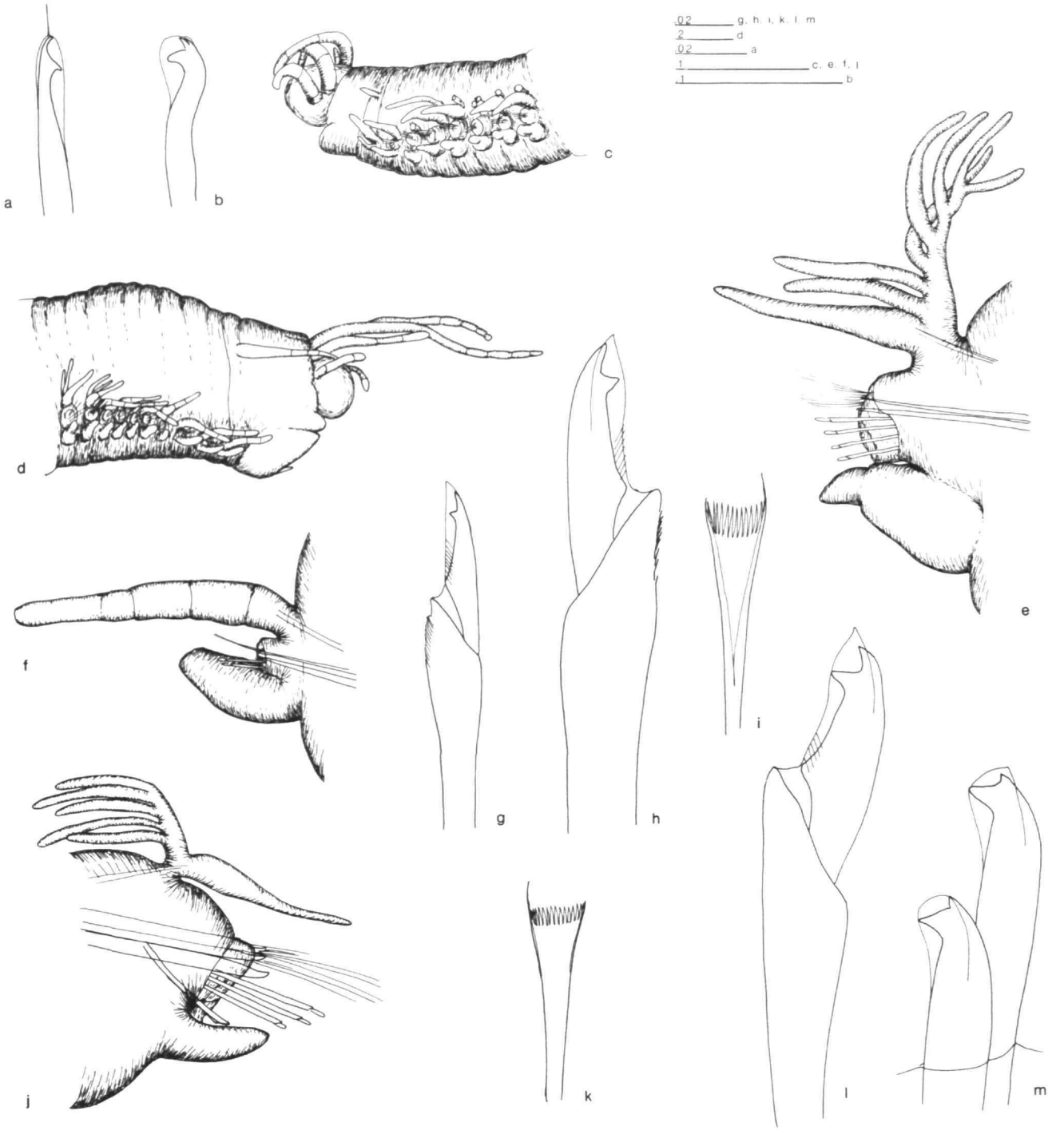

FIGURE 47.—*Eunice flavocuprea* (holotype, ZMB 498): a, appendage of compound falciger, median parapodium; b, subacicular hook, median parapodium; c, anterior end, lateral view. *Eunice floridana* (complete specimen from MCZ 674): d, anterior end, lateral view; e, parapodium 21, anterior view; f, parapodium 2, anterior view; g, compound falciger, parapodium 2; h, compound falciger, parapodium 21; i, pectinate seta, parapodium 21; j, parapodium 60, anterior view; k, pectinate seta, parapodium 60; l, compound falciger, parapodium 60; m, subacicular hooks, parapodium 60. (Scale bars in mm.)

14 filaments. Notopodial cirri articulated; ventral cirri inflated from about setiger 3 through setiger 28. Aciculae and subacicular hooks black. Subacicular hooks bidentate.

Grube clearly had a specimen belonging to group B-2; it is well described, but without access to the types, it is difficult to differentiate it from a series of similar species. The species is here considered indeterminable.

68. *Eunice flavopicta* Izuka, 1912

TABLES 27, 29, 30

Eunice flavopicta Izuka, 1912:121-123, pl. 14: figs. 1-5.

REMARKS.—The type material of this species has been lost, according to Miura (1986:269), who considered the species synonymous with *E. aphroditois*. Considering the complex synonymy of the latter species it appears best to keep the two apart, until the variability of *E. aphroditois* has been established. The following represents a summary of the information in the original description.

Body with 166 segments; length 215 mm; maximal width 6 mm at setiger 10. Body tapering relatively abruptly anteriorly and slowly posteriorly. Anal cirri rather long. Color lightly iridescent deep purple, with 3 bright yellow spots on dorsum of each segment as transverse band on setiger 4.

Palpal region set off by frontal horizontal grooves. Eyes at bases of A-I. Antennae faintly articulated. A-I to posterior end of posterior peristomial ring; A-II to setiger 1; A-III to setiger 3. Peristomial rings distinct at least dorsally. Peristomial cirri short, presumably not outreaching peristomium.

Maxillary formula 1+1, 4+5, 6+0, 4+9, 1+1, and 1+1.

Branchiae from setiger 5 to end of body. All(?) branchiae pectinate; maximum 18 or 19 filaments at setiger 14, this number maintained to about setiger 50, decreasing slowly posteriorly. Branchiae longer than notopodial cirri. Stems erect, tapering, longer than notopodial cirri. Filaments digitiform, shorter than notopodial cirri.

Ventral cirri basally inflated. Notopodial cirri basally inflated, vaguely articulated, tapering to blunt tips.

Limbate setae slender, marginally smooth. Pectinate setae tapering, flat. Marginal teeth no longer than other teeth, with 9 teeth. Shafts of compound falcigers tapering, marginally finely serrated, with distinct internal striations. Appendages broad-based, triangular, short, bidentate. Proximal teeth triangular, directed laterally. Distal teeth slender, erect; 6 small teeth present between proximal and distal teeth. Guards bluntly pointed, marginally serrated. Aciculae and presumably subacicular hooks dark. Subacicular hooks tapering, bidentate; heads bent. Proximal teeth larger than distal teeth, directed laterally. Distal teeth short, curved.

Eunice flavopicta is compared to similar species in Tables 27, 29, and 30. The presence of small denticles between the proximal and distal teeth of the compound falciger is unusual and would need to be confirmed on fresh material.

69. *Eunice floridana* (Pourtalès, 1867)

FIGURE 47d-m; TABLES 5, 27, 32

Marphysa floridana Pourtalès, 1867:108.
Eunice floridana.—Ehlers, 1887:88-90, pl. 22: figs. 1-7.

MATERIAL EXAMINED.—MCZ 674, off the Sambos, 229 m, 8 specimens.

COMMENTS ON MATERIAL EXAMINED.—The description is based on one of the complete specimens; the information about the other specimens is summarized in Table 5.

DESCRIPTION.—Specimen illustrated complete, of unknown sex, with 111 setigers; length 80 mm; maximal width 6 mm at setiger 10; length through setiger 10, 10.5 mm. Anterior dorsum strongly convex; anterior ventrum slightly flattened; further posteriorly body dorsoventrally flattened. Long anal cirri tapering, as long as last 5 setigers together, without articulations.

Prostomium (Figure 47d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, slightly dorsally flattened; median sulcus shallow. Eyes between bases of A-I and A-II, large purple. Antennae in shallow horseshoe; A-I separated by gap from A-II and A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and nearly digitiform, tapering only slightly distally, with up to 7 long, irregular, cylindrical articulations. Articulations distally drop-shaped in A-I. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 8. Other specimens with A-II to setiger 6-7 and A-III to setigers 12-13. Peristomium short, flaring anteriorly; lower lip muscular. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri at least to middle of prostomium, slender, tapering, with 4-5 articulations.

Maxillary formula 1+1, 6+6, 7-9+0, 6+8, 1+1, and 1+1. Mx III part of distal arc with left Mx IV.

Branchiae (Figure 47e,j) present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region, erect. Branchiae from setigers 9 (8-10) to 111. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae pectinate, except in 2 cases first branchiae. Maximum 8 filaments. Branchiae reduced to 3-4 filaments in median region, increasing to 7-8 filaments in penultimate setigers. Branchial stems thick, tapering, shorter than notopodial cirri. Filaments digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes (Figure 47f) symmetrically rounded, becoming obliquely truncate with aciculae emerging near superior, higher end. Presetal lobes low, transverse folds. Postsetal lobes symmetrically rounded free lobes through about setiger 60-75, thereafter reduced to low folds following outline of acicular lobes closely. Anterior ventral cirri thick and tapering, becoming basally strongly

TABLE 5.—Variable and invariable features in the type lot of *Eunice floridana* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	4	138	100	117.5	16.13
Total length	4	95	53	70.75	20.30
Maximal width	8	6	4.5	5.31	0.59
Length through 10	8	10.5	7	8.81	1.22
No. of antennal articulations	8	8	5	7.38	1.19
Branchiae first present from setiger no.	8	10	8	9.00	0.93
Ventral cirri inflated to setiger no.	8	55	40	47.50	5.35
No. of notopodial articulations	8	4	3	3.13	0.35
Subacicular hooks first present from setiger no.	8	40	29	33.25	3.62

INVARIABLE FEATURES	N=8
Separation of peristomial rings	visible dorsally and ventrally
Peristomial cirri reach	middle of prostomium
Max. no. of branchial filaments	8
Pectinate setae	furled, flared
No. of teeth in pectinate setae	12
Shaft of compound falcigers	inflated
Color of aciculae	black
Shaft of aciculae	flattened and knife-like
Color of subacicular hooks	black
No. of teeth in subacicular hooks	2
Core-sheath separation	distinct

inflated from about setiger 8–10. Inflated bases thick, ventral ridges along lower edge of parapodia; narrow tips tapering. Inflated bases reduced posterior to setiger 30–40, missing from setiger 40–50. Posterior ventral cirri nearly triangular in outline, tapering, broadly attached ventrally, nearly scoop-shaped. Anterior notopodial cirri digitiform, with 3 to 5 indistinct articulations. Median and posterior notopodial cirri basally slightly inflated, tapering to thick, digitiform tips, without articulations.

Limbate setae frayed. Shafts of pectinate setae (Figure 47i,k) slender, cylindrical. Blades slightly flaring, gently furled. One marginal tooth distinctly longer than all other teeth; 15–18 teeth present. Shafts of all compound falcigers (Figure 47g,h,l) slightly inflated, marginally serrated in anterior and median setigers and marginally smooth further posteriorly; beaks distinct. Anterior appendages (Figure 47g) slender, tapering; heads small, bidentate. Proximal teeth smaller than distal teeth, triangular, directed laterally. Distal teeth nearly erect, tapering. Anterior guards asymmetrically sharply pointed; mucros absent. Posterior appendages (Figure 47l) short, thick, distinctly triangular in outline; heads distinct, bidentate. Proximal teeth larger than distal teeth, narrowly triangular, directed laterally. Distal teeth short, directed obliquely distally. Posterior guards symmetrically sharply pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Anterior aciculae dark brown, tapering to straight tips; cross-section round. Posterior aciculae black, extremely shiny, flattened anteroposteriorly to form slightly curved knife-shaped blades (Figure 47j). Median and posterior aciculae very thick, numbering at least 3 in a parapodium. Subacicular hooks (Figure 47m) first dark brown, becoming black and shiny in later setigers, bidentate. Hooks first present from setiger 29–40, present in all setigers thereafter, usually paired. Hooks tapering abruptly to narrow necks. Proximal teeth larger than distal teeth, narrowly triangular, directed laterally. Distal teeth very small, triangular, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The original description mentioned only the thick, pergamentaceous tubes in which the species lives and its association with deep-water hard-bottom environments. The first complete description of the species was given by Ehlers (1887) and the description given above is based on material used by Ehlers in his description; thus, the material, although not type material, is certainly authoritative in terms of the definition of the species.

The species has been widely reported but appears to have been confused with a number of other members of group B-2, with which it is listed in Tables 27 and 32.

Eunice floridana has articulated ceratostyles in which the articulations become increasingly moniliform distally. In addition to *E. floridana*, the following species in Table 32 have the notopodial cirri articulated only in the anterior end: *E. frauenfeldi*, *E. grubei*, *E. northioidea*, and *E. pycnobranchiata*.

In *E. floridana* the peristomial cirri reach the middle of the prostomium; in the other species, the peristomial cirri do not outreach the peristomium.

70. *Eunice franklini* Monro, 1924

FIGURE 48a-e; TABLES 27, 31

Eunice franklini Monro, 1924:56-57, figs. 14-16.—Fauchald, 1986:250-251, figs. 41-45.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1924.1.28.81, the Franklin Shoal, Arafura Sea, 9°53'S, 129°19'E.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 92 setigers; length 105 mm; maximal width 7 mm at setiger 10; length through setiger 10, 15 mm.

Prostomium (Figure 48a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 10 irregular articulations in A-III. A-I to setiger 1; A-II to setiger 4 (only left present); A-III to setiger 7. Peristomium cylindrical. Separation between rings distinct dorsally, barely visible ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to posterior 1/3 of prostomium, slender and tapering, with 5 indistinct articulations.

Maxillary formula 1+1, 6+7, 8+0, 6+9, and presumably 1+1 according to Monro (1924, fig. 16).

Branchiae (Figure 48e) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region (not apparent in illustration), erect. Branchiae from setiger 6 to end of fragment. First branchia with 5 filaments, maximum about 25 filaments. Branchial stems long, erect, shorter than notopodial cirri. Filaments short, digitiform.

Neuropodial acicular lobes flattened conical; aciculae emerging at midline. Anterior pre- and postsetal lobes distinct, distally rounded in first 15 setigers, thereafter reduced to low transverse folds. Anterior ventral cirri tapering, blunt. Ventral cirri basally inflated in median setigers. Inflated bases indistinct, ovate; narrow tips tapering. Notopodial cirri supported by dark aciculae, very long, digitiform, without articulations.

Shafts of pectinate setae (Figure 48b) wide, cylindrical. Blades flat, slightly flaring. Both marginal teeth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 48d) slender, smoothly tapering, marginally smooth, without beaks or internal striations. Appendages slender; heads distinct, bidentate. Proximal and distal teeth similar in length; proximal teeth narrowly triangular, directed laterally. Distal teeth tapering, slimmer than proximal teeth, directed obliquely distally. Guards symmetrically bluntly rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae, including 2 of 4 notopodial aciculae, black, tapering, straight, pointed; cross-section round. Subacicular hooks black (Figure 48c), bidentate. Hooks first present from setiger 34; present in all setigers thereafter, always single (except for replacements). Hooks slender, gently curved. Both teeth similar in size. Proximal teeth triangular, directed obliquely distally. Distal teeth slightly narrower than proximal teeth, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; all features associated with far posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate characters: 56. Unknown Characters:* 1, 2, 13, 14, 36-38, 40, 42, 47, 50, 51, 57-60, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice franklini* is listed with similar species in Tables 27 and 31; justification for including the species in group B-2 was given by Fauchald (1986).

The combination of very short, numerous branchial filaments and extremely long notopodial cirri is unique to the genus. In addition *E. franklini* has compound falcigers with mucronate guards, a feature shared only with *E. amphiheliae* of the species listed in Table 31. The two species are readily separated on the relatively length of the branchiae; despite their length, these are outreached by the notopodial cirri in *E. franklini* and are distinctly longer than the notopodial cirri in *E. amphiheliae*.

71. *Eunice frauenfeldi* Grube, 1866

FIGURE 48f-k; TABLES 27, 32

Eunice frauenfeldi Grube, 1866c:175; 1867:11-12, pl. 1: fig. 3.

MATERIAL EXAMINED.—Holotype, ZMB 4008, St. Paul's Island, South Atlantic.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 77 setigers; length 45 mm; maximal width 5 mm at setiger 10; length through setiger 10, 7 mm. Body dorsally inflated and ventrally flattened, with parallel sides and short parapodia. Prostomium (Figure 48f) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally obliquely transverse, dorsally excavate with thickened rim; median sulcus shallow. Eyes not seen. Antennae very large, in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 14 articulations in A-III; inner articulations cylindrical, becoming drop-shaped distally. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical, with distinct, muscular lower lip. Separation distinct dorsally and ventrally;

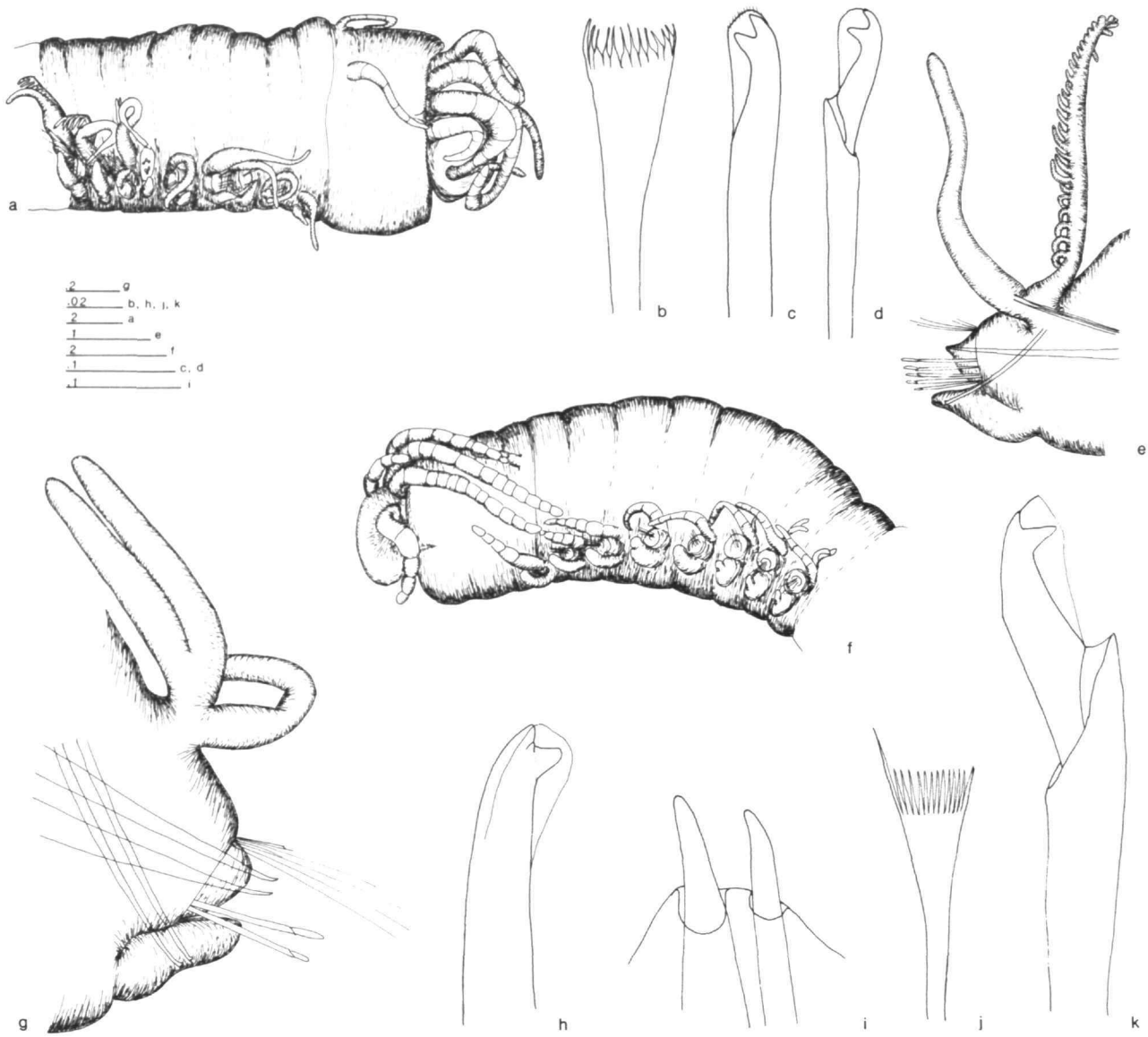

FIGURE 48.—*Eunice franklini* (holotype, BM(NH) ZK 1924.1.28.81): a, anterior end, lateral view; b, pectinate seta, parapodium 69; c, subacicular hook, parapodium 69; d, compound falciger, parapodium 69; e, parapodium 69, anterior view. *Eunice frauenfeldi* (holotype, ZMB 4008): f, anterior end, lateral view; g, parapodium 63, anterior view; h, subacicular hook, parapodium 63; i, aciculae, parapodium 63; j, pectinate seta, parapodium 63; k, compound falciger, parapodium 63. (Scale bars in mm.)

anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, with 4 or 5 articulations.

Jaws not examined.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 6 to end of fragment. First branchia single filaments; maximum 3 filaments in setigers 15–25; all other branchiae with 2 filaments (Figure 48g). Stems reduced to short buttons. Filaments thick, distally blunt, posteriorly as long as notopodial cirri.

Anterior neuropodial acicular lobes distally truncate; poste-

rior acicular lobes rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases short welts where best developed, decreasing in size from about setiger 45; narrow tips tapering. Posterior ventral cirri thick, tapering, directed posteriorly. Anterior notopodial cirri tapering and articulated with up to 5 articulations, farther posteriorly cirri decreasing in length, without articulations.

Limbate setae slim, marginally smooth. Shafts of pectinate setae (Figure 48j) cylindrical. Blades slightly flaring, flat. One marginal tooth longer than other teeth; ~12 teeth present. Compound falcigers (Figure 48k) very large, long-shafted. Shafts tapering, marginally smooth; distal beaks absent. Appendages with distinctly angled back edge, tapering, bidentate. Proximal teeth longer than distal teeth, tapering, directed laterally. Distal teeth gently curved, nearly erect. Guards longer than appendages, angular, but distinctly symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 48i) paired, with light brown or chestnut-colored cores and clear sheaths, tapering, slender, gently curved tips; tips curved dorsally; cross-sections round. Subacicular hooks (Figure 48h) with chestnut-colored cores and clear sheaths, bidentate. Hooks first present from setiger 27, present in all setigers thereafter, paired in some setigers. Hooks slender, not distinctly larger than compound falcigers, tapering, with small heads. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth short, nearly erect. Paired bosses present on distal bases of proximal teeth. Bases of proximal teeth much narrower than shaft at that point.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; all features associated with posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 36–38, 40, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice frauenfeldi* is assumed to belong to group B-2 and is listed with similar species in Tables 27 and 32; the reduction in size of the branchiae towards the posterior end of the incomplete fragment makes this assumption somewhat suspect. The problem cannot be resolved without access to more material from the type locality. The synonymy list given in Hartman (1964:118) must be revised: *Eunice magellanica* is here treated as a distinct species. The only other species with palmate branchiae listed in Table 32 is *E. rubella*. The two species differ in the proportions of the prostomium and in various shape-related characters best elucidated by comparing the illustrations of the two species.

72. *Eunice fucata* Ehlers, 1887

FIGURE 49a–d; TABLES 27, 28, 50

Eunice fucata Ehlers, 1887:91–93, pl. 25: figs. 8–20.
Staurocephalus gregaricus Mayer, 1900:1.
Mayeria gregaricus.—Verrill, 1900:650.

MATERIAL EXAMINED.—MCZ, 3 posterior fragments from type lots, Tortugas, Florida.

COMMENTS ON MATERIAL EXAMINED.—The re-description is based on the original description, complemented where possible by observations on the original material.

DESCRIPTION.—One specimen complete, with 250 segments; total length 195 mm; width ~5 mm; length through setiger 10 ~10 mm (based on illustration of anterior end). Posterior body roughly circular in cross-section with no indication of dorsoventral flattening.

Eyes present. Ceratostyles without articulations. A-I to posterior peristomial ring; A-II and A-III to setiger 3. Anterior peristomial ring 3/4 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, without articulations.

Maxillary formula 1+1, 4+5, 6+0, 3+8, 1+1, and 1+1. Branchiae (Figure 49d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5, absent on last 70–80 setigers. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. Last 30 pairs single filaments; maximum 12 primary filaments; primary filaments sometimes pectinate, especially towards posterior end, yielding up to 24 or more terminal filaments. Branchiae longer than notopodial cirri except in last 15 branchial setigers. Filaments digitiform, shorter than notopodial cirri.

Neuropodial acicular lobes obliquely truncate with aciculae emerging at upper, high end of lobes. Pre- and postsetal lobes low, transverse folds. Median ventral cirri basally inflated. Inflated bases missing posteriorly, in fragments available, all ventral cirri thick, digitiform. Anterior and median notopodial cirri basally inflated, tapering to digitiform tips, without articulations. Posterior notopodial cirri short, digitiform.

Limbate setae very narrowly limbate, marginally smooth. Pectinate setae (Figure 49b) very long in posterior setigers. Shafts cylindrical. Blades strongly flaring, furled. Marginal teeth no longer than other teeth, with 20 teeth. Compound falcigers broken in all setigers examined. Shafts described as slightly inflated, marginally smooth. Appendages very short, triangular. Cutting edge with series of small, irregular teeth, rather than single proximal teeth. Distal teeth nearly erect. Guards asymmetrically bluntly to sharply pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 49c) paired, with dark brown cores and clear sheaths, tapering to slender tips, gently curved or straight; cross-sections round. Subacicular hooks (Figure 49a) with light to medium brown cores and clear sheaths, unidentate. Hooks distally gently curved, without any traces of other teeth.

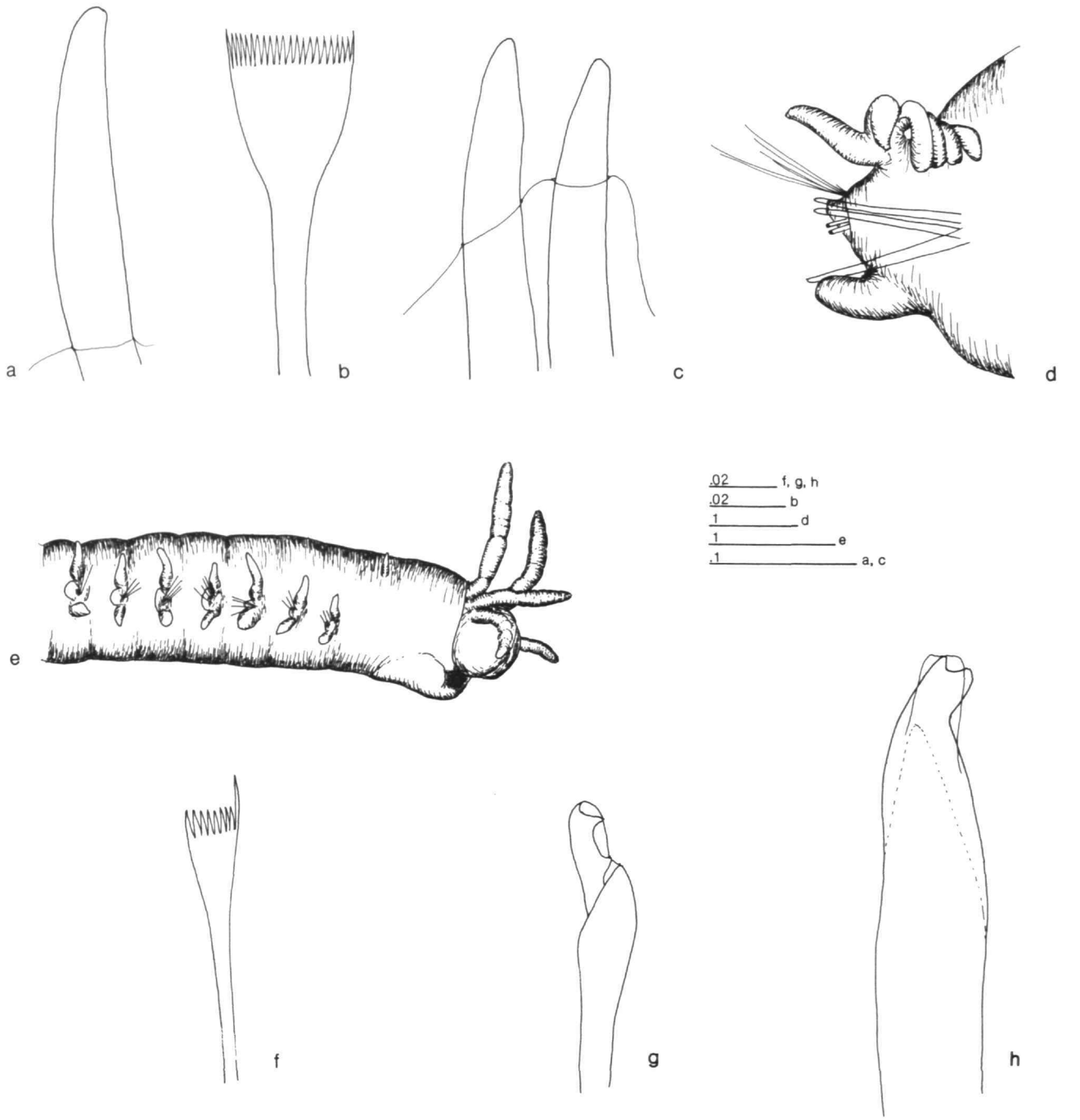

FIGURE 49.—*Eunice fucata* (MCZ, fragments of type lot): a, subacicular hook; b, pectinate seta; c, aciculae; d, ?posterior parapodium. *Eunice fuscafasciata* (syntype, AMNH 1920-1529): e, anterior end, lateral view; f, pectinate seta, parapodium 60; g, compound falciger, parapodium 60; h, subacicular hook, parapodium 60. (Scale bars in mm.)

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; all features associated with anterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 58, 59. *Unknown Characters:* 4, 6–12, 14–20, 24, 25, 39, 42, 51, 52, 54–56, 65, 66, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice fucata* was synonymized with *E. schemacephala* by Augener (1925:28–29) after an examination of the types of the latter. The latter is here considered to be indeterminable. The two are here considered separable. *Eunice fucata* is listed in Tables 27 and 28 and listed with other species with simple spine-like subacicular hooks in Table 50. Of the species listed in Table 28, *E. sebastiani* as well as this species has these kinds of subacicular hooks. *Eunice fucata* has up to 12 branchial filaments; *E. sebastiani* has 40 filaments, and the relative lengths of the antennae are very different in the two species.

73. *Eunice fuscafasciata* (Treadwell, 1922)

FIGURE 49e–h; TABLES 33, 40

Nicidion fusca-fasciata Treadwell, 1922:156–157, figs. 47–50, pl. 7: fig. 5.

MATERIAL EXAMINED.—Syntype, AMNH 1920-1529, Pago Pago, Samoa. Syntype, AMNH 1920-1537, Pago-Pago, Samoa.

COMMENTS ON MATERIAL EXAMINED.—The syntype from 1529 is labeled *Nicidion flava-fasciata;* the syntype from 1537 is labeled *Nicidion fusca-fasciata.* The latter is the specimen illustrated by Treadwell (1922, pl. 7: fig. 5). The present description and illustrations are based on the specimen from 1529.

DESCRIPTION.—Syntype described incomplete, of unknown sex, with 84 setigers; length 33 mm; maximal width 1.3 mm at setiger 10; length through setiger 10, 3 mm.

Prostomium (Figure 49e) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae large, in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles medially inflated, with up to 8 cylindrical articulations in A-III; articulations distinct on distal half of ceratostyles only. A-I to middle of anterior peristomial ring; A-II to anterior edge of posterior peristomial ring; A-III to posterior edge of peristomium. Peristomium cylindrical with distinctly muscular lower lip. Separation between rings barely visible dorsally, invisible elsewhere; anterior ring 4/5 of total peristomial length. Peristomial cirri short, slender and digitiform, without articulations.

Maxillary formula 1+1, 5+6, 6+0, 4+9, and presumably 1+1 according to information in Treadwell (1922).

Branchiae absent.

Neuropodial acicular lobes distally truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick and tapering. Ventral cirri basally inflated in median setigers. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri slender. Anterior notopodial cirri thick, tapering, becoming distinctly medially inflated in posterior setigers, without articulations.

Pectinate setae (Figure 49f) slightly flaring, flat. One marginal tooth distinctly longer than the teeth, with ~10 teeth. Shafts of compound falcigers (Figure 49g) distally inflated, marginally smooth. Appendages short with distinct head, bidentate. Proximal teeth larger than distal teeth, pointed, tapering, directed basally. Distal teeth slender, curved. Guards distally symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae with black cores and clear sheaths, tapering distally to blunt, straight tips; cross-section round. Subacicular hooks (Figure 49h) with black cores and clear sheaths, bidentate. Hooks first present from setiger 23, present in all setigers thereafter, always single (except for replacements). Hooks with distinctly bent, narrowed necks, distinct heads. Both teeth directed obliquely distally; proximal teeth larger than distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; setal characters associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 31–42, 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The structure of the subacicular hooks of *E. fuscafasciata* resembles those in *E. afra* and the species is compared to other species in group B-4 in Table 33 and with other abranchiate species in Table 40. Only two abranchiate species have articulated ceratostyles; of these, *E. fuscafasciata* has cylindrical articulations and *E. curticirris* has distinctly moniliform articulations. The differences between this species and *E. brevis* was discussed above.

Eunice fusicirris Grube, 1878

Eunice fusicirris Grube, 1878a:102–103.

REMARKS.—Grube described *E. fusicirris* as having short, thick antennae and peristomial cirri without articulations. The notopodial cirri were thick and stumpy in anterior setigers, becoming more slender in posterior setigers. Branchiae were present from setiger 5 to setiger 37 (of 50 setigers in the

complete specimen). Aciculae were black and the maxillary formula was given as 1+1, 6+5, 8+0, 4+7, and 1+1.

No locality information was available. The species appears to belong to group B-2, or possibly group B-1. Without access to the type it cannot be further characterized and is here considered indeterminable.

74. *Eunice gagzoi* Augener, 1922

FIGURE 50a–h; TABLES 33, 37

Eunice gagzoi Augener, 1922b:45.

MATERIAL EXAMINED.—Lectotype ZMH V-9755, paralectotype, ZMH V-6812, St Thomas, coll. Kröyer and Örsted (part of original material of *Eunice cariboea* Grube, 1856); paralectotype, ZMB 6286, St. Thomas, coll. Kükenthal and Hartmeyer.

COMMENTS ON MATERIAL EXAMINED.—The lectotype has been frontally dissected and the jaws are now missing as are several parapodia along the body.

DESCRIPTION.—Lectotype complete, of unknown sex, with 160 setigers; total length 32.5 mm; maximal width 1.5 mm at setiger 10; length through setiger 10, 2.75 mm. ZMH paralectotype complete, of unknown sex, with 105 setigers. ZMB paralectotype incomplete, of unknown sex, with 167 setigers.

Prostomium (Figure 50a) distinctly shorter than peristomium, about as wide as peristomium, as deep as $^1/_2$ of the peristomium. Prostomial lobes frontally rounded, dorsally flattened, tapering from junction to peristomium; median sulcus distinct ventrally and marked as shallow notch frontally, invisible dorsally. Eyes between bases of A-I and A-II. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. A-I to middle of anterior peristomial ring; A-II and A-III to setiger 1. Peristomium tapering anteriorly, with distinct muscular lower lip. Separation between rings distinct on all sides; anterior ring ~$^2/_3$ of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula of ZMB paralectotype 1+1, 6+6, 6+0, 4+8, and 1+1. Mx III part of distal arc with left Mx IV. Mx VI missing.

Branchiae (Figure 50g) present as single thick branchial filaments from setiger 120 in lectotype, from setiger 85 in ZMH paralectotype, and from setiger 115 in ZMB paralectotype. Branchiae increasing in length posteriorly up to last 5 setigers, about as long as body is wide where best developed, reduced over last 5 setigers to short, indistinct buttons on last setigers present. Branchiae present on less than 55% of the total number of setigers.

Anterior neuropodial acicular lobes (Figure 50f) asymmetrically rounded, becoming symmetrically rounded in posterior setigers; aciculae emerging at midline. Anterior presetal lobes low, transverse folds, considerably shorter than acicular lobes, increasing in relative length posteriorly and from about setiger 50 follow outline of acicular lobes closely. Anterior postsetal lobes higher than acicular lobes, symmetrically rounded, by setiger 25 postsetal lobes reduced to low folds following outline of acicular lobes closely. Anterior ventral cirri thick and tapering. Ventral cirri basally strongly inflated in setigers 10 to about setiger 30. Inflated bases thick, transverse welts; narrow tips tapering. Inflation rapidly reduced rapidly from setiger 30, from about setiger 45 ventral cirri short, slender and digitiform. Anterior notopodial cirri basally inflated, becoming shorter and more slender in posterior setigers, but always longer than ventral cirri, without articulations.

Limbate setae slender, marginally finely serrated. Pectinate setae (Figure 50e) very large, tapering, flat. Both marginal teeth longer than other teeth, ~12 teeth present. Shafts of compound falcigers (Figure 50c,d) inflated, marginally coarsely and shallowly serrated. Appendages slender. Anterior appendages (Figure 50c) with nearly parallel sides and large heads, bidentate. Teeth similar in size. Proximal teeth tapering, directed obliquely distally. Distal teeth curved, directed obliquely distally. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Posterior appendages (Figure 50d) tapering with small heads, bidentate. Proximal teeth smaller than distal teeth, tapering, directed obliquely distally. Distal teeth curved, directed obliquely distally. Guards increasingly symmetrically rounded in posterior setigers, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 50b) single, amber-colored, thick, abruptly tapering, distally bent. Subacicular hooks (Figure 50h) amber-colored, bidentate. Hooks first present from setiger 27–38, present in all setigers thereafter, always single (except for replacements). Hooks with distinctly inflated subdistal region and large, parrot-beak shaped heads. Proximal teeth very large, strongly curved. Distal teeth small, distinctly curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 33, 34, 39–42, 56, 58, 59. *Unknown Characters:* 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—This species was considered a junior synonym of *E. cariboea* by Hartman (1959) and it certainly resembles that species. The two species have, however, distinctly different subacicular hooks, pectinate setae, and aciculae, in addition to having differently shaped prostomia and peristomia. The presence of distinct branchiae on *E. gagzoi* also clearly separates the two species. *Eunice gagzoi* has been compared to similar species in Tables 33 and 37. The very late start of the

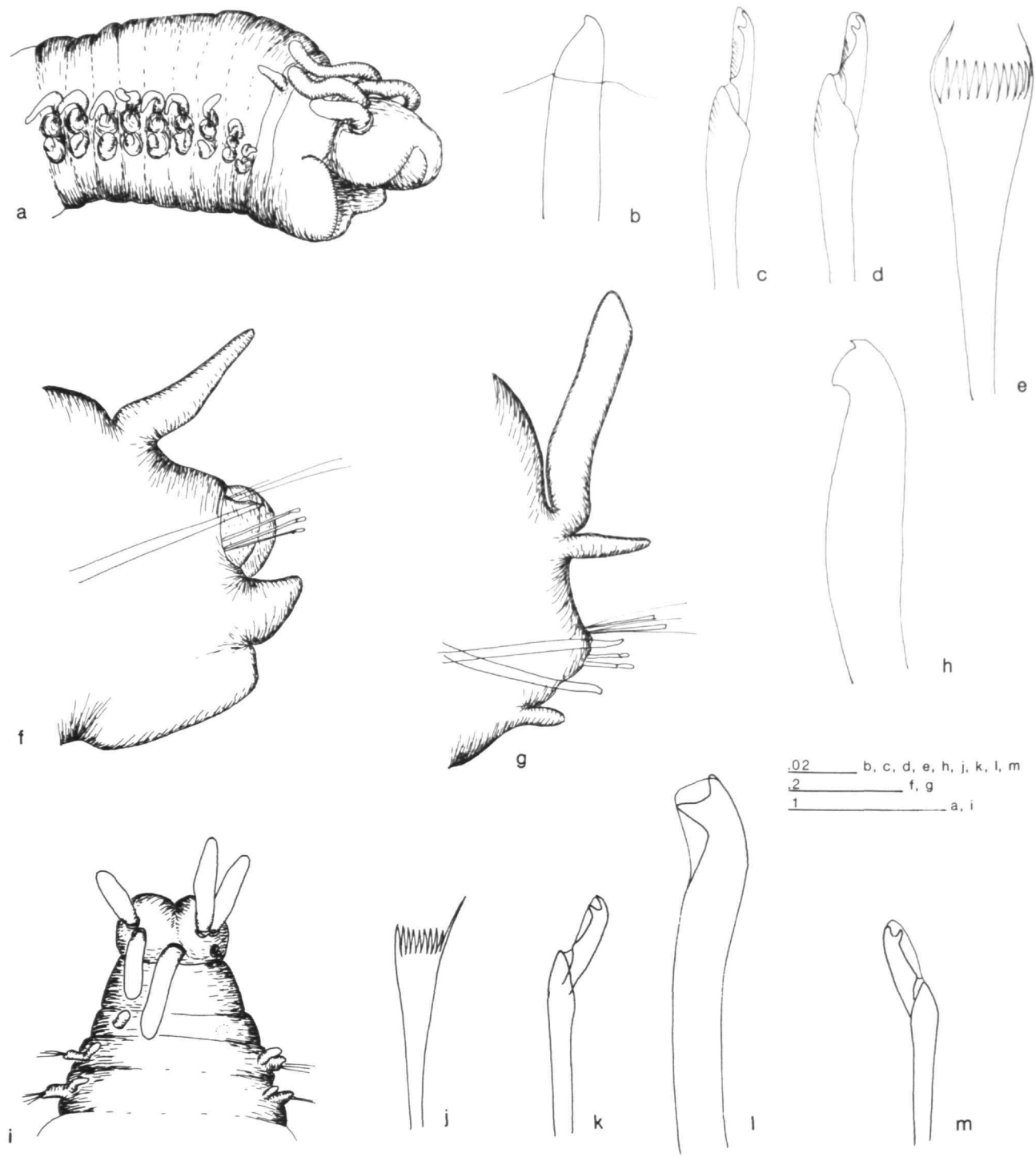

FIGURE 50.—*Eunice gagzoi* (lectotype ZMH V-9755): a, anterior end, lateral view; b, acicula, parapodium 12; c, compound falciger, parapodium 12; d, compound falciger, parapodium 150; e, pectinate seta, parapodium 150; f, parapodium 12, anterior view; g, parapodium 150, anterior view; h, subacicular hook, parapodium 150. *Eunice goodei*, new name (holotype of *Nicidion kinbergi*, USNM 4800): i, anterior end, dorsal view; j, pectinate seta, median parapodium; k, compound falciger, median parapodium; l, subacicular hook, median parapodium; m, compound falciger, median parapodium. (Scale bars in mm.)

branchiae is rare in the genus, and unique to the species listed in Table 37.

Eunice gaimardi Quatrefages, 1866

Eunice gaimardi Quatrefages, 1866:321.—Fauchald, 1986:251.

REMARKS.—The information available about this species was reviewed by Fauchald (1986). The species is indeterminable without access to the type material.

Eunice gallica (Lamarck, 1818)

Leodice gallica Lamarck, 1818:322.—Savigny, 1820:50-51.
Eunice gallica.—Audouin and Milne Edwards, 1833:218; 1834:144.

REMARKS.—Lamarck gave a brief Latin diagnosis and an even briefer comment in French. The combined information is summarized in the next paragraph.

Specimen with 71 segments. Antennae without articulations. Branchiae first present from segment 6 [setiger 4?, K. Fauchald comment]. Anterior branchiae single filaments; other branchiae bifid. Branchiae missing on last 18 setigers.

Savigny added that the antennae were shorter than in *E. antennata* and lacked articulations and that branchiae in segments 6-8 were simple filaments, that the branchiae of segment 9 had two filaments, and that branchiae were missing in the last 18 segments of a total of 72 segments.

Audouin and Milne Edwards (1834) stated that they had not seen any material, that the species resembles *E. harassii*, except for the absence of articulations from the ceratostyles, and that the branchiae started on segment 6. They otherwise quoted Savigny's description in toto.

No specimens are known and no type locality other than what is implied by the species name is known. The species is here considered indeterminable, in agreement with Hartman (1959).

Eunice gigantea auctores

REMARKS.—This specific name has been used several times, in a variety of contexts. The specimens to which the different versions of the name were originally applied are no longer in existence, and the name, in all its many guises, is invalid. Part of the discussion has referred to the designation of type species for the genus; this aspect was reviewed above. However, a brief review of the various uses of this name may clarify some of the confusion at the species level.

1. *Nereis gigantea* Linnaeus, 1758:654. The total description is the following line:

Nereis tentaculorum fasciculis triplici ordine.

As a synonym for this species, Linnaeus lists *Millepora marina amboinensi* and as habitat "Mare Indico." The information in the Linnean description is clearly inadequate to identify the taxon even to family.

2. *"Eunice gigantea* Cuvier" sensu auctores. According to Savigny (1820:49-50), Cuvier used this name for specimens in the collections in Paris and published in Cuvier (1817:525). Cuvier (1817:525) named the genus *Eunice*, but no species named *gigantea* was mentioned. He listed *aphroditois, pinnata, norwegica, tubicola*, and *cuprea* as members of his new genus and stated that he "had seen a giant specimen [of *Eunice*]" from the Indian Ocean. That informal mention may have been the source of the reference by later authors. Lamarck (1818:322) made no reference to a species named *gigantea* authored by Cuvier. In a later edition, Cuvier (1830:200) included *gigantea* in a list of synonyms similar to the one issued by Savigny (1820). Cuvier (1830) reviewed material from both the Indian and Atlantic oceans.

3. *Leodice gigantea* Lamarck, 1818. Lamarck (1818:322) gave a brief Latin diagnosis of the species and a rather extensive description in French. His description is an excerpt of the one published by Savigny two years later and clearly refers to the same specimens.

4. *Leodice gigantea*.—Savigny, 1820:49-50. Savigny listed *Nereis aphroditois* Pallas (= *Terebella aphroditois*, sensu Gmelin) as a possible synonym for his new species (which actually had been published already by Lamarck). The quote reads "Variété d'âge ou espèce très-voisine." In addition, Savigny quoted the museum collections and gave reference to Cuvier as listed above. The material studied by Savigny was from the Indian Ocean and the fairly detailed description is consistent with *Eunice aphroditois* (Pallas). Because the latter name is valid (see above), in this sense the name is a junior synonym of *E. aphroditois*.

5. Quatrefages (1866:311) reserved the name *gigantea* for material from the Indian Ocean. He gave a new name, *Eunice roussaei*, to Atlantic specimens, including some he had collected; as a synonym for this species he quoted *"Eunice gigantea* Cuvier Règne anim. t. III, p. 200." This reference is to the second edition of Cuvier's book, issued in 1833, where the species occurs on the page indicated and where Cuvier included specimens from both the Atlantic and Indian oceans. Quatrefages is correct in separating the Atlantic species from the Indian Ocean species; thus he was also correct in giving the Atlantic material a new name. As the original author for the name *gigantea*, Quatrefages quoted *Nereis gigantea* Linnaeus with no date. As indicated above, the Linnaean species, as originally described in 1758, is wholly unidentifiable, even to family. In summary, where identifiable, the name *gigantea* in combination with the generic names *Eunice* or *Leodice* used about material from the Indian Ocean refers to the species validly named *E. aphroditois* (Pallas). The Linnaean name *Nereis gigantea* cannot be identified even to family. Cuvier did not use the name *E. gigantea* in the 1817 edition of his "Règne animal"; he used it first in 1833; thus Lamarck (1818) first used the name *Leodice gigantea* and in his sense the name can be identified as a junior synonym of Pallas' *Nereis aphroditois*.

75. *Eunice goodei*, new name

FIGURE 50i-m; TABLES 33, 40

Nicidion kinbergi Webster, 1884:320-321, pl. 12: figs. 81-88 [not *Eunice kinbergi* Ehlers, 1868:306].
Eunice (Nicidion) kinbergi.—Hartman, 1944:124; 1959:313.

MATERIAL EXAMINED.—Holotype of *Nicidion kinbergi*, USNM 4800, 1 specimen plus 3 slides of prostomium and parapodia, Bermuda, coll. G. Brown Goode.

COMMENTS ON MATERIAL EXAMINED.—The holotype is now in three pieces; the anterior end and two first setigers are mounted on a slide; two other slides contain various parapodia.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 56 setigers; estimated length 16 mm; maximal width 0.75 mm; length through setiger 10, 4 mm. Body dorsally convex, ventrally slightly flattened, basically cylindrical with little indication of taper posteriorly.

Prostomium (Figure 50i) distinctly shorter and narrower than peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes posterior to bases of A-I and A-II. Antennae in horseshoe; A-I and A-II close together, separated by gap from A-III, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. A-I and A-II to posterior peristomial ring; A-III to setiger 1. Peristomium tapering anteriorly. Separation between rings distinct on all sides; anterior ring $^2/_3$ of total peristomial length. Peristomial cirrus on right side lost; left cirrus short, ovate, possibly in regeneration.

Jaws not examined.

Branchiae absent.

Anterior neuropodial acicular lobes truncate, becoming conical in posterior setigers; aciculae emerging at midline. Presetal lobes low, transverse folds. Anterior postsetal lobes rounded, longer than acicular lobes, becoming low, transverse folds at about setiger 20. Anterior ventral cirri tapering, becoming basally inflated by setiger 10. Inflated bases large, nearly hemispherical; narrow tips short and button-shaped. Inflated bases rapidly reduced posteriorly, absent by setiger 40. Posterior ventral cirri slender and digitiform. Anterior notopodial cirri basally slightly inflated, tapering to slender tips; inflated bases lost posteriorly; last notopodial cirri present slender, digitiform. Notopodial cirri without articulations.

Limbate setae marginally smooth with long, thin, filamentous tips. Pectinate setae (Figure 50j) tapering, flat. One marginal tooth longer than other teeth, with 10 teeth. Shafts of compound falcigers (Figure 50k,m) inflated, marginally smooth. Appendages tapering, bidentate. Proximal teeth tapering, directed slightly distally in most hooks. Distal teeth tapering to sharp or blunt points, directed obliquely distally. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae with dark yellow to dark brown cores and clear sheaths, sharply pointed, straight; cross-sections round. Subacicular hooks (Figure 50l) with light to dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 23, present in all setigers thereafter, always single (except for replacements). Hooks curved, with distinctly narrowed necks just below heads. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth triangular, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; setal features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 31-42, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 12, 24, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—This species was originally described as *Nicidion kinbergi*. Because of the fusion of the genus *Nicidion* with *Eunice*, the species name ends up being preoccupied in the combination *Eunice kinbergi* Ehlers (1868:306), proposed for a very different species (see below). The new specific name honors G. Brown Goode, who at the time of collecting this material was a professor at Wesleyan University, he later became Assistant Secretary of the Smithsonian Institution.

Eunice goodei is listed with similar species in Tables 33 and 40. It can be separated from the other abranchiate species as suggested in the discussion of *E. cariboea*.

207. *Eunice goodsiri* (McIntosh, 1885)

TABLES 33, 34

Marphysa goodsiri McIntosh, 1885:299-301, figs. 56-58, pl. 38: figs. 6-8, pl. 19A: figs. 18-20.

DESCRIPTION.—No material is available. The following description is based on McIntosh's description and interpretation of his illustrations.

Maximum width 2.5 mm.

Median sulcus deep. Eyes present. Antennae similar in thickness. Ceratostyles tapering, articulated with distal articulations drop-shaped. Length of A-II and A-III similar. Peristomial cirri to anterior end of peristomium.

Maxillary formula (after McIntosh, 1885:300 and fig. 56) 1+1, 4+4, 3+0, 3+6, 1+1.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 25 or 26 to end of fragment. First 11 pairs single filaments, maximum 2 filaments continued to end of fragment.

Median acicular lobes conical; aciculae emerging close to midline. Pre- and postsetal lobes unknown. Ventral cirri inflated in median setigers (at least in setigers 20 and 40). Notopodial cirri tapering in all setigers present, without articulations.

Limbate and pectinate setae unknown. Shafts of compound falcigers distally inflated, without marginal serrations, with internal striations. Appendages tapering, bidentate. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth tapering, curved, distally directed obliquely laterally. Guards of compound falcigers distally symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Up to 3 aciculae in anterior setigers, single in median setigers (setiger 40), dark, pointed, bent in anterior setigers. Subacicular hooks with dark core and clear sheath, bidentate. Distribution unknown, single. Proximal teeth larger than distal teeth, directed laterally, tilted upward distally. Distal teeth short, thick, tapering, directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Most features remain unknown.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Species too poorly known to allow any predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56. *Unknown Characters:* 1, 2, 4-8, 10-12, 14-16; 18, 19, 24-26, 28, 29, 36-38, 40, 45-52, 57-60, 63, 65-68, 80.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Described from St. Thomas in the West Indies, this species was compared to *E. filamentosa* by McIntosh. It has not been reported since it was first recorded. It belongs to group B-4 and has been compared to similar species in Tables 33 and 34. The only other species in Table 34 with distally drop-shaped articulations in the antennae is *E. collaris*. The two species differ in many characters; perhaps most noticeable are the differences in the branchial structures. *Eunice goodsiri* has palmate branchiae with up to two filaments; *E. collaris* has pectinate branchiae with up to 12 filaments.

Eunice goodsiri is too poorly known to be included in the key.

76. *Eunice gracilicirrata* (Treadwell, 1922)

FIGURE 51a-g; TABLES 22, 23

Leodice gracili-cirrata Treadwell, 1922:149-150, figs. 36-38, pl. 5: figs. 1-8.
Eunice armillata.—Hartman, 1956:282 [not *Eunice armillata* Treadwell, 1922].

MATERIAL EXAMINED.—Holotype, AMNH IV-1920-1535, Suva Harbor, Fiji.

COMMENTS ON MATERIAL EXAMINED.—The antennae are all bent over and cannot be illustrated as stretched without damage to the specimen; the sizes of the antennae given below are low estimates.

DESCRIPTION.—Holotype complete, of unknown sex, with 323 setigers; length 214 mm; maximal width 2.5 mm at setiger 10; length through setiger 10, 9 mm.

Prostomium (Figure 51a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in shallow horseshoe; A-I and A-II close together, separated by gap from A-III; A-III slimmer than A-I and A-II. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, slender, with up to 5 indistinct, long, cylindrical articulations; articulations limited to distal half of styles. A-I to middle of anterior peristomial ring; A-II to setiger 2; A-III to front edge of setiger 4. Peristomium about twice as long as prostomium, cylindrical. Separation between rings distinct dorsally and ventrally and less well marked, but visible also laterally; anterior ring ~$^4/_5$ of total peristomial length. Peristomial cirri to tip of prostomium, slender, with 3 or 4 indistinct articulations.

Jaws not examined.

Branchiae (Figure 51f) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 181. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 pairs single filaments; maximum 7 filaments in setiger 20-60, thereafter numbers decreasing gradually. From setiger 145 to setiger 181 only single filaments present. Branchial stems slender, tapering, shorter than notopodial cirri. Filaments very long, slender, digitiform. Last few branchiae short, nearly button-shaped protrusions.

Neuropodial acicular lobes distally truncate; aciculae emerging at midline. Presetal lobes low, transverse folds. Anterior postsetal lobes about as long as acicular lobes, rounded, becoming reduced to low, transverse folds by setiger 20. Ventral cirri digitiform through setiger 10, thereafter basally inflated through next 40 setigers, retaining long, digitiform narrow tips. Inflated bases ovate, decreasing rapidly from setiger 60, essentially lost by setiger 70. Posterior to setiger 100, ventral cirri tapering and digitiform. Anterior notopodial cirri slender and tapering, similar in length to anterior ventral cirri. Notopodial cirri increasing rapidly in length, by setiger 10 longer than half of body width, with 2 to 5 indistinct articulations. Median and posterior notopodial cirri without articulations. Notopodial cirri long in all branchial segments, thereafter decreasing rapidly to about setiger 240. Posterior to setiger 240 ventral cirri and notopodial cirri again of about same length (Figure 51g); far posterior notopodial cirri less than half as wide as ventral cirri.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 51e) large, tapering, flat. Either 1 or both marginal teeth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 51c) inflated, with fine marginal serrations. Appendages slender, bidentate. Proximal teeth smaller than distal teeth, triangular, directed laterally. Distal teeth tapering, curved. Guards symmetrically rounded, marginally finely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, straight; cross-sections round. Superior aciculae (Figure 51b) tapering abruptly, distally covered with a fine hood or mucro. Inferior aciculae bluntly rounded. Separation between core and sheath

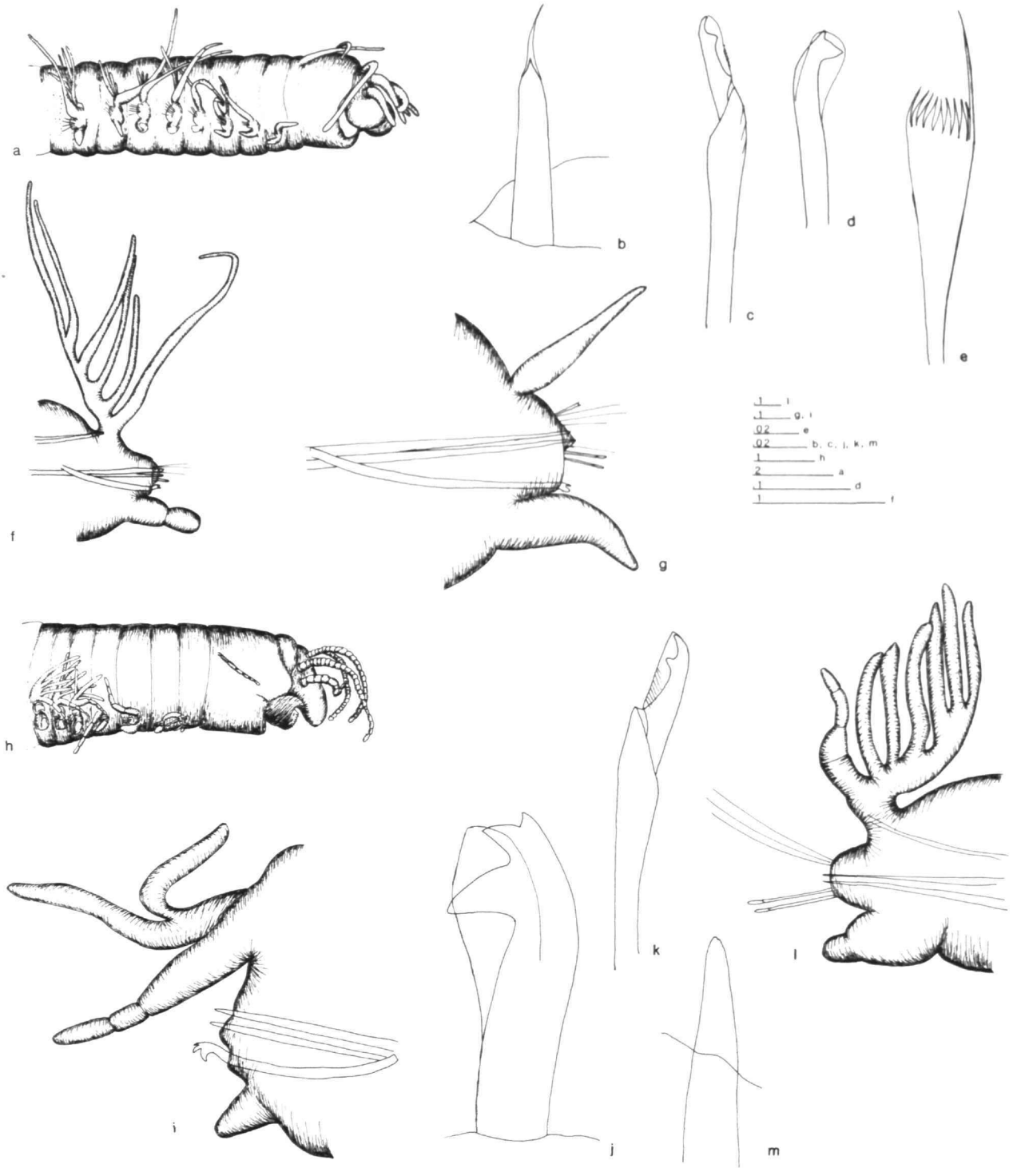

FIGURE 51.—*Eunice gracilicirrata* (holotype, AMNH IV-1920-1535): a, anterior end, lateral view; b, acicula, parapodium 74; c, compound falciger, parapodium 74; d, subacicular hook, parapodium 275; e, pectinate seta, parapodium 275; f, parapodium 74, anterior view; g, parapodium 275, anterior view. *Eunice gracilis* (syntype, ZMB 1856): h, anterior end, lateral view; i, parapodium 30, anterior view; j, subacicular hook, parapodium 30; k, compound falciger, parapodium 6; l, parapodium 6, anterior view; m, acicula, parapodium 30. (Scale bars in mm.)

indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 51d) yellow, bidentate. Hooks first present from setiger 63, present in all setigers thereafter, always single (except for replacements). Hooks distally strongly curved; heads small. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth less than half as massive as proximal teeth, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Presumably through a lapsus, *E. gracilicirrata* was referred to *E. armillata* by Hartman (1956). *Eunice gracilicirrata* belongs to group A-2 (Fauchald, 1970).

It is a very long, slender species with long, slender ceratostyles and notopodial cirri. The aciculae are hooded in some anterior setigers. It is listed with similar species in Tables 22 and 23. Of the species listed in Table 23, only *E. gracilicirrata* and *E. stigmatura* have articulated peristomial cirri. The latter has tridentate subacicular hooks, in addition to bidentate ones; *E. gracilicirrata* has only distinctly bidentate subacicular hooks.

77. *Eunice gracilis* Grube, 1866

FIGURE 51h–m; TABLES 46–48

Eunice antennata gracilis Grube, 1866a:65.
Eunice gracilis.—Grube, 1866c:174.
Eunice gracilis Gr. var. *antennata*.—Grube, 1867:9–11, pl. 1: fig. 2.

MATERIAL EXAMINED.—Two syntypes, ZMB 1856 and ZMH V-787, Tahiti, *Novara* Exp.

COMMENTS ON MATERIAL EXAMINED.—Both specimens are now rather flaccid, but are otherwise in good condition; but the shape of the parapodial lobes is difficult to describe in detail. The description is based on the Berlin syntype with notes where the Hamburg syntype differs.

DESCRIPTION.—Berlin syntype complete, of unknown sex, with 81 setigers; total length 66 mm; maximal width 2 mm at setiger 10; length through setiger 10, 6 mm. Hamburg syntype incomplete, of unknown sex, with 31 setigers; length 25 mm; maximal width 3 mm at setiger 10; length through setiger 10, 7 mm.

Prostomium (Figure 51h) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium, sloping steeply ventrally. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes between bases of A-I and A-II in Hamburg syntype, reddish. Antennae in horseshoe, evenly spaced; A-I thicker than other antennae. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform with up to 23 moniliform articulations; styles articulated to bases. A-I to middle of anterior peristomial ring; right A-II to setiger 2; left A-II and A-III incomplete. A-III probably longest antenna, in incomplete condition as long as right A-II. Peristomium cylindrical. Separation between rings faintly visible dorsally, indiscernible ventrally and laterally. Anterior ring 4/5 of total peristomial length. Peristomial cirri to front edge of peristomium, very slender and digitiform, with 6 articulations.

Maxillary formula 1+1, 6+7, 8+0, 5+10, and 1+1. Teeth slender and delicate. Mx III long and located behind left Mx II. Mx VI missing.

Branchiae (Figure 51l) present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region, erect. Branchiae from setiger 5 (4 in Hamburg specimen) to setiger 81. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchia with 3 filaments, maximally 6 filaments present. Number of filaments decreasing rapidly from setiger 20, by setiger 35 single filaments. At setiger 65 number of filaments increasing to 2; last 10 branchiae with 3 filaments. Anterior and posterior branchiae longer than notopodial cirri; median and posterior branchiae shorter than notopodial cirri. Stems tapering, about as long as notopodial cirri. Anterior and posterior filaments digitiform; median filaments filiform; anterior and posterior filaments shorter than notopodial cirri.

Anterior neuropodial acicular lobes apparently rounded; posterior acicular lobes triangular or perhaps conical; aciculae emerging at midline. Pre- and postsetal lobes apparently low, transverse folds. Anterior ventral cirri thick and tapering. Bases inflated base from about setiger 10. Bases ovate; narrow tips tapering. From setiger 30 ventral cirri reduced to short, sharply tapering lobes (Figure 51i). Anterior notopodial cirri long, tapering or digitiform, with 4 or 5 articulations. Number of articulations decreasing posteriorly, and completely lost at about setiger 50. Posterior notopodial cirri retaining shape but shorter than in anterior part of body.

Limbate setae slender. Shafts of compound falcigers (Figure 51k) distally gently inflated, marginally smooth. Appendages short, tapering; head distinct, bidentate. Proximal teeth shorter than distal teeth, tapering, directed distally. Distal teeth tapering, directed obliquely distally. Guards asymmetrically bluntly pointed, marginally finely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 51m) paired, yellow, tapering to bluntly pointed, straight tips; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 51j) yellow; tridentate with teeth in a crest. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks very large; fangs in a row, decreasing evenly and rapidly in size from large main fangs to small tertiary fangs; all fangs curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 23, 42, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Described on material collected during the *Novara* Expedition, this species was named in a brief note. In this note Grube stated that the species described from the *Novara* material under the name *E. gracilis* should be considered a variety of *E. antennata* Sav., differing basically in the greater articulations of the notopodia. This note was published before the expedition report came out, so the official original name for the species becomes *E. antennata gracilis*. The types differ clearly from *E. antennata* and is here considered a distinct species.

Eunice gracilis is listed with similar species in Tables 46 and 48. It is the only species in Table 48 with very poorly marked separation between the anterior and posterior ring of the peristomium; in this species it is barely visible dorsally and indiscernible laterally and ventrally; in the other species in this table, the separation is at the very least distinct dorsally and ventrally and in some species is distinct on all sides.

Eunice gracilis Moore, 1903

Eunice gracilis Moore, 1903:440-441, pl. 25: figs. 46-48.

REMARKS.—The name *E. gracilis* is preoccupied in the combination *E. gracilis* Grube, 1866. Moore's species, which clearly differs from Grube's, is here renamed *E. japonica* and is described below.

Eunice gracilis (Crossland, 1904)

Nicidion gracilis Crossland, 1904:327-329, fig. 66, pl. 22: figs. 10, 11.
Eunice (Nicidion) gracilis.—Hartman, 1959:313.

REMARKS.—With the fusion of *Nicidion* and *Eunice*, the specific name becomes preoccupied in the combination *E. gracilis* Grube, 1866. Crossland's species is here renamed *E. wasinensis* and is described below.

78. *Eunice gravieri* Fauvel, 1911

TABLES 24, 25

Eunice gravieri Fauvel, 1911:14-15, figs. 1a-b, 2a-d; 1914:145-146, pl. 10: figs. 1-4 and 11-18.

DESCRIPTION.—The types are not available. Fauvel's two descriptions are detailed and suffice to characterize the species.

Types two small specimens, one incomplete, other 28 mm long and 2 mm wide (presumably with parapodia); numbers of setigers not mentioned but must have exceeded 50.

Prostomium frontally rounded. Two pairs of eyes; 1 between bases of A-I and A-II and 1 pair posterior and slightly medial to other pair, hidden under peristomial fold. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 6 long, cylindrical articulations in A-III (as illustrated, not moniliform as stated by Fauvel). A-II and III to setiger 8. Peristomium apparently a single ring. Peristomial cirri very slender and digitiform, reaching well beyond frontal edge of peristomium, articulated (Fauvel's illustrations conflict with his text).

Maxillary formula 1+1, 6+7, 7+0, 6+10, 1+1, and 1+1. Mx V and VI reduced. Mx III part of distal arc with left Mx IV.

Branchiae present, single filaments, distinctly shorter than notopodial cirri. Branchiae from setiger 5 to setiger 20 or 26. Branchiae terminating well before posterior end. Filaments digitiform.

Ventral cirri basally inflated in branchial region, tapering in anterior and far posterior setigers. Notopodial cirri digitiform, vaguely articulated, at least through branchial region.

Pectinate setae narrow. One marginal tooth very long, stout, with ~10 teeth. Shafts of compound falcigers tapering or slightly inflated, marginally smooth. Appendages relatively short, with large heads, bidentate. Proximal teeth triangular, slightly tapering, directed at various angles. Distal teeth either gently curved and slender or thick with distinct bends. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae dark, tapering, pointed, straight in anterior setigers, bent in posterior setigers; cross-sections round. Subacicular hooks dark, bidentate. Hooks first present from setiger 25. Hooks strongly curved, with distinct inflated region just below heads. Proximal teeth larger than distal tooth, directed laterally. Distal tooth directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Numerous features from all parts of the body.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Species too poorly known to allow predictions.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 26, 33, 34, 39, 40, 56, 58, 59. *Unknown Characters:* 1, 4-6, 8-12, 15-17, 24, 38, 43-51, 54, 55, 65, 67, 74, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Some puzzling features described by Fauvel need confirmation. The presence of four eyes is rare in the family. An entire peristomium, as far as I know, has never been reported for any other species. The distribution of branchiae and the structure of the branchiae are similar to what is present in certain juveniles, but these features are by no means uniquely juvenile features. The species is listed with similar species in Tables 24 and 25; it is not characterized by a single unique feature; other than those noted above. It is too poorly known to be included in the key.

79. *Eunice grubei* Gravier, 1900

FIGURE 52a-e; TABLES 27, 32

Eunice grubei Gravier, 1900:258-261, figs. 125-129, pl. 14: figs. 87, 88.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, Djibouti, H. Coutière no. 29, 1897.

COMMENTS ON MATERIAL EXAMINED.—The holotype has been mildly dehydrated at one time.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 55 setigers; length 42 mm long; maximal width 6 mm at setiger 10; length through setiger 10, 12 mm. Body cylindrical throughout.

Prostomium (Figure 52e) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes not observed. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 8 cylindrical articulations, articulations basally cylindrical becoming drop-shaped distally. A-I to posterior peristomial ring; A-II and A-III to setiger 1. Peristomium cylindrical with distinct muscular lower lip. Separation between rings distinct dorsally and ventrally, and invisible on short lateral section; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and digitiform with 5 long, drop-shaped articulations.

Maxillary formula 1+1, 5+5, 7+0, 6+9, and 1+1. Mx III part of distal arc with very short left Mx IV. Mx VI absent.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to end of fragment. First branchiae single filaments, maximum 8 filaments at about setiger 20; number of filaments decreasing posteriorly; 4 or 5 filaments in each branchia in last segments. Branchial stems thick, tapering, as long as notopodial cirri. Filaments digitiform, shorter than notopodial cirri.

Neuropodial acicular lobes distally truncate; aciculae emerging at midline. Pre- and postsetal lobes transverse folds; presetal lobes shorter than acicular lobes; postsetal lobes nearly as long as acicular lobes. First 5 ventral cirri large, nearly triangular, tapering to blunt tips. Ventral cirri basally inflated from setiger 6 through setiger 30. Inflated bases modest, ovate, in relation to large, tapering tips. Posterior to setiger 30 ventral cirri very broadly attached ventral to neuropodial acicular lobes, tapering to blunt tips; attachment point slightly posterior to emergence of subacicular hooks, forming incomplete scoops around lower edge of neuropodia. Notopodial cirri basally inflated, tapering to digitiform tips. Prebranchial notopodial cirri with 4 or 5 indistinct articulations; all other notopodial cirri without articulations.

Limbate setae marginally smooth or slightly frayed. Pectinate setae (Figure 52b) tapering, gently furled. Both marginal teeth thicker than other teeth; one marginal tooth distinctly longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 52c,d) tapering, marginally smooth. Appendages short, tapering, with large heads, bidentate. Proximal teeth smaller than distal teeth, conical to nearly triangular, directed laterally or slightly distally. Distal teeth tapering, curved, directed laterally. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae numbering 2 or 3, amber to dark brown, thick, distally blunt, gently curved or straight; cross-sections round. Subacicular hooks (Figure 52a) amber to dark brown, bidentate. First few hooks light amber and easily overlooked. Hooks first present from setiger 24, present in all setigers thereafter, usually single, paired in some setigers. Hooks with narrow neck and distinct head. Proximal teeth large, directed laterally. Distal teeth smaller than proximal teeth, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 36-38, 40, 47, 50, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice grubei* is listed with similar species in Tables 27 and 32. It is the only species listed in Table 32 that combines branchiae starting from setiger 3 with articulated notopodial cirri limited to the anterior end; in the other species in the table with branchiae from setiger 3, the notopodial cirri are articulated throughout.

Eunice grunwaldi (Risso, 1826)

Leodice Grunwaldi Risso, 1826:423.—Fauvel, 1923:451.
Eunice Grunwaldi.—Grube, 1850:292.

REMARKS.—Grube (1850) referred this species to his section of *Eunice* without tentacular cirri (his *"Leodicae Marphysae* Sav."); Fauvel (1923) referred the species to *Marphysa*. The species will be further considered in a planned review of that genus.

80. *Eunice guanica* (Treadwell, 1921)

FIGURE 52f-i; TABLES 33, 36

Leodice guanica Treadwell, 1921: 39-40, figs. 107-116, pl. 2: figs. 9-12.
Eunice afra.—Hartman, 1956:282 [not *Eunice afra* Peters, 1854].

MATERIAL EXAMINED.—Holotype, AMNH 1915-1342, Sand Key, Key West, Florida.

DESCRIPTION.—Holotype complete, of unknown sex, with 224 setigers; total length 100 mm; maximal width 4 mm at setiger 10; length through setiger 10, 7 mm. Body anteriorly cylindrical with very short parapodia.

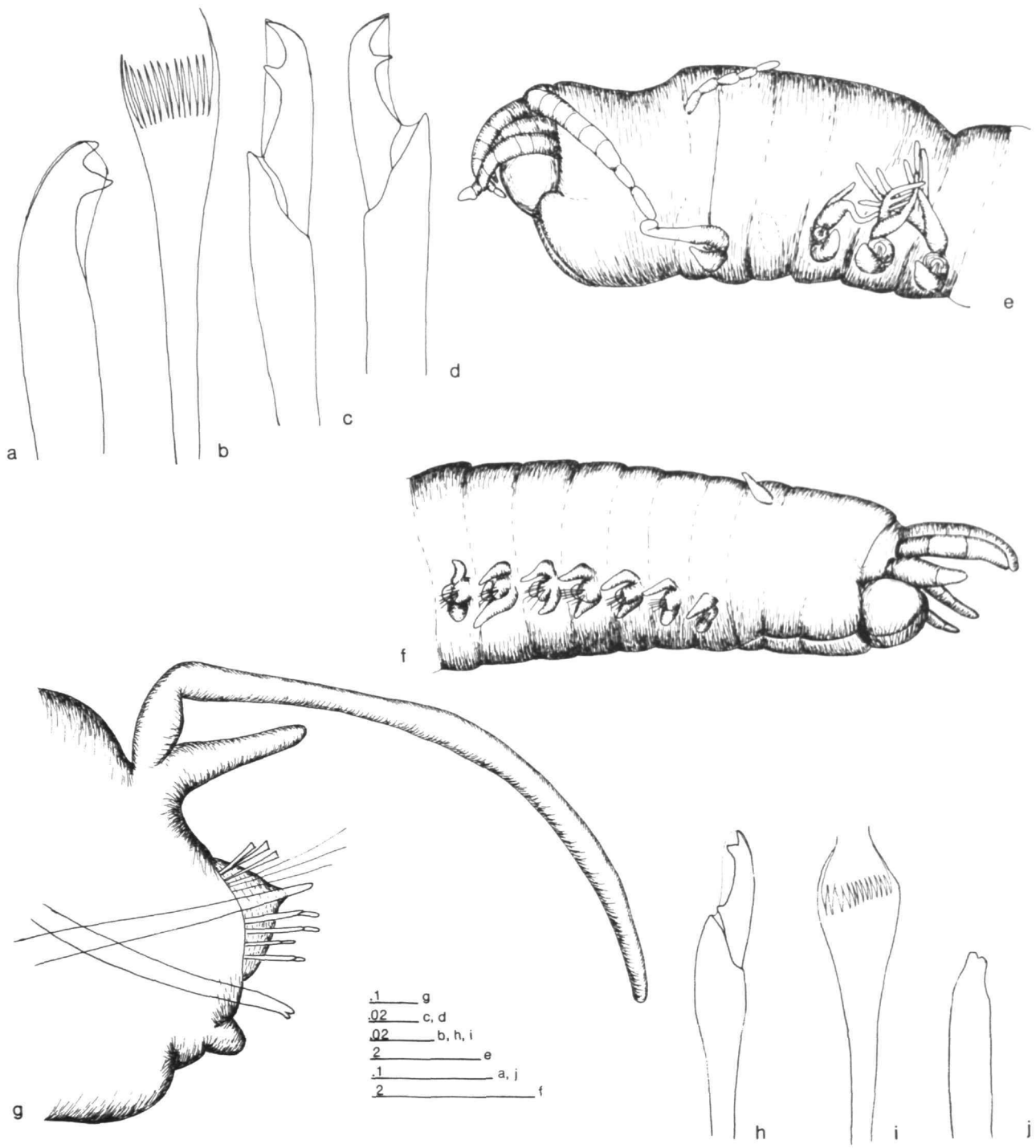

FIGURE 52.—*Eunice grubei* (holotype, MNHN, Paris): a, subacicular hook, parapodium 42; b, pectinate seta, parapodium 42; c, compound falciger, parapodium 49; d, compound falciger, parapodium 42; e,anterior end, lateral view. *Eunice guanica* (holotype, AMNH 1915-1342): f, anterior end, lateral view; g, posterior parapodium, anterior view; h, compound falciger, posterior parapodium; i, pectinate seta, posterior parapodium; j, subacicular hook, posterior parapodium. (Scale bars in mm.)

Prostomium (Figure 52f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes short, frontally rounded, dorsally inflated; median sulcus short. Antennae in a nearly complete circle and directed forwards, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with 2 or 3 cylindrical articulations in A-II and A-III. A-I to middle of anterior peristomial ring; A-II to middle of anterior peristomial ring; A-III to posterior edge of anterior peristomial ring. Peristomium more than twice as long as prostomium, cylindrical with a ventral depression anteriorly. Peristomium divided ventrally into 3 equally long parts; posteriormost of these parts distinct also dorsally representing posterior peristomial ring, separation indistinct laterally. Peristomial cirri barely reach front edge of posterior peristomial ring, tapering, without articulations.

Jaws missing.

Branchiae present, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 19 to setiger 224. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 10 branchiae single filaments, thereafter some segments with 2 filaments, others with single filaments, up to 1/4 of segments in branchial region, without branchiae. Branchiae very long (Figure 52g), slender, digitiform, outreaching notopodial cirri in all but a few posterior branchial segments.

Anterior neuropodial acicular lobes distally symmetrically rounded; posterior acicular lobes triangular with prominently projecting aciculae; aciculae emerging at midline. All presetal lobes low transverse folds. Anterior postsetal lobes higher than acicular lobes, distally rounded; postsetal lobes reduced to low folds by beginning of branchial region. First 6–7 ventral cirri digitiform. Ventral cirri becoming basally inflated in median setigers. Bases ovate; narrow tips short and button-shaped. Inflated bases continued through rest of body. Notopodial cirri tapering, similar in length except shorter in first 2 segments. Notopodial cirri without articulations.

Limbate setae slender, marginally frayed. Pectinate setae (Figure 52i) relatively large, but very delicate, flaring, flat. Both marginal teeth distinctly longer than other teeth, with 15 teeth. Shafts of compound falcigers (Figure 52h) distally inflated, marginally smooth. Appendages tapering; head small, bidentate. Proximal teeth considerably larger than distal teeth, tapering, directed slightly distally. Distal teeth gently curved, tapering. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, black, distally tapering to blunt, straight tips; cross-sections round. Subacicular hooks (Figure 52j) black, bidentate. Hooks first present from setiger 36, present in all setigers thereafter, always single (except for replacements). Hooks abruptly tapered with small heads; both teeth directed distally, very small, blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 60. *Unknown Characters:* 13, 14, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice guanica* is listed with similar species in Tables 33 and 36. It is one of three species in Table 36 in which the bases of the ventral cirri remain inflated through posterior setigers; the other two species are *E. cirrobranchiata* and *E. excariboea*. In the latter the branchiae do not start until setigers 78–79; in the two former, branchiae are present from about setigers 19 and 28 respectively. In *E. cirrobranchiata* at least some of the subacicular hooks are tridentate with the teeth in tandem; all subacicular hooks are bidentate in *E. guanica*.

81. *Eunice guildingi* Baird, 1869

FIGURE 53a–e; TABLES 27, 31

Eunice guildingi Baird, 1869:351.

MATERIAL EXAMINED.—Holotype, BM(NH) 1839.12.27.5, St. Vincent, West Indies.

DESCRIPTION.—Holotype complete, of unknown sex, with 258 setigers; total length 138 mm; maximal width 6 mm at setiger 10; length through setiger 10, 7 mm.

Prostomium (Figure 53a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform; A-I without articulations; A-II and A-III with up to 7 long, cylindrical articulations. A-I to posterior peristomial ring. A-II to posterior edge of setiger 1; A-III to setiger 2. Peristomium slightly flaring anteriorly, with distinct muscular lower lip. Separation between rings distinct on all sides; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of prostomium, slender and digitiform, without articulations.

Maxillary formula 1+1, 5+5, 7+0, 6+8, and 1+1.

Branchiae (Figure 53e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 236. Branchiae terminating well before posterior end, more than 65% of total number of setigers. First branchia with 3 filaments; maximum 11 filaments at setiger 15. From about setiger 40 number of filaments reduced rapidly and by setiger 60 2 filaments remaining. Last 20 branchiae single filaments. Posterior to setiger 50 filaments short and easily overlooked. Branchial stems slender, cylindrical, longer than notopodial cirri. Filaments filiform, longer than notopodial cirri.

Anterior neuropodial acicular lobes broadly rounded; median and posterior acicular lobes asymmetrically rounded;

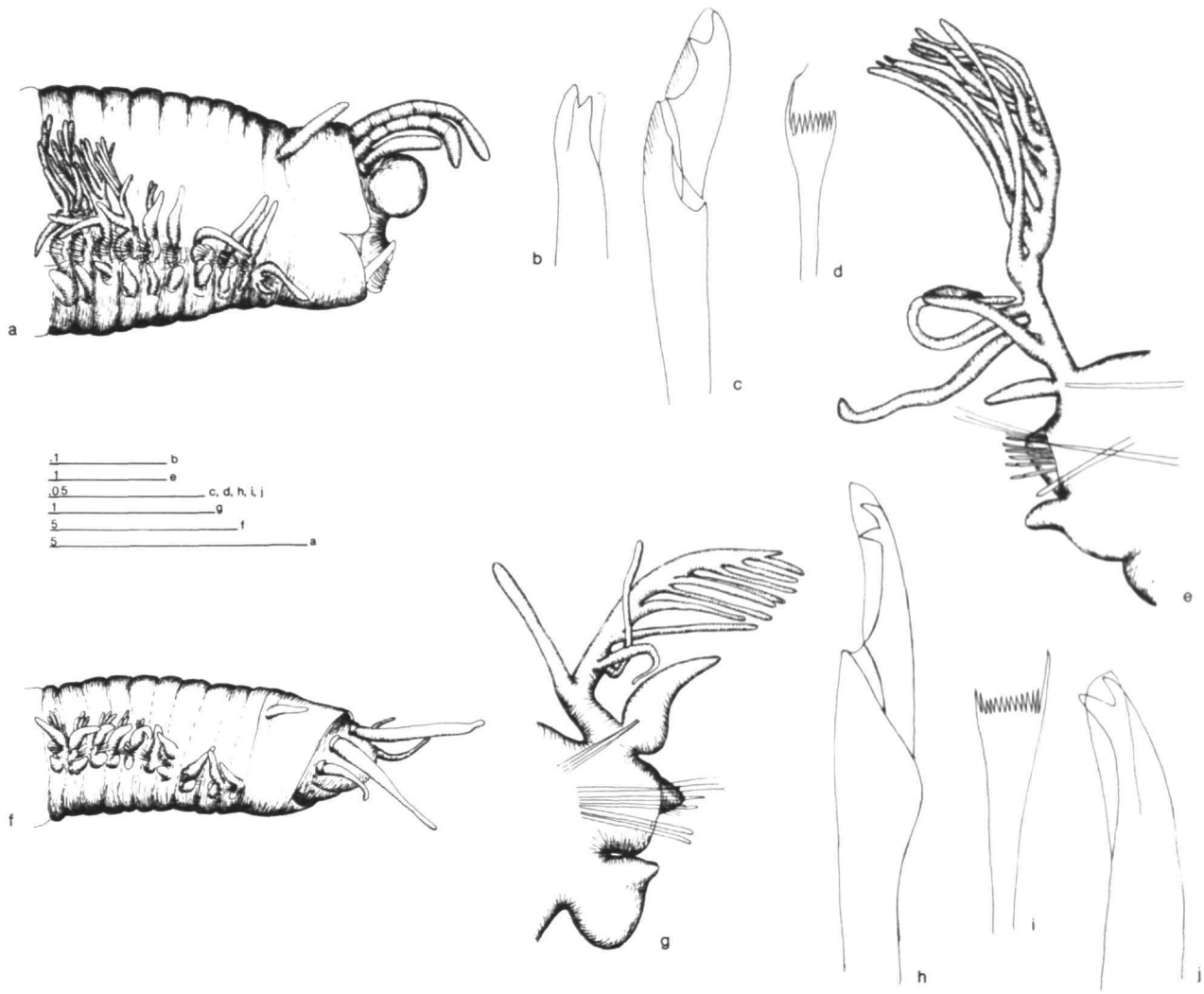

FIGURE 53.—*Eunice guildingi* (holotype, BM(NH) 1839.12.27.5): a, anterior end, lateral view; b, subacicular hook, parapodium 37; c, compound falciger, parapodium 37; d, pectinate seta, parapodium 37; e, parapodium 37, anterior view. *Eunice guttata* (holotype, BM(NH) ZB 1972.71): f, anterior end, lateral view; g, parapodium 34, anterior view; h, compound falciger, parapodium 34; i, pectinate seta, parapodium 34; j, subacicular hook, parapodium 34. (Scale bars in mm.)

aciculae emerging above midline. Presetal lobes low, transverse folds. Anterior postsetal lobes following outline of acicular lobes closely, becoming low transverse folds in median and posterior setigers. First 4 ventral cirri tapering. Ventral cirri basally inflated from about setiger 5 through remainder of body. Bases ovate, narrow tips tapering. Anterior notopodial cirri digitiform, becoming slightly inflated medially in anterior branchial segments. Notopodial cirri decreasing in length from about setiger 5 to setiger 20, thereafter short, slender, digitiform. Notopodial cirri without articulations.

Pectinate setae (Figure 53d) flat, flaring. One marginal tooth distinctly longer than other teeth, with ~10 coarse teeth. Shafts of compound falcigers (Figure 53c) distally slightly inflated, marginally frayed or serrated. Appendages short, tapering with very large head, bidentate. Proximal teeth shorter than distal teeth, tapering, directed obliquely distally. Distal teeth very nearly erect, tapering. Guards symmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notopodia supported by paired aciculae. Neuropodial aciculae single, black, tapering, distally straight; cross-sections round. Subacicular hooks (Figure 53b) black, bidentate. Hooks first present from setiger

24, present in all setigers thereafter, always single (except for replacements). Hooks tapering to small heads; both teeth directed distally and similar in size.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The holotype was examined by Arthur Willey, who referred it to *E. floridana*. Baird stated that the posterior half of the type was abranchiate; as indicated above, this is not the case: about 80% of the body is branchiated.

Eunice guildingi has been reported only once. It is listed in Tables 27 and 31. Two species listed in Table 31 have the bases of the ventral cirri inflated to near the posterior end. Eunice borneensis has articulated peristomial cirri reaching the middle of the peristomium; *E. guildingi* has peristomial cirri without articulations reaching the middle of the prostomium.

"Eunice" gunneri (Storm, 1881)

Leodice gunneri Storm, 1881:92-95.

REMARKS.—Three species of *Nereis* were described in the late 1700s from the ahermatypic coral reefs of Norwegian fjords; two by O.F. Müller, *Nereis pennata* and *Nereis pinnata*, were found in the Oslofjord near Dröbak. The third species, named by Linnaeus on material sent him by Gunnerus from Trondheims-fjorden, was called *Nereis norvegica*.

The characterization of these species were adequate for the time, and especially as illustrated by Gunnerus (1768), *N. norvegica* appears to be well characterized as having branchiae starting at about setiger 6 and continued to the far posterior end.

Nereis pinnata and *N. norwegica* (note spelling) were transferred to *Eunice* by Cuvier (1817:525), who appears to have overlooked *N. pennata*. Lamarck (1818:323) synonymized *N. pennata* with *N. norwegica* under the name *Leodice norwegica* and maintained *L. pinnata* as a distinct species. Örsted (1845:402 and 406) complicated the issue by reporting a single species, which he called *E. norvegica*, from the Oslofjord and described it as having branchiae limited to the anterior end and light-colored aciculae and subacicular hooks.

Storm (1881) recognized the presence of two species associated with the ahermatypic reef at Statsbygd, Trondheimsfjorden, Norway. One species, which he, in accord with Örsted, called *Leodice norvegica*, had branchiae from setiger 7 and limited to the anterior end, with up to 17 branchial filaments where best developed. The other species, which he newly described as *Leodice gunneri*, had branchiae from setiger 6 and continued to the posterior end, with up to nine branchial filaments where best developed. The aciculae and subacicular hooks were described as black. This description matches the original description of *N. norvegica* by Linnaeus (1767) and the illustration given of that species by Gunnerus (1768) and cannot match either of Müller's two species.

Storms name, *Leodice gunneri* (= *Eunice gunneri*), is here considered a junior synonym of *Eunice norvegica*. No material of *E. gunneri* identified by Storm exists in the collections in Trondheim or Oslo, Norway (Tor Strömgren, Inger Winsnes, in litt.).

The name *Eunice pennata* (Müller, 1776) is here, as in most of the literature, applied to a species with branchiae limited to the anterior end and light-colored aciculae and subacicular hooks (a member of group A1, see below). Müller's second species, *Nereis pinnata*, is unidentifiable (see below).

82. *Eunice guttata* Baird, 1869

FIGURE 53f-j; TABLES 27, 28

Eunice guttata Baird, 1869:350.

MATERIAL EXAMINED.—Holotype, BM(NH) ZB 1972.71, taken between Bombay and Singapore, Indian Ocean.

DESCRIPTION.—Holotype complete, of unknown sex, with 115 setigers; total length 52 mm; maximal width 3 mm at setiger 10; length through setiger 10, 8 mm.

Prostomium (Figure 53f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes not observed. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles long, tapering, without articulations. A-I to posterior edge of peristomium; A-II to setiger 2; A-III to setiger 3. Peristomium slightly tapering anteriorly. Separation between rings distinct only dorsally; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, without articulations.

Jaws not observed.

Branchiae (Figure 53g) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 105. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Where best developed branchiae distinctly pectinate with up to 10 filaments. Branchial stems nearly digitiform, longer than notopodial cirri. Filaments slender, digitiform, as long as or shorter than notopodial cirri.

Neuropodial acicular lobes conical or depressed conical; aciculae emerging at midline. Presetal lobes low, transverse folds. Anterior postsetal lobes rounded, flattened, as high as acicular lobe, becoming reduced to low, transverse folds in median and posterior setigers. Anterior ventral cirri tapering. Ventral cirri basally inflated from about setiger 20; ventral cirri

remaining inflated through rest of body. Basal inflation very large, nearly spherical, very small tapering tips present in all setigers. Notopodial cirri basally inflated, distally tapering, without articulations.

Limbate setae tapering, gently geniculate, frayed. Pectinate setae (Figure 53i) numbering 5 or more in a fascicle. Shafts wide, flat. Blades tapering, flat. One marginal tooth clearly longer than other teeth, with ~14 teeth. Shafts of compound falcigers (Figure 53h) distally inflated, marginally smooth. Appendages very slender, tapering, with large heads, bidentate. Proximal teeth about as large as distal teeth, sharply directed laterally. Distal teeth flattened, nearly geniculate and directed laterally. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae numbering 1 to 3, dark, tapering, straight; cross-sections round. Notopodial aciculae paired, dark. Subacicular hooks (Figure 53j) dark, bidentate. Hooks first present from setiger 32, present in all setigers thereafter, paired in some setigers. Hooks smoothly tapering to small head. Proximal teeth larger than distal teeth; both teeth directed obliquely distally. Guards short and blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 13, 14, 39, 40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The specimen may have been highly colored; a ghost of dark pigmentation remains. The specimen may have been dark brown or red, with white circular spots scattered densely over the anterior end. A white band may have been present.

As far as known, this species has never been reported since it was briefly described by Baird (1869); it belongs to group B-2 and is listed with similar species in Tables 27 and 28. It is the only species, other than *E. aphroditois*, listed in Table 28 that has the ventral cirri basally inflated through the posterior end. It differs from that species mainly in that it has far fewer branchial filaments and in the proportions of the prostomium.

Nothing is known about its habitat, other than that it was collected somewhere in the Indian Ocean/Indonesian region, presumably in shallow water.

83. *Eunice harassii* Audouin and Milne Edwards, 1833

FIGURE 54a-d; TABLES 27, 31

Eunice harassii Audouin and Milne Edwards, 1833:215-218, pl. 11: figs. 5-7, 10, 11; 1834:141-144, pl. 3: figs. 5-7, 10, 11.—Quatrefages, 1866:307-309, pl. 10: fig. 3.

?Eunice punctata.—Heider, 1925:55-89, figs. 1, 2, 7-16 [not *Leodice punctata* Risso, 1826].

MATERIAL EXAMINED.—One specimen, MNHN, Paris A.1(R.)-1868-no. 46a. Iles Chausey, Quatrefages.

COMMENTS ON MATERIAL EXAMINED.—The type has been lost; justification for using the current specimen to represent the species is given below. The jaws are half everted and the maxillary formula given is incomplete because detailing the formula would destroy the jaws completely.

DESCRIPTION.—Specimen incomplete, of unknown sex, with 63 setigers; length 22 mm; maximal width 2.5 mm at setiger 10; length through setiger 10, 5 mm. Body cylindrical.

Prostomium less than 1/2 as thick as peristomium, narrow. Prostomium (Figure 54a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes at bases of A-I, faded. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 5 indistinct, cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 2; A-III to setiger 4. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and tapering, without articulations.

Incomplete maxillary formula 1+1, ?+?, 6+0, 3+8, 1+1. Mx VI missing. Mx III long, but part of distal arc with left Mx IV.

Branchiae (Figure 54d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to end of fragment. First 3 branchiae single filaments; all others pectinate with maximally 10 filaments at about setiger 15; last branchia present, on setiger 63, with 2 filaments only. Stems tapering, shorter than notopodial cirri. Filaments long, digitiform, as long as notopodial cirri where best developed.

Anterior neuropodial acicular lobes truncate; posterior acicular lobes triangular; aciculae emerging at midline. Pre-and postsetal lobes low, transverse folds. First 5 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 6 through about setiger 35; inflated base ovate; narrow tips tapering. Posterior ventral cirri broadly transversely attached; enfolding lower edge of parapodia, nearly scoop-shaped. Anterior notopodial cirri basally slightly inflated, retaining same size in all setigers, but less distinctly inflated in posterior setigers, without articulations.

Limbate setae slender, marginally smooth. Pectinate setae tapering, flat. One marginal tooth longer than other teeth, with ~12 teeth. Shafts of compound falcigers (Figure 54c) distally tapering, marginally smooth. Appendages relatively short, tapering with large, distinct heads, bidentate. Proximal teeth as large as distal teeth, triangular, directed laterally. Distal teeth distinctly bent, sharply tapering. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired; anterior aciculae honey colored, becoming darker brown in posterior setigers, distally tapering to sharp points,

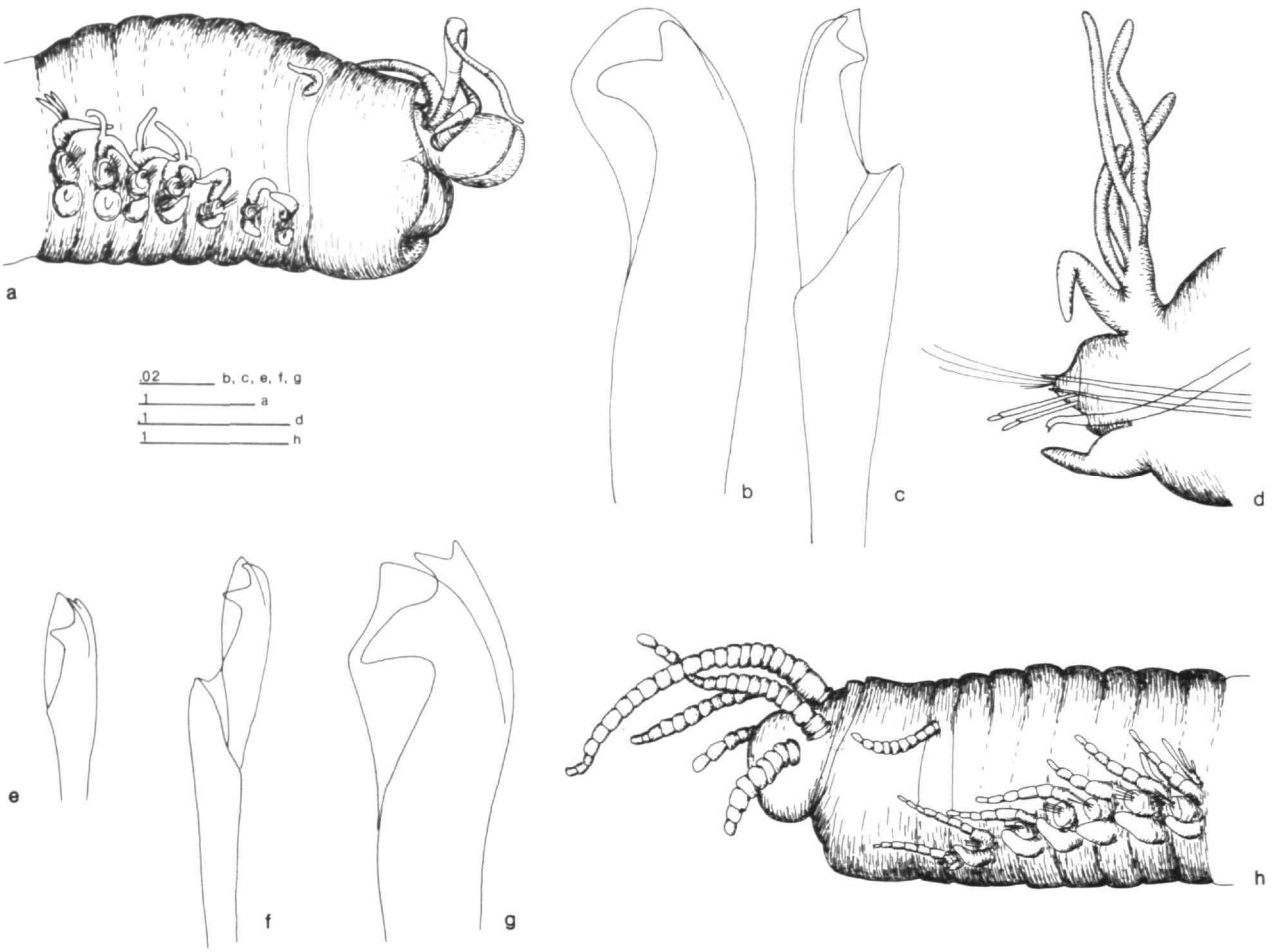

FIGURE 54.—*Eunice harassii* (MNHN, Paris, A.1(R.)-1868-no. 46a): a, anterior end, lateral view; b, subacicular hook, parapodium 46; c, compound falciger, parapodium 46; d, parapodium 46, anterior view. *Eunice havaica* (syntype, RM 430): e, appendage of compound falciger, median parapodium; f, compound falciger, median parapodium; g, subacicular hook, median parapodium; h, anterior end, lateral view. (Scale bars in mm.)

straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 54b) light brown, bidentate. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks with distinct neck. Proximal teeth large, curved, directed laterally. Distal teeth bluntly triangular, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 36–38, 40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice harassii* was described from Iles Chausey and St. Malo. Audouin and Milne Edwards (1833:215) mentioned that the species was relatively common in these areas. Quatrefages (1866:309) mentioned that he described the species based on a specimen reported from Iles Chausey by Audouin and Milne Edwards. The specimen described above appears to be the specimen used by Quatrefages (1866) in his review and thus potentially part of the original material. At the very least, the specimen comes from one of the two type areas and may be part of the type material. It is here considered an authoritative specimen, but not as a type.

Heider (1925) gave an excellent description of the anatomy of the anterior end of a species he called *E. punctata* (Risso,

1826); he cited *E. harassii* as a synonym. Risso's species is not identifiable (see below); Heider's description fits *E. harassii*, thus his detailed anatomical work is assumed to be of this species.

Eunice harassii is a member of B-2, but differs from most species in that group by having brown aciculae and subacicular hooks rather than black ones as usual in that group. It is listed with similar species in Tables 27 and 31. One unique character state of this species appear to be the broadly attached, flattened, nearly leaf-shaped ventral cirri in posterior setigers. The detailed branchial distribution may also be characteristic, in that the number of filaments is reduced from middle segments, but branchiae are retained through the rest of the body.

84. *Eunice havaica* Kinberg, 1865

FIGURE 54e-g; TABLES 46–48

Eunice havaica Kinberg, 1865: 562; 1910:41, pl. 15: fig. 14.
Eunice antennata.—Hartman, 1948:78 [in part, not *Eunice antennata* Lamarck, 1818].

MATERIAL EXAMINED.—14 syntypes, RM 430, Honolulu, Hawaii, *Eugenie* Expedition 1087-89.

COMMENTS ON MATERIAL EXAMINED.—All but one of the 15 specimens of the original material of *E. havaica* belong to this species; the last one differs from the others at the specific level and is described above as *E. eugeniae*. All the syntypes are poorly preserved and most are anterior fragments only. Due to the poor preservation parapodial shape can be described only tentatively.

DESCRIPTION.—Complete syntype of unknown sex, with 78 setigers; total length 25 mm; maximal width 1 mm at setiger 10; length through setiger 10, 4 mm.

Prostomium (Figure 54h) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes barely visible well behind bases of A-I. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 22 moniliform articulations in A-III, articulated to bases. A-I to middle of first peristomial ring; A-II to setiger 2; A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to frontal margin of peristomium, slender, with 9–10 moniliform articulations.

Summary maxillary formula for 2 syntypes 1+1, 7+7, 7+0, 6–8+8, and 1+1. Max III long, located behind left Mx II. Mx VI missing.

Branchiae present, pectinate, about as long as notopodial cirri, reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 78. Branchiae present to near posterior end, on more than 65% of total number of setigers. In complete syntype branchial occurrence interrupted between setigers 28 and 48 leaving median segments abranchiate. Maximum number of filaments 5 at about setiger 20; maximum number of filaments in posterior branchiated region 3. Stems slender, tapering, shorter than notopodial cirri. Filaments slender, digitiform, shorter than notopodial cirri.

Neuropodial acicular lobes distally apparently truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Anterior and posterior ventral cirri digitiform, basally inflated between setigers 5 and 40. Inflated bases ovate; narrow tips tapering. Notopodial cirri tapering, with up to 6 articulations at least in first 25 setigers; articulations indistinct posteriorly; far posterior notopodial cirri without articulations.

Limbate setae slender. Pectinate setae flat, tapering. Both marginal teeth slightly longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 54f) distally inflated, usually marginally smooth. Appendages short with large head, bidentate or tridentate (Figure 54e). Proximal and distal teeth of same size. Proximal teeth narrowly triangular, directed laterally. Distal teeth distinctly bent, split in some hooks, forming distinctly tridentate appendages. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, tapering to bluntly conical tips, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 54g) yellow, tridentate with teeth in a crest. Hooks first present from setiger 19–23, present in all setigers thereafter, always single (except for replacements). Main fang large, curved. Smaller fangs decreasing evenly in size.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 39, 40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice havaica* was considered a synonym of *E. antennata* by Hartman (1948). It is listed in Tables 46 and 48. Of the species listed in Table 48 only *E. havaica* and *E. stigmatura* have complete cinctures marking off the separation between the two peristomial rings. The compound falcigers have both bi- and tridentate appendages in *E. havaica* and only bidentate appendages in *E. stigmatura*.

Hartman (1948:78) indicated that she had seen only one of the syntypes of this species, but later indicated a range of values for first occurrence of subacicular hooks, showing that she must have examined at least several specimens. The specimens are very soft, making study of variability difficult.

85. *Eunice hawaiensis* Treadwell, 1906

FIGURE 55a-f; TABLES 19, 21

Eunice hawaiensis Treadwell, 1906: 1166-1167, figs. 42-44.
Eunice hawaiiensis.—Fauchald, 1970:206 [note misspelling of species name].

MATERIAL EXAMINED.—Holotype, USNM 5210, *Albatross* sta 4134, off Hawaii Island, 225-324 fathoms, fine coral and volcanic sand.

COMMENTS ON MATERIAL EXAMINED.—The lower half of the peristomium and first setiger have been sliced off; the cut is indicated by a dashed line in the illustration. The specimen is otherwise in good condition; it is in part covered with a loose mucoid-appearing material and may have been tubicolous in life.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 118 setigers; length 115 mm; maximal width 7 mm at setiger 10; length through setiger 10, 13 mm.

Prostomium (Figure 55a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally slightly inflated; median sulcus deep. Palpal areas set off by frontal, horizontal grooves. Eyes between bases of A-I and A-II, brown. Antennae in shallow horseshoe, evenly spaced; A-I thinner than A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. A-I to middle of anterior peristomial ring; A-II to setiger 5; A-III to setiger 8. Peristomium apparently cylindrical, considerably wider than prostomium. Separation between rings barely visible dorsally, indeterminable ventrally; anterior ring ~2/3 of total peristomial length. Peristomial cirri to front edge of peristomium, tapering to slender tips, without articulations.

Maxillary formula 1+1, 8+9, 8+0, 12+12, 1+1 according to Treadwell (1906:1167).

Branchiae (Figure 55b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to 54. Branchiae terminating well before posterior end. Last 4 pairs single filaments; all other branchiae strongly pectinate with up to 30 filaments. Stems strong, erect, tapering, longer than notopodial cirri. Filaments slender, filiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes distally rounded, somewhat more pointed in last setigers present; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering, becoming basally inflated in branchial region. Inflated bases ovate; narrow tips long, tapering. Postbranchial ventral cirri less distinctly inflated basally, becoming thick and tapering in last setigers present. Notopodial cirri distinctly inflated basally, tapering to slender, digitiform tips, similar in shape, but shorter in postbranchial region. Notopodial cirri without articulations.

Limbate setae long, slender. Pectinate setae (Figure 55e) very short, slender, tapering, flat. One marginal tooth distinctly longer than other teeth, with ~12 very long, slender teeth. Shafts of compound falcigers (Figure 55f) distally inflated, marginally smooth. Appendages long, narrow, with nearly parallel sides and small head, bidentate. Proximal teeth smaller than distal teeth, reduced triangular, directed laterally. Distal teeth erect, tapering. Guards symmetrically sharply pointed with short, slender mucros, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 55c) paired, yellow. Inferior aciculae blunt or truncate, slightly curved. Superior aciculae tapering to blunt tips, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 55d) yellow, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Hooks tapering to very small heads. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth very short, thick, sharply tapered. Guards short and truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 24, 25, 38, 42, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice hawaiensis* was considered, incorrectly, to be a member of group C-1 by Fauchald (1970), who also misspelled the species name; it is in fact a member of group A-1 and closely resembles *E. megabranchia* and *E. validobranchiata*. These and related species are listed in Tables 19 and 21. *Eunice hawaiensis* has branchiae ending at setiger 54, with up to 30 filaments, mucronate compound falcigers and the notopodial cirri lack articulations throughout the body. *Eunice megabranchia* has branchiae ending at setiger 54, up to 47 branchial filaments, mucronate compound falcigers and the notopodial cirri are articulated in anterior setigers. The separation between the peristomial rings is barely visible dorsally in *E. hawaiensis* and forming a distinct cincture in *E. megabranchia*. *Eunice validobranchiata* has branchiae through setigers 37-40 with up to 33 filaments; amucronate compound falcigers and the notopodial cirri lack articulations throughout the body; the separation between the peristomial rings is indistinct laterally in this species.

86. *Eunice heterochaeta* Quatrefages, 1866

FIGURE 55g-l; TABLES 19, 21

Eunice heterochaeta Quatrefages, 1866:314, pl.10: fig. 3.—Grube, 1870a:295-296.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, A.1 (R.)-1868-no. 48a, Guettary, Quatrefages.

DESCRIPTION.—Holotype complete, of unknown sex, with

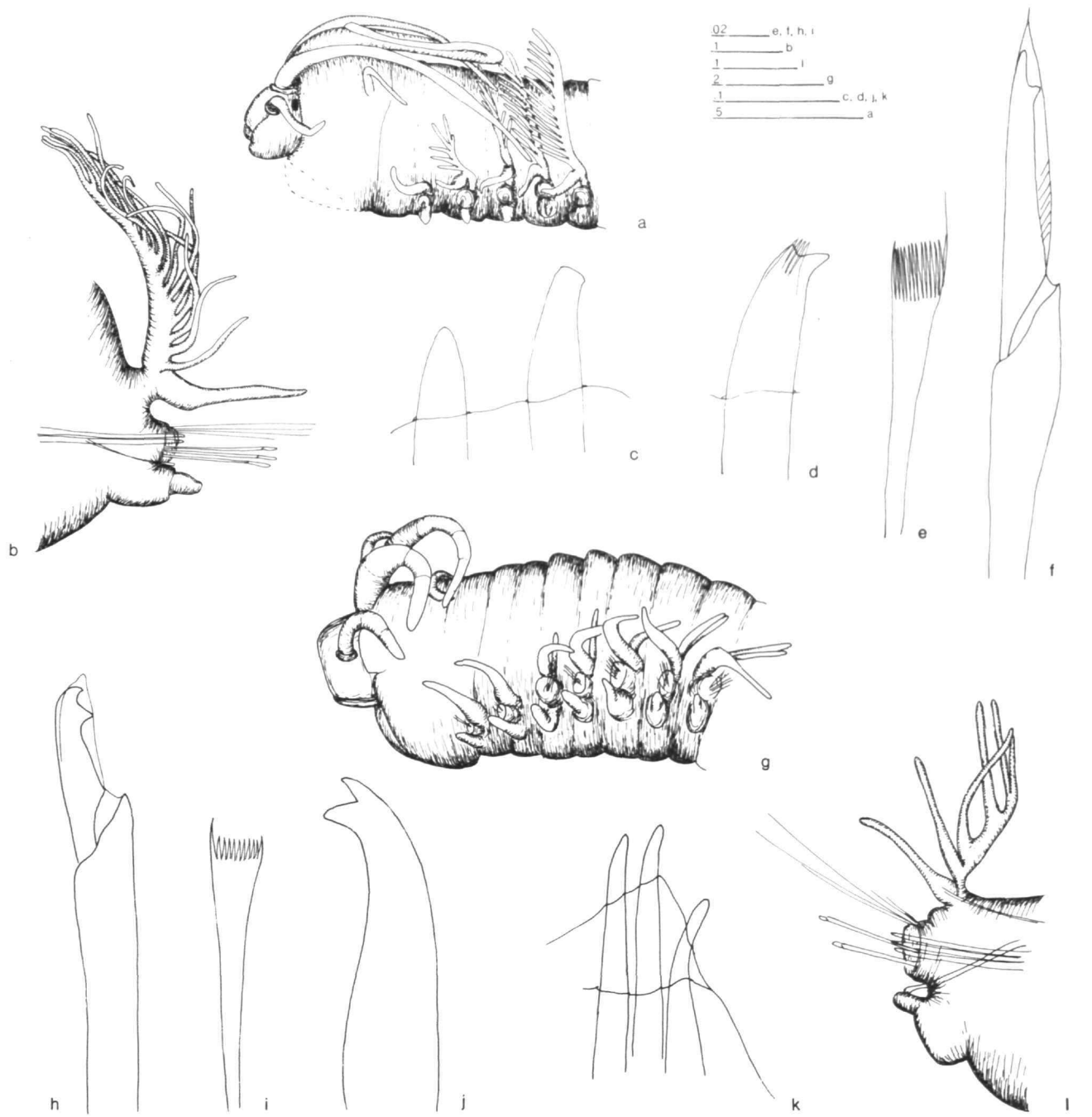

FIGURE 55.—*Eunice hawaiensis* (holotype, USNM 5210): a, anterior end, lateral view; b, parapodium 34, anterior view; c, aciculae, parapodium 34; d, subacicular hook, parapodium 34; e, pectinate seta, parapodium 34; f, compound falciger, parapodium 34. *Eunice heterochaeta* (holotype, MNHN, Paris A.1(R.)-1868-no. 48a): g, anterior end, lateral view; h, compound falciger, parapodium 28; i, pectinate seta, parapodium 28; j, subacicular hook, parapodium 50; k, aciculae, parapodium 28; l, parapodium 28, anterior view. (Scale bars in mm.)

105 setigers; total length 27 mm; maximal width 3.5 mm at setiger 10; length through setiger 10, 4 mm. Body cylindrical throughout.

Prostomium (Figure 55g) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus shallow. Eyes absent. Antennae in horseshoe, evenly spaced; A-I slimmer than A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 5 long, cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 5. Peristomium very much wider than prostomium, with distinct, muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and tapering, without articulations.

Jaws missing.

Branchiae (Figure 55l) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to 85. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. First 3 and last 15 branchiae single filaments, maximum 7 filaments at about setiger 25. Stems short, tapering, shorter than filaments. Filaments slender, as long as notopodial cirri in all except first 2 and last 10 branchial setigers.

Neuropodial acicular lobes truncate to rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri tapering, digitiform, becoming basally inflated from setiger 5. Inflated bases thick, short transverse welts, lost by setiger 30; narrow tips tapering. Posterior ventral cirri tapering, becoming increasingly digitiform in last setigers present. Anterior notopodial cirri basally inflated, with 3–4 long, cylindrical articulations, losing articulations in branchial region, retaining inflated bases in all setigers. Limbate setae slender, marginally smooth. Pectinate setae (Figure 55i) tapering, flat. One marginal tooth slightly longer than other teeth, less than 10 teeth present. Shafts of compound falcigers (Figure 55h) tapering, marginally smooth; beaks indistinct. Appendages tapering; heads large, bidentate. Proximal teeth about twice as large as distal teeth, triangular. Distal teeth distinctly curved, tapering. Guards symmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Usually 3 or more aciculae (Figure 55k) in anterior or medial parapodia, yellow, slender, gently curved or bent; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 55j) yellow, bidentate. Hooks first present from setiger 22, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering, curved. Proximal teeth about twice as large as distal teeth; both teeth directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Quatrefages original description and illustrations are inadequate to characterize the species. Grube (1870a:295–296) gave some detail, but saw no reason to retain the species and referred it to *E. pennata*, despite the fact that branchiae are continued to setiger 85 and not terminated at setiger 39 as in the latter. Fauvel (1923:400, 451) referred *E. heterochaeta* to *E. pennata* apparently under some doubt.

Eunice heterochaeta clearly belongs to group A-1 and is listed with similar species in Tables 19 and 21. Only one species in this list, *E. rubrocincta*, resembles *E. heterochaeta* in having better than 70% of the total numbers of setigers branchiated; most species in this group have less than 50% of the setigers branchiated. The antennae increase in length from A-I through A-III in *E. heterochaeta;* all antennae are similar in length and very short in *E. rubrocincta*.

87. *Eunice hirschi*, new name

FIGURE 56a–i; TABLES 46, 48

Leodice articulata Hoagland, 1920:615–616, pl. 50: figs. 9–12.

MATERIAL EXAMINED.—Holotype and 1 paratype of *Leodice articulata* Hoagland, USNM 18955, *Albatross* sta 5159, Tinakta Island, Philippines, 5°11′50″N, 119°54′E, 22 Feb 1908, 22 m, sand, dredged. One additional specimen of *Leodice articulata* Hoagland, USNM 19024, Albatross sta 5205, off Caguayan Point, Leyte Island, Philippines, 11°19′30″N, 124°58′05″E, 13 Apr 1908, 15 m, Agassiz trawl.

COMMENTS ON MATERIAL EXAMINED.—The paratype from station 5205 has at one time been dry and no meaningful measures can be taken; it does not appear to differ from the two other specimens.

DESCRIPTION.—Holotype complete, of unknown sex, with 112 setigers; total length 55 mm; maximal width 3 mm at setiger 10; length through setiger 10, 7 mm. Paratype from sta 5159 incomplete, of unknown sex, with 71 setigers; length 37 mm; maximal width 4 mm; length through setiger 10, 7 mm.

Prostomium (Figure 56a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus deep. Eyes not observed. Antennae in a horseshoe, evenly spaced; A-III distinctly thinner than other antennae. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles very slender, tapering, articulated to bases, with up to 35 moniliform articulations in A-III. A-I to setiger 1; A-II to setiger 4; A-III to setiger 6. Peristomium cylindrical, with distinct muscular lower lip. Separation between rings distinct

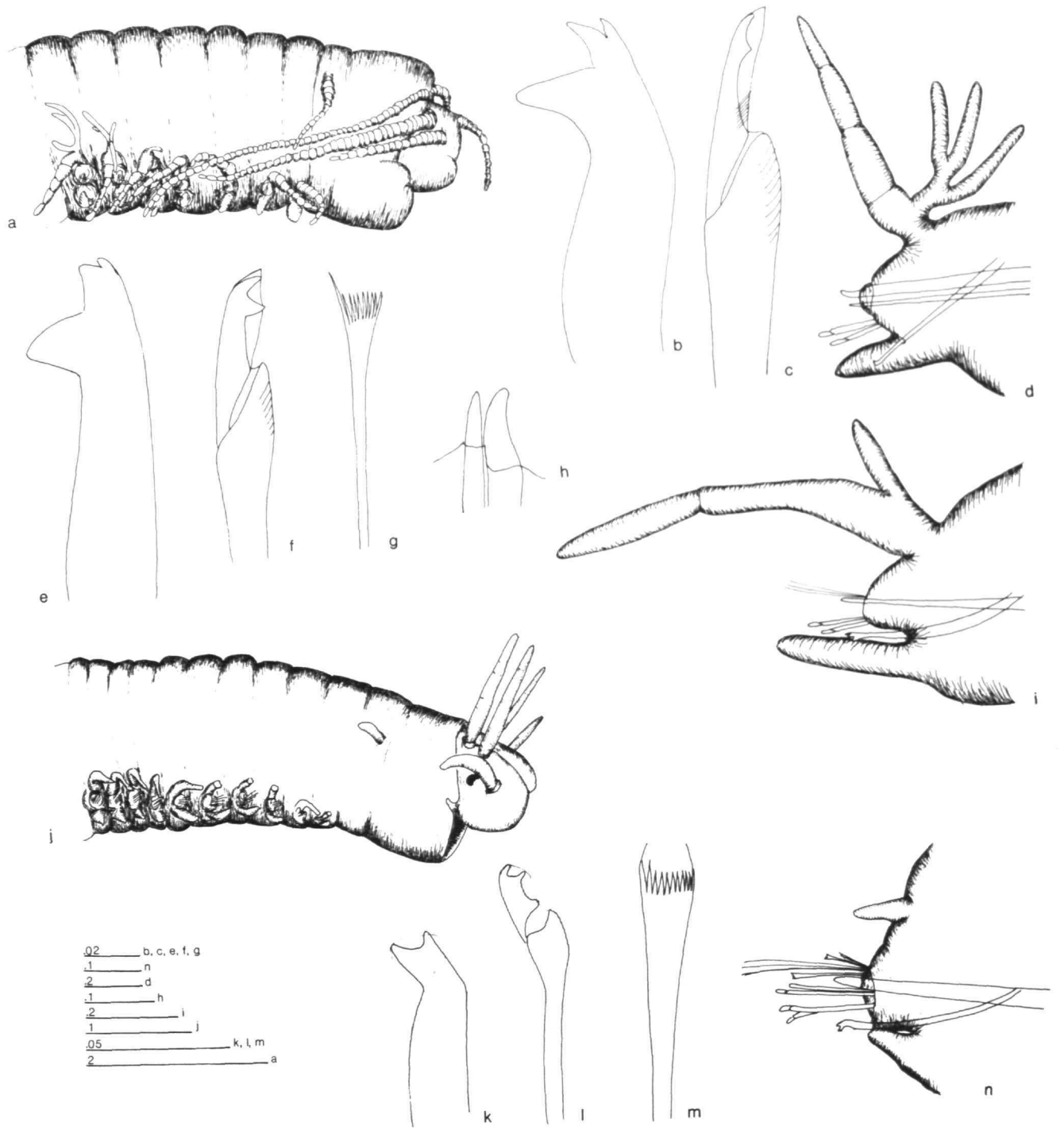

FIGURE 56.—*Eunice hirschi*, new name (holotype of *Leodice articulata* Hoagland, USNM 18955): a, anterior end, lateral view; b, subacicular hook, parapodium 66; c, compound falciger, parapodium 66; d, parapodium 66, anterior view; e, subacicular hook, parapodium 102; f, compound falciger, parapodium 102; g, pectinate seta, parapodium 102; h, aciculae, parapodium 66; i, parapodium 102, anterior view. *Eunice imogena* (holotype of *Nicidion imogena*, BM(NH) ZK 1924.1.28.91): j, anterior end, lateral view; k, subacicular hook, parapodium 113; l, compound falciger, parapodium 113; m, pectinate seta, parapodium 113; n, parapodium 113, anterior view. (Scale bars in mm.)

dorsally and especially ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, slender, with 10 articulations.

Maxillary formula 1+1, 8+9, 9+0, 6+10, 1+1 according to Hoagland (1920, pl. 50: fig. 10). Teeth very small and indistinct. Mx III long, located behind left Mx II.

Branchiae (Figure 56d) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to setiger 102 (Figure 56i). Branchiae present to near posterior end, on more than 65% of total number of setigers. First and last 7 branchiae single filaments. Maximum 7 filaments from setiger 10 through setiger 30. From about setiger 35 through setiger 90, 3 filaments. Stems shorter than filaments, tapering. Filaments short, digitiform.

Neuropodial acicular lobes symmetrically rounded; aciculae emerging at midline. Pre-and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering, basally inflated from about setiger 5. Inflated bases modest, ovate, reduced by setiger 50; narrow tips tapering. Posterior ventral cirri increasingly long and slender, tapering, less than half as long as notopodial cirri. Notopodial cirri long, basally somewhat inflated, with 6 articulations anteriorly, decreasing to 2 in far posterior setigers. Articulations moniliform in anterior setigers, becoming cylindrical in posteriormost setigers.

Limbate setae longer than all other setae, slender, marginally serrated. Pectinate setae (Figure 56g) very small; shafts slender, cylindrical. Blades flaring, flat. One marginal tooth distinctly longer than other teeth, with 10 long, slender teeth. Shafts of anterior and median compound falcigers (Figure 56c) inflated, marginally serrated; distal beak absent. Anterior appendages very narrow, tapering; head small, bidentate. Proximal teeth reduced triangular, directed laterally. Distal teeth longer than proximal teeth, directed obliquely laterally. Shafts of posterior compound falcigers (Figure 56f) inflated, but less so than in median setigers, marginally serrated; distal beak present. Posterior appendages short, tapering; head distinct, bidentate. Proximal teeth large, triangular, directed laterally. Distal teeth smaller than proximal teeth, tapering, directed obliquely distally. Guards of all compound hooks asymmetrically bluntly pointed, marginally serrated in anterior and median hooks, smooth in posterior hooks; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 56h) paired, yellow; cross-sections round. Inferior aciculae curved, bluntly pointed, about twice as thick as superior aciculae. Superior aciculae straight, sharply pointed. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 56b,e) yellow, tridentate with teeth in a crest. Hooks first present from setiger 22 or 25, present in all setigers thereafter, always single (except for replacements). Proximal teeth large, directed laterally, straight; two distal teeth erect, emerging from common shaft.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The specific name *articulata* is preoccupied in the combination *Eunice articulata* Ehlers, 1887, and must be replaced.

Eunice hirschi is listed with similar species in Tables 46 and 48. Among the species in Table 48, *E. hirschi, E. panamena,* and *E. stigmatura* lack a middle region with reduced branchiae; such a region is present in some specimens of *E. ornata,* but is missing in others. Among these species, *E. panamena* and *E. stigmatura* have the three median antennae similar in length; the other two species have A-III distinctly longer than A-II. In *E. ornata* the branchiae are distinctly longer than the notopodial cirri; in *E. hirschi* the branchiae are shorter than the notopodial cirri.

The species is named for Dr. Leonard P. Hirsch for all his support and encouragement during this study.

Eunice hispanica (Lamarck, 1818)

Leodice hispanica Lamarck, 1818:323.—Savigny, 1820:51.
Eunice hispanica.—Audouin and Milne Edwards, 1833:219; 1834:145.—Grube, 1850:292.—Quatrefages, 1866:324.—Fauvel, 1923:451.

REMARKS.—This species was described as having smooth antennae and chestnut-colored aciculae; anterior notopodial cirri long; branchiae with up to three filaments present from setiger 3; only 15 or 16 pairs of branchiae present; branchiae shorter than notopodial cirri.

Audouin and Milne Edwards (1833:219) suggested that the species was primarily characterized by the poor development of the branchiae.

Grube (1850:292) listed the species as valid without comment. Quatrefages (1866:324) found it to be incompletely described. Fauvel (1923:451) listed it as incertae sedis without comment.

No material is available; the precise origin of Lamarck's material (other than presumably Spain) is unknown and the available information is wholly inadequate to characterize the species. The species is here considered indeterminable.

88. *Eunice imogena* (Monro, 1924)

FIGURE 56j-n; TABLES 33, 40

Nicidion imogena Monro, 1924:61-62, figs. 22-24.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1924.1.28.91, Hotspur Bank, off the coast of Brazil, 16°S, 36°W.

COMMENTS ON MATERIAL EXAMINED.—The holotype was originally described as consisting of 108 setigers and being 25

mm long; the current specimen, labeled as type, is larger, as indicated below. It is unclear how this discrepancy has arisen: it is here assumed that a simple lapsus has taken place and that specimen here described in fact is the holotype.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 138 setigers; length 30 mm; maximal width 2 mm at setiger 10; length through setiger 10, 3.5 mm.

Prostomium (Figure 56j) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, somewhat flattened dorsally; median sulcus very deep. Eyes behind bases of A-I, kidney-shaped, black. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles medially inflated with irregular notches, but without articulations. A-I to middle of anterior peristomial ring; A-II and A-III to posterior end of peristomium. Peristomium longer than prostomium, cylindrical. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri barely to front edge of posterior peristomial ring, digitiform, without articulations.

Maxillary formula 1+1, 5+5, 7+0, 6+9, and presumably 1+1; Mx V apparently absent in preparation (see comment below). Distal tooth of both Mx II with small subdistal notches, indicating possible presence of reduced sixth tooth.

Branchiae absent.

Anterior neuropodial acicular lobes short, distally rounded, becoming sessile in median and posterior setigers (Figure 56n); aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri digitiform, becoming basally inflated by setiger 10. Ventral cirri retaining inflated bases through rest of body, but inflated bases increasingly retracted into body wall. Narrow tips short and button-shaped in median setigers, becoming distinct and tapering in far posterior setigers. Anterior notopodial cirri tapering and about twice as long as ventral cirri, increasing in length through median setigers. Notopodial cirri reduced in length from about setiger 50, becoming short and tapering in far posterior setigers, located well above neuropodia on body wall. Notopodial cirri without articulations.

Pectinate setae (Figure 56m) tapering, flat. Both marginal teeth longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 56l) slender, distally strongly inflated, marginally strongly serrated; distinct beak present. Appendages very short, with nearly parallel sides; heads small, bidentate. Both teeth similar in size. Proximal teeth slender, tapering, directed laterally. Distal teeth tapering, directed laterally. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 56n) single, with black core and clear sheath, thick, distally tapering, straight; cross-sections round. Subacicular hooks (Figure 56k) with black core and clear, nearly translucent heads, bidentate. Hooks first present from setiger 50, present in all setigers thereafter, always single (except for replacements). Hooks with distinctly bent necks; heads distinct. Proximal teeth larger than distal teeth, curved, directed laterally. Distal teeth triangular, tapering, directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short and forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 31–42, 56, 60. *Unknown Characters:* 1, 2.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice imogena* is compared to similar species in Tables 33 and 40. It is unique among the abranchiate species in that subacicular hooks are first present from setiger 50; in the other species, subacicular hooks are present from setigers 16–31.

The maxillary formula was given by Monro (1924:62) in the following words: "formula as follows: 4-4:7+5?-9." The illustration given by Monro (1924, fig. 24) shows the formula to be 1+1, 5+5, 7+0, 6+9. The jaws are now missing; Monro's illustration suggests a less aberrant formula than the text and is here assumed to approximate the condition in the species.

89. *Eunice impexa* Grube, 1878

FIGURE 57a–m; TABLES 52, 53

Eunice impexa Grube, 1878b:159–160, pl. 9: fig. 6.

MATERIAL EXAMINED.—Holotype, ZMB 4001, Cape of Lapinig, Philippines, coll. Semper.

COMMENTS ON MATERIAL EXAMINED.—Four parapodia removed from the holotype were also available; two of these were previously examined by Grube, the other two by Augener.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 101 setigers; length 63 mm; maximal width 5.5 mm at setiger 10; length through setiger 10, 11 mm.

Prostomium (Figure 57a) distinctly shorter than peristomium, distinctly narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes present posterior to bases of A-I, faded purple. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with 1 or 2 irregular, cylindrical articulations. A-I to anterior peristomial ring; A-II to posterior peristomial ring; A-III to setiger 1. Peristomium massive, expanded anteriorly due to eversion of jaws; muscular lower lip present. Separation between rings distinct ventrally and visible dorsally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, without articulations.

Maxillary formula 1+1, 5+4, 5+0, 2+5, and 1+1. Mx III short, forming a distal arc with very short left Mx IV and MX V. Mx VI absent.

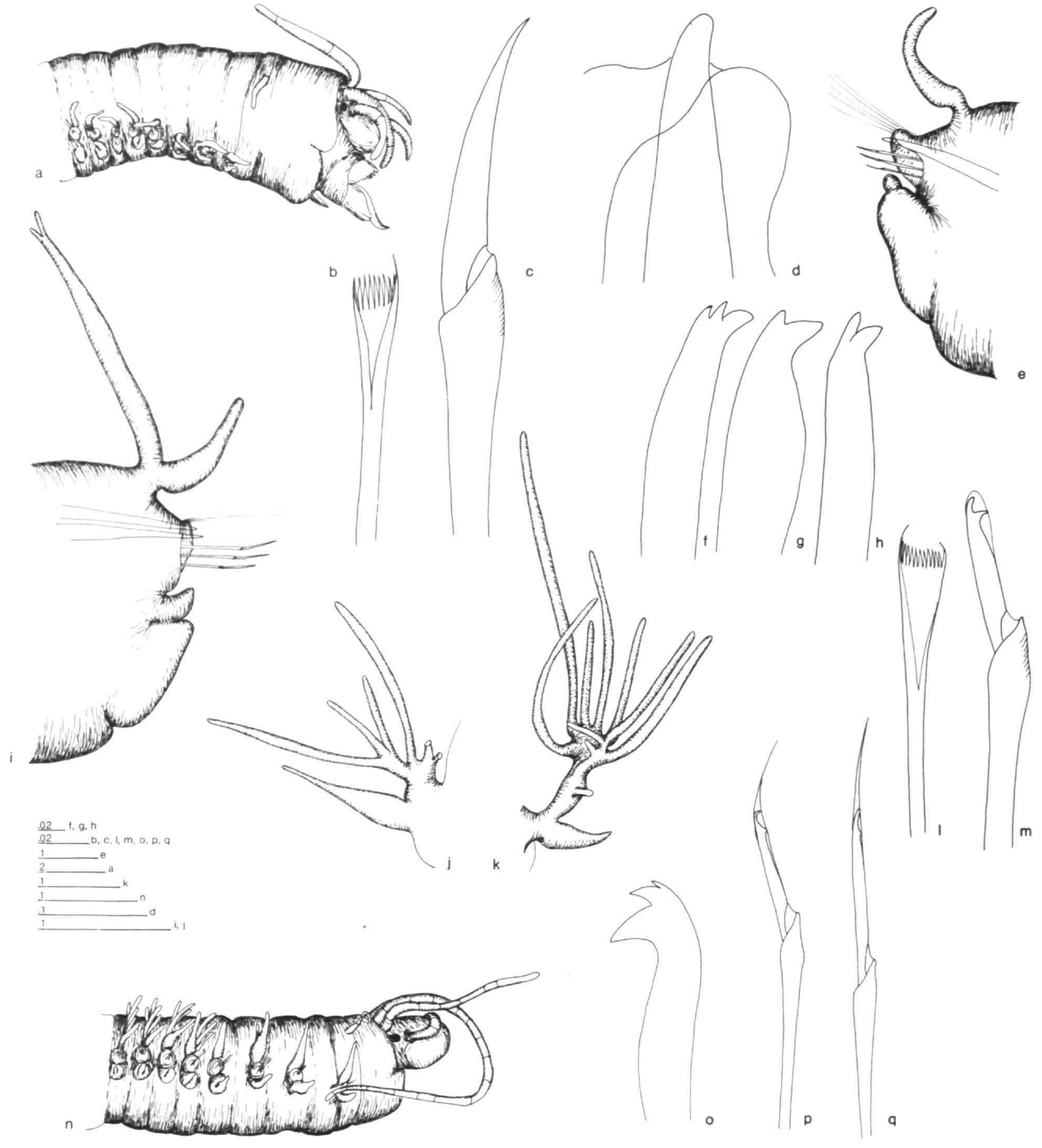

FIGURE 57.—*Eunice impexa* (holotype, ZMB 4001): a, anterior end, lateral view; b, pectinate seta, parapodium 45; c, compound spiniger, parapodium 15; d, acicula, parapodium 15; e, parapodium 15, anterior view; f, inferior subacicular hook, posterior parapodium; g, median subacicular hook, posterior parapodium; h, superior subacicular hook, posterior parapodium; i, parapodium 45, anterior view; j, notopodium and branchia, parapodium 60–70; k, notopodium and branchia, parapodium 65, drawn in situ; l, pectinate seta, posterior parapodium; m, compound falciger, posterior parapodium. *Eunice indica* (holotype, RM 435): n, anterior end, lateral view; o, subacicular hook, parapodium 27; p, compound falciger, parapodium 27; q, compound falciger, parapodium 3. (Scale bars in mm.)

Branchiae (Figure 57j,k) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 22 to end of fragment. First 10 branchiae short, button-shaped. From setiger 31 branchiae long, with slender filaments. Branchial distribution irregular with most branchiae having 4–5 filaments clustering at tip of short stems. Several branchiae with 6 to 7 long filaments and up to 3 short, truncate filaments emerging near bases. Some branchiae with filaments in 2 groups emerging from common stems. Relation between length of filaments and branchiae and notopodial cirri variable.

Neuropodial acicular lobes (Figure 57e,i) distally obliquely rounded with aciculae emerging above midline. Anterior presetal lobes high dorsally, forming rounded tabs visible dorsal to aciculae. At level of aciculae presetal lobes deeply cut away leaving bases of compound hooks exposed. Median and posterior presetal lobes low, transverse folds. Postsetal lobes low folds following outline of acicular lobes. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5. Inflated bases thick; prominent ventrolateral ridges in all later setigers. Narrow tips short and button-shaped in median setigers, tapering in posterior setigers. Notopodial cirri short, basally distinctly inflated, tapering towards slender tips, without articulations.

Limbate setae stout, tapering, marginally smooth. Pectinate setae (Figure 57b,l) tapering, furled or funnel-shaped. One marginal tooth distinctly longer than other teeth; ~12 teeth present. First 30 setigers with compound spinigers (Figure 57c). Shafts distally inflated, marginally serrated. Appendages tapering, knife-shaped. Compound falcigers (Figure 57m) replacing compound spinigers from about setiger 30, considerably smaller than spinigers. Shafts inflated, marginally serrated. Appendages short, narrow, with nearly parallel sides, with small, distinct heads, bidentate. Proximal teeth larger than distal teeth, narrow, tapering, curved, directed laterally. Distal teeth gently curved, directed obliquely distally. Guards longer than appendage, symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers absent. Aciculae (Figure 57d) single or paired, with chestnut to copper-colored cores and clear sheaths, tapering, gently curved dorsally; cross-sections round. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 57f–h) honey colored anteriorly, becoming darker posteriorly, but always lighter in color than aciculae, bidentate or tridentate, the latter with teeth in a crest. Hooks first present from setiger 60, present in all setigers thereafter; three hooks in most setigers. Most hooks tapering distally towards tip with distinct inflated subdistal region. Proximal teeth large, directed laterally. Distal teeth short, nearly erect. Some hooks distally tridentate with small distal, medium-sized intermediate tooth and large main fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 1-2, 36-38, 40, 42, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice impexa* is listed with other species with compound spinigers in Tables 52 and 53. It has articulated ceratostyles, in contrast to the two other species, *E. tubicola* and *E. tubifex*.

Eunice incerta (Hansen, 1882)

Nicidion incerta Hansen, 1882:8, pl. 2: figs. 19–21.
Eunice (Nicidion) incerta.—Hartman, 1959:313.

REMARKS.—An examination of the type material shows that this species is a junior synonym of *E. cariboea* and is treated as such above.

90. *Eunice indica* Kinberg, 1865

FIGURE 57n–q; TABLES 41, 42

Eunice indica Kinberg, 1865:562; 1910:41, pl. 15: fig. 12.

MATERIAL EXAMINED.—Holotype, RM 435, Bangka Strait, Indian Ocean. Kinberg (1865:562) gives locality information as: "Pars australis Freti Bangka, in fundo maris."

COMMENTS ON MATERIAL EXAMINED.—Holotype is now incomplete, in three pieces, but is reasonably well preserved. A posterior end in the same vial may belong to the same specimen, but association is not unequivocal due to the different state of preservation of the posterior end.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 38 setigers; length 11 mm; maximal width 2 mm; length through setiger 10, 4 mm.

Prostomium (Figure 57n) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes posterior to bases of A-I, dark. Antennae in horseshoe; A-I separated from A-II and A-III by gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 14 regular, cylindrical, long articulations in A-III. A-I to posterior edge of peristomium; A-II to setiger 4; A-III to setiger 14. Peristomium tapering slightly anteriorly (possibly distorted by removal of jaws). Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, with 3 articulations.

Jaws missing.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to 21. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First branchiae single filaments; all other branchiae pectinate; maximum 8 filaments. Stems tapering, erect.

Filaments slender.

Neuropodial acicular lobes distally rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 2 ventral cirri thick, tapering. Ventral cirri basally inflated in next 20 setigers. Inflated bases ovate; narrow tips tapering. From about setiger 23 inflated bases decreasing. Posteriormost ventral cirri tapering evenly. Notopodial cirri medially inflated, becoming slender and digitiform in posterior setigers, without articulations.

Limbate setae slender, marginally serrated. Shafts of anterior compound falcigers (Figure 57m,n) tapering evenly, becoming distally inflated in median setigers, marginally smooth. Appendages very long and slender, especially in anterior setigers, bidentate. Anterior appendages with proximal teeth very much smaller than distal teeth, forming a small, triangular lateral projection. Distal teeth nearly erect, tapering. In median and posterior appendages proximal teeth larger, triangular, usually directed basally. Distal teeth distinctly curved, directed laterally. All guards tapering to fine slender tips, mucronate. Guards very long, especially in anterior setigers. Pseudocompound falcigers and compound spinigers absent. Aciculae single, yellow, tapering, distally blunt, straight or gently curved; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 57o) yellow, tridentate with teeth in a crest. Hooks first present from setiger 18, present in all setigers thereafter, at first single, but all posterior setigers with at least 3, usually 4 hooks. Main fangs large, curved; median fang similar in shape but smaller; distal fang very small, but usually distinctly pointed.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; all features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 42, 47, 50, 63, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice indica* is listed with similar species in Tables 41 and 42. In addition to *E. indica*, *E. tentaculata* and *E. vittata* have multiple subacicular hooks in most setigers. *Eunice indica* and *E. vittata* both have the first branchia on setiger 3; *E. tentaculata* has the first branchia on setiger 6. *Eunice indica* has mucronate guards on the compound falcigers; *E. vittata* has distally blunt guards.

Kinberg indicated that A-III should reach setiger 19; this cannot be confirmed and would be unusually long, even for this species.

Eunice indica has been widely reported from Indian Ocean and western Pacific Ocean; a number of similar species have been reported from this area, and the distribution of *E. indica* proper must be considered unsettled.

91. *Eunice interrupta* Treadwell, 1906

FIGURE 58a-e; TABLES 41, 44, 46, 47

Eunice interrupta Treadwell, 1906:1167-1168, figs. 45, 46.

MATERIAL EXAMINED.—Holotype, USNM 5211, and 5 paralectotypes, USNM 5417, *Albatross* sta 3850, 79-84 m, coarse sand and broken shells; 1 paralectotype, USNM 5418 and 1 paralectotype, CAS TY74 (IZ No. 018795), *Albatross* sta 3940, Hawaii, Leeward lands, Laysan Island Light S84°, E7.0′, 16 May 1902, 108-128 m, white sand and broken shells.

COMMENTS ON MATERIAL EXAMINED.—Both paratypes from station 3940 have been dried out and are not considered further. The description is based on the holotype, but comments about variable features are included.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 65 setigers; length 55 mm; maximal width 2 mm; length through setiger 10, 9 mm. Paratypes from sta 3850 2 complete specimens with 79 and 69 setigers, respectively; other paratypes incomplete.

Prostomium (Figure 58a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes at base of A-I, dark. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores long in all antennae, without articulations. Ceratostyles tapering, with up to 27 moniliform articulations in A-II and A-III, articulated to bases of styles. A-I to middle of anterior peristomial ring; A-II and A-III to setiger 2. A-III incomplete in holotype, complete in several paratypes. Peristomium cylindrical, long; anterior margin flared in holotype, but not in paratypes; muscular lower lip distinct. Separation between rings distinct only ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and tapering, with 5 to 7 articulations.

Maxillary formula of paratype from USNM 5417 1+1, 4+5, 6+0, 4+7, and 1+1. Jaws completely decalcified, soft and fragile.

Branchiae present, palmate, distinctly shorter than notopodial cirri, reduced in mid-body region in some specimens. Branchiae from setiger 5-7 either to setiger 24-26 or continued to near the posterior end. Present on more than 65% of total number of setigers in some specimens. Maximum 3 filaments at or near setiger 15. Most specimens with branchiae to setigers 24-26; holotype and one of 2 complete paratypes with single branchial filaments also present in posterior end starting at setiger 50 (Figure 58b) or 55, continuing to posterior end. Other complete paratype with branchiae only near anterior end. Filaments digitiform.

Anterior neuropodial acicular lobes distally truncate; median acicular lobes rounded; posterior acicular lobes triangular; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 6 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 7. Inflated bases ovate; narrow tips tapering. Ventral cirri increasingly slender and

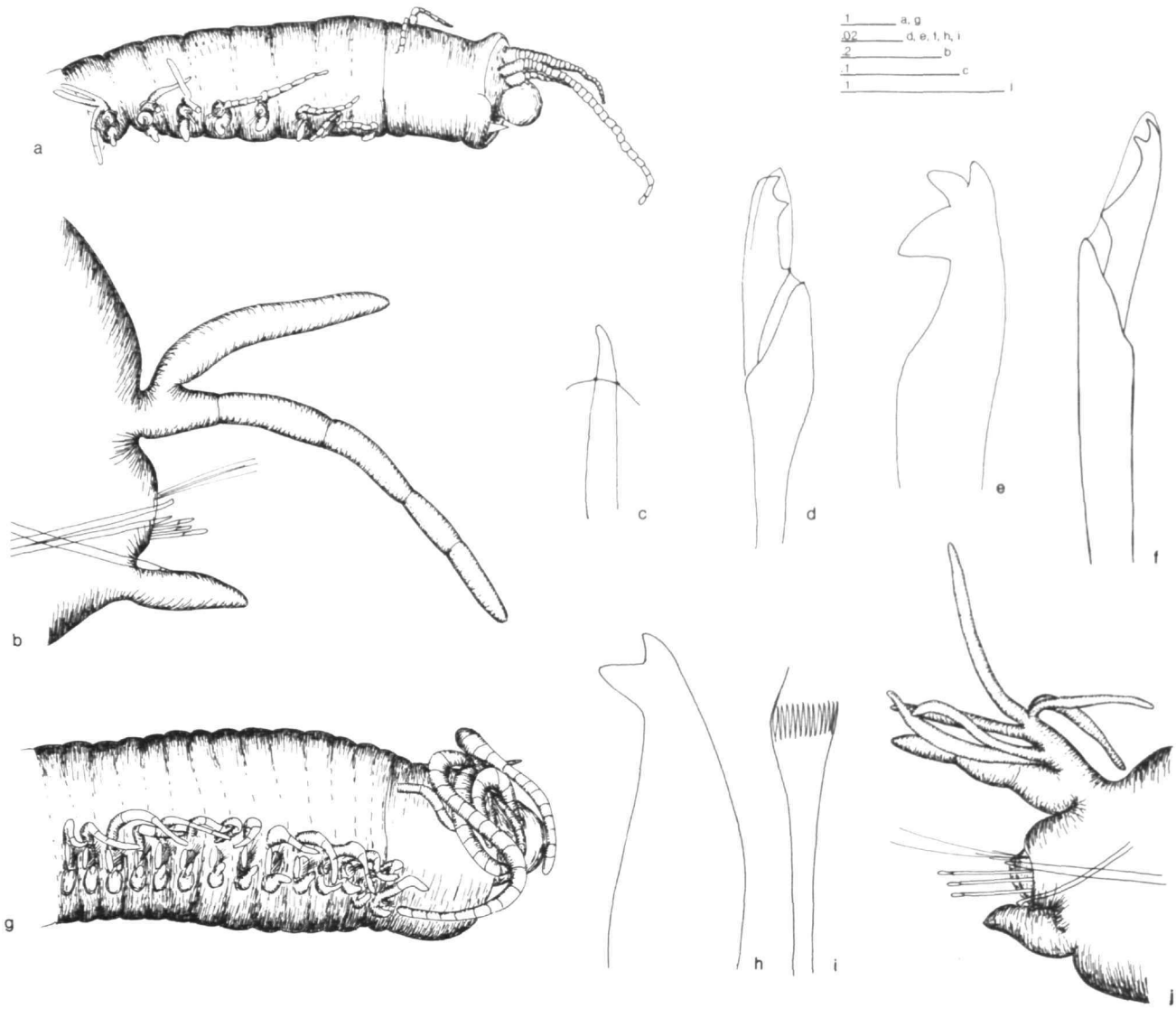

FIGURE 58.—*Eunice interrupta* (holotype, USNM 5211): a, anterior end, lateral view; b, parapodium 53, anterior view; c, acicula, parapodium 53; d, compound falciger, parapodium 53; e, subacicular hook, parapodium 53. *Eunice jagori* (holotype, ZMB F2003): f, compound falciger, parapodium 53; g, anterior end, lateral view; h, subacicular hook, parapodium 44; i, pectinate seta, parapodium 44; j, parapodium 44, anterior view. (Scale bars in mm.)

digitiform from about setiger 35. Notopodial cirri slender, with up to 5 distinct articulations; articulations present in all setigers.

Shafts of compound falcigers (Figure 47d) inflated, marginally smooth. Appendages thick, relatively short, with large heads, bidentate. Proximal teeth smaller than distal teeth, tapering, directed laterally. Distal teeth thick, bent, with small notch sometimes appearing as rudimentary third teeth. Guards nearly symmetrically sharply pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 48c) paired, yellow, tapering, gently curved; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 57e) yellow, tridentate with teeth in a crest. Hooks first present from setiger 24–27, present in all setigers thereafter, always single (except for replacements). Hooks with 3 very large fangs decreasing evenly from main to distal fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship be-

tween Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 39, 40, 42, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice interrupta* was named for the interrupted branchial distribution in the holotype; this kind of branchial distribution is also present in one paratype, but other paratypes of sufficient length do not show this feature. Consequently the species has been listed among species in group C-1 (Tables 40 and 44) and C-2 (Tables 46 and 47). Non-type specimens identified by Treadwell include very small, juvenile specimens and one larger incomplete specimen in which the branchial distribution could not be determined. Among species in group C-1 with moniliform articulations in the ceratostyles, *E. interrupta* is the only one to have the notopodial cirri articulated throughout the body. Only *E. interrupta* and *E. oliga*, of all the species in group C-2 with all notopodial cirri articulated, have as few as three branchial filaments where the branchiae are best developed. In *E. interrupta* the three median antennae are similar in length; in *E. oliga* the median antenna is distinctly longer than the other four antennae.

Treadwell designated only a single specimen as type; the rest of the material here examined is part of his original material and have here been designated as paralectotypes.

92. *Eunice investigatoris* Fauvel, 1932

TABLES 27, 28

Eunice investigatoris Fauvel, 1932:137–138, fig. 19a–f.

DESCRIPTION.—The type of this species, described from 45 m depth in the Persian Gulf, is not available. The description is sufficiently detailed to allow some comments.

Numbers of setigers not indicated. Specimen complete; total length 110 mm; width 7 mm.

Antennae similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. A-I presumably to setiger 1-2; A-II and A-III to setiger 6 or 7.

Branchiae present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region, erect. Branchiae from setiger 6 to near posterior end, present on more than 65% of total number of setigers. Maximum 18–20 filaments at about setiger 14. Branchiae "reduced in size" in middle of body, "increase very much" in posterior end. Branchiae in median and especially posterior regions dichotomously or trichotomously regularly branched.

Anterior ventral cirri tapering, becoming basally inflated in early branchial setigers. Narrow tips tapering. Ventral cirri without inflated bases in posterior half of body, increasingly long and slender in far posterior setiger, up to twice as long as neuropodial lobes. Notopodial cirri long in anterior setigers, becoming shorter than branchiae in branchial region, without articulations.

Pectinate setae with either 1 or both marginal teeth longer than other teeth, with 8–10 teeth. Shafts of compound falcigers inflated, marginally smooth. Appendages thick, tapering, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth very short, slender, bent. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae black, tapering, straight; cross-sections round. Subacicular hooks black, bidentate. Hooks first present from setiger 44–45, present in all setigers thereafter, always single (except for replacements). Hooks with inflated median shafts; heads small. Proximal teeth directed laterally. Distal teeth smaller than proximal teeth, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features of all parts of the body.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 4–16, 24–29, 36, 39, 40, 43–51, 54, 65–68, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice investigatoris* is listed with similar species in Tables 27 and 28; it is very unusual among species with dark aciculae and subacicular hooks in that is has a reduced number of branchial filaments in a mid-body region. This characters state is other limited exclusive to species with yellow, tridentate subacicular hooks. It was not included in the key, because it is relatively poorly known.

93. *Eunice jagori* Grube, 1878

FIGURE 58g–j; TABLES 33, 35

Eunice jagori Grube, 1878a:103.

MATERIAL EXAMINED.—Holotype, ZMB F2003, Manila, Philippines, coll. Semper.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 58 setigers; length 30 mm; maximal width 6 mm near setiger 15; length through setiger 10, 6 mm. Body dorsoventrally flattened; segments crowded with parapodia on lateral ridges, especially in posteriormost setigers present.

Prostomium (Figure 58h) distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes lateral to bases of A-II, faded. Antennae in horseshoe; A-I distinctly isolated from A-II and A-III, similar in thickness. Ceratophores ring-shaped in all

antennae, without articulations. Ceratostyles tapering, with up to 20 short, cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 6; A-III to setiger 12 when folded back over dorsum. Peristomium slightly wider than prostomium, tapering anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to posterior edge of prostomium, digitiform, with 3 to 4 cylindrical articulations.

Maxillary formula 1+1, 4+4, 8+0, 5+?8, and 1+1. Mx III part of distal arc with left Mx IV. Mx VI absent. Jaws friable; right Mx IV damaged so number of teeth uncertain.

Branchiae (Figure 58j) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 17 to end of fragment. Maximum 8 filaments in setigers 25 to 30. Stems long, erect in median setigers, shortening rapidly posteriorly. Filaments relatively thick, folded up against branchial stems, relative length of filament increasing posteriorly, but shorter than notopodial cirri in all setigers.

Neuropodial acicular lobes rounded; aciculae emerging above midline. Presetal lobes low, transverse folds. Postsetal lobes free, distinct lobes, higher than acicular lobes, becoming reduced in size, following outline of acicular lobes in posterior end of fragment. Ventral cirri thick, tapering; inflated bases totally imperceptible. Notopodial cirri basally inflated, prominent, with 2 to 3 long, cylindrical rings.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 58i) gently furled, slightly flaring. One marginal tooth longer than other teeth, with 13 to 14 teeth. Shafts of compound falcigers (Figure 58f) slender, tapering, marginally smooth. Appendages narrow, tapering; heads distinct, bidentate. Proximal teeth slightly longer than distal teeth, tapering, directed obliquely distally. Distal teeth tapering, curved. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, with brown cores and clear sheaths, tapering, straight; cross-sections round. Subacicular hooks (Figure 58h) with brown cores; heads completely clear, nearly translucent, bidentate. Hooks first present from setiger 23, present in all setigers thereafter, always single (except for replacements). Hooks tapering, with distinct head. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth triangular, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; features associated with posterior setigers, including branchial distribution; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 51, 54, 55. *Unknown Characters:* 1, 2, 6, 36–40, 47, 50, 57–60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice jagori* has remained incompletely known since it was originally described; it is listed with similar species in Tables 33 and 35. The ventral cirri are not basally inflated in median setigers, which is an unusual feature in the genus, but perhaps most characteristic is the crowding of the posterior setigers, with the parapodia carried on fleshy ridges.

Eunice januarii Grube, 1881

Eunice januarii Grube, 1881:111.

REMARKS.—The material of this species currently present in Zoologisches Museum, Berlin, consists of a large specimen and two parapodia. It lacks peristomial cirri and has well-developed fascicles of compound spinigers and lacks compound falcigers. The species belong to the genus *Marphysa* and will be treated in a review of that genus.

94. *Eunice japonica*, new name

FIGURE 59a–e; TABLES 19, 20

Eunice gracilis Moore, 1903:440–441, pl. 25: figs. 46–48.

Eunice longicirrata.—Imajima and Hartman, 1964:256 [not *Eunice longicirrata* Webster, 1884].

MATERIAL EXAMINED.—Holotype of *E. gracilis* Moore, 1903, USNM 15724, *Albatross* sta 3730, off Omae Zaki, Honshu Island, Japan, approximate position 34°36′N, 138°14′E, 16 May 1900, 62–67 m, mud, gravel, rock.

COMMENTS ON MATERIAL EXAMINED.—Station 3730 was a surface tow, according to the published station list; several dredge and beam trawl hauls were taken off Omae Zaki on the same day in approximately the same depths. The specimen may have come from any one of these hauls. The position indicated is that of the cape, Omae Zaki proper.

DESCRIPTION.—Holotype complete, of unknown sex, with 110 setigers; total length 50 mm; maximal width 2.5 mm; length through setiger 10, 7 mm. Body cylindrical with relatively long segments. Two pairs of anal cirri present; ventral pair long; dorsal pair very short. All anal cirri with long, cylindrical articulations.

Prostomium (Figure 59e) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes between bases of A-I and A-II. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender, tapering; articulations long, cylindrical in A-II and A-III, nearly moniliform in A-I. Maximum 10 articulations in A-III; articulations indistinct towards bases of 3 longer antennae. A-I to middle of anterior peristomial ring; A-II to setiger 3; A-III to setiger 5. Peristomium cylindrical. Separation between rings distinct on all sides, but especially distinct dorsally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to posterior half of prostomium, slender and tapering,

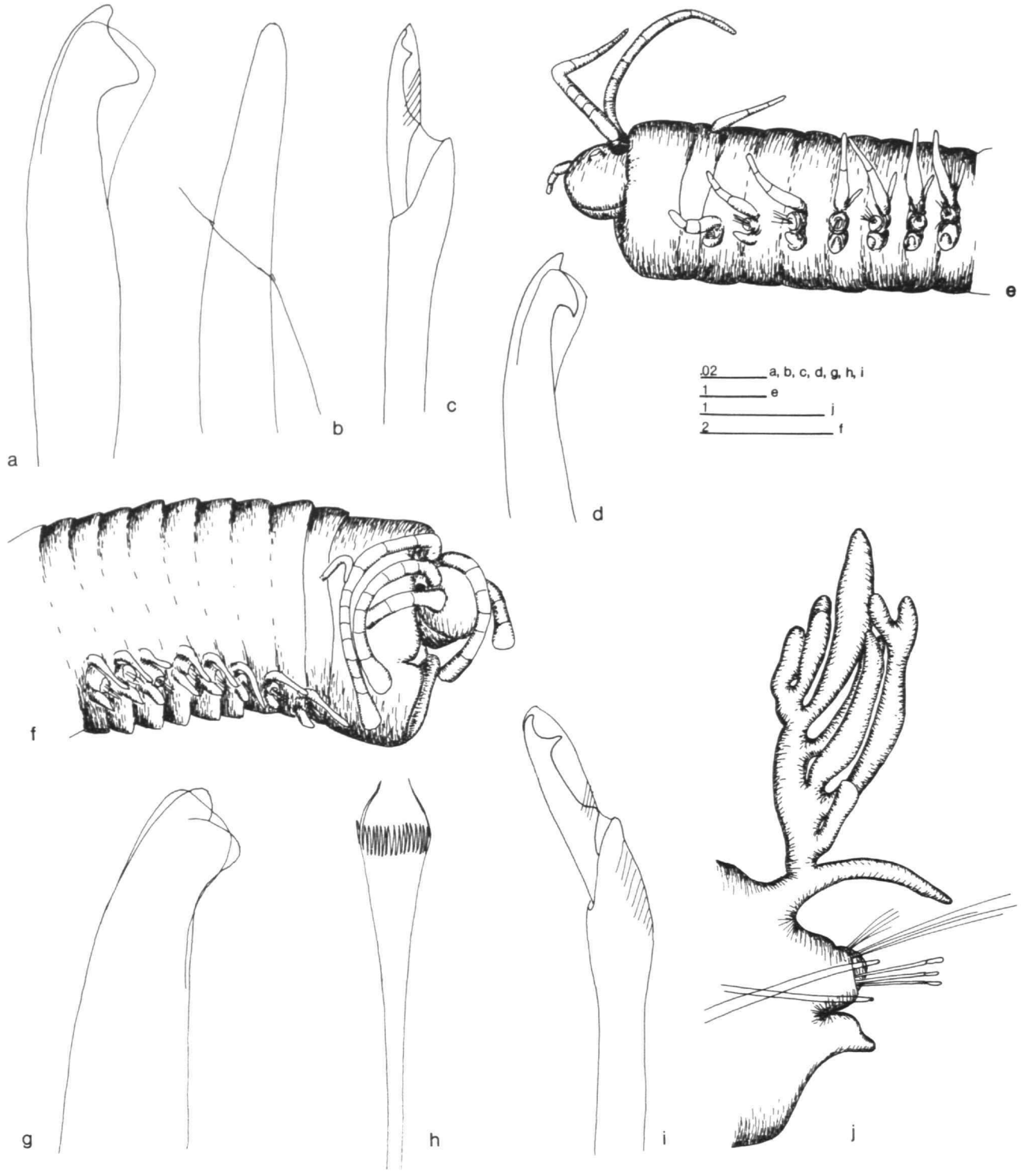

FIGURE 59.—*Eunice japonica*, new name (holotype of *E. gracilis*, USNM 15724): a, subacicular hook, parapodium 75; b, acicula, parapodium 75; c, compound falciger, parapodium 75; d, secondary subacicular hook, parapodium 75; e, anterior end, lateral view. *Eunice johnsoni* (holotype, USNM 24717): f, anterior end, lateral view; g, subacicular hook, parapodium 45; h, pectinate seta, parapodium 45; i, compound falciger, parapodium 45; j. parapodium 45, anterior view. (Scale bars in mm.)

with 3 or 4 indistinct articulations.

Maxillary formula 1+1, 8+9, 8+0, 7+11, and 1+1; maxillae slender and teeth even in size in each maxilla.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to 46, terminating well before posterior end, present on less than 55% of total number of setigers. First 2 and last 2 or 3 pairs single filaments. All other branchiae pectinate with up to 11 filaments. Stems slender, erect. Filaments slender.

Anterior neuropodial acicular lobes distally truncate; median acicular lobes increasingly triangular; posterior acicular lobes bluntly pointed; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Inflated bases never very distinct, ovate; narrow tips large and tapering. Postbranchial ventral cirri gradually becoming tapering and finally digitiform. Notopodial cirri prominent in anterior setigers, becoming shorter in far posterior setigers. Anterior notopodial cirri basally somewhat inflated, with 2 or 3 articulations. Postbranchial notopodial cirri less distinctly basally inflated. Articulations missing from early branchial setigers.

Most setae broken. Shafts of compound falcigers (Figure 59c) inflated, marginally smooth. Appendages narrow, slightly tapering; heads indistinct, bidentate. Proximal teeth shorter than distal teeth, forming a wide-based, low triangular projection. Distal teeth tapering, narrow, nearly erect. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Up to 3 aciculae (Figure 59b) present, yellow, pointed, very nearly straight or very gently curved ventrally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 59a,d) yellow, bidentate. Hooks first present from setiger 34, present in all setigers thereafter, paired in some setigers. Hooks tapering; heads large. Proximal teeth very much larger than distal teeth, triangular, directed slightly basally. Distal teeth triangular, erect. Secondary subacicular hooks (Figure 59d), when present, resembling primary hooks, except proximal teeth strongly parrot-beaked.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; structure of pectinate setae.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The original name, *E. gracilis,* is preoccupied in the combination *E. gracilis* Grube, 1866. The new name refers to the country of origin of the type material.

Eunice japonica was considered a synonym of *E. longicirrata* Webster (Imajima and Hartman, 1964:256; see *E. websteri*). It belongs to group A-1 and is listed with similar taxa in Tables 19 and 20. It can be separated from *E. websteri* and similar species by having branchiae from setiger 4 rather than from setiger 3. It is very similar to *E. kobiensis,* but in the former the proximal teeth of the subacicular hooks are directed laterally; both teeth are directed distally in *E. kobiensis. Eunice kobiensis* can be separated from *E. websteri* as indicated below.

Eunice jeffreysii McIntosh, 1903

Eunice jeffreysii McIntosh, 1903:137-140, fig. 1, pl. 11: figs. 15-20.

REMARKS.—Examination of the type material demonstrates that this species belongs to the genus *Euniphysa;* a review of that genus is in preparation.

95. *Eunice johnsoni* Hartman, 1954

FIGURE 59f-j; TABLES 22, 23

Eunice johnsoni Hartman, 1954:633-634, fig. 175a-c,e,f.

MATERIAL EXAMINED.—Holotype, USNM 24717, Bikini Atoll, Marshall Islands, Operation CROSSROADS, 1946, coll. M. W. Johnson.

DESCRIPTION.—Holotype complete, of unknown sex, with 160 setigers; total length 75 mm; maximal width 3 mm; length through setiger 10, 7 mm. Anterior body cylindrical, farther posteriorly dorsally flattened, flat and broad, *Marphysa*-like, with crowded segments.

Prostomium (Figure 59f) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes between bases of A-I and A-II. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles distally club-shaped, with up to 12 poorly marked, cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 4. Peristomium cylindrical. Separation between rings distinct on all sides, but best marked dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and digitiform, without articulations.

Maxillary formula 1+1, 4+5, 7+0, 4+8, and 1+1.

Branchiae (Figure 59j) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 24 to 130. Branchiae terminating well before posterior end, present more than 65% of total number of setigers. First 3 and last 20 pairs single filaments. Other branchiae with up to 10 primary filaments. Stems cylindrical, about as long as notopodial cirri. Filaments thick, often somewhat folded, some branching distally with short terminal filaments, longer filaments as long as notopodial cirri.

Anterior neuropodial acicular lobes truncate; median acicular lobes rounded; posterior acicular lobes increasingly triangular; aciculae emerging at midline. Pre- and postsetal lobes low,

transverse folds. All ventral cirri thick, tapering, not distinctly inflated anywhere, an inflation on body wall proximal to ventral cirri present in most setigers, may represent remnant inflated bases. Anterior notopodial cirri digitiform, about as long as peristomial cirri. Notopodial cirri tapering with slightly inflated bases in branchial region, becoming digitiform in last 20 setigers. Notopodial cirri without articulations.

Limbate setae long, slender. Pectinate setae (Figure 59h) number at least 10 in a parapodium, tapering, furled. Both marginal teeth longer than other teeth, with ~20 teeth. Shafts of compound falcigers (Figure 59i) inflated, marginally serrated. Appendages short, tapering; heads distinct, bidentate. Both teeth equally well developed. Proximal teeth narrowly tapering, directed laterally. Distal teeth tapering, nearly erect. Guards short, symmetrically bluntly pointed, nearly rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, yellow, smoothly tapering, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 59g) yellow, bidentate. Hooks first present from setiger 31, present in all setigers thereafter, always single (except for replacements). Proximal teeth much larger than distal teeth, triangular, directed obliquely laterally. Distal teeth triangular, erect. Guards short and truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 51, 54, 55, 58, 59. *Unknown Characters:* 4, 6, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice johnsoni* is listed with similar species in Tables 22 and 23. Of the species listed in Table 22, *E. johnsoni* and *E. schizobranchia* have a very late start of the branchiae; the other species have branchiae from setigers 3–6. The subacicular hooks and aciculae are both yellow in *E. johnsoni*. In *E. schizobranchia*, the aciculae are black, whereas the subacicular hooks are yellow.

96. *Eunice kerguelensis* Averincev, 1974

FIGURE 60a–c; TABLES 41, 43, 46, 49

Eunice kerguelensis Averincev, 1974:172, pl. 31: figs. 11–14.

MATERIAL EXAMINED.—Holotype, ZIL, 1/15808, Antarctic Ocean near Kerguelen Island, 49°38′7″S, 70°43′7″, OB sta 121, 141 m, 20 May 1956, coll. Averincev, Ushakov, Belayev.

COMMENTS ON MATERIAL EXAMINED.—The anterior end has been deeply dissected and especially the peristomium has been partially reconstructed in the illustration.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 26 setigers; length 4 mm; maximal width 0.3 mm; length through setiger 10, 1.2 mm. Body cylindrical throughout.

Prostomium (Figure 60c) about as long as peristomium, about as wide as peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally very slightly inflated; median sulcus shallow. Eyes between bases of A-I and A-II, large reddish. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 9 angular articulations in A-III. A-I to posterior peristomial ring; A-II (only 1 present) to setiger 4; A-III to setiger 4. Peristomium cylindrical, with distinct muscular lower lip. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, without articulations.

Maxillary formula 1+1, 8+11, 8+0, 7+10, and 1+1 according to Averincev (1974:172).

Branchiae present, palmate, longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 3 (according to Averincev, both parapodia on setiger 3 now missing) to end of fragment. Where best developed, branchiae with 2 slender tapering filaments. Filaments of same length as notopodial cirri.

Neuropodial acicular lobes distally rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Ventral cirri becoming basally inflated from setiger 4–5. Inflated bases ovate; narrow tips tapering. Inflated bases retained to end of fragment. Notopodial cirri basally slightly inflated, tapering to narrow tips, without articulations.

Limbate setae marginally smooth. Pectinate setae now missing, illustrated by Averincev (1974, pl. 31: fig. 13) as tapering, with 1 marginal tooth very much longer than other teeth, with ~10 teeth totally. Shafts of compound falcigers (Figure 60a) inflated, marginally serrated. Appendages slender, tapering; heads large, bidentate. Proximal teeth smaller than distal teeth, tapering, directed basally. Distal teeth curved, directed nearly laterally. Guards symmetrically sharply pointed, sometimes appearing mucronate. Pseudocompound falcigers and compound spinigers absent. Aciculae mostly paired, yellow, tapering, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 60b) yellow, tridentate with teeth in a crest. Hooks first present from setiger 19, present in all setigers thereafter always single (except for replacements). Hooks with large curved main fangs. Fangs decreasing evenly in size distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; all features associated with posterior parapodia; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—The high number of teeth in Mx III suggests that this jaw piece was long and located behind left Mx II rather than part of a distal arc.

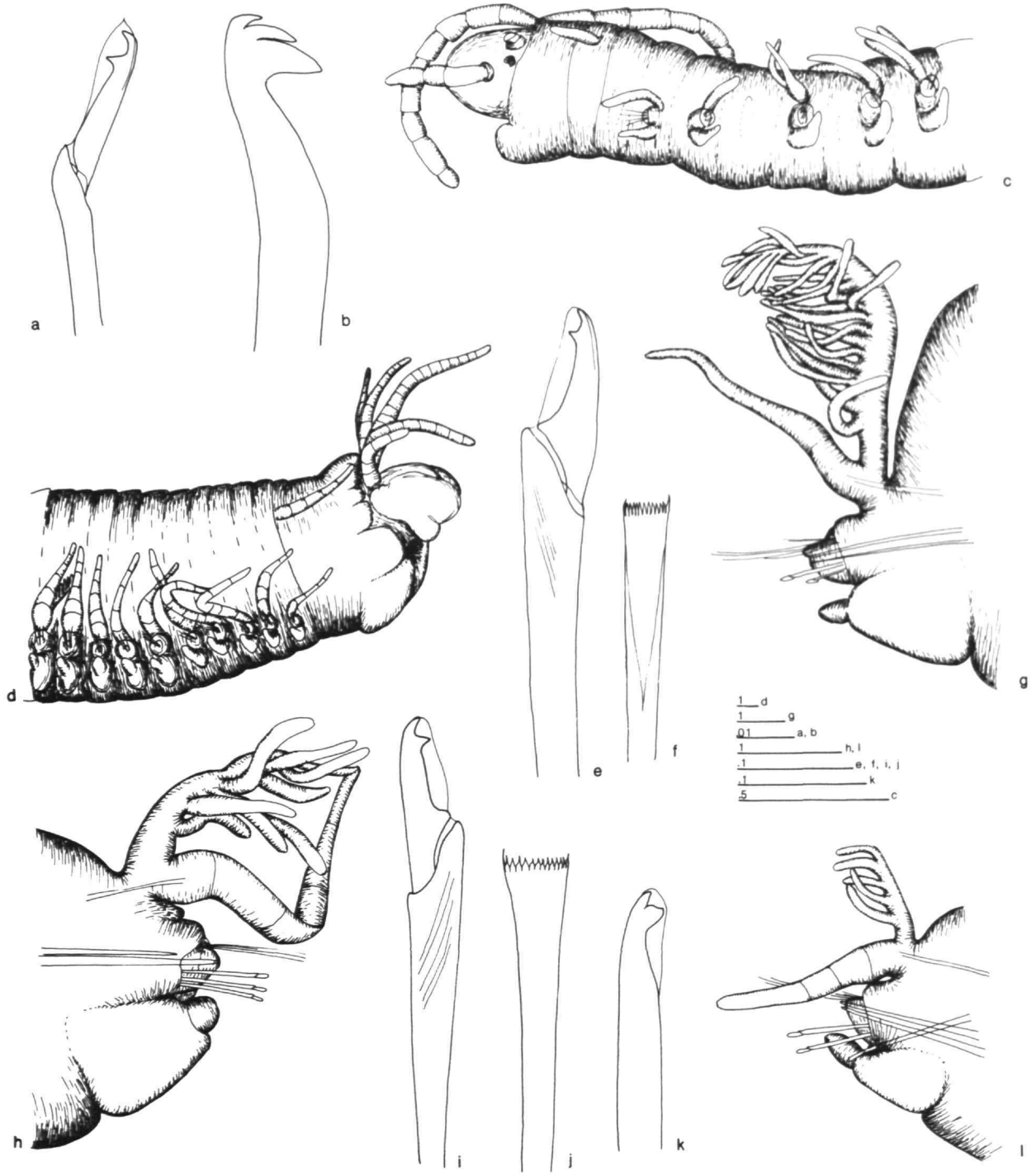

FIGURE 60.—*Eunice kerguelensis* (holotype, ZML, 1/15808): a, compound falciger, parapodium 19; b, subacicular hook, parapodium 19; c, anterior end, lateral view. *Eunice kinbergi* (syntypes, RM Type 1255, d–j of incomplete syntype; k and l of complete syntype): d, anterior end, lateral view; e, compound falciger, parapodium 27; f, pectinate seta, parapodium 27; g, parapodium 27, anterior view; h, parapodium 275, anterior view; i, compound falciger, parapodium 275; j, pectinate seta, parapodium 275; k, subacicular hook, parapodium 350; l, parapodium 350, anterior view. (Scale bars in mm.)

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56. *Unknown Characters:* 1, 2, 4, 6, 36–40, 42, 47, 50, 57–60, 63, 65, 67.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,2; 38,2.

REMARKS.—The type is not in very good condition; most of the setae are now broken. The specimen is very small and appears juvenile. It has the structure of a specimen of group C-2; the pectinate setae as illustrated by Averincev resemble those present in *E. vittata* and related species in group C-1. The specimen is sufficiently incomplete that the branchial distribution cannot be accurately determined. The species is compared both to species in group C-1 and C-2 in Tables 41 and 43 as well as in Tables 46 and 49. It is the only species in Table 43 with only single branchial filaments. Of the species listed in Table 49 only *E. eugeniae* and *E. kerguelensis* have mucronate guards on the compound falcigers. The former lacks eyes and antennal articulations; *E. kerguelensis* has articulated ceratostyles and eyes are prominent.

97. *Eunice kinbergi* Ehlers, 1868

FIGURE 60d–l; TABLES 27, 29

Eriphyle capensis Kinberg, 1865:561; 1910:41, pl. 15: fig. 16.
Eunice kinbergi Ehlers, 1868:306.

MATERIAL EXAMINED.—Two syntypes, RM Type 1255, Cape of Good Hope, coll. Wahlberg.

COMMENTS ON MATERIAL EXAMINED.—The complete syntype is currently in four pieces. Most illustrations are of the incomplete syntype as indicated in the figure legends.

DESCRIPTION.—One syntype complete, of unknown sex, with 380 setigers; length 398 mm; maximal width 15 mm; length through setiger 10, 16 mm. Other syntype incomplete, of unknown sex, with 282 setigers; length 655 mm; maximal width 15 mm; length through setiger 10, 22 mm.

Prostomium (Figure 60d) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Each prostomial lobe distinctly divided longitudinally into 2 parts; lateral parts large, frontally rounded, dorsally inflated. Medial parts narrow, frontally angularly rounded. Median sulcus deep, separating prostomium to more than half its length and continued as distinct suture to base of A-III. Palpal region set off by horizontal, frontal grooves. Eyes between bases of A-I and A-II; black. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, relatively slender, with up to 13 irregular, cylindrical articulations in A-III. A-I to middle of anterior peristomial ring; A-II to setiger 1; A-III to setiger 1 in one syntype and to setiger 4 in other syntype. Peristomium about twice as wide as prostomium, overall cylindrical, flaring anteriorly, with paired large ventrolateral cushions forming lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to front end of peristomium, slender and gently tapering, with 5 articulations.

Maxillary formula 1+1, 5+5, ?+0, 4+9, 1+1, and 1+1. Mx III now missing, probably short, forming part of distal arc with left Mx IV–VI judging from compressed shape of left Mx IV.

Branchiae (Figure 60g,h,l) present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 8–9 to 365. Branchiae present to near posterior end, more than 65% of total number of setigers. First 2 pairs single filaments, maximum 22 filaments from setiger 25, slowly reduced in length and numbers of filaments posteriorly. Stems strong, erect anteriorly and medially, usually held curved posteriorly, shorter than notopodial cirri. Filaments slender, nearly filiform, shorter than notopodial cirri.

Neuropodial acicular lobes asymmetrically triangular with aciculae emerging dorsal to midline. Pre- and postsetal lobes forming low folds around dorsal edge of acicular lobes, especially cut away frontally. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases continued to end of body, forming thick, elongated welts along ventral edge of neuropodia. Upper edge of inflated bases wrapped around lower edges of neuropodia, forming shallow scoops; free edge produced as short, thick tapering narrow tips. Notopodial cirri slightly inflated basally, tapering to long, digitiform tips; anterior cirri with 5 cylindrical articulations. Posterior notopodial cirri shorter than anterior ones, but otherwise similar, articulations indistinct, but present.

Limbate setae very slender, marginally smooth. Anterior pectinate setae (Figure 60f) with cylindrical shafts. Blades tapering, furled into open scoops; marginal teeth barely longer than other teeth, with 12 teeth. Posterior pectinate setae (Figure 60j) with flat shafts. Blades completely flattened, otherwise similar to anterior pectinate setae. Shafts of compound falcigers (Figure 60e,i) tapering, marginally smooth, with distinct internal striations; distal peak present. Appendages tapering; heads small, bidentate. Proximal and distal teeth similar in size. Proximal teeth tapering, directed obliquely distally. Distal teeth slender, tapering, distinctly curved. Guards slightly asymmetrically rounded, marginally smooth; mucros absent. Slender, honey-colored notopodial aciculae present in all setigers. Pseudocompound falcigers and compound spinigers absent. Neuropodial aciculae paired, with brown cores and clear sheaths, tapering, blunt-tipped, straight; cross-sections round. Subacicular hooks (Figure 60k) with brown cores and clear sheaths, bidentate. Shorter syntype without subacicular hooks; other syntype with first subacicular hook in setiger 123, next in setiger 135 and scattered thereafter, becoming more frequent in far posterior setigers, where most frequent paired in some, but not all parapodia. Hooks very slender (no thicker than compound hooks), abruptly tapering distally, with distinct heads. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth triangular, nearly erect. Guards symmetrically rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Kinberg (1865) erected the genus *Eriphyle* for species of *Eunice* with quadrilobate prostomia, including *E. gigantea* Savigny (actually Lamarck, K. Fauchald comment), *E. aphroditois* Pallas, and *E. violacea* Grube. The genus has not been recognized by later authors, including Ehlers (1868), who renamed Kinberg's species, because Kinberg's species name was preoccupied in the combination *Eunice capensis* Schmarda (1861).

Eunice kinbergi has been considered a synonym of *E. aphroditois;* two forms both belong to group B-2 and are similar, as indicated in Table 27. However, *E. kinbergi* has articulated notopodial cirri and cylindrical articulations in the ceratostyles; *E. aphroditois* lacks articulations of both structures. *Eunice kinbergi* is one of two species in Table 29 with basally inflated ventral cirri continued to the posterior end; the other species is *E. plicata.* The latter has only about five branchial filaments; the former has 22 filaments.

Eunice kinbergi (Webster, 1884)

Nicidion kinbergi Webster, 1884:320, pl. 12: figs. 81–88 [not *Eunice kinbergi* Ehlers, 1868:306].

Eunice (Nicidion) kinbergi.—Hartman, 1944:124; 1959:313.

REMARKS.—Originally described in *Nicidion,* this species must be renamed, because the name, once the genus *Nicidion* was fused with *Eunice,* became pre-occupied in the combination *E. kinbergi* Ehlers, 1868. The species is here renamed *E. goodei.*

98. *Eunice kobiensis* McIntosh, 1885

FIGURE 61a–i; TABLES 19, 20

Eunice kobiensis McIntosh, 1885:278–280, figs. 37, 38, pl. 38: figs. 12, 13, pl. 20A: figs. 1, 3.—Fauchald, 1969: 4–6, fig. 2a–g.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK. 1885.12.1.197, Dredged off Kobe, Japan, 8–50 fathoms. *Challenger.*

COMMENTS ON MATERIAL EXAMINED.—The specimen has been frontally dissected and the jaw apparatus removed; it is cut into two pieces. Two sets of maxillae are present in a small vial accompanying the specimen; the maxillary formula is the same for both sets, even if one set appears too large to fit the holotype.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 131 setigers; length 55 mm; maximal width 3.5 mm; length through setiger 10, 6.5 mm.

Prostomium (Figure 61a) distinctly shorter and narrower than peristomium, less than $^1/_2$ as deep as peristomium. Prostomial lobes frontally rounded, dorsally slightly flattened; median sulcus deep. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender, tapering, with up to 5 long, cylindrical articulations. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 8. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring ~$^2/_3$ of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender, with 4 articulations.

Maxillary formula 1+1, 7+8, 7+0, 10+12, and 1+1. Mx III nearly as long as left Mx II; located behind Max II.

Branchiae (Figure 61e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 41. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Three first and last 2 pairs single filaments, all others pectinate with up to 8 filaments. Stems slender, tapering, about as long as notopodial cirri. Filaments slender, about as long as notopodial cirri.

Pre- and postbranchial neuropodial acicular lobes (Figure 61b,f) distally rounded; acicular lobes in branchial region distally bluntly conical; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Pre- and postbranchial ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 4. Inflated bases ovate; tips thick and tapering. Anterior notopodial cirri long, medially inflated, becoming increasingly slender and tapering in branchial and postbranchial setigers. Prebranchial and branchial notopodial cirri with up to 3 long, cylindrical articulations; postbranchial notopodial cirri without articulations.

Limbate setae slender. Pectinate setae (Figure 61d) narrow, tapering, flat. One marginal tooth distinctly longer than other teeth, with ~10 teeth. Shafts of compound falcigers (Figure 61c,g) gently inflated, marginally finely dentate at least in some hooks. Appendages narrow, tapering, bidentate. Proximal teeth smaller than distal teeth, triangular, directed laterally or slightly distally. Distal teeth gently curved, blunt or pointed. Guards asymmetrically pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 61i) paired, yellow, pointed, straight or gently curved; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 61h) yellow, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Hooks tapering; head distinct. Proximal and distal teeth similar in size. Proximal teeth triangular, directed laterally. Distal teeth curved, distinctly narrower than proximal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior parapodia; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT

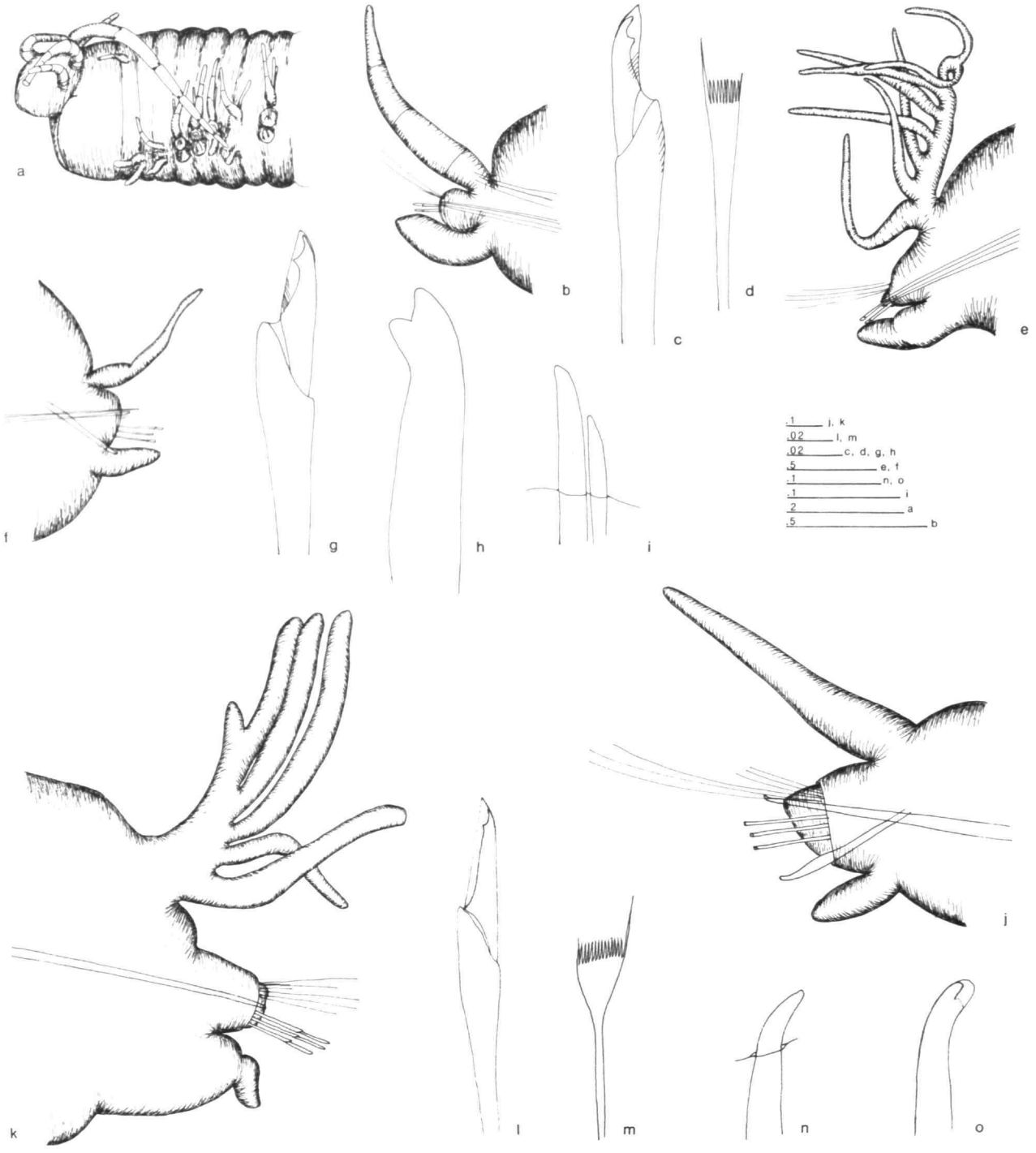

FIGURE 61.—*Eunice kobiensis* (holotype, BM(NH) ZK.1885.12.1.197): a, anterior end, lateral view; b, parapodium 2, anterior view; c, compound falciger, parapodium 19; d, pectinate seta, parapodium 19; e, parapodium 19, anterior view; f, parapodium 127, anterior view; g, compound falciger, parapodium 127; h, subacicular hook, parapodium 127; i, aciculae, parapodium 127. *Eunice langi* (holotype, AMHN 3739): j, parapodium 51, anterior view; k, parapodium 20, anterior view; l, compound falciger, parapodium 20; m, pectinate seta, parapodium 51; n, acicula, parapodium 51; o, subacicular hook, parapodium 51. (Scale bars in mm.)

SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 42, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice kobiensis* was considered a synonym of *E. websteri* (as *E. longicirrata* Webster) by Imajima and Hartman (1964:256); as already indicated by Fauchald (1969), the proposed synonymy cannot be correct. *Eunice kobiensis* is compared to similar species in Tables 19 and 20. Fauchald (1969) compared it to a number of similar species; at this time nothing can be added to that comparison and to discussions of other species listed in Table 20.

99. *Eunice langi* (Treadwell, 1943)

FIGURE 61j–o; TABLES 24, 26

Leodice langi Treadwell, 1943:3, figs. 14–18.
Eunice savignyi.—Hartman, 1956:283 [not *Eunice savignyi* Grube, 1878].

MATERIAL EXAMINED.—Holotype, AMHN 3739, Cape Town, South Africa.

COMMENTS ON MATERIAL EXAMINED.—The anterior end has been badly mangled and partly dissected, and all antennae are lost, so no illustrations were attempted of the anterior end.

DESCRIPTION.—Holotype complete, of unknown sex, with 71 setigers; total length 42 mm; maximal width 2 mm; length through setiger 10, 5.5 mm.

Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes not observed. Ceratophores ring-shaped in all antennae. Ceratostyles missing. Peristomial rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to setiger 3, with 6 distinct articulations.

Maxillary formula 1+1, 6+5, 9+0, 6+?8, and presumably 1+1 according to Treadwell (1943, fig. 18).

Branchiae (Figure 61k) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 39. Maximum 8 filaments at or near setiger 15; most branchiae with 4 or 5 filaments. Stems stout, strongly tapered, shorter than notopodial cirri. Filaments digitiform, about as long as notopodial cirri.

Anterior neuropodial acicular lobes distally truncate; posterior acicular lobes (Figure 61j) obliquely conical; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri very long, digitiform, as long as notopodial cirri. Ventral cirri basally inflated from setiger 5 to setiger 36, with distinct, digitiform, obliquely attached tips. Inflated bases increasing evenly from setiger 5 to setiger 15, ovate, decreasing from setiger 30, missing posterior to setiger 36. Posterior ventral cirri short, nearly tubercular. Anterior notopodial cirri slender, digitiform; posterior notopodial cirri long, tapering. Notopodial cirri without articulations.

Shafts of pectinate setae (Figure 61m) slender, cylindrical. Blades flat, strongly flaring. One marginal tooth longer than other teeth, with ~15 teeth. Shafts of compound falcigers (Figure 61l) gently inflated, marginally smooth. Appendages long, tapering; heads very small, bidentate. Proximal teeth much smaller than distal teeth, very short, triangular, directed laterally. Distal teeth tapering, nearly erect. Guards asymmetrically sharply pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 61n) single, amber-colored, tapering, distinctly bent in median and posterior setigers; cross-sections round. Subacicular hooks (Figure 61o) amber colored, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Hooks tapering; heads small, distinctly curved. Proximal and distal teeth similar in size. Proximal teeth directed laterally, blunt. Distal teeth truncate, directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Prostomial features; relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short; forming a distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 10–17, 19–24, 39–40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—21,2.

REMARKS.—The compound falcigers of *E. langi* resemble those of *E. tubifex*, but compound spinigers are absent in *E. langi*. The aciculae and subacicular hooks are amber colored, rather than clear yellow; by definition this places the species in B-1 as defined by Fauchald (1970). It is listed with similar species in Table 24 and 26.

Eunice langi was considered synonymous with *E. savignyi* by Hartman (1956); it differs by having considerably darker subacicular hooks and acicula. In addition the latter have branchiae from setiger 4 through setiger 45 with a maximum of 12 filaments; *E. langi* has branchiae from setiger 3 through setiger 39 with a maximum of eight filaments. Due to the indeterminate status of *E. savignyi*, other differences or similarities cannot be detailed at this time.

None of the character states listed in Table 26 are unique to this species. Among species listed in Table 24, it is characterized first and foremost by the very poor development of the head of the compound falcigers and the sharply pointed, but not mucronate, hood of these hooks.

100. *Eunice laticeps* Ehlers, 1868

FIGURE 62; TABLES 27, 30

Eunice tentaculata Quatrefages, 1866:317–318.
Eunice laticeps Ehlers, 1868:312.—Fauchald, 1986:251–252, figs. 46–50.

MATERIAL EXAMINED.—Holotype of *E. tentaculata* Quatrefages, MNHN, Paris, A.1(R.)-1868-no. 52b. Port Western, Australia, coll. Quoy and Gaimard, 1839.

COMMENTS ON MATERIAL EXAMINED.—The holotype of *E.*

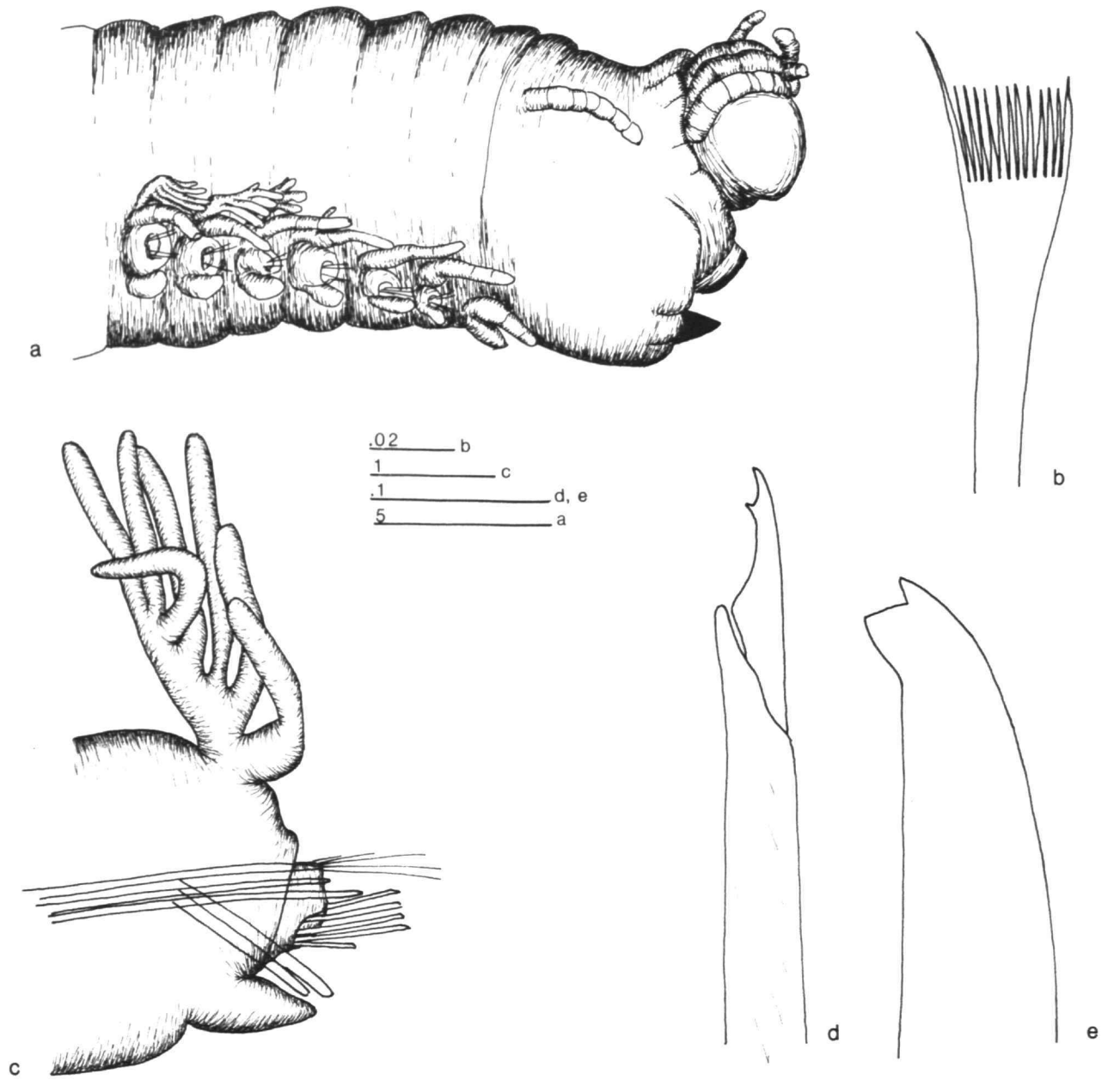

FIGURE 62.—*Eunice laticeps* (holotype of *E. tentaculata* Quatrefages, MNHN, Paris, A.1(R.)-1868-no. 52b): a, anterior end, lateral view; b, pectinate seta, parapodium 50; c, parapodium 50, anterior view; d, compound falciger, parapodium 50; e, subacicular hook, parapodium 50. (Scale bars in mm.)

tentaculata is an incomplete specimen that currently is in three fragments. In addition a small posterior fragment with a pygidium is present; its relation to the type cannot be determined.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 81 segments; length 126 mm; maximal width 10 mm; length through setiger 10, 21 mm. Anterior fragment with first 38 setigers.

Prostomium (Figure 62a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium.

Prostomial lobes frontally rounded, dorsally strongly inflated; median sulcus deep. Antennal bases overlapped by peristomial fold. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 10 distinct, cylindrical articulations in A-II and A-III. A-I to middle of anterior peristomial ring; A-II and A-III to middle of posterior peristomial ring. Left A-I doubled and left A-II missing. Peristomium massive, cylindrical. Separation between rings distinct dorsally and visible ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to anterior 1/3 of anterior peristomial ring, digitiform, with 6 rings.

Partial maxillary formula 1+1, ?4+?, 6+0, 6+9, and 1+1. Mandibles massive, strongly calcified, presently very friable.

Branchiae (Figure 62c) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to end of fragments. All branchiae pectinate. First branchiae with 4 filaments, maximum 18 filaments reached at about setiger 20, most median segments with 10 or fewer filaments. Stems tapering, shorter than notopodial cirri. Filaments digitiform, as long as notopodial cirri.

Neuropodial acicular lobes obliquely truncate; aciculae emerging from high dorsal section. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri digitiform. Median ventral cirri basally inflated. Inflated bases modest, ovate; narrow tips tapering. Posterior ventral cirri with less distinctly inflated bases, increasingly tapering. Notopodial cirri digitiform; anterior cirri with 2 or 3 articulations; posterior cirri without articulations.

Limbate setae narrow, marginally smooth. Pectinate setae (Figure 62b) present in large numbers, most tapering, some slightly flaring, flat. One marginal tooth longer than other teeth, with 15–20 teeth. Shafts of compound falcigers (Figure 62d) tapering, marginally smooth, internally striated. Appendages narrow, bidentate. Proximal teeth smaller than distal teeth, bluntly triangular, directed laterally. Distal teeth blunt, erect. Guards short, symmetrically rounded (not illustrated). Pseudocompound falcigers and compound spinigers absent. Aciculae at least paired, black, pointed, straight; cross-sections round. Subacicular hooks (Figure 62e) black, bidentate. Hooks first present from setiger 38, present in all setigers thereafter, paired in some setigers. Hooks tapering. Proximal teeth much larger than distal teeth, triangular, directed laterally. Distal teeth triangular, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 36–38, 40, 47, 50, 63, 70, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1; 70,2.

REMARKS.—The use of the name *E. laticeps* for this species was explored by Fauchald (1986). The species belongs to group B-2 and is listed with similar species in Tables 27 and 30. In numbers of branchial filaments, *E. laticeps* most closely resembles two poorly known species, *E. flavopicta* and *E. macrobranchia;* two better-known species, *E. reducta* and *E. violaceomaculata,* have slightly higher number of filaments. Of these, *E. reducta* has branchiae terminating well before the posterior end. The inflated bases of the ventral cirri are ovate in *E. laticeps* and thick, transverse welts in *E. violaceomaculata.* A-III is distinctly longer than A-II in *E. macrobranchia* and of about the same length as A-II in *E. laticeps,* and a similar difference separates the latter from *E. flavopicta.*

101. *Eunice laurillardi* Quatrefages, 1866

FIGURE 63; TABLES 27, 32

Eunice laurillardi Quatrefages, 1866:314–315, pl. 10: fig. 3.—Grube, 1870a:294.

MATERIAL EXAMINED.—Syntype, MNHN, Paris, A.1(R.)-1868-no. 49b, Nice. Syntype, MNHN-Paris, A.1(R.)-1868-no. 49c, Palermo. Syntype, MNHN-Paris, A.1(R.)-1868-no. 49a, Marseille, coll. M. Barbour (posterior fragment only).

COMMENTS ON MATERIAL EXAMINED.—One additional specimen identified as *E. laurillardi,* MNHN A1 (R) 1868 no 49d from Palermo, Italy, is a posterior fragment of an arabellid and cannot be further identified. The description is based primarily on the specimen from Nice, except as noted.

DESCRIPTION.—Syntype from Nice complete, of unknown sex, with 189 setigers; total length 150 mm; maximal width 5 mm; length through setiger 10, 9 mm. Syntype from Palermo complete, of unknown sex, with 170 setigers; total length 143 mm; maximal width 4.5 mm; length through setiger 10, 9 mm.

Prostomium (Figure 63a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally slightly flattened; median sulcus deep. Eyes between bases of A-I and A-II. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, articulated to bases, with up to 13 articulations in A-III; innermost articulations cylindrical, gradually becoming drop-shaped distally. A-I to setiger 1; A-II to setiger 5; A-III to setiger 8. Peristomium slightly flaring anteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, with 5 cylindrical articulations.

Maxillary formula 1+1, 6+6, 5+0, 5+8, and 1+1. Left Mx IV short; part of distal arc with Mx III.

Branchiae (Figure 63b,c) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region,

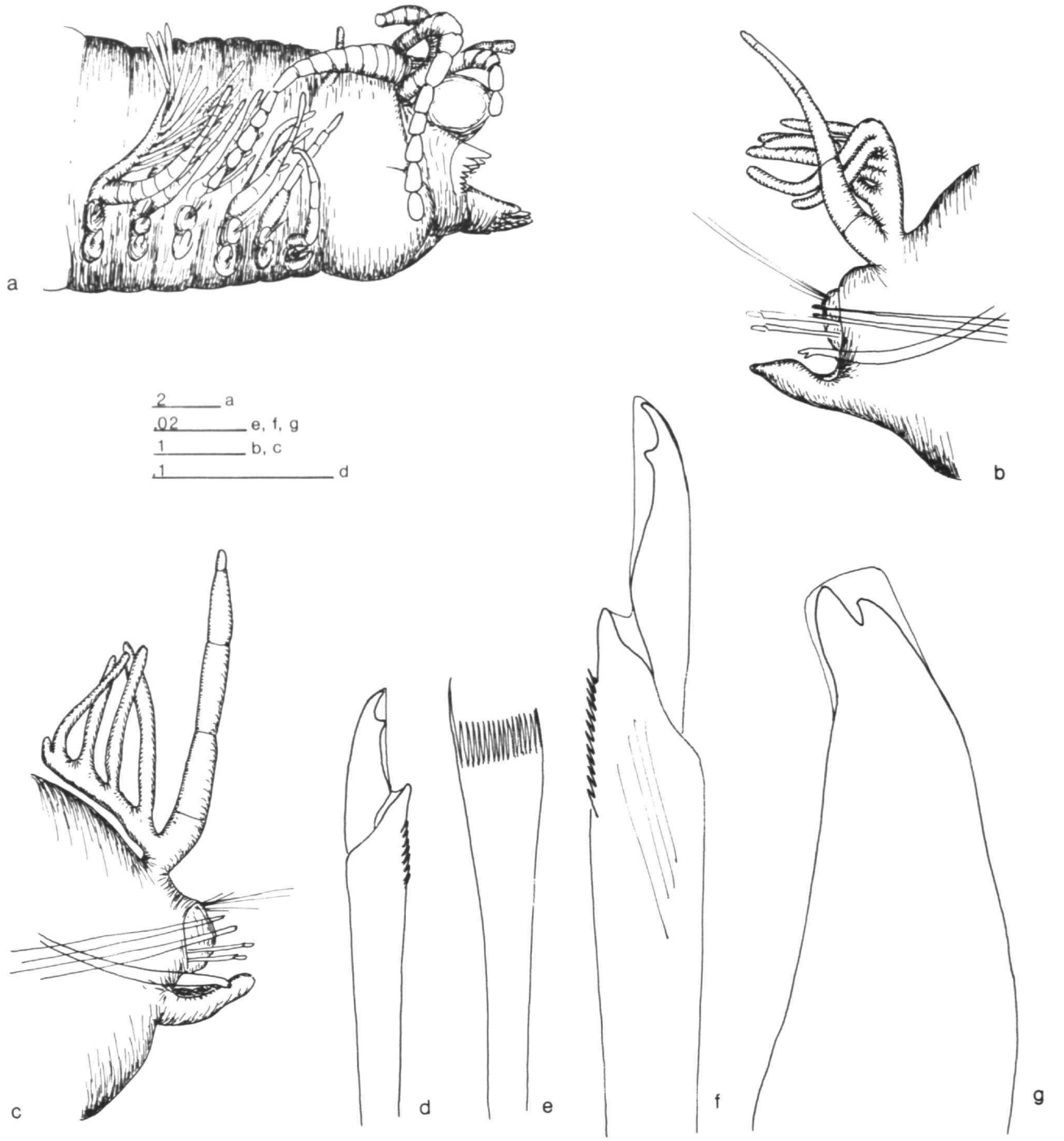

FIGURE 63.—*Eunice laurillardi* (syntype, MNHN, Paris, A.1(R.)-1868-no. 49b): a, anterior end, lateral view; b, parapodium 37, anterior view; c, first parapodium of posterior fragment from Marseille, anterior view; d, compound falciger, first parapodium of Marseille fragment; e, pectinate seta, parapodium 37; f, compound falciger, parapodium 37; g, subacicular hook, parapodium 37. (Scale bars in mm.)

erect. Branchiae from setiger 3 to setiger 184 (five setigers before pygidium). Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchia single filaments; maximum 10 filaments at about setiger 15. Stems short, flexible. Filaments slender, longer than stems.

Neuropodial acicular lobes rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri tapering, becoming basally inflated by setiger 10. Inflated bases modest, ovate, completely reduced by setiger 35; narrow tips tapering. Posterior ventral cirri broadly attached forming shallow open scoops covering lower edge of neuropodia. Notopodial cirri long, tapering to slender digitiform tips, with 4 to 5 articulations anteriorly and 3 to 4 articulations posteriorly.

Limbate setae narrow, marginally smooth. Pectinate setae (Figure 63e) tapering, flat. One marginal tooth longer than other teeth, with ~15 very slender teeth. Shafts of compound falcigers (Figure 63d,f) tapering, marginally coarsely serrated, internally striated. Appendages narrow, tapering towards small head, bidentate. Proximal teeth very much smaller than distal teeth, nearly button-shaped, directed laterally. Distal teeth tapering, directed obliquely distally. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae mostly paired, dark brown or black, tapering to blunt tips, slightly curved; cross-sections round. Subacicular hooks (Figure 63g) dark brown to black, bidentate. Hooks first present from setiger 32-33, present in all setigers thereafter, always single (except for replacements). Hooks tapering to small head. Proximal teeth very much larger than distal teeth. Both teeth directed distally. Subacicular hooks darker than aciculae.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Grube (1870a) indicated that the type material contained specimens of two previously known taxa. As indicated above, one lot consists of an unidentifiable arabellid; the remaining material currently present under this name in MNHN, Paris, appears to belong to a single species in group B-2. The fragment from no. 49a agrees with the other two specimens in structure of parapodia and setae.

Eunice laurillardi is listed with similar species in Tables 27 and 32. Of the three species with 10 or more branchial filaments listed in Table 32, *E. bowerbanki* has A-III distinctly longer than A-II; A-II and III are similar in length in *E. laurillardi;* the length of A-III is unknown in *E. multipectinata.* The peristomial cirri reach the middle of the prostomium in *E. laurillardi* and the middle of the peristomium in *E. multipectinata.*

102. *Eunice leptocirris* Grube, 1870

FIGURE 64a-f; TABLES 22, 23

Eunice leptocirris Grube, 1870b:55.

MATERIAL EXAMINED.—Holotype, ZMH V-795, Fiji Islands.

DESCRIPTION.—Holotype incomplete, of unknown sex, with 141 setigers; length 110 mm; maximal width 3 mm; length through setiger 10, 9 mm. Body cylindrical, with very prominent notopodial cirri.

Prostomium (Figure 64a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally obliquely truncate, dorsally slightly flattened; median sulcus deep. Eyes not observed. Antennae in horseshoe; A-I and A-II separated from A-III by gap, similar in thickness. Ceratophores long in all antennae, without articulations. Ceratostyles slender and digitiform, without articulations. A-I to posterior peristomial ring; A-II to setiger 6; A-III to setiger 9. Peristomium cylindrical. Separation between peristomial rings distinct on all sides; anterior ring ~$^2/_3$ of total peristomial length. Peristomial cirri reaching well beyond tip of prostomium, slender and tapering, without articulations.

Jaws not examined.

Branchiae (Figure 64b) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to end of fragment. Maximum 6 filaments at about setiger 15. Stems tapering, slender, shorter than filaments. Filaments slender, nearly filiform, shorter than notopodial cirri.

Neuropodial acicular lobes rounded or slightly triangular; aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5. Inflated bases modest, ovate, very long, distally obliquely truncate tips present through median setigers. Inflation gradually lost from about setiger 60; posteriormost ventral cirri slender and digitiform, distally obliquely truncate. Notopodial cirri very long, distally tapering to very slender tips; bases modestly inflated, especially in anteriormost setigers; articulations absent.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 64e) tapering, flat. One marginal tooth longer than thicker than other teeth, with ~10 teeth. Shafts of compound falcigers (Figure 64c) slightly inflated, marginally smooth; beaks distinct. Appendages slender, with distinct heads, bidentate. Proximal teeth smaller than distal teeth, narrowly triangular, directed laterally. Distal teeth slender, strongly curved, directed laterally. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure

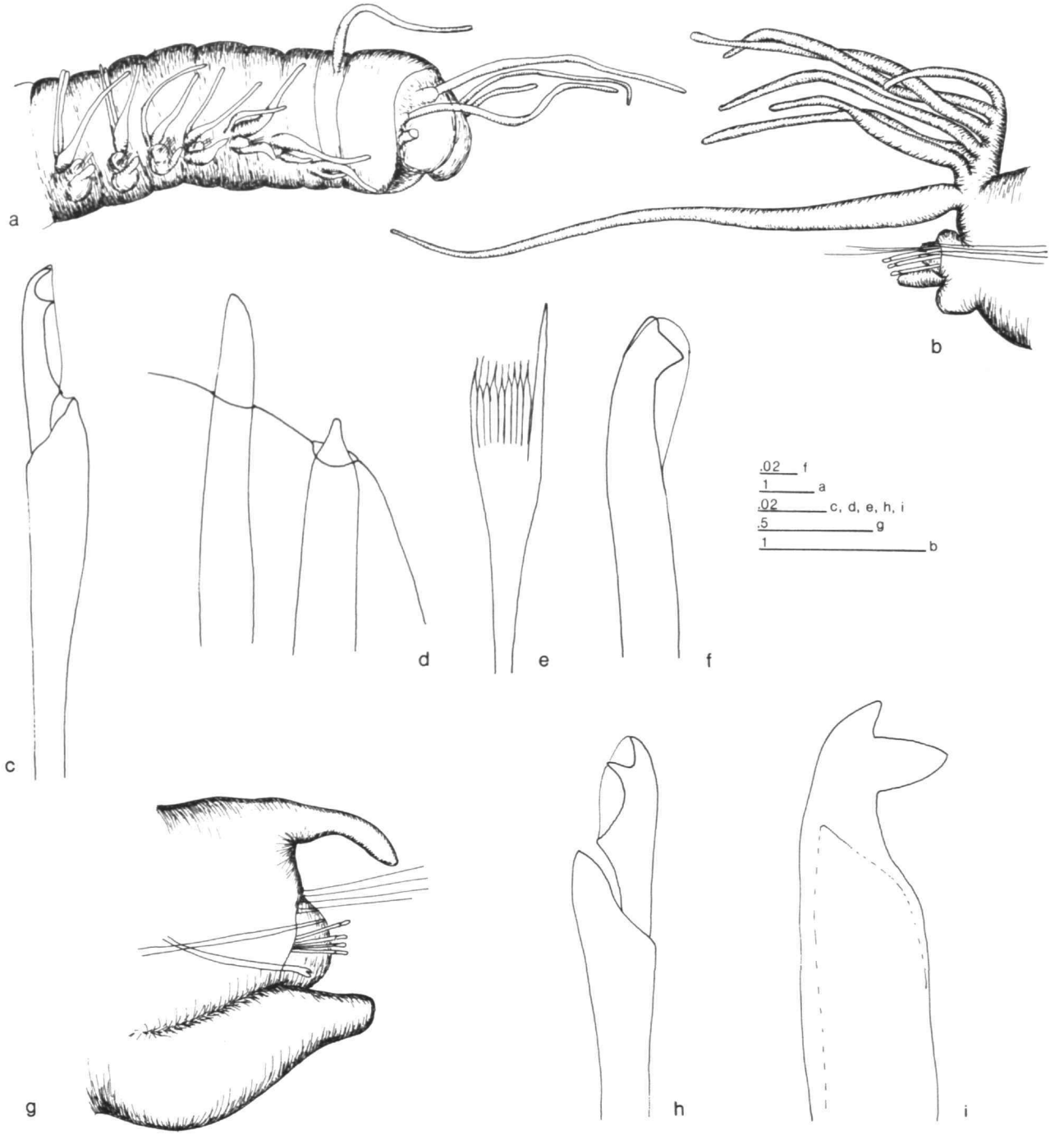

FIGURE 64.—*Eunice leptocirris* (holotype, ZMH V-795): a, anterior end, lateral view; b, parapodium 34, anterior view; c, compound falciger, parapodium 34; d, aciculae, parapodium 34; e, pectinate seta, parapodium 134; f, subacicular hook, parapodium 134. *Eunice leucosticta* (slide from holotype, ZMB F-2044): g, posterior parapodium, anterior view; h, compound falciger, posterior parapodium; i, subacicular hook, posterior parapodium. (Scale bars in mm.)

64d) paired, yellow, most tapering distally to nearly straight, blunt tips, some very abruptly tapering with short, nearly nipple-shaped tips; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 64f) yellow, bidentate. Hooks first present from setiger 51, present in all setigers thereafter, always single (except for replacements). Proximal teeth much larger than distal teeth, very thick, short, triangular, directed laterally. Distal teeth short, blunt, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 36-40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice leptocirris* has not been reported since it was originally described by Grube (1870b:55); the original description was so brief that the species has been considered indeterminable by most authors. The species belong to group A-2 and is listed with similar species in Tables 22 and 23. The only other species listed in Table 23 without articulated ceratostyles is *E. schizobranchia*. Among other differences, the latter has dark aciculae and yellow subacicular hooks; *E. leptocirris* has both the aciculae and subacicular hooks light-colored.

Eunice leucodon Ehlers, 1901

Eunice leucodon Ehlers, 1901:261.

REMARKS.—Examination of the type material demonstrated that this species has the jaw structure and setal complement of the genus *Palola*. It is included in a treatment of that genus currently in preparation.

Eunice leuconuchalis Benham, 1900

Eunice leuconuchalis Benham, 1900:21-22.—Fauchald, 1986:252-253.
Eunice australis.—Ehlers, 1907:12.—Fauchald, 1986:244-245, figs. 9-14.

REMARKS.—Justification for considering this species a synonym of *E. australis* was reviewed by Fauchald (1986).

103. *Eunice leucosticta* Grube, 1878

FIGURE 64g-i; TABLES 33, 37

Eunice leucosticta Grube, 1878a:103.

MATERIAL EXAMINED.—Slide of parapodium from holotype, Zool. Mus. Berlin, F-2044, East Africa, coll. v.d. Decken.

DESCRIPTION.—Slide of a posterior parapodium, presumably near segment 120, without branchiae, but apparently not a segment immediately in front of the pygidium.

Species described by Grube (1878a:103) with 131 segments; total length 130 mm. Color dark red, densely studded with white spots. Three median antennae of same length, reaching segment 4 (including peristomium?).

Maxillary formula (rewritten from Grube) 1+1, 5+5, 10+0, 4+6, and 1+1.

Branchiae from setiger 14 and 15 (presumably on either side of body) and continued to setiger 113, terminating well before end of specimen. Where best developed with 4 filaments, but 3 filaments by far most common number. Filaments short, no longer than short notopodial cirri.

Neuropodia (Figure 64g) distally evenly rounded; aciculae emerging above midline. Pre- and postsetal lobes low folds. Posterior ventral cirri large, distally tapering, basally moderately inflated. Notopodial cirri short, digitiform in parapodium examined.

Parapodium with a thick bundle of limbate setae, a number of compound falcigers, and a few pectinate setae. Shafts of compound falcigers (Figure 64h) inflated, marginally smooth. Appendages short triangular, bidentate. Teeth similar in size. Proximal teeth tapering, curved, directed laterally. Distal teeth tapering, nearly erect. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, with dark brown cores and clear sheaths, tapering to straight tips; cross-sections round. Subacicular hooks (Figure 64i) with dark brown cores and clear sheaths. Hooks distally abruptly tapered. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth abruptly tapering, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with anterior and median parts of the body.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* None known. *Unknown Characters:* 3-22, 24-29, 31-34, 38-40, 42, 45, 46, 48, 49, 51-56, 60-62, 65-68, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice leucosticta* was considered a synonym of *E. afra* by Hartman (1959). *Eunice leucosticta* appears to differ from *E. afra* in that the antennae are much longer than in that species and in that the two teeth on the subacicular hooks are directed laterally rather than distally as in *E. afra*. It is listed with similar species in Tables 33 and 37. It is too poorly known to be included in the key or to be discussed in detail in relation to similar species listed in Table 37.

104. *Eunice levibranchia* (Hoagland, 1920)

FIGURE 65a-d; TABLES 33, 37

Leodice levibranchia Hoagland, 1920:614-615, pl. 50: figs. 1-8.

MATERIAL EXAMINED.—Holotype, USNM 19018, *Alba-*

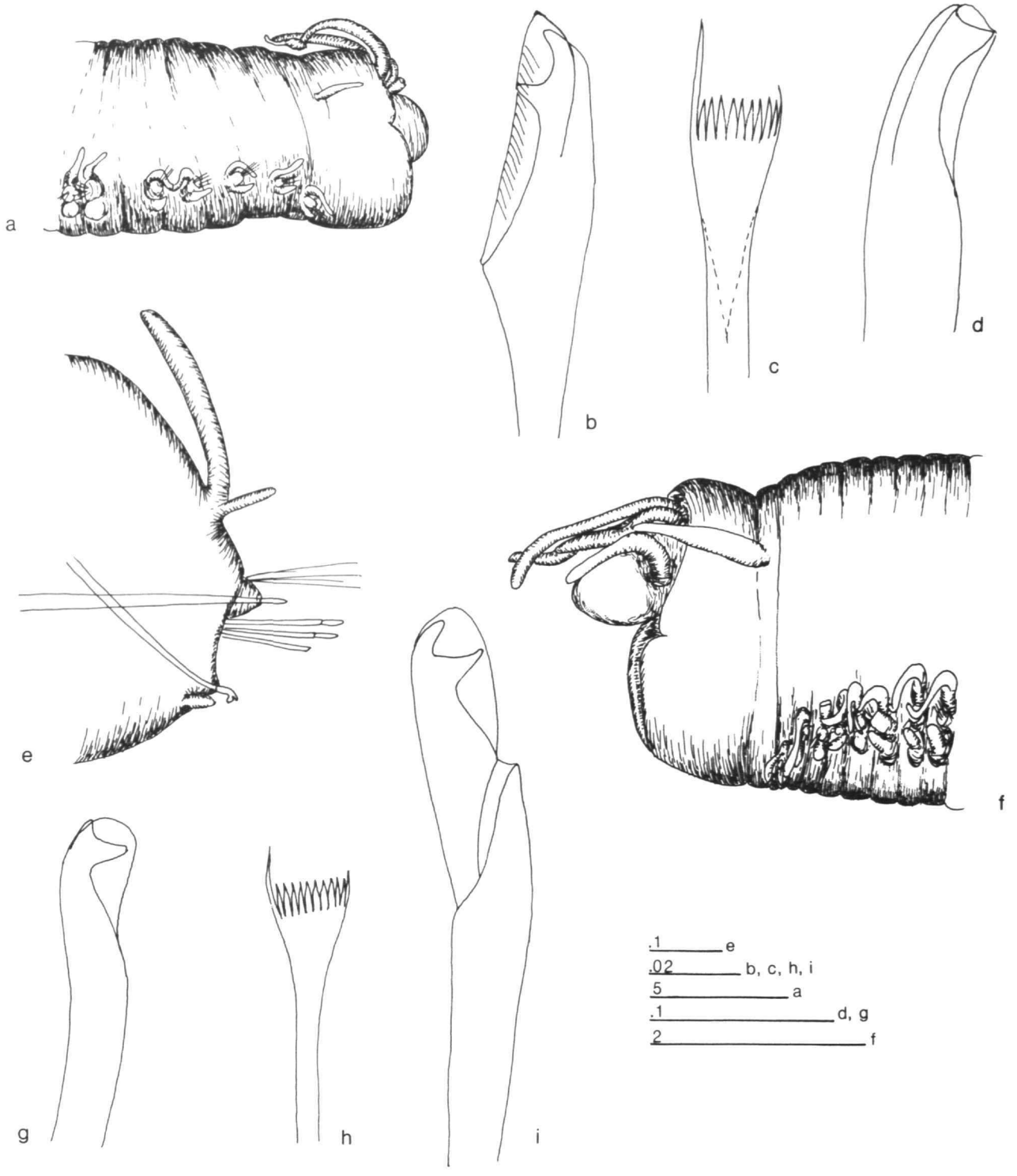

FIGURE 65.—*Eunice levibranchia* (holotype, USNM 19018): a, anterior end, lateral view; b, appendage of compound falciger, parapodium 13; c, pectinate seta, parapodium 13; d, subacicular hook, approximately parapodium 80. *Eunice lita* (holotype, USNM 19395): e, parapodium 106, anterior view; f, anterior end, lateral view; g, subacicular hook, parapodium 106; h, pectinate seta, parapodium 106; i, compound falciger, parapodium 106. (Scale bars in mm.)

tross sta 5348, Point Tabonan, Palawan Passage, Philippine Islands, 10°57′45″N, 118°38′15″E, 27 Dec 1908, 686 m, coral and sand bottom, beam-trawl.

COMMENTS ON MATERIAL EXAMINED.—The holotype is poorly preserved and especially the different parapodial lobes are difficult to distinguish. The type has been dissected for the jaws, and details of the ventral side of the prostomia and peristomia are difficult to discern.

DESCRIPTION.—Holotype complete, of unknown sex, with 105 setigers; total length 94 mm; maximal width 8 mm; length through setiger 10, 9 mm. Body anteriorly dorsally strongly convex, tapering abruptly to a ragged posterior end.

Prostomium (Figure 65a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes short, frontally rounded, dorsally inflated. Eyes between bases of A-I and A-II, black. Antennae in shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, without articulations. A-I to middle of posterior peristomial ring; A-II and A-III to setiger 2. Peristomium cylindrical. Separation between rings distinct dorsally and probably ventrally; anterior ring ~2/3 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula (combining observations of Mx I and II, which are present, with Hoagland's observations) 1+1, 8+7, ?+0, 10+10, and 1+1.

Branchiae present, palmate, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 69 to setigers 85–95. Branchiae present to near posterior end to terminating well before posterior end, present on less than 55% of total number of setigers. Branchiae small tufts with 2 to 3 filaments.

Parapodia all very small compared to size of specimen, especially in anterior end. Neuropodial acicular lobes distally truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 1–2 ventral cirri tapering. Median ventral cirri with inflated bases. Inflated bases transverse welts; narrow tips short and button-shaped. Inflated bases decreasing posteriorly. Posterior ventral cirri tapering. Notopodial cirri short, tapering, slender, without articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 65c) short, relatively stout, slightly flared, furled. One marginal tooth distinctly longer than other teeth, with ~10 coarse teeth. Shafts of compound falcigers inflated, marginally serrated. Appendages (Figure 65b) thick, tapering; heads large, bidentate. Teeth similar in size. Proximal teeth narrowly triangular, directed laterally. Distal teeth thick, with distinct basal bend, blunt, directed obliquely distally. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae numbering 2–3, dark, tapering, straight or very gently curved; cross-sections round. Subacicular hooks (Figure 65d) dark, bidentate. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks slender, distally abruptly tapering to slender necks; heads distinct. Proximal teeth very much larger than distal teeth, directed laterally. Distal teeth blunt, very short, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Various details of the jaw apparatus; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 4, 6, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice levibranchia* is characterized by antennae without articulations and dark subacicular hooks and by the very late start of the very poorly developed branchiae.

Hoagland's illustration of the jaws (1920, pl. 50: fig. 2) indicates a maxillary formula of 1+1, 8+7, 10+10, and 8+0. A symmetric development of Mx III appears unlikely; the match-up of the different jaw pieces appears to have been confused.

Branchiae do not appear to have been present as far forward as setiger 50 as indicated by Hoagland, but the specimen is very poorly preserved and the branchial distribution is difficult to determine. Two features are certain: the branchiae do not start until very late, and the branchial filaments are few and very short.

Eunice levibranchia is listed with similar species in Tables 33 and 37. Other species listed in 33 with a very late start of the branchiae include *E. excariboea* and *E. gagzoi*. The former has articulated ceratostyles; the two latter lack articulations. *Eunice gagzoi* has single branchial filaments; *E. levibranchia* has as many as three filaments. There are other shape differences best evaluated by comparing the illustrations of the two species.

105. *Eunice limosa* Ehlers, 1868

TABLES 41, 43

Eunice limosa Ehlers, 1868:348-352, pl. 15: figs. 15-22.
Eunice vittata.—Fauvel, 1911:11 [? not *Eunice vittata* Chiaje, 1828].

DESCRIPTION.—This species was originally described from Kvarner Gulf in the Adriatic Sea. The types are no longer available, but the description given by Ehlers is sufficiently detailed to characterize the form.

Specimens with 81–106 segments; total length 32–65 mm; width ~2 mm. Body cylindrical anteriorly, tapering to slender posterior ends. Anal cirri as long as last 5 setigers, without articulations.

Prostomium frontally rounded; median sulcus shallow. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 25 cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 5. Separation between peristomial rings distinct on all sides; anterior ring twice as long as posterior ring.

Peristomial cirri to front edge of peristomium, digitiform, without articulations.

Maxillary formula 1+1, 9+10, 7+0, 6+10, and presumably 1+1. Mx III long, located behind left Mx II.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 36. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximum 12 slender, nearly filiform filaments. Filaments about as long as notopodial cirri.

Ventral cirri basally inflated in median setigers. Posterior ventral cirri not inflated. Notopodial cirri digitiform, without articulations in all setigers.

Shafts of compound falcigers distally inflated, marginally serrated. Appendages short, tapering, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth short, obliquely directed distally. Guards symmetrically sharply pointed, with distinct mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, slender, tapering, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, tridentate with teeth in a crest. Distribution unknown, present well before setiger 30.

UNKNOWN MORPHOLOGICAL FEATURES.—Several features from all parts of the body.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 58, 59. *Unknown Characters:* 4–6, 8, 10–17, 24, 39, 40, 42–52, 54–56, 60, 65–68, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice limosa* is listed with similar species in Tables 41 and 43. It is the only species in Table 43 to combine mucronate guards on the compound falcigers with as many as 12 branchial filaments. It has usually been considered a synonym of *E. vittata;* the two are very similar and may not be separable. A comparison shows a series of minor differences and without knowledge of the variability in these characters a possible synonymy should be held in abeyance.

An indication of the distribution of subacicular hooks is given by Ehlers in his illustration of parapodium (1868, pl. 15: fig. 17) shown as being a heavily branchiated parapodium with nine branchial filaments and subacicular hooks. In the text Ehlers indicated that such heavily branchiated parapodia are present only before setiger 30.

106. *Eunice lita* (Chamberlin, 1919)

FIGURE 65e–i; TABLES 33, 38

Leodice lita Chamberlin, 1919a:240–244, pl. 54: figs. 6–10, pl. 55: figs. 1–7.

MATERIAL EXAMINED.—Holotype, USNM 19395, *Albatross* (no station indicated), Marshall Islands, on anchor coming up from 12 fathoms, Exped. 1899–1900.

DESCRIPTION.—Holotype complete (in 2 pieces), of unknown sex, with 240 setigers; length 78 mm; maximal width 4 mm; length through setiger 10, 4 mm.

Prostomium (Figure 65f) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally excavate with a thickened rim; median sulcus deep. Eyes between bases of A-I and A-II, black. Antennae in horseshoe; A-I separated by gap from A-II and A-III; A-I thicker than A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I to middle of peristomium; A-II to setiger 4; A-III to setiger 5. Peristomium anteriorly somewhat flaring. Separation between rings very distinct both dorsally and ventrally and visible laterally. Anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of prostomium, medially inflated, without articulations.

Maxillary formula 1+1, 4+4, 6+0, 4+9, and 1+1. Mx III and left Mx IV forming distal arc.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 15 to setiger 120. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Most branchiae single, digitiform filaments (Figure 65e); some branchiae, especially at about setigers 35–70 with 2 filaments. Filaments digitiform, longer than notopodial cirri.

Anterior neuropodial acicular lobes distally truncate, becoming conical posteriorly; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering, becoming basally inflated from about setiger 5. Inflated bases thick, transverse welts; narrow tips short and button-shaped. From about setiger 50 inflated bases reduced. Ventral cirri emerging increasingly from posterior face of parapodium, by last setigers present reduced to very small, nearly rudimentary knobs. Anterior notopodial cirri short, digitiform, becoming short, slender filaments at bases of much larger branchial filaments in branchial region. Notopodial cirri without articulations.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 65i) small. Shafts slender. Blades flaring, flat. One marginal tooth longer than other teeth, with 12 teeth. Compound falcigers (Figure 65h) long-shafted, shafts gently inflated, marginally smooth. Appendages short, sharply tapering; heads large, bidentate. Proximal teeth larger than distal teeth, tapering, directed laterally, distally upturned. Distal teeth thick, blunt, directed obliquely distally. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single except in a few anterior setigers, dark, pointed, straight; cross-sections round. Posterior aciculae projecting well beyond acicular lobes. Subacicular hooks (Figure 65g) dark, bidentate. Hooks first present from setiger 23, present in all setigers thereafter, always single (except for replacements). Hooks curved, distally abruptly tapering; heads large. Proximal teeth

larger than distal teeth, directed laterally, distally upturned. Distal teeth nearly erect, triangular.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 4, 6, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice lita* is listed with similar species in Tables 33 and 38. An unusual feature of the species is the high number of setigers with single branchial filaments, both before and after the peak number is reached, and the fact that the branchiae terminate well before the posterior end of the body.

Eunice longicirrata (Kinberg, 1865)

Nicidion longicirrata Kinberg, 1865:564; 1910:43, pl. 16: fig. 20.
Eunice (Nicidion) cariboea.—Hartman, 1948:80 [not *Eunice cariboea* Grube, 1856].

MATERIAL EXAMINED.—Holotype, RM 415, Honolulu, Hawaii, *Eugenie* Expedition.

COMMENTS ON MATERIAL EXAMINED.—Kinberg (1865:564) gave locality information as "Mare pacificum juxta urbem Honolulu insulae Oahu, inter corallia, summa aqua." The type lot includes a very poorly preserved anterior end and a median fragment. The anterior end has been ripped apart and the whole jaw apparatus is missing.

DESCRIPTION.—A-III distinctly longer than A-I and A-II. Separation between peristomial rings distinct dorsally, but probably not laterally; unknown for ventral side. Peristomial cirri to frontal margin of peristomium.

Branchial distribution cannot be determined. Median fragment with long, digitiform single branchial filaments.

Shape of parapodial structures indeterminable. Notopodial cirri short, slender in median fragment.

Limbate setae marginally serrated. Shafts of compound hooks strongly inflated. Appendages short; both teeth directed laterally. Hoods short, symmetrically rounded, marginally serrated. Aciculae brown, distally bent. Subacicular hooks and pectinate setae absent in both fragments.

REMARKS.—Hartman (1948:80) referred *Nicidion longicirrata* to Grube's species, *Eunice cariboea*, originally described from Caribbean. This synonymy is incorrect. In *E. cariboea* all antennae are similar in size and digitiform, in the type of *E. longicirrata*, A-III is distinctly longer than other antennae and all antennae tapering. The absence not only of subacicular hooks, but also of pectinate setae points to an affiliation with *Palola* rather than with *Eunice*, but the specimen is in such poor shape that it cannot be accurately assigned to genus. *Eunice longicirrata* Kinberg is here considered indeterminable.

Eunice longicirrata Webster, 1884

Eunice longicirrata Webster, 1884:318-319, pl. 12: figs. 75-80.
Eunice websteri Fauchald, 1969:12-14, fig. 6a-e.

REMARKS.—Fauchald (1969:12) renamed this species, pointing out that the name applied by Webster had been preoccupied in combination *E. longicirrata* (Kinberg, 1865). The species is described below.

107. *Eunice longicirris* Grube, 1869

FIGURE 66a-f.

Eunice longicirris Grube, 1869:492.

MATERIAL EXAMINED.—Holotype, ZMB 499, Suez, coll. Ehrenberg.

COMMENTS ON MATERIAL EXAMINED.—The type lot consists of one anterior end, two posterior ends, and several long sections of median setigers. The features of all pieces are closely similar and are here assumed to belong to the same species; however, it is unclear how the pieces match, so measurements were taken on the anterior fragment only.

DESCRIPTION.—Anterior fragment of unknown sex, with 30 setigers; length 43 mm; maximal width 5 mm; length through setiger 10, 16 mm.

Prostomium (Figure 66d) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes posterior to bases of A-I; faded. Antennae in horseshoe; A-I and A-II separated from A-III by gap; A-III slimmer than A-I and A-II. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 14 long, articulations in A-III; basal articulations cylindrical, distal ones drop-shaped. A-I to posterior peristomial ring; all other antennae incomplete; A-II to setiger 1; A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~$^3/_4$ of total peristomial length. Peristomial cirri outreaching prostomium, very slender, tapering, with 8 articulations.

Maxillary formula 1+1, 7+7, 7+0, 8+10, 1+1. Mx III part of distal arc with left Mx IV. Left Mx IV with very small teeth. Mx VI absent.

Branchiae (Figure 66a) present, pectinate, distinctly shorter than notopodial cirri, erect. Branchiae from setiger 3 to end; all branchiae pectinate except last 10-15 pairs. Maximum 7 filaments at about setiger 15. Stems slender, cylindrical, shorter than filaments. Filaments slender, digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes distally truncate, becoming triangular in posterior setigers; aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming basally distinctly inflated from about setiger 5. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri tapering without inflated bases.

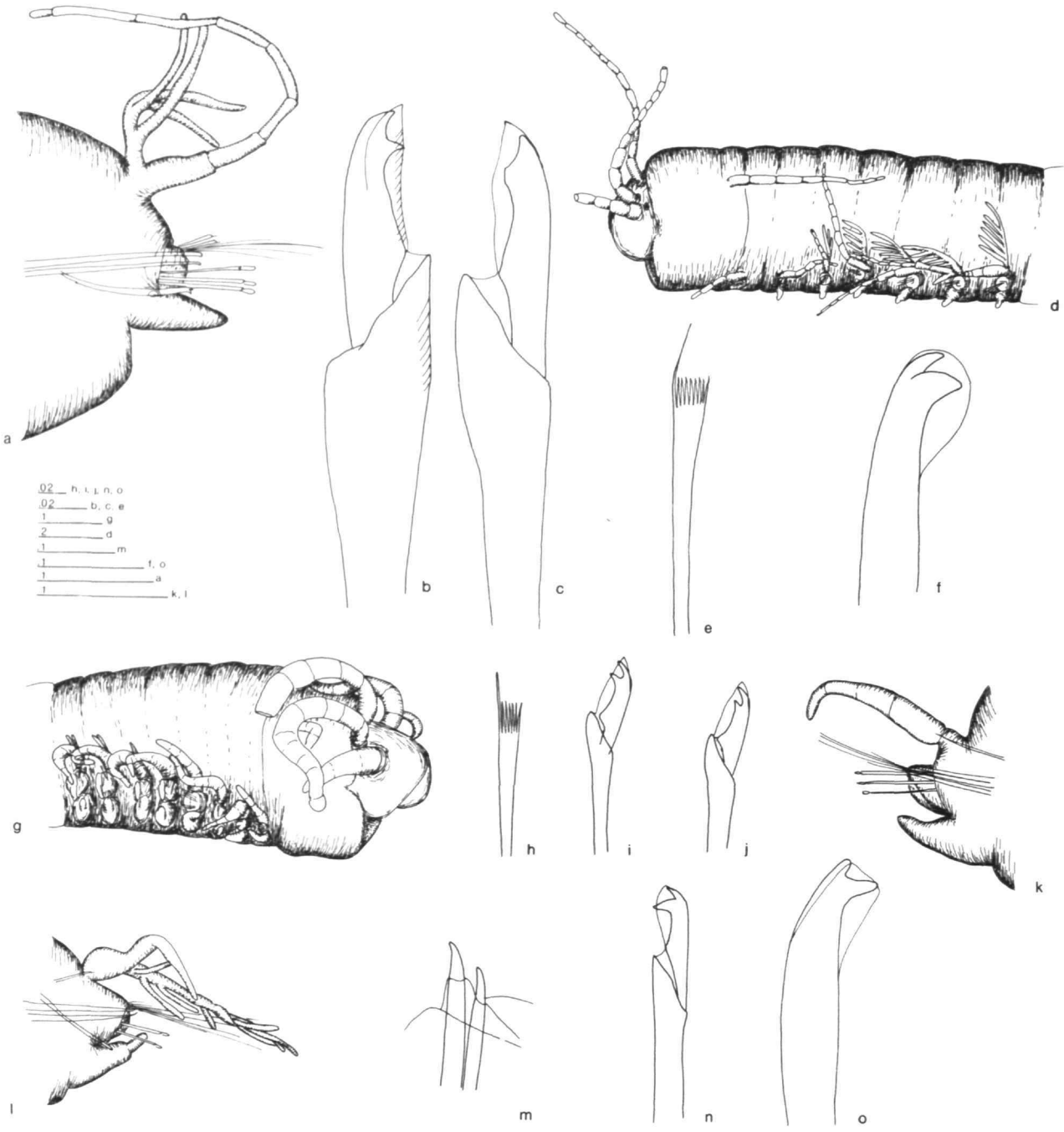

FIGURE 66.—*Eunice longicirris* (holotype, ZMB 499): a, median parapodium, anterior view; b, compound falciger, median parapodium; c, compound falciger, median parapodium; d, anterior end, lateral view; e, pectinate seta, median parapodium; f, subacicular hook, median parapodium. *Eunice longisetis* (holotype, USNM 4791): g, anterior end, lateral view; h, pectinate seta, anterior parapodium; i, compound falciger, anterior parapodium; j, compound falciger, anterior parapodium; k, anterior parapodium, anterior view; l, median parapodium, anterior view; m, aciculae, median parapodium; n, compound falciger, median parapodium; o, subacicular hook, median parapodium. (Scale bars in mm.)

Notopodial cirri very slender, very long, nearly whip-like, longer than branchiae, with 5 or more long, slender articulations.

Limbate setae slender, marginally smooth. Shafts of pectinate setae (Figure 66e) wide flat. Blades tapering, flat. One marginal tooth longer than other teeth, with ~10 teeth. Shafts of compound falcigers (Figure 66b,c) slightly inflated, marginally serrated when not worn. Appendages thick, tapering, bidentate. Proximal teeth shorter than distal teeth, tapering, directed laterally. Distal teeth distinctly thicker than proximal teeth, bent, tapering. Many appendages with both teeth distinctly worn, rounded or truncated. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, chestnut-colored without distinction between cores and sheaths, tapering, straight in anterior and median setigers, becoming bent ventrally in posterior setigers; cross-sections round. Subacicular hooks (Figure 66f) with chestnut-colored cores and clear sheaths, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Hooks tapering, with distinct heads. Proximal teeth larger than distal teeth, slender, directed laterally. Distal teeth blunt, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 23, 33, 36–40, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,2; 37,1; 38,1.

REMARKS.—*Eunice longicirris* belongs to group B-2; it is listed with similar species in Tables 27 and 32. It is primarily characterized by the very long, slender, articulated notopodial cirri and peristomial cirri. It is the only species listed in Table 32 in which the peristomial cirri clearly outreach the prostomium.

Eunice longicornis Grube, 1866

Eunice longicornis Grube, 1866b:68.
Eunice longicirris.—Grube, 1878b:100 [bottom of page, not *Eunice longicirris* Grube, 1869:492].

REMARKS.—This species was described with branchiae from setiger 6 to the end of the incomplete specimen (145+ setigers), where best developed 23 filaments were present, and even in the last setiger 19 filaments were present. A-III reached segment 7; all antennae and peristomial cirri without articulations. The branchiae outreach the notopodial cirri by setiger 12.

Through a lapsus, this species was referred to as *E. longicirris* in a tabular review of the genus issued by Grube (1878b:100); however, on the same page is also mentioned the very different species described as *E. longicirris* by Grube in 1869 and redescribed, based on the type above.

No material is available of *E. longicornis* and the original description is insufficient to characterize the species; it is here considered indeterminable.

Eunice longiqua Kinberg, 1865

Eunice longiqua Kinberg, 1865:563.
Eunice antennata.—Hartman, 1948:78–79 [in part, not Lamarck, 1818].

REMARKS.—The single specimen reported by Hartman (1948:78) is no longer present in the collections of Riksmuseet, Stockholm (R. Oleröd, in litt.). The available information, summarized from Kinberg (1865) and Hartman (1948), is given below.

Antennae, peristomial cirri, and notopodial cirri with moniliform articulations. A-III to setiger 5; with 20 articulations. Branchiae from setiger 6 to end of body; median region with lowered number of branchial filaments. Aciculae yellow; tapering with blunt, straight or gently curved tips. Subacicular hooks yellow; tridentate. Compound hooks distally bidentate.

Eunice longiqua was reported from Foua in the Pacific Ocean. It belongs to group C-2. Without access to any material, the species cannot be separated from a series of similar species and it is here considered indeterminable.

108. *Eunice longisetis* Webster, 1884

FIGURE 66g–o

Eunice longisetis Webster, 1884:317-318, pl. 10: figs. 46, 46a,b, 47–49.

MATERIAL EXAMINED.—Holotype and 4 slides of parapodia, USNM 4791, Bermuda, coll. G. Brown Goode, 1876.

DESCRIPTION.—Holotype complete, of unknown sex, with 108 setigers; length 40 mm; maximal width 3.5 mm; length through setiger 10, 6.5 mm. Body thickset, cylindrical, tapering posteriorly, vaguely dorsoventral flattened.

Prostomium (Figure 66g) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally depressed and flattened; median sulcus shallow. Eyes between bases of A-I and A-II, purple. Antennae in horseshoe, evenly spaced, with A-I thicker than other antennae. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform, with up to 10 distinct, cylindrical articulations in A-II. A-I to middle of anterior peristomial ring; A-II to setiger 4; A-III incomplete, at least as long as A-II judging from its girth. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 2 cylindrical articulations.

Jaws not examined.

Branchiae (Figure 66l) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 104. Branchiae present to

near posterior end, present on more than 65% of total number of setigers. First and last 15 branchiae single filaments, maximum 8 filaments. Stems slender, tapering, longer than notopodial cirri. Filaments digitiform, shorter than notopodial cirri.

Neuropodial acicular lobes obliquely conical with aciculae emerging from tips of lobes, dorsal to midline. Presetal lobes low, transverse folds. Postsetal lobes free, about as long as acicular lobes, visible behind acicular lobes. Anterior ventral cirri thick, tapering, becoming ventrally inflated from about setiger 10. Inflated bases forming short transverse inflated ridges along lower edge of parapodia; narrow tips long and digitiform. Posterior to setiger 45 ventral cirri increasingly digitiform, elongated. Notopodial cirri digitiform, tapering, similar in length. Anterior notopodial cirri articulated (Figure 66k), loosing articulations in early branchial setigers.

Limbate setae long, slender, very narrowly limbate, marginally smooth. Pectinate setae (Figure 66h) narrow, tapering, flat. One marginal tooth longer than other teeth, with 7 teeth in anterior setigers and 12 teeth in median and posterior setigers. Shafts of anterior compound falcigers (Figure 66i,j) inflated, becoming tapering in median and posterior setigers (Figure 66n), all marginally smooth. Anterior appendages relatively short, tapering, with small heads, bidentate. Proximal teeth shorter than distal teeth, tapering, directed obliquely distally. Distal teeth long, slender, strongly curved. Median appendages very slender, with large heads, bidentate. Proximal teeth much larger than distal teeth, strongly tapering, directed laterally. Distal teeth strongly tapering, directed obliquely distally. Anterior guards symmetrically bluntly pointed, becoming distinctly rounded in posterior setigers, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 66m) paired, with dark brown to black cores and clear sheaths, slender, tapering, distinctly curved dorsally; cross-sections round. Subacicular hooks (Figure 66o) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setiger 18, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering, with distinct heads. Proximal teeth larger than distal teeth, directed laterally. Distal teeth slender, curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 23, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice longisetis* belongs to group B-2 and is listed with similar species in Tables 27 and 30. The only unusual feature, compared to the other species in Table 30, appears to be the high number of posterior branchiated setigers with single filaments; most species listed in this table have a maximum of five; *E. longisetis* and *E. fimbriata* have 15 and 10–12, respectively. The latter have branchiae terminating well before the posterior end; in *E. longisetis* the branchiae are continued to the far posterior setigers.

109. *Eunice lucei* Grube, 1856

FIGURE 67; TABLE 6

Eunice lucei Grube, 1856:57–58.

MATERIAL EXAMINED.—Lectotype and 3 paralectotypes, and a posterior fragments, ZMC (uncataloged), Puntarenas, Costa Rica, coll. H. Kröyer, 1846.

DESCRIPTION.—Lectotype of unknown sex, with 170 setigers, missing perhaps 15 setigers; length 93 mm; maximal width 3 mm at about setiger 40; length through setiger 10, 5.5 mm.

Prostomium (Figure 67f) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Palpal region marked by vague frontal horizontal groove. Eyes posterior to bases of A-I, dark. Antennae in horseshoe; A-I separated from other antennae by gap, similar in thickness. Ceratophores ring-shaped, in all antennae, without articulations. Ceratostyles tapering, with up to 14 very distinct, nearly moniliform articulations; inner 1/5 of A-II and A-III without articulations. A-I to middle of anterior peristomial ring; A-II to setiger 1; A-III to setiger 3. Antennae of paralectotypes slightly shorter, but otherwise similar. Peristomium basically cylindrical with large, inflated lower lip. Separation between rings distinct on all sides; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of peristomium, slightly inflated basally, tapering to fine, slender tips, with up to 7 distinct, cylindrical articulations.

Maxillary formula of 1 paralectotype 1+1, 7+7, 9+0, 4+10, and 1+1. Mx III long, located behind left Mx II. Mx VI missing.

Branchiae (Figure 67a) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 168. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and at least last 10–15 pairs short, single filaments (Figure 67h), maximum 8 filaments. Stems relatively slender, tapering, as long as notopodial cirri. Filaments slender, as long as notopodial cirri.

Anterior neuropodial acicular lobes truncate, becoming rounded in median setigers and conical in last setigers present; aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming basally inflated from about setiger 5. Inflated bases of median region thick, inflated ridges; narrow tips very short and button-shaped. From about setiger 80 ventral cirri increasingly dominated by a long, tapering distal tip; inflated bases decreasing. Last 20 ventral cirri present long, digitiform, flexed

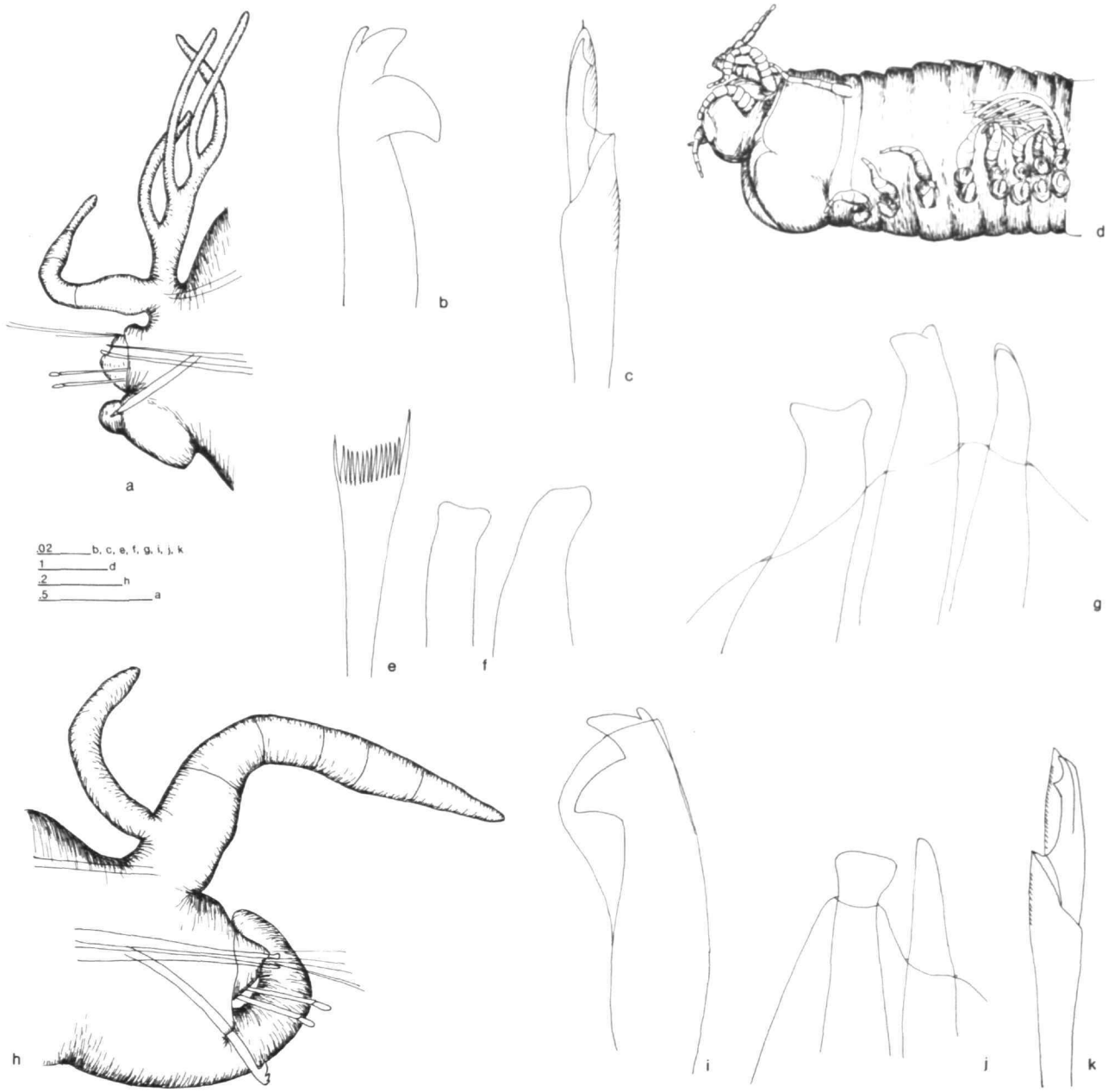

FIGURE 67.—*Eunice lucei* (lectotype, ZMC): a, parapodium 45, anterior view; b, subacicular hook, parapodium 45; c, compound falciger, parapodium 45; d, anterior end, lateral view; e, pectinate seta, parapodium 45; f, aciculae, parapodium 45; g, aciculae, parapodium 100; h, parapodium 160, anterior view; i, subacicular hook, parapodium 160; j, aciculae, parapodium 160; k, compound falciger, parapodium 160. (Scale bars in mm.)

up behind neuropodial acicular lobe. Notopodial cirri basally inflated, with 5 to 6 cylindrical articulations. Notopodial cirri of posterior setigers very large, longer than in anterior setigers and nearly as wide at base as neuropodial acicular lobe.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 67d) tapering, flat. One marginal tooth slightly longer than other teeth, with 15 teeth. Shafts of compound falcigers (Figure 67c,k) distally slightly inflated, marginally serrated. Anterior appendages (Figure 67c) slender, tapering, bidentate. Proximal teeth thicker, but shorter than distal teeth, triangular,

TABLE 6.—Variable and invariable features in the type lot of *Eunice lucei* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	4	195	108	151	33.71
Total length	4	93	22	58.25	32.42
Maximal width	4	3.5	2	2.75	0.56
Length through 10	4	7.5	3	4.88	1.78
No. of antennal articulations	4	14	8	12.5	2.60
Subacicular hooks first present from	4	34	24	28.75	4.32

INVARIABLE FEATURES	N=4
Peristomial rings	complete
No. of peristomial cirral articulations	5
Branchiae first present from setiger no.	5
End of branchiae	prepygidially
Max. no. of branchial filaments	10
No. of teeth in pectinate setae	15
Guards of compound hooks	mucronate
Acicular color	yellow
Acicular tip	hammer-headed
Subacicular color	yellow
No. of teeth in subacicular hooks	3

directed laterally. Distal teeth nearly erect. Guards symmetrically rounded, with short, distinct mucros, marginally serrated. Posterior appendages (Figure 67k) thicker, bidentate. Proximal teeth smaller than distal teeth, short, triangular. Distal teeth large, thick, distinctly bent. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Compound hooks of paralectotypes with both kinds of appendages as well. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, most distinctly hammer-headed, nearly bifid (Figure 67e,g,j), some superior aciculae tapering, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 67b,i) yellow, tridentate with teeth in a crest. Hooks first present from setiger 24–34, present in all setigers thereafter, always single (except for replacements). Main fangs large curved; fangs decreasing evenly in size to slender, distinct tertiary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 6, 40, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice lucei* has remained poorly understood since its first description; it is listed with similar species in Tables 46 and 47. Unusual are the long, thick notopodial cirri in posterior setigers and the mixture of mucronate and amucronate guards on the compound falcigers. Four species in Table 47 have modified aciculae. These species include *E. elseyi*, *E. makemoana*, and *E. rubra*, in addition to *E. lucei*. *Eunice elseyi* has tridentate subacicular hooks with the distal teeth in tandem; the other three species have crested tridentate hooks. In *E. lucei* the aciculae may be hammer-headed or weakly bidentate; in *E. makemoana* they are pointed or hammer-headed, and in *E. rubra* they are pointed or weakly bidentate. *Eunice makemoana* has single branchial filaments; *E. lucei* has up to eight branchial filaments, and *E. rubra* has as many as 21 filaments.

110. *Eunice macrobranchia* Schmarda, 1861

TABLES 27, 30, 50

Eunice macrobranchia Schmarda, 1861:130, 7 figs., pl. 32: fig. 258.
Eunice (Eriphyle) macrobranchia.—Augener, 1918:310–312.
Eriphyle capensis.—Augener, 1918:310–312.

REMARKS.—No types are currently available of this species; however, Augener (1918) did review the types. The following comments combines information in Schmarda's original description with additional information specified by Augener.

Type very large of about 200 mm in total length, with about 150 setigers. Ceratostyles irregularly articulated. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 4. Peristomial cirri shorter than peristomium. Maxillary formula indeterminable. Branchiae present, pectinate, about as long as notopodial cirri, erect. Branchiae from setiger 7–8; first several pairs single filaments. Where best developed branchiae with 15 to 17 filaments. Schmarda illustrated parapodia as having very long, thick, tapering notopodial cirri of very nearly same length as branchiae. Pectinate setae were illustrated as narrow, tapering, with relatively few teeth and no marginal teeth obviously longer than other teeth. Appendages of compound falcigers bidentate; guards illustrated as symmetrically

rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks black; subacicular hooks present in second half of body and either uni- or bidentate.

Schmarda's illustration of the jaws is so confused that no maxillary formula can be recorded. He must also have missed the first several pairs of simple branchiae and stated that branchiae were from setiger 12 where the strongly pectinate complex branchiae start according to his illustration.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* *Unknown Characters:* 3-20, 23-26, 28-29, 33, 36-38, 40, 42-65, 67, 74-76, 78, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—33,2; 37,1; 38,1.

REMARKS.—Augener (1918) synonymized *Eriphyle capensis* Kinberg (1865 = *Eunice kinbergi* Ehlers, 1868) with this species, but rejected the synonymy of both with *E. aphroditois* as proposed by McIntosh (1905). All three species belong to the same group, B-2, and are rather similar. McIntosh's synonyms have been generally accepted (e.g., Day, 1967). The species are here listed separately in Tables 27 and 30, because resolution of this problem will have to await studies of morphological variability in material of *E. aphroditois* from Indian Ocean. *Eunice macrobranchia* has not been included in the key.

Eunice macrobranchia is supposed to have either simple, spine-like or bidentate subacicular hooks. For that reason it is also listed with other species with simple subacicular hooks in Table 50. Because it is so poorly known, it cannot be clearly separated from other species in this table.

Eunice macrochaeta Schmarda, 1861

Eunice macrochaeta Schmarda, 1861:128, 6 figs.

REMARKS.—Schmarda (1861:128) stated that the type and apparently only known specimen lacked the anterior end. The species is thus wholly unidentifiable. Grube (1878b:101) referred the species under doubt to the genus *Marphysa* based on the illustration of the branchiae. Hartman (1944:107) referred the species, again doubtfully, to *E. filamentosa*, following suggestions by Augener (1925). The structure of the setae as illustrated by Schmarda (1861:128) agree with *E. filamentosa*, except that the characteristic hammer-headed aciculae of that species were not illustrated. The species is here considered indeterminable.

Eunice madeirensis Baird, 1869

Eunice madeirensis Baird, 1869:344-345.

REMARKS.—Examination of the type material demonstrated that this species has the jaw structure and setal complement of the species in the genus *Palola*.

111. *Eunice magellanica* McIntosh, 1885

FIGURE 68a-f; TABLES 27, 29

Eunice magellanica McIntosh, 1885:265-268, fig. 28, pl. 37: figs. 12-15, pl. 19A: figs. 6-9.

MATERIAL EXAMINED.—Two syntypes, BM(NH) ZK.1885.12.1.191, and slide preparation, ZK.1885.12.1.191a. *Challenger* sta 311, Magellan Strait, north of Isla Desolaçion, 52°50'S, 73°53'W, 448 m, mud, 11 Jan 1876.

COMMENTS ON MATERIAL EXAMINED.—Unless otherwise indicated, the description is based on the larger of the two syntypes.

DESCRIPTION.—Larger of 2 syntypes complete female with eggs in body cavity with 130 setigers; total length 140 mm; maximal width 7 mm; length through setiger 10, 17 mm. Small syntype complete (in 2 pieces) with 108 setigers; total length 78 mm; maximal width 5 mm; length through setiger 10, 11 mm.

Prostomium (Figure 68a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes short, frontally rounded; median sulcus deep. Eyes posterior to bases of A-I, black. Antennae evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 5 irregular articulations in A-III. A-I barely to middle of anterior peristomial ring; A-II to posterior peristomial ring; A-III to setiger 2. Peristomial fold deep, covering bases of antennae; peristomium flaring slightly ventrally; lower lip muscular. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri of large syntype very short, ovate, to middle of peristomium in small syntype, without articulations.

Two sets of maxillae present in vial, both of roughly same size, either one could belong to large syntype; small syntype not dissected. One maxillary formula 1+1, 6+6, 8+0, 8+10, 1+1, and 1+1. Other maxillary formula 1+1, 7+7, 8+0, 7+9, 1+1, and 1+1. Both maxillae with Mx III forming part of distal arc with left Mx IV. Mx VI with distinct teeth in both sets of jaws.

Branchiae (Figure 68e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7-8 to setiger 120. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchiae with 2 filaments, increasing to 5 filaments at about setiger 20. From about setiger 70-75 number of filaments increasing rapidly to 20 at setiger 85; this number continued to setiger 115 in large syntype. Some filaments irregularly branching. Reduction in size and numbers of filaments in far posterior setigers very rapid. Where best developed branchial stems thick, somewhat coiled, and so branchiae may appear palmately, rather than pectinately branched.

Neuropodial acicular lobes distally truncate or rounded; aciculae emerging at midline. All pre- and postsetal lobes low,

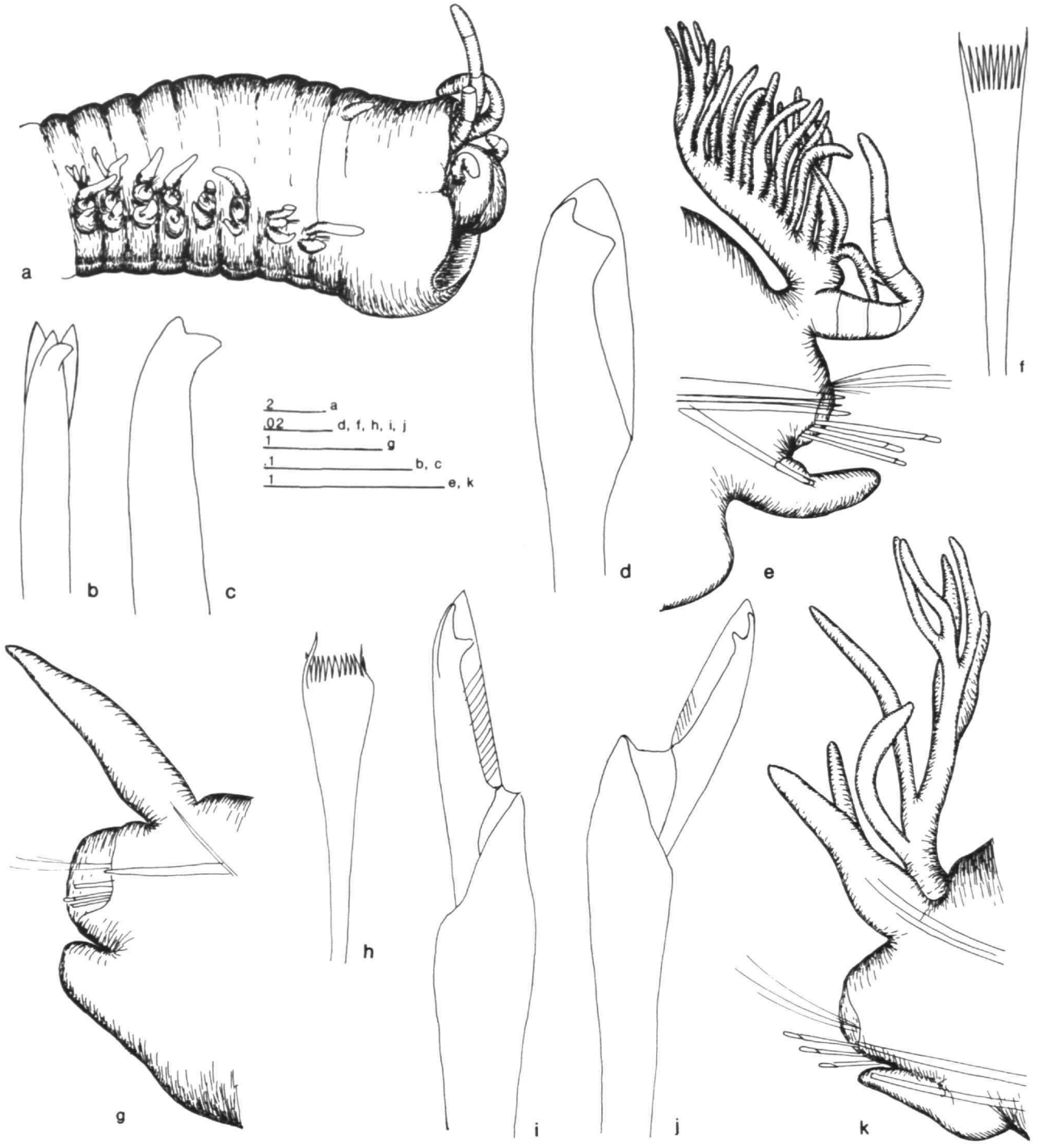

FIGURE 68.—*Eunice magellanica* (syntype, BM(NH) ZK.1885.12.1.191 and slide preparation, ZK.1885.12.1.191a): a, anterior end, lateral view; b, subacicular hook, parapodium 102; c, subacicular hook, parapodium 100; d, appendage of compound falciger, parapodium 100; e, parapodium 100, anterior view; f, pectinate seta, parapodium 100. *Eunice magnifica* (holotype, ZMB F1993):g, anterior parapodium, anterior view; h, pectinate seta, median parapodium; i, compound falciger, anterior parapodium; j, compound falciger, median parapodium; k, median parapodium, anterior view. (Scale bars in mm.)

transverse folds. First 5 ventral cirri thick, digitiform. Ventral cirri basally inflated from about setiger 6 through setiger 30, inflated bases ovate; narrow tips tapering. Posterior ventral cirri digitiform. All notopodial cirri with 5 to 6 irregular articulations. Anterior notopodial cirri thick, digitiform. Posterior notopodial cirri relatively larger than anterior ones, becoming very prominent in far posterior setigers.

Limbate setae slender. Pectinate setae (Figure 68f) tapering, flat. Both marginal teeth slightly larger than other teeth, ~10 teeth present. Shafts of compound falcigers inflated, marginally smooth. Appendages (Figure 68d) long, bidentate. Proximal teeth much larger than distal teeth, triangular, directed laterally. Distal teeth tapering, nearly erect or gently curved. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae numbering up to 3, with black cores and clear sheaths, tapering to blunt tips; ventralmost aciculae gently curved in most parapodia; cross-sections round. Subacicular hooks (Figure 68b,c) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setiger 26 or 30, present in all setigers thereafter, always single (except for replacements). Proximal teeth about twice as large as distal teeth, directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 15.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Hartman (1964:118, pl. 36: figs. 8–10) referred *E. magellanica* to *E. frauenfeldi*, which it resembles in many respects. Note that Hartman's illustrations were redrawn from McIntosh's original description of *E. magellanica* and most of the text was taken from McIntosh as well; thus Hartman's description does not, except as the two species are identical, refer to Grube's *E. frauenfeldi*. The two species appear to differ most clearly in the distribution of branchiae. In *E. frauenfeldi* the maximum number of filaments is ~3 at setigers 15–25; In *E. magellanica* the maximum number of filaments is ~20 near setiger 85. These and other species in group B-2 are compared in Tables 27 and 29.

112. *Eunice magnifica* Grube, 1866

FIGURE 68g–k; TABLES 33, 37–39

Eunice magnifica Grube, 1866a:64.

MATERIAL EXAMINED.—?Holotype, ZMB F1993 (marked *E. bipapillata*), Samoa, 2 parapodia.

COMMENTS ON MATERIAL EXAMINED.—The identity of the two parapodia examined was discussed above in the section of *E. bipapillata*.

REMARKS.—The following is a summary of Grube's original description combined with notes on the two parapodia.

Type incomplete with 102 setigers; about 100 mm in length; violet-copper-colored with white spots.

Branchiae present, pectinate, distinctly longer than notopodial cirri, erect. Branchiae from setiger 22, with up to 8 filaments.

One parapodium from an anterior segment (Figure 68g), probably before setiger 15 of a large specimen, with neuropodial acicular lobe distally transverse; aciculae emerging at midline. Presetal lobe a low fold; postsetal lobe a high ridge behind acicular lobe. Notopodial cirrus basally slightly inflated, tapering to a digitiform tip; ventral cirrus thick, with a thick, blunt tip, without articulations.

The other parapodium is distorted and cannot be described in detail; it does not appear to have been remarkably different from usual pattern in genus. Notopodium is similar to the one present in the other parapodium and a very large branchia is present (Figure 68k); it has a strong branchial stem and 8 distinct branchial filaments. Ventral cirrus without basal inflation; tapering. The label indicates that this parapodium should be from segment 96; this agrees with the shape of acicular lobe and ventral cirrus. The branchial development is unusual for such a late segment, but may be related to the apparent very large size of the specimen.

Pectinate setae (Figure 68h) tapering in both parapodia. One marginal tooth distinctly longer than other teeth; 12 teeth present. Shafts of compound falcigers (Figure 68i,j) distally inflated, with smooth cutting edge; distal beak indistinct. Appendages slender, tapering with large head anteriorly; with small heads posteriorly, bidentate. Proximal teeth triangular in anterior setigers, slender and tapering posteriorly, directed laterally or slightly distally. Distal teeth nearly erect, nearly triangular in anterior setigers, slender and tapering in posterior setigers. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, dark, bluntly conical, straight; cross-sections round. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hook present in branchiated parapodium, single, dark, distally broken so the dentition cannot be determined.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 58, 59. *Unknown Characters:* 1–29, 33, 36–40, 42, 46, 47, 49–51, 53–56, 62, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The first parapodium described should be from setiger 26, according to the label. This would be the beginning of the branchial region; it is, however, distinctly from a prebranchial setiger. The number of the parapodia may have been confused, but the structure of aciculae and compound

falcigers agree well with the other parapodium present. It is here assumed that parapodium number indicated is erroneous. *Eunice magnifica* belongs to group B-4; it differs from *E. afra* and related species in that the branchiae are very well developed as far back as setiger 96; it is listed with similar species in Tables 33 and 37-39. It is too poorly known to be included in the key and cannot really be discussed in detail in relation to other species in tables 37-39.

113. *Eunice makemoana* (Chamberlin, 1919)

TABLES 46, 47

Leodice makemoana Chamberlin, 1919a:233-236, plate 53: figs. 1-11.

MATERIAL EXAMINED.—Holotype, USNM 19396, Makemo, Paumotu Islands (= Tuamotu Archipelago), 21 Oct 1899.

COMMENTS ON MATERIAL EXAMINED.—The holotype and only known specimen of species has been frontally deeply dissected and has been dry at one time; all setae are broken, so no meaningful illustrations can be made. The following remarks are based on Chamberlin's original description in addition to the few observations that could be made on the specimen.

DESCRIPTION.—Holotype complete with 92 setigers; total length 20 mm; maximal width 1 mm; length through setiger 10, 3.5 mm.

Prostomium distinctly shorter than peristomium. Prostomial lobes frontally rounded, dorsally inflated. Eyes behind bases of A-I. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles with up to 15 moniliform articulations in A-III. A-I to middle of peristomium; A-II to setiger 3; A-III to setiger 4.

Maxillary formula (re-written from Chamberlin, 1919a:236): 1+1, 6+7, 8+0, 8+11(?12), and 1+1.

Branchiae from setiger 7 to 6 setigers from posterior end. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae single filaments.

Neuropodial acicular lobes distally rounded or truncate. Pre- and postsetal lobes low, transverse folds. First few ventral cirri thick, tapering, becoming basally inflated in anterior branchial region. Posteriorly inflated bases decreasing in importance; far posterior ventral cirri slender, resembling notopodial cirri. All notopodial cirri medially inflated, articulated with relatively short, vague articulations, shorter and more slender in posterior than in anterior setigers.

Pectinate setae tapering, with ~10 coarse teeth. One marginal tooth much longer than other teeth. Shafts of compound falcigers inflated. Appendages short, bidentate. Both teeth distally well curved. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow; ventral aciculae slender, distally pointed, curved ventrally; dorsal aciculae thick, distally blunt, possibly slightly hammer-headed; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, tridentate with teeth in a crest. Hooks first present from setiger 28. Fangs decreasing in size from large main fang to very small distal fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features from all parts of the body.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 33, 34, 39, 40, 42, 58, 59. *Unknown Characters:* 4, 6, 9, 11, 12, 15-17, 20, 24-29, 44, 51, 54-56, 65, 67, 68, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice makemoana* is listed with similar species in Tables 46 and 47. It appears unique in the group in having single branchial filaments in all setigers; all other species in group have branched branchiae at least in some setigers. As pointed out by Chamberlin (1919a:236), the reduced condition of branchiae might be considered a larval feature, but the sexually mature state of the individual argues for retaining separate status of specimen.

114. *Eunice manihine* Longbottom, 1972

FIGURE 69a-g; TABLES 19, 21

Eunice manihine Longbottom, 1972:339-344, figs. 1-17.

MATERIAL EXAMINED.—Holotype, BM(NH) ZB 1971.1, western Indian Ocean, Cosmoledo, S of Menai Island, 10°S, 47°E, foul-hooked, 421 m, coral debris, 6 Feb 1969, coll. M.R. Longbottom, Royal Society Indian Ocean Deep Slope Fishing Expedition.

DESCRIPTION.—Holotype complete with 127 setigers; total length 75 mm; maximal width 5 mm; length through setiger 10, 9 mm.

Prostomium (Figure 69a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes absent. Antennae arranged in a horseshoe, evenly spaced. Ceratophores ring-shaped in all antennae, without articulations. Only a single A-II attached to prostomium, slender and tapering, without articulations, reaching setiger 10. Another ceratostyle, presumably A-III, loose in vial, same shape as A-II, considerably longer, probably reaching setiger 20. Peristomium much longer ventrally than dorsally, projecting forward nearly to tip of prostomium, with a distinct muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 2/3 of total length dorsally, ~3/4 ventrally. Peristomial cirri to middle of prostomium, slender and digitiform, without articulations.

Maxillary formula 1+1, 12+11, 12+0, 11+13, and 1+1 according to Longbottom (1972).

Branchiae present, palmate, distinctly longer than notopodial

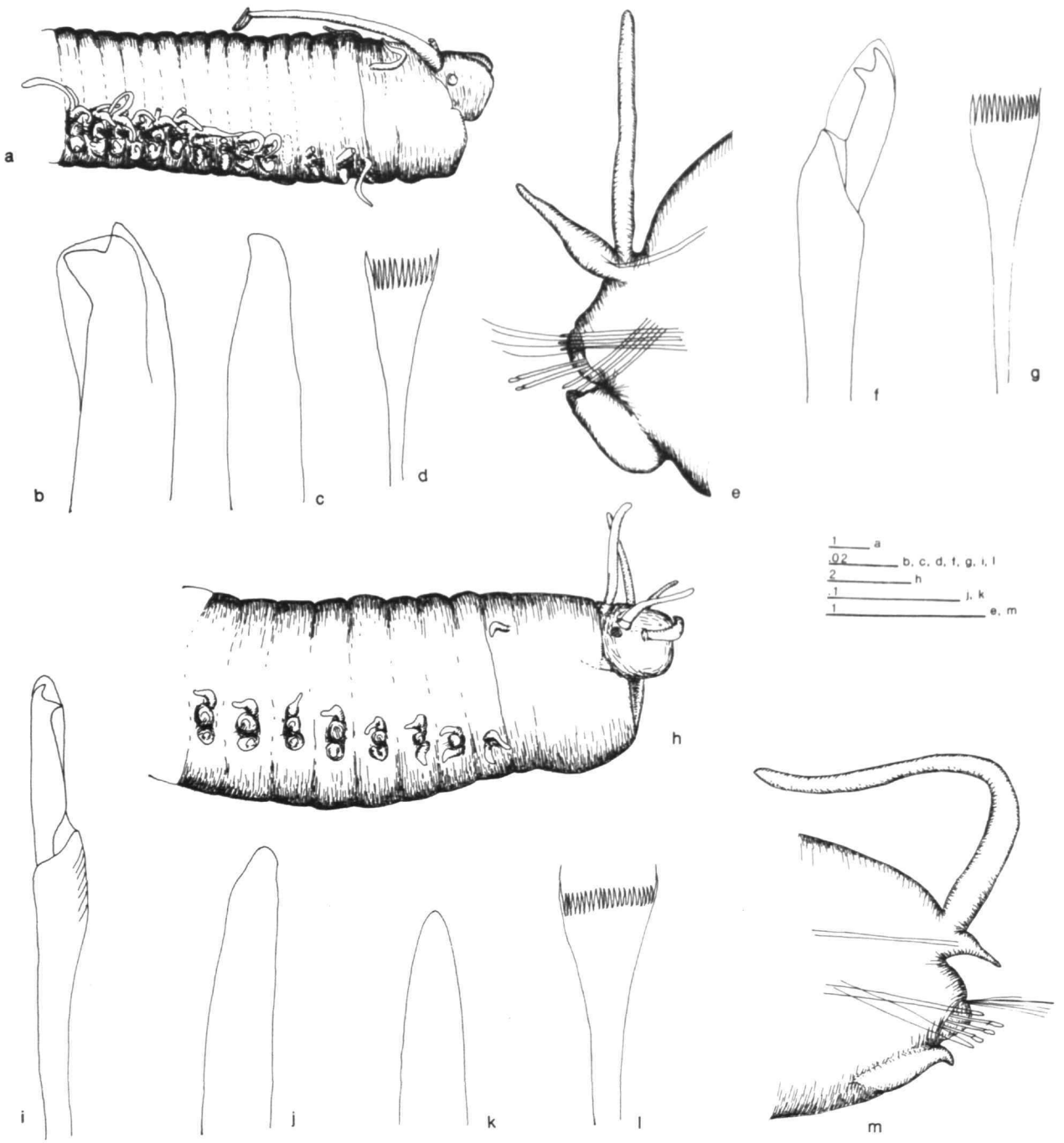

FIGURE 69.—*Eunice manihine* (holotype, BM(NH) ZB 1971.1): a, anterior end, lateral view; b, subacicular hook, parapodium 34; c, acicula, parapodium 34; d, pectinate seta, parapodium 90; e, parapodium 34, anterior view; f, compound falciger, parapodium 34; g, pectinate seta, parapodium 90. *Eunice marenzelleri* (syntype, MNHN): h, anterior end, lateral view; i, compound falciger, parapodium 125; j, subacicular hook, parapodium 125; k, acicula, parapodium 125; l, pectinate seta, parapodium 125; m, parapodium 125, anterior view. (Scale bars in mm.)

cirri, not reduced in mid-body region. Branchiae from setiger 8 to setiger 43. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Most branchiae single, slender filaments (Figure 69e), up to 3 filaments present.

Neuropodial acicular lobes distally truncate, usually somewhat lobed between aciculae; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. From setiger 5 bases increasingly inflated, by setiger 25 inflated bases projecting as ridges on ventral side of neuropodia; narrow tips short and button-shaped. Inflated bases reduced from about setiger 50, by setiger 60 inflated bases completely lost. Ventral cirri thick, tapering through remainder of body. Anterior notopodial cirri strongly inflated basally; notopodial cirri of branchial region tapering; postbranchial notopodial cirri digitiform; all without articulations.

Limbate setae present marginally smooth. Pectinate setae (Figure 69d,g) flaring, flat. One marginal tooth slightly longer than other teeth, ~15 teeth present. Shafts of compound falcigers (Figure 69f) distally inflated, marginally smooth. Appendages short, bidentate. Both teeth well developed. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notoaciculae present in base of notopodial cirri in middle part of body. All neuropodia with multiple aciculae arranged in dorsoventral row, at least 3 aciculae, but up to 6 aciculae present, yellow, tapering to blunt tip (Figure 69c), especially inferior aciculae slightly bent; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 69b) yellow, bidentate. Hooks first present from setiger 29, present in all setigers thereafter; most parapodia with 2 hooks, up to 4 hooks present. Both teeth well developed, rather similar in size.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 39, 40, 56, 58, 59. *Unknown Characters:* 4, 6, 17, 23, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Unusual features of this species include the multiple aciculae and subacicular hooks, combined with the late start of branchiae and well-developed basal inflation of ventral cirri. *Eunice manihine* is listed with similar species in Tables 19 and 21.

Eunice manorae Aziz, 1938

Eunice manorae Aziz:1938:34-35, pl. 3: fig.3, pl. 6: fig. 34, pl. 7: figs. 61-64.

REMARKS.—The type is not available. The species apparently belongs to group B-4. It has non-articulated, relatively long antennae; peristomial cirri do not outreach peristomium. It has branchiae from setiger 80 through posterior region; with up to 5 filaments. Aziz' illustration indicates that the branchial filaments are longer than the notopodial cirri.

Aciculae dark-colored; pectinate setae and compound hooks present, the latter with both teeth well developed. The distal tooth is illustrated as being considerably shorter than the proximal teeth; guards are symmetrically rounded. Subacicular hooks not illustrated nor mentioned in the text.

The development of branchiae and the presence of pectinate setae precludes placement of the species in *Palola;* however, no other related taxa are known to lack subacicular hooks. Without access to the type, exact position of this species cannot be determined and it is here considered indeterminable.

115. *Eunice marenzelleri* Gravier, 1900

FIGURE 69h-m; TABLES 33, 37, 50

Eunice marenzelleri Gravier, 1900:229-232, figs. 78-82, pl. 13: figs. 68, 69.

MATERIAL EXAMINED.—Two syntypes, MNHN, Paris, Djibouti, Red Sea, coll. Coutière (label marked no. 29).

COMMENTS ON MATERIAL EXAMINED.—Syntype material contains two incomplete specimens; the long syntype has been slightly desiccated at one time; illustrations are based on the long syntype.

DESCRIPTION.—Short syntype with 91 setigers. Long syntype with 257 setigers; length 150 mm; maximal width 5 mm; length through setiger 10, 11 mm.

Prostomium (Figure 69h) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes posterior to bases of A-I, black. Antennae in a horseshoe, with A-III emerging near peristomial fold; bases of A-I and A-II well forward of A-III; A-I distinctly thicker than other antennae. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. A-I to middle of peristomium; A-II and A-III to posterior edge of peristomium. Peristomium cylindrical, massively muscular. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri short, nearly ovate, without articulations.

Maxillary formula for 2 syntypes 1+1, 4+4, 5+0, 4+5, and 1+1. Mx III and left Mx IV part of distal arc. Mx VI absent.

Branchiae (Figure 69m) present, single filaments, distinctly longer than notopodial cirri. Branchiae from setiger 28 in both specimens and present on last setigers present. All filaments long. A single medioposterior segment on the smaller syntype with 3 filaments in a palmate arrangement.

Anterior neuropodial acicular lobes truncate; median and posterior acicular lobes rounded; aciculae emerging at midline. All presetal lobes low, transverse folds. Anterior postsetal lobes as high as or slightly higher than acicular lobes, becoming low, transverse folds from about setiger 25. Anterior ventral cirri

thick; tapering, becoming basally inflated from about setiger 12; inflated bases retained to about setiger 100. Inflated bases long transverse welts; narrow tips tapering. Posterior ventral cirri tapering. Anterior notopodial cirri distinctly medially inflated, becoming short and strongly tapering from about setiger 75, without articulations.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 69l) large, flaring, flat. Both marginal teeth longer than other teeth; ~20 teeth present. Shafts of compound falcigers (Figure 69i) distinctly inflated, marginally serrated. Appendages slender, narrow, with nearly parallel sides, bidentate. Proximal and distal teeth similar in size. Proximal teeth tapering, directed laterally. Distal teeth curved. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 69k) dark brown, tapering to blunt, distally rounded tips, straight; cross-sections round. Subacicular hooks (Figure 69j) dark brown, unidentate. Hooks first present from setiger 38, present in all setigers thereafter, always single (except for replacements). Tips more or less gently curved, slightly asymmetrical in some setigers, but no trace of secondary teeth seen. Notopodial aciculae light brown.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with the far posterior end.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 33, 34, 39, 40, 42, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36-38, 64, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice marenzelleri* is listed with similar species in Tables 33 and 37. It is the only species in Table 37 with simple, spine-like subacicular hooks. It is listed with other species with simple spine-like subacicular hooks in Table 50. It is the only species in Table 50 with exclusively single branchial filaments.

Eunice margaritacea Williams, 1853

Eunice margaritacea Williams, 1853:408, fig. 4.

REMARKS.—The article in which this species was named concerns mechanisms of aquatic respiration in invertebrates. The species name is mentioned in the caption to an illustration showing the pectinate branchial structure of a eunicid. The discussion in the text gives no additional information about the species, other than indicating that it presumably was found in Great Britain, nor is the disposition of any material mentioned. The species is indeterminable; the name is here considered a nomen nudum, making the combination available.

Eunice margaritacea (Verrill, 1900)

Leodice margaritacea Verrill, 1900:644-645.

Leodice longicirrata.—Treadwell, 1921:11-14, figs. 3-12, pl. 1: figs. 1-4 [not *Nicidion longicirrata* Kinberg, 1865].

Eunice longicirrata.—Hartman, 1942:9 [in part, not *Nicidion longicirrata* Kinberg, 1865].

REMARKS.—The types of this species are no longer available in the collections of the Peabody Museum (W. Hartman, in litt.). It is not clear whether Hartman (1942:9) saw any specimens of this species when she examined the type collections of that museum. She referred to Treadwell's treatment of the species. Treadwell (1921:11-14) clearly did not see Verrill's types; on page 14 he stated: "From comparison of his descriptions with specimens of *longicirrata* collected by myself in Bermuda, in the locality where [Verrill] records *margaritacea* as abundant, I am convinced that [*elegans* and *margaritacea*] are identical with *longicirrata*." I am inclined to believe that the specimen(s) on which Verrill based his species were missing already by 1920.

The only descriptive detail available, namely that branchiae are present from setigers 3-4 and end at setigers 45-50 with up to 5 branchial filaments, is consistent with Treadwell's conclusion and with Webster's species, also originally described from Bermuda. Webster's name is preoccupied and his species was renamed *Eunice websteri* by Fauchald (1969). The synonymy proposed by Treadwell is here accepted. Verrill's name is valid because the previously published combination *Eunice margaritacea* Williams (1853) is a nomen nudum (see above).

116. *Eunice margaritacea* Fischli, 1900

TABLES 46, 47

Eunice margaritacea Fischli, 1900:104-106, pl. 4: figs. 8, 9, pl. 6: figs. 35, 36, pl. 7: figs. 55-58.

COMMENTS ON MATERIAL EXAMINED.—The types, from Ternate in the Moluccas, are not available. Fischli's description and illustrations are quite detailed; the following summary of his findings updates his terminology.

DESCRIPTION.—Medium-size specimen with 95 segments; length 14 mm. Ceratostyles with up to 30 moniliform articulations in A-III. A-III to setiger 7. Peristomium cylindrical. Separation between peristomial rings distinct on all sides. Peristomial cirri to posterior edge of prostomium, with up to 7 articulations.

Maxillary formula 1+1, 5+5, 7+0, 5+7, and presumably 1+1. Mx III long, located behind left Mx II.

Branchiae present, pectinate, reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 95. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Maximum 5 filaments at about setiger 10. Mid-body setigers in 1 specimen with single filaments; posterior setiger with 2-3 filaments.

Ventral cirri basally strongly inflated in median setigers, less distinctly inflated in far posterior setigers. Inflated bases nearly spherical. Notopodial cirri with up to 5-7 articulations, most distinct anteriorly, but present in all setigers.

Limbate setae marginally smooth. Pectinate setae flaring, flat. Both marginal teeth distinctly longer than other teeth; ~15 teeth present. Appendages of compound falcigers tapering, tridentate. Distal tooth well developed. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae, presumably yellow or light-colored, distally gently double-curved, tapering to blunt tips; cross-sections round. Subacicular hooks tridentate with teeth in a crest. Starting segment for subacicular hooks not mentioned. Fangs decreasing evenly in size from large main fang to small tertiary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features from all parts of the body.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* None known. *Unknown Characters:* 3-20, 23, 25, 26, 28, 32, 39, 40, 43-51, 55, 56, 58-63, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice margaritacea* is incompletely known, and without access to material from the type locality, it cannot be adequately characterized; it is, however, sufficiently well characterized that it can be compared with other species in the group in Tables 46 and 47.

117. *Eunice marovoi* Gibbs, 1971

FIGURE 70a-f; TABLES 7, 41, 45

Eunice marovoi Gibbs, 1971:158-160, figs. 10a-h.

MATERIAL EXAMINED.—Holotype, BM(NH) ZB 1970.42, Solomon Islands, sta ML 96, Marovo Lagoon, Vangunu Island, dredged, 9 m, sand, 28 Oct 1965, coll. Royal Society Expedition to Solomon Islands. Nine paratypes, BM(NH) ZB 1970.46, Solomon Islands, sta ML 110, Koto Lagoon, Vangunu Island, 26 m, mud, 28 Oct 1965, coll. Royal Society Expedition to Solomon Islands. One paratype, BM(NH) ZB 1970.49, Solomon Islands, sta ML 218, Tokavai Lagoon, New Georgia, dredged, 18 m, mud, 8 Nov 1965, coll. Royal Society Expedition to Solomon Islands.

COMMENTS ON MATERIAL EXAMINED.—The description is based on the holotype and a single paratype from ZB 1970.46. The variability is indicated in Table 7.

DESCRIPTION.—Holotype complete with 65 setigers; total length 14.5 mm; maximal width 1 mm wide; length through setiger 10, 2.5 mm.

Prostomium (Figure 70a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally slightly inflated; median sulcus represented by very shallow frontal notch; ventral side deeply furrowed. Eyes between bases of A-I and A-II, black; posterior 1/4 of eyes overlapped by peristomial fold. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. A-I to setiger 1; A-II to setiger 2; A-III to setiger 3. Peristomium cylindrical. Separation between peristomial rings distinct on all sides of body; anterior ring about twice as long as posterior ring. Peristomial cirri about as long as A-I, to middle of peristomium, digitiform, without articulations.

Maxillary formula 1+1, 4-6+10-13, 10-13+0, 10-13+10-13, according to Gibbs. Left Mx II with large fang; such fang absent on right side.

Branchiae (Figure 70f) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 17-22. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First branchia with 2 or more usually 3 filaments, maximum 6 filaments. Only last branchia single filaments.

Neuropodial acicular lobes distally obliquely rounded with high side superiorly; aciculae emerging above midline. All pre- and postsetal lobes low, transverse folds. First 2 ventral cirri bluntly tapering. Bases of ventral cirri inflated from beginning of branchial region. Inflated bases about 1/2 of cirral length, ovate; narrow tips digitiform. Basal inflation less distinct in postbranchial region, but even in last setigers present, glandular bases of ventral cirri slightly thicker than the remainder of the cirri, distinctly set off from tips. Prebranchial notopodial cirri increasing in length, tapering. Notopodial cirri of branchial region long, tapering, with embedded aciculae basally. Postbranchial notopodial cirri decreasing in length, becoming slender and digitiform in posterior setigers. Notopodial cirri located on dorsal body wall well above bases of acicular lobes in posterior setigers. Notopodial cirri without articulations.

Limbate setae slender, marginally smooth. Pectinate setae not seen. Compound falcigers (Figure 70d,e) slender. Shafts distinctly inflated, marginally serrated. Appendages narrow, tapering to tips, bidentate. Proximal teeth triangular, directed laterally. Distal teeth very nearly erect. Guards tapering to distinct, slender mucros. Guards of posterior hooks (Figure 70d) distally rounded with very small, narrow mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow; anterior aciculae tapering to sharp tips; postbranchial aciculae distally blunt and slightly bent dorsally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 70c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 17-19, present in all setigers thereafter; 3 hooks present in most setigers. Hooks strongly curved with large heads. Main fangs large; secondary fangs much smaller; tertiary fangs very small and appended to back of secondary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

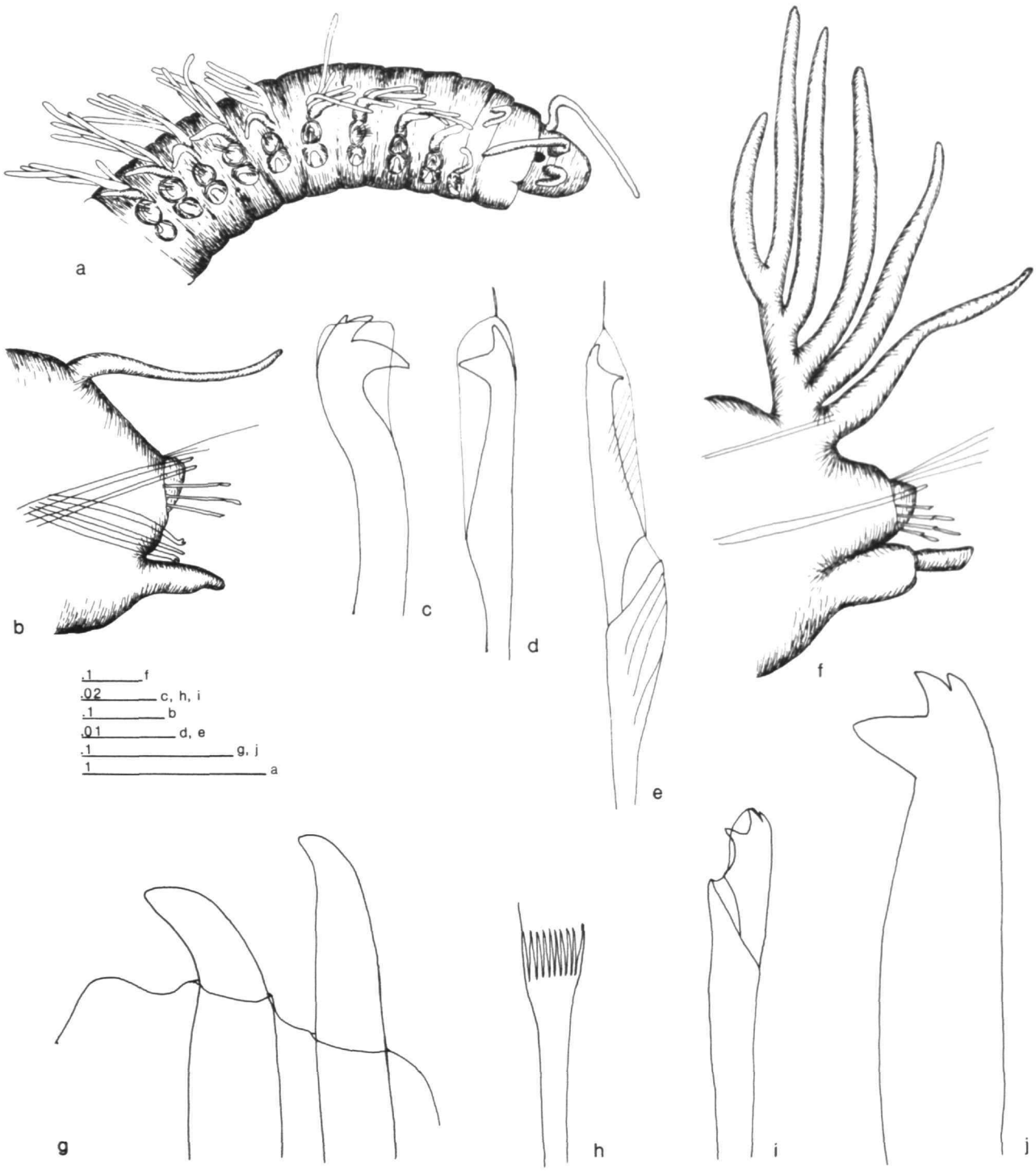

FIGURE 70.—*Eunice marovoi* (holotype, BM(NH) ZB 1970.42): a, anterior end, lateral view; b, posterior parapodium, anterior view; c, subacicular hook, posterior parapodium; d, appendage of compound falciger, posterior parapodium; e, compound falciger, parapodium 9; f, parapodium 9, anterior view. *Eunice martensi* (holotype, ZMB 923): g, aciculae, parapodium 45; h, pectinate seta, parapodium 45; i, compound falciger, parapodium 45; j, subacicular hook, parapodium 45. (Scale bars in mm.)

TABLE 7.—Variable and invariable features in the type lot of *Eunice marovoi* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	5	61	46	56.2	5.38
Total length	5	13	7	10.7	2.18
Maximal width	5	1	0.5	0.9	0.2
Length through 10	5	3	1.5	2.29	0.54
Last branchiae on setiger no.	5	24	19	22	1.90
Max. no. of branchial filaments	5	5	3	4.2	0.75
Ventral cirri inflated through setiger no.	3	25	20	23.33	2.36
No. of notopodial articulations	4	3	2	2.25	0.43
Subacicular hooks first present from setiger no.	5	19	10	15.6	3.38

INVARIABLE FEATURES	N=5
Antennal articulations	absent
Peristomial cirral articulations	absent
Branchiae first present from setiger no.	3
Pectinate setae	tapering
No. of teeth in pectinate setae	10
Shaft of compound falcigers	inflated
Color of aciculae	yellow
Acicular tip	tapering; straight
Color of subacicular hooks	yellow
No. of teeth in subacicular hooks	3
Core-sheath separation	indistinct

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 4, 6, 42, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice marovoi* was described with bluntly rounded guards to compound hooks and with branchiae extended to setigers 23-25; as indicated above, guards are mucronate and branchiae are not found on any segment later than 22 in the specimens examined. The dentition of the jaws is remarkable and may represent a juvenile dentition. The shape of the subacicular hooks also resembles the condition found in juvenile specimens. None of the specimens are sexually mature.

Eunice marovoi is listed with similar species in Tables 41 and 45. It is the only species known to combined non-articulated ceratostyles with multiple subacicular hooks.

118. *Eunice martensi* Grube, 1878

FIGURE 70g–j; TABLES 46, 47

Eunice martensi Grube, 1878a:102.

MATERIAL EXAMINED.—Holotype, ZMB 923, Zamboanga, Philippines, coll. v. Martens.

COMMENTS ON MATERIAL EXAMINED.—The specimen is very poorly preserved and no meaningful illustrations of soft parts are possible.

DESCRIPTION.—Holotype complete with 168 setigers; total length 220 mm; maximal width 6 mm; length through setiger 10, 14 mm. Body apparently cylindrical, slowly tapering posteriorly.

Prostomium distinctly shorter than peristomium. Median sulcus very shallow. Eyes between bases of A-I and A-II. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 10 cylindrical articulations in A-II. Only right A-I and A-II complete. A-I to anterior peristomial ring; A-II to setiger 1. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to posterior end of prostomium, slender and digitiform, with 5 articulations.

Maxillary formula 1+1, 6+6, 10+0, 9+10, and 1+1. Mx III long, located behind left Mx II. Mx VI absent.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 163. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae pectinate with up to 16 filaments at setigers 15-20. Branchial stems very thick, tapering, erect. Filaments short, digitiform. Number of filaments decreasing posteriorly; 6 filaments in setiger 150. No increase in number of filaments, length of filaments, or of branchial stem towards posterior end.

All neuropodial acicular lobes apparently truncate or rounded; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. Anterior ventral cirri tapering, becoming moderately basally inflated in some median setigers. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri without basal inflation, tapering. All notopodial cirri basally

inflated, tapering, with at least one articulation.

Limbate setae short, slender, marginally smooth. Pectinate setae (Figure 70h) small, slightly flaring, flat. One marginal tooth longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 70i) tapering, marginally smooth. Appendages short, very chunky, tridentate. Proximal teeth smaller than distal teeth, triangular. Distal teeth distally split, forming tridentate appendages. Guards distally rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 70g) yellow, tapering, sharply bent; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 70j) yellow, tridentate with teeth in a crest. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Main fangs large, laterally directed. Two distal fangs forming small crests, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6-8, 11, 12, 15-17, 23, 24, 51.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice martensi* is listed with similar species in Tables 46 and 47. Four species listed in Table 47 lack reduced branchiae in a median region; these species include *E. elseyi, E. lucei,* and *E. rubra* in addition to *E. martensi.* All the other three species have at least some hammer-headed or weakly bidentate aciculae; in *E. martensi* all aciculae are pointed.

Eunice maxima Quatrefages, 1866

Eunice maxima Quatrefages, 1866:330.—Ehlers, 1868:310-311, pl. 15: figs. 30-34.

Nereis gigantea Chiaje, 1825:389, 424, pl. 27: figs. 1-8.

REMARKS.—Quatrefages introduced the name *Eunice maxima* as a replacement name for delle Chiaje's *Nereis gigantea* described from Gulf of Naples.

Quatrefages had no specimens available and was clearly in considerable doubt that the species could be separated from other, similar forms, such as Cuvier's *Eunice gigantea* and Grube's *E. magnifica.* He commented that he renamed the form mainly due to the excellent reputation of delle Chiaje as a describer.

Ehlers described an anterior fragment collected in Naples region, present in the collection in Göttingen under this name. This specimen is closely similar to *Eunice aphroditois,* but crucial pieces of information are missing and the identity cannot be confirmed, nor is the specimen currently available.

Grube (1878:98) referred the form renamed by Quatrefages to *Eunice roussaei,* another very large species described by Quatrefages (1866).

No type material is available; the species has never been adequately characterized and is here considered indeterminable.

119. *Eunice medicina* Moore, 1903

FIGURE 71a-e; TABLES 41, 42

Eunice medicina Moore, 1903:441-444, pl. 25: figs. 49-51.

MATERIAL EXAMINED.—Syntype, USNM 15852, *Albatross* sta 3700, Japan, Suruga Wan, 2 miles NE of Seno Umi Bank, (approximately 34°45'N, 138°30'E), 7 May 1900, 115 m, volcanic mud and sand, Blake trawl, grapnels and tangles.

DESCRIPTION.—Syntype complete with 79 setigers; total length 29 mm; maximal width 1.3 mm; length through setiger 10, 5 mm. Body cylindrical, tapering abruptly anteriorly and slowly posteriorly.

Prostomium (Figure 71d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes posterior to bases of A-I, dark. Antennae in a horseshoe, evenly spaced. Ceratophores ring-shaped in all antennae, without articulations. Only left A-I remaining of ceratostyles, slender and digitiform, with 3 long, cylindrical articulations, reaching setiger 1. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, slender and digitiform, with 3 articulations.

Jaws not examined.

Branchiae present, pectinate, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 26. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 5 pairs single filaments (Figure 71a); maximum 7 long, flattened filaments present. Branchial stems slender, erect.

Anterior neuropodial acicular lobes truncate, becoming rounded in posterior setigers; aciculae emerging above midline. All presetal lobes low, transverse folds. Anterior postsetal lobe following outline of acicular lobe closely, becoming low transverse fold in postbranchial region. First 2 ventral cirri digitiform, becoming basally inflated in branchial region. Inflated bases barrel-shaped; narrow tips digitiform. Far posterior setigers with less prominent inflated bases; last few ventral cirri digitiform. All notopodial cirri slender and digitiform; anterior notopodial cirri with 3 articulations; posterior notopodial cirri slightly shorter than anterior ones, slightly more distinctly inflated basally, without articulations.

Limbate setae slender. Pectinate setae short, flaring, flat. Marginal teeth similar to other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 71b) inflated, marginally serrated. Appendages long, narrow, bidentate. Proximal teeth shorter than distal teeth, tapering, directed basally. Distal teeth sharply bent. Guards symmetrically sharply pointed, mucro-

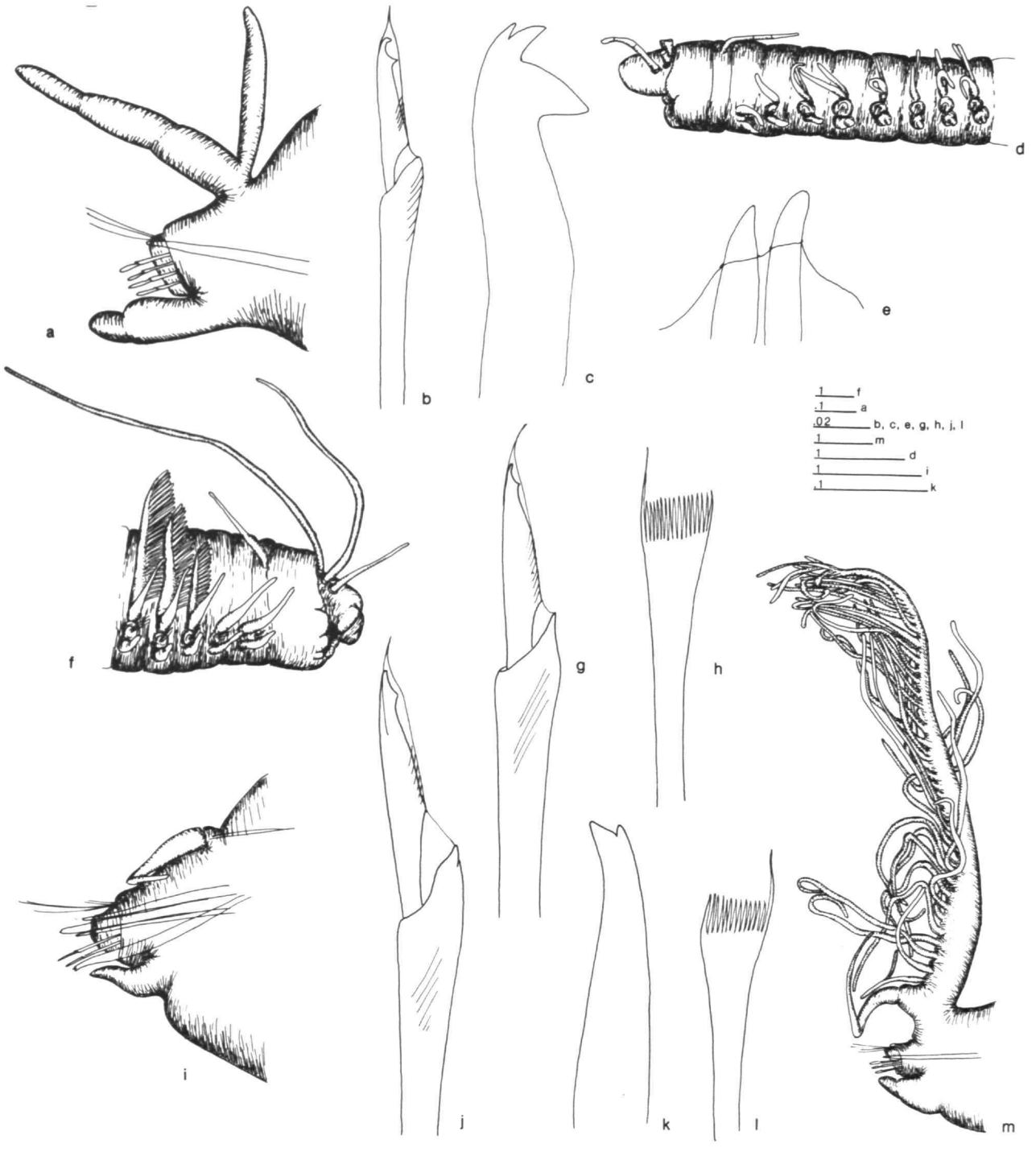

FIGURE 71.—*Eunice medicina* (syntype, USNM 15852): a, parapodium 3, anterior view; b, compound falciger, parapodium 3; c, subacicular hook, parapodium 39; d, anterior end, lateral view; e, aciculae, parapodium 39. *Eunice megabranchia* (holotype, AHF Poly 1056): f, anterior end, lateral view; g, compound falciger, parapodium 18; h, pectinate seta, parapodium 18; i, parapodium 61, anterior view; j, compound falciger, parapodium 61; k, subacicular hook, parapodium 61; l, pectinate seta, parapodium 61; m, parapodium 18, anterior view. (Scale bars in mm.)

nate. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 71e) paired, yellow, tapering, slightly bent or straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 71c) yellow, tridentate with teeth in a crest. Subacicular hooks first present from setiger 17, present in all thereafter, occurring singly (except for replacements). Hooks distally bent. Two distal fangs emerging from joint bases.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 17, 23, 32, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice medicina* is listed with similar species in Tables 41 and 42. In addition to *E. medicina*, two species listed in Table 42 lack posterior simple branchiae; these are *E. indica* and *E. multicylindri*. Subacicular hooks are always single in *E. medicina* and *E. multicylindri;* in *E. indica* three or more subacicular hooks are present in each segment. The maximum number of branchial filaments is seven in *E. medicina* and four in *E. multicylindri*. Other differences can be seen by comparing illustrations and descriptions of the two species.

120. *Eunice megabranchia* Fauchald, 1970

FIGURE 71f–m; TABLES 19, 21, 24, 26

Eunice megabranchia Fauchald, 1970:33–36, pl. 4: figs. a–e.

MATERIAL EXAMINED.—Holotype, AHF Poly 1056, Gulf of California, Mexico, 27°03′N, 112°18″W, 894 m, coll. S. Calvert, sta L-184.

DESCRIPTION.—Holotype incomplete mature female with large eggs in body cavity with 74 setigers; length 68 mm; maximal width 7 mm; length through setiger 10, 12 mm. Anterior end of body cylindrical, becoming dorsally and ventrally flattened towards posterior end of fragment; cross-section nearly quadrangular posteriorly.

Prostomium (Figure 71f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely rounded; median sulcus shallow, separation continued as distinct ridge to base of A-III. Surface of prostomium rugose, palps distinctly marked frontolaterally by shallow grooves. Eyes posterior to bases of A-I, hidden under peristomial fold, purple. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. A-I to setiger 1; A-II to setiger 6; A-III to setiger 9. Peristomium cylindrical. Lower lip scalloped. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to slightly beyond tip of prostomium slender and tapering, without articulations.

Jaws not examined.

Branchiae (Figure 71m) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 54. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Last 7 pairs single filaments; all other branchiae strongly pectinate with 47 or more filaments where best developed, at setigers 15–20. Branchial stems erect, strong, tapering to very narrow tips, and outreaching notopodial cirri in all but last 7 branchial segments. Filaments filiform, forming tangled masses on sides of specimen; some filaments longer than notopodial cirri, but most distinctly shorter than notopodial cirri.

Anterior neuropodial acicular lobes obliquely truncate with aciculae emerging dorsal to midline. Posteriormost neuropodial acicular lobes present (Figure 71i) symmetrically rounded with aciculae emerging medially. Pre- and postsetal lobes low, transverse folds. Pre- and postbranchial ventral cirri tapering. Ventral cirri modestly basally inflated in branchial region. Inflated bases ovate; narrow tips tapering. Anterior notopodial cirri, slightly inflated basally, becoming tapering with long, slender, filiform tips in branchial region; postbranchial notopodial cirri slender, tapering, very much shorter than in branchial region. All notopodial cirri with distinct cirrophores; anterior notopodial cirri with 3 to 4 irregular articulations; articulations lost in first few branchial setigers.

Limbate setae narrow, marginally smooth. Shafts of pectinate setae (Figure 71h,l) wide, flattened. Blades slightly flaring, flat or gently furled. One marginal tooth distinctly longer than other teeth; 16 teeth present. Shafts of anterior compound falcigers (Figure 71g) distally inflated, becoming tapering in posterior setigers (Figure 71j), marginally smooth; internal striation distinct, with distinct, narrow beaks. Appendages tapering from base to very small distal heads, bidentate. Proximal teeth smaller than distal teeth, forming low, triangular lateral projections. Distal teeth erect, slender in anterior setigers and thick in posterior setigers. Guards tapering to slender, distinct mucros, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae single in anterior setigers, up to 3 in posterior setigers, honey-colored, tapering to blunt tips, straight; cross-sections round. Subacicular hooks (Figure 71k) honey-colored, bidentate. Hooks first present from setiger 35, present in all setigers thereafter, always single (except for replacements). Hooks tapering to small heads. Proximal teeth much larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; features associated with posterior parapodia; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 47, 50, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice megabranchia* is a member of group A1 and was compared to other deep-water species by Fauchald (1970); it is listed with similar species in Tables 19 and 21; it is also listed in Tables 24 and 26, because the aciculae and subacicular hooks may be a rather dark yellow. A detailed discussion of the relation between this species, *E. hawaiensis*, and *E. validobranchiata* is given as part of the description of the former.

Eunice megabranchia differs from all species in Table 26 by having more than five times as many branchial filaments (47 vs. 9) as the species with the next high number listed in that table.

Eunice megalodus Grube, 1878

Eunice megalodus Grube, 1878b:156–158, pl 9: fig. 5.

REMARKS.—The unusual jaw apparatus and the structure of the anterior end as described by Grube, the setal complement, and the structure of the notopodial cirri are all features found in the genus *Euniphysa*.

121. *Eunice mexicana* Fauchald, 1970

FIGURE 72; TABLES 8, 19, 20

Eunice biannulata mexicana Fauchald, 1970:27–28, pl. 1: figs. f, g.

MATERIAL EXAMINED.—Lectotype (AHF Poly 1539) and 10 paralectotypes (AHF Poly 1540), Mexico, Isla Isabel, 21°54′10″N, 105°53′05″W, 18–33 m, corallines, dredge, 2 Apr 1937, *Velero* sta 747-37.

DESCRIPTION.—Lectotype complete with 106 setigers; total length 87 mm; maximal width 3.5 mm wide at about setiger 15; length through setiger 10, 10.5 mm; width at setiger 10, 3.2 mm. Body cylindrical anteriorly, slightly dorsoventrally flattened posteriorly. Anal cirri short, tapering, possibly articulated.

Prostomium (Figure 72a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate, dorsally slightly inflated, sloping obliquely laterally; median sulcus very shallow. Eyes posterior to bases of A-I, black. Palpal region marked by transverse folds on ventral side. Antennae in very open horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and slightly tapering; maximum 17 articulations in A-III; first several articulations cylindrical, becoming increasingly drop-shaped distally; in some paralectotypes distal articulations moniliform. A-I to posterior peristomial ring; A-II to setiger 5; A-III to setiger 8. Peristomium with distinctly muscular lower lip. Separation between rings distinct dorsally, visible ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of prostomium, slender and tapering, with 4 to 5 cylindrical articulations.

Maxillary formula of 5 paralectotypes 1+1, 6–7+7–8, 7–9+0, 6–8+8–11, and 1+1. Mx III relatively short, slightly curved, located behind left Mx II. Mx VI missing.

Branchiae (Figure 72d,e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 40. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximum 18 filaments at about setiger 15; in lectotype all branchiae with at least 2 filaments; in paralectotypes up to 3 posterior segments with single branchial filaments. First 2 and last 3 branchiae shorter than notopodial cirri; all other branchiae longer. Branchial stems slender, tapering. Filaments slender, digitiform, shorter than notopodial cirri in all setigers.

Anterior and median neuropodial acicular lobes asymmetrically rounded with aciculae emerging dorsal to midline; posterior acicular lobes increasingly lower, merging into body wall near posterior end. Pre- and postsetal lobes low, transverse folds in all setigers. Anterior ventral cirri thick and tapering, becoming distinctly inflated by setiger 10. Inflated bases ovate, modest in size; narrow tips digitiform. Inflated bases reduced from about setiger 25–30. Ventral cirri thick and digitiform from about setiger 45, retaining that shape in remainder of body. Anterior and median notopodial cirri thick and tapering, with up to 5 cylindrical articulations. Posterior notopodial cirri nearly as long as those in median setigers, digitiform, without articulations.

Limbate setae thick, marginally finely serrated, longer than compound hooks in all setigers. All pectinate setae (Figure 72c,f,i) furled, tapering. Both marginal teeth longer than other teeth; number of teeth increasing from 8 to ~12 posteriorly. Shafts of all compound falcigers (Figure 72b,g,j) tapering, internally distinctly striated, with distinct beak. All appendages relatively wide basally, tapering towards small heads, bidentate. Proximal teeth very short; indistinct low knobs in anterior and median setigers, distinctly triangular in posterior setigers. Distal teeth nearly erect in all setigers, increasing in size from anterior to posterior setigers. Anterior and median guards asymmetrically bluntly pointed, becoming increasingly symmetrical and rounded posteriorly, marginally finely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae at least paired, with clear yellow cores. Anterior aciculae bluntly pointed, distally straight, medially at least superiormost aciculae distally expanded into tabs (Figure 72h); posterior aciculae (Figure 72k) tapering, distinctly bent dorsally; cross-sections round. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 72k) yellow,

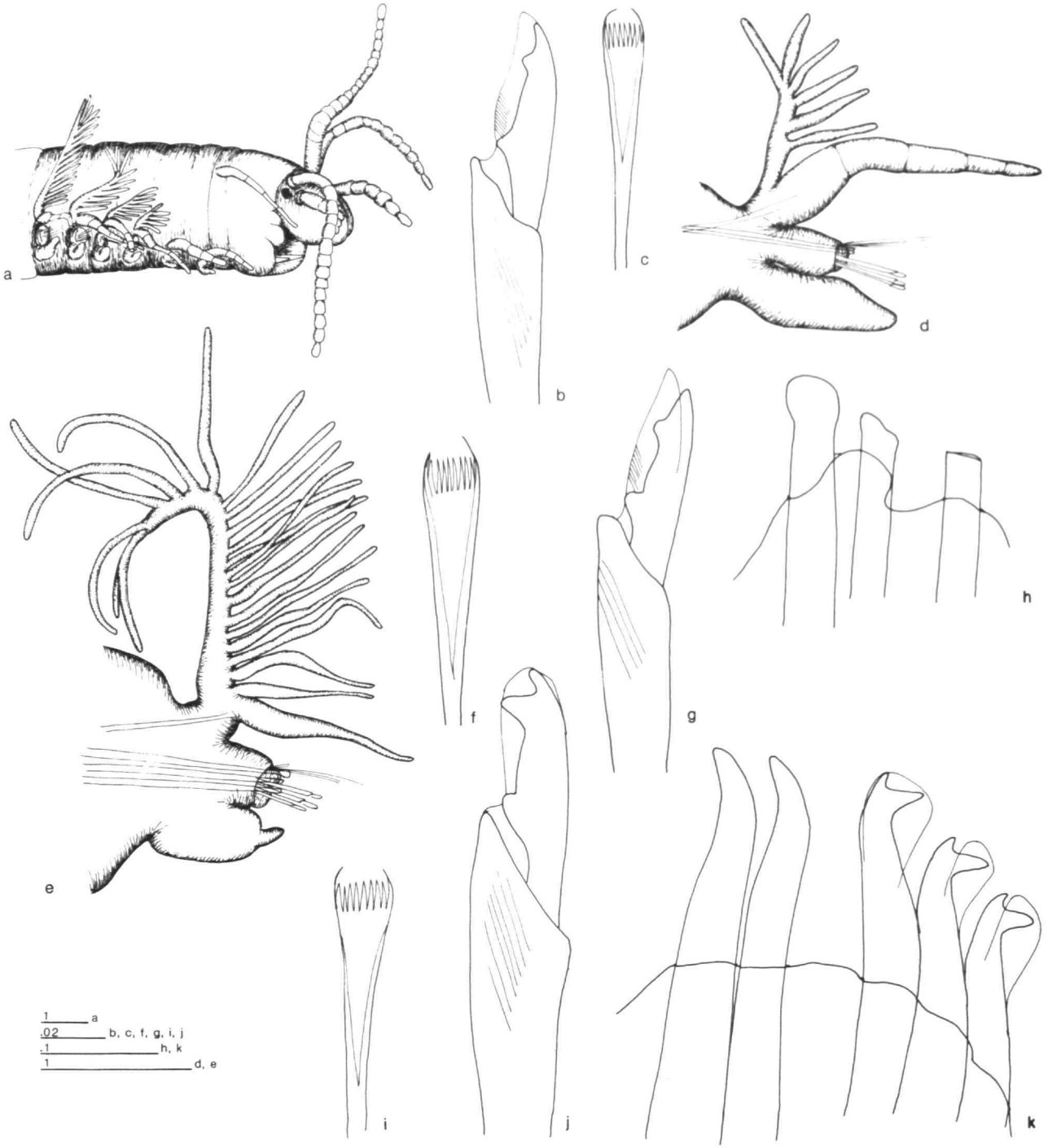

FIGURE 72.—*Eunice mexicana* (lectotype, AHF Poly 1539): a, anterior end, lateral view; b, compound falciger, parapodium 3; c, pectinate seta, parapodium 3; d, parapodium 3, anterior view; e, parapodium 15, anterior view; f, pectinate seta, parapodium 15; g, compound falciger, parapodium 15; h, aciculae, parapodium 15; i, pectinate seta, parapodium 48; j, compound falciger, parapodium 48; k, aciculae and subacicular hooks, parapodium 48. (Scale bars in mm.)

TABLE 8.—Variable and invariable features in the type lot of *Eunice mexicana* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	11	4	2	3.2	0.64
Length through 10	11	10.5	6	8.8	1.63
No. of antennal articulations	3	21	16	18.67	2.52
Branchiae present to setiger no.	11	40	26	34	3.61
Max. no. of branchial filaments	11	18	15	16.91	1.38
Ventral cirri inflated through setiger no.	10	30	20	26.4	2.95
Subacicular hooks first present from	11	32	21	26.45	3.11

INVARIABLE FEATURES	N=11
Separation of rings	visible dorsally and ventrally
Peristomial cirri reach	middle of prostomium
No. of peristomial cirral articulations	4
Branchiae first present from setiger no.	3
No. of notopodial articulations	5
Pectinate setae	tapering; furled
No. of teeth in pectinate setae	10
Shafts of compound falcigers	tapering
Guards of compound falcigers	bluntly pointed to rounded
Acicular color	yellow
Acicular shape	flattened tab
Subacicular color	yellow
No. of teeth in subacicular hooks	2
Core-sheath construction	visible

bidentate. Hooks first present from setiger 32, present in all setigers thereafter, usually 3 in a vertical row in posterior setigers. Hooks gently curved; necks and heads distinct. Proximal teeth larger than distal teeth, directed laterally. Distal teeth nearly erect, slender.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Through a lapsus, type locality and type specimens were not designated when the species was first described; I take the opportunity to rectify the error at this time by designating lecto- and paralectotypes for the species. As indicated above, the species is separated from other species in the group by the same kinds of characters used to separate other species, thus subspecific status originally designated is unjustified.

Eunice mexicana is listed with similar species in Tables 19 and 20. It is very similar to *E. pennata* in distributional features, but can be separated from it by having 18 rather than 12 branchial filaments and usually three subacicular hooks in a vertical row rather than having maximally paired subacicular hooks as in *E. pennata*.

Eunice elegans (see Table 24) also resembles *E. mexicana* closely, but can be separated as suggested in the discussion of the former.

122. *Eunice microprion* Marenzeller, 1879

FIGURE 73a-k; TABLES 27, 29

Eunice microprion Marenzeller, 1879:135-136, pl 5: fig. 1, 1A-1D.—Imajima and Hartman, 1964:252.

MATERIAL EXAMINED.—ZMW 1062, Jaqashima, Japan, don. Döderlein, 1 specimen; ZMW 1064, Eno Shima, Japan, don. Döderlein, 1 specimen.

COMMENTS ON MATERIAL EXAMINED.—The specimens listed above are not the types, but specimens identified by v. Marenzeller from collections taken at or near the type area.

DESCRIPTION.—Specimen from ZMW 1062 complete with 127 setigers; total length 82 mm; maximal width 5 mm; length through setiger 10, 10 mm. Other specimen incomplete with 124 setigers; length 85 mm; maximal length 5 mm; length through setiger 10, 12 mm. Both specimens cylindrical, gently tapering. Anal cirri as long as last 10 setigers together.

Prostomium (Figure 73a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally excavate with a thickened rim; median sulcus deep. Eyes near bases of A-II, dark. Antennae in a horseshoe; with A-III isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering very slowly towards tips, with up to 10 poorly marked, cylindrical

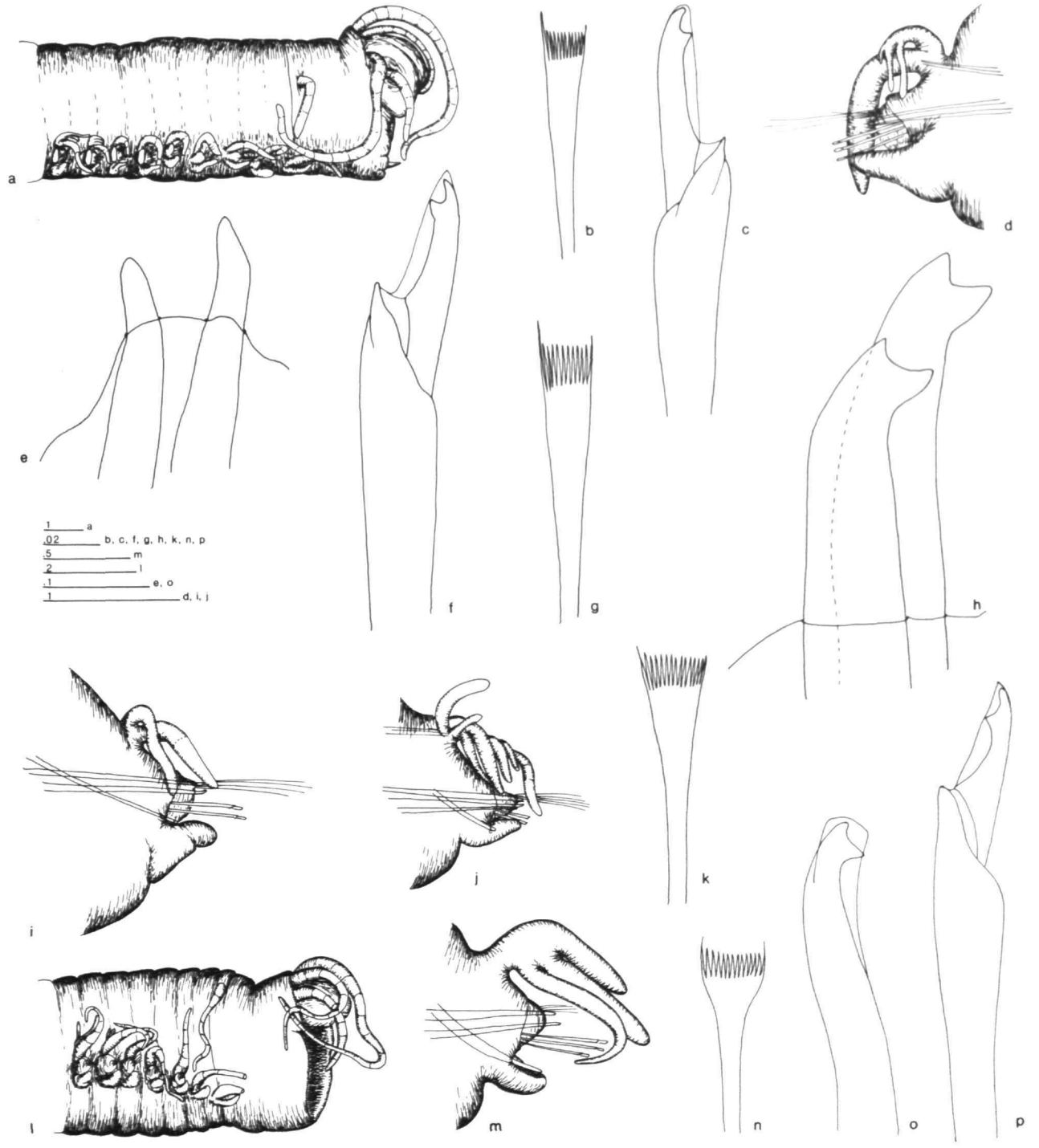

FIGURE 73.—*Eunice microprion* (ZMW 1062): a, anterior end, lateral view; b, pectinate seta, parapodium 9; c, compound falciger, parapodium 9; d, parapodium 9, anterior view; e, aciculae, parapodium 46; f, compound falciger, parapodium 46; g, pectinate seta, parapodium 46; h, subacicular hooks, parapodium 47; i, parapodium 46, anterior view; j, parapodium 105, anterior view; k, pectinate seta, parapodium 105. *Eunice mindanavensis* (holotype, BM(NH) ZK.1885.12.1.51a): l, anterior end, lateral view; m, parapodium 30, anterior view; n, pectinate seta, parapodium 30; o, subacicular hook, parapodium 30; p, compound falciger, parapodium 30. (Scale bars in mm.)

articulations in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 3; A-III slightly longer than A-II. Peristomium cylindrical. Separation between rings distinct nearly all way around body, indistinct only for short stretch laterally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of prostomium, slender and tapering, with 5 indistinct articulations.

Maxillary formula of specimen from ZMW 1062 1+1, 6+6, 10+0, 4+8, 1+1, and 1+1. Mx III with very short, small teeth, forming an arc with left Mx IV. Mx VI small plate with small point on either side.

Branchiae (Figure 73d,i,j) present, pectinate, distinctly shorter than notopodial cirri, reduced in mid-body region, flexible. Branchiae from setiger 7–8 to setiger 127. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All anterior and posterior branchiae with 2 or more filaments, in median region, from about setiger 35 to 65, branchiae reduced to single, relatively long filaments (Figure 73i). Maximum ~8 filaments at about setiger 15. Filaments short, digitiform.

Anterior neuropodial acicular lobes rounded; posterior acicular lobes triangular or conical; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming basally inflated from about setiger 10. Inflated bases distinct transverse welts; narrow tips tapering. Inflated bases reduced from about setiger 55–60, completely missing from about setiger 60–65. Posterior ventral cirri tapering, broadly attached ventrally, nearly scoop-shaped. All notopodial cirri digitiform, with 2 or more articulations. Anterior notopodial cirri about as long as peristomial cirri, becoming shorter from about setiger 3, but very much longer than branchiae in all setigers, retaining about same length from setiger 10 through rest of body, becoming slowly slimmer. Notopodial cirri articulated throughout body.

Limbate setae marginally serrated. All pectinate setae (Figure 73d,g,k) tapering, flat. Both marginal teeth slightly longer than other teeth; number of teeth increasing from ~15 to ~20 posteriorly. Shafts of pectinate setae increasing in length posteriorly. Pectinate setae numbering ~10 in all parapodia. Shafts of compound falcigers (Figure 73c,f) tapering, with distinct distal beak, marginally smooth, with distinct internal striations. Appendages elongated with parallel sides anteriorly (Figure 73c), becoming shorter and distinctly tapering posteriorly (Figure 73f), bidentate. Proximal and distal teeth similar in size. Proximal teeth triangular, directed laterally. Distal teeth gently curved. Anterior guards symmetrically rounded, becoming symmetrically bluntly pointed in posterior setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 73e) at least paired, up to 4 present, with dark brown, nearly black cores and clear sheaths, tapering with slender tips, bent or curved dorsally; cross-sections round. Subacicular hooks (Figure 73h) with dark brown, nearly black cores and clear sheaths, bidentate. Hooks first present from setiger 38 or 41, present in all setigers thereafter; 2 in most setigers; 3 or more in some setigers. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The species belongs to group B-2 and is compared to similar species in Tables 27 and 29. A characteristic feature is the reduced number of branchial filaments in median region of body; this pattern is present in *E. antennata* and a few similar species in group C-2, but is otherwise not known to be present in any other species in the genus.

123. *Eunice mindanavensis* McIntosh, 1885

FIGURE 73l–p; TABLES 27, 30

Eunice mindanavensis McIntosh, 1885:289–291, figs. 50, 51, pl. 39: figs. 9, 10, pl. 20A: figs. 21, 22.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1885.12.1.51a, off Mindanao, Philippines, 7°3′N, 121°48′E, 148 and 186 m, stones and gravel, 26 Oct 1874, *Challenger* sta 201.

COMMENTS ON MATERIAL EXAMINED.—The holotype is now in three pieces; an anterior end consisting of 21 setigers (cut into two pieces) and a posterior end of 42 setigers. The two pieces clearly belong to the same specimen and appear to represent a complete specimen. McIntosh reported only the first of the two depths listed above; Alex Muir (in litt.) informed me that station 201 included hauls at two different depths.

DESCRIPTION.—Holotype complete with 63 setigers; total length ~40 mm; maximal width 4 mm; length through setiger 10, 7 mm. Body thickset anteriorly, circular in cross-section, tapering strongly, with relatively few, very distinct segments.

Prostomium (Figure 73l) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded; dorsally flattened lobes; median sulcus deep. Eyes not seen. Antennae covered by large overhanging peristomial fold, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering and slender, with up to 15 relatively long, rather indistinct, cylindrical articulations. A-I to setiger 1, A-II to setiger 3; A-III to setiger 7. Peristomium roughly cylindrical. Separation between rings distinct dorsally and possibly ventrally; separation on ventral side confounded by presence of superficial folds; anterior ring ~6/7 of total peristomial length. Peristomial cirri to tip of prostomium, tapering, with 7 long, cylindrical articulations.

Maxillary formula 1+1, 7+7, 10+0, 10+10, 1+1, and 1+1. Teeth of Mx III and IV very small, but distinct. Mx III short; part of distal arc with left Mx IV.

Branchiae (Figure 73m) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 63. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Last 5 pairs single filaments. First few pairs of filaments very unequal in length. Maximum 3 filaments from about setiger 15 through setiger 30. Filaments very thick, digitiform.

Anterior neuropodial acicular lobes distally truncate, becoming distally rounded posteriorly; aciculae emerging above midline. All pre-setal lobes low, transverse folds. Anterior postsetal lobes following outline of acicular lobes closely, becoming low, transverse folds from about setiger 15. Prebranchial ventral cirri thick, tapering. Ventral cirri large, flattened, forming scoop around lower edge of acicular lobe from early branchial setigers, eventually forming scoops around emergent part of subacicular hooks; tips tapering. All notopodia medially inflated; anterior notopodial cirri with 5 or 6 cylindrical articulations; articulations indistinct from mid body.

Limbate setae narrow. Pectinate setae (Figure 73n) flaring, flat. Both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 73p) slightly inflated, internally strongly striated, marginally smooth. Appendages short, slender, bidentate with thick teeth. Proximal teeth triangular, directed laterally. Distal teeth erect. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single anteriorly; 2-3 present in median and posterior setigers, dark brown, tapering to blunt tips, straight; cross-sections round. Subacicular hooks (Figure 73o) with dark brown cores and clear sheaths, bidentate. Hooks distinct from setiger 21; setigers 17-20 with broken remnants of much more delicate hooks in subacicular positions, present in all setigers thereafter, always single (except for replacements). Hooks distinctly tapering; heads distinct. Proximal teeth directed laterally. Distal teeth triangular, rather blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 4, 6, 13-16, 74.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice mindanavensis* is listed with similar species in Tables 27 and 30. It has scoop-shaped ventral cirri with inflated bases continued to the far posterior end; the only other species in Table 30 with inflated bases through the posterior end is *E. coccinea*, in which the bases are ovate. The branchiae are continued to the far posterior setigers in *E. mindanavensis* and terminate well before the posterior end in *E. coccinea*.

Eunice minuta Grube, 1850

Eunice minuta Grube, 1850:292.
Eunice vittata.—Grube, 1866b:68.

REMARKS.—Originally a nomen nudum, Grube did not issue any description of this form before withdrawing it in 1867 as a juvenile of *E. vittata*. *Eunice vittata* he considered, incorrectly, as being indistinguishable from alcohol-preserved specimens of *E. pennata*. *Eunice minuta* is here considered a junior synonym of *E. vittata*.

124. *Eunice modesta* Grube, 1866

FIGURE 74; TABLES 33, 36

Eunice modesta Grube, 1866a:64.

MATERIAL EXAMINED.—Two syntypes, ZMH V-801, Samoa. ZMB 3998, Samoa, coll. Godeffroy.

COMMENTS ON MATERIAL EXAMINED.—The Hamburg syntype has been completely dried out at one time and no meaningful illustrations of soft parts could be made, so the illustration of the anterior end is based on the very soft Berlin specimen, but otherwise the description is based on the Hamburg syntype with comments as necessary where the Berlin syntype differs.

DESCRIPTION.—Hamburg syntype complete female with very large eggs in body cavity, with ~80 setigers; total length 28 mm; maximal width 1 mm; length through setiger 10, 3 mm. Berlin syntype incomplete with 37 setigers; length 21 mm; maximal width 2 mm; length through setiger 10, 5.5 mm.

Prostomium (Figure 74a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomium frontally rounded, dorsally excavate with a thickened rim; median sulcus very deep. Eyes between bases of A-I and A-II, reddish. Ceratophores long in all antennae, confluent with prostomium, rather than ring-shaped, without articulations. Ceratostyles digitiform, with up to 6 long, cylindrical articulations in A-III. All antennae short; none reaching beyond the peristomium. Peristomium with large, inflated lower lip, set off from rest of peristomium as thickened cushion delimited posteriorly by ventral groove separating anterior and posterior peristomial rings. Peristomial rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri barely to posterior edge of anterior peristomial ring, ovate, without articulations.

Jaws not observed.

Branchiae present, single filaments, distinctly longer than notopodial cirri. Branchiae from setiger 17-18 to setiger 70, from setiger 11 to end of fragment in Berlin syntype. Branchiae terminating before posterior end, present on 65% of total

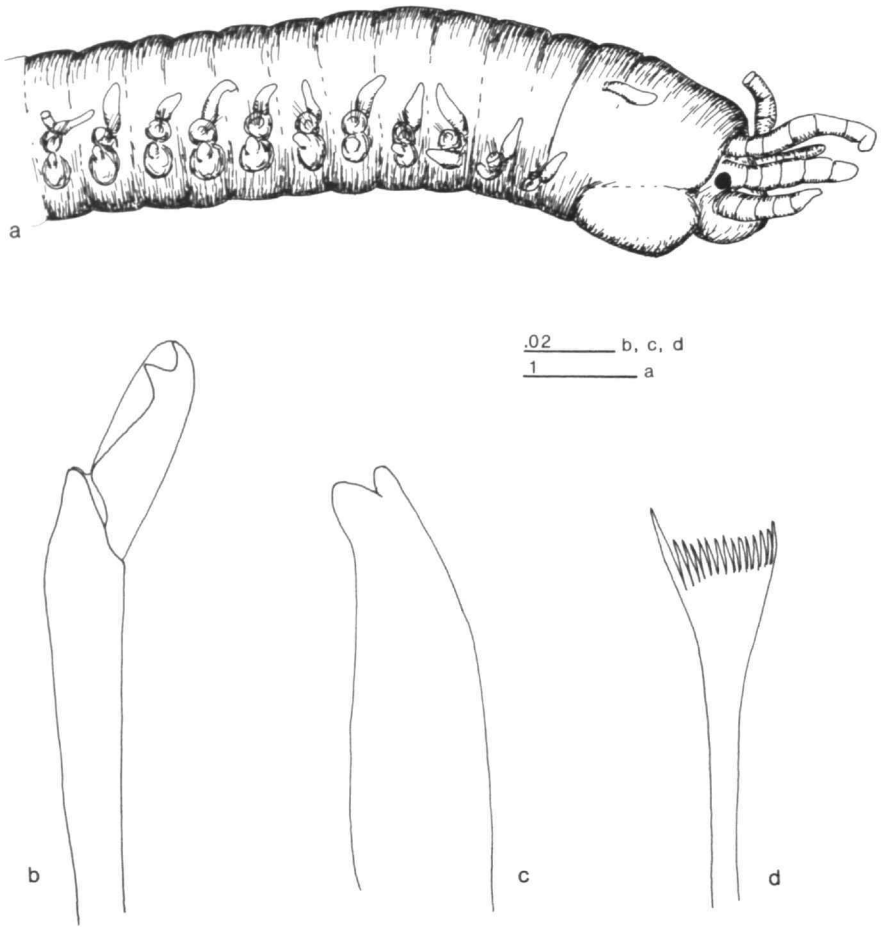

FIGURE 74.—*Eunice modesta* (syntype, ZMB 3998 (a only), syntype, ZMH V-801 (b-d)): a, anterior end, lateral view; b, compound falciger, parapodium 29; c, subacicular hook, parapodium 29; d, pectinate seta, parapodium 29. (Scale bars in mm.)

number of setigers. All branchiae relatively long, slender filaments.

Shape of neuropodial acicular lobes cannot be determined accurately. Ventral cirri basally inflated from about setiger 5 through setiger 45, tapering in posterior setigers. Inflated bases ovate. All notopodial cirri basally inflated, without articulations, very much shorter than branchial filaments in all but first few branchial setigers.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 74d) flaring, flat. One marginal tooth longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 74b) slightly inflated, marginally smooth. Appendages tapering, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth tapering, distinctly curved. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Acicular light brown, tapering to blunt tips, straight; cross-sections round. Subacicular hooks (Figure 74c) light brown, thick, tapering, bidentate. Hooks first present from setiger 22, present in all setigers thereafter, always single (except for replacements). Both teeth directed distally. Proximal teeth about twice as large as distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; parapodial structures; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 33, 34, 39, 40, 56, 58, 59. *Unknown Characters:* 4, 6, 43-50, 52, 55, 74, 78, 80.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice modesta* has not been reported since it

was first described. It is listed with similar species in Tables 33 and 36. *Eunice pruvoti* and *E. modesta* both have single filaments in all branchiae. Branchiae are continued to the posterior end in the former and are missing on the last 10 setigers in the latter. *Eunice modesta* is further characterized by the relatively light color of subacicular hooks and aciculae.

Eunice monilifer (Chamberlin, 1919)

Leodice monilifer Chamberlin, 1919b:11-12.
Eunice enteles.—Hartman, 1938:97 [not *Leodice enteles* Chamberlin, 1918].
Eunice antennata.—Hartman, 1944:115-117, pl. 7: figs. 154-156 [in part, not *Leodice antennata* Lamarck, 1818].

REMARKS.—This species was originally described nestling in kelp hold-fasts near Laguna Beach, California. The type was deposited at the Museum of Comparative Zoology according to Chamberlin, but is now missing (A. Johnston, pers. comm.). The description given here summarizes information given by Chamberlin, with updated terminology.

Antennae short, with up to 12 moniliform articulations. Peristomial cirri much shorter than peristomium and wrinkled or distinctly articulated. Maxillary formula 1+1, 4+6, 8+0, 9+9, and presumably 1+1. Branchiae from setiger 7 to setiger 30 (of 109 setigers in complete type specimen), with maximum 3 filaments.

No mention was made of any parapodial or setal features, except that notopodial cirri were characterized as being wrinkled, but not distinctly divided into articulations.

Hartman (1938:97) stated that Chamberlin's information about branchial distribution was unreliable. She illustrated tridentate hooks in a specimen of *Eunice* from Laguna Beach, but did not specify branchial distribution in the specimen she illustrated. In other members of groups C-1 and C-2, differences in branchial distribution such as the one separating *E. enteles* from *E. monilifer* in similar-sized specimens is considered highly significant. The two forms cannot be synonymized with each other; however, neither one is sufficiently well characterized to allow positive identification. *Eunice monilifer* is here considered indeterminable.

Eunice mossambica Peters, 1854

Eunice mossambica Peters, 1854:612.
Marphysa mossambica.—Gravier, 1900:267-270, figs. 137-139, pl. 14: figs. 89, 90.—Crossland, 1903:139-140, pl. 15: figs. 7-10.—Day, 1967:395, fig. 17.5.i-m.
Nauphanta mossambica.—Fauchald, 1987:376-378, fig. 1a-e.

REMARKS.—Originally described in *Eunice* and usually considered a member of *Marphysa*, this species was moved to the genus *Nauphanta* by Fauchald (1987).

125. *Eunice mucronata* Moore, 1903

FIGURE 75a-e; TABLES 9, 41, 45

Eunice mucronata Moore, 1903:437-440, pl. 25: figs. 42-45.

MATERIAL EXAMINED.—Lectotype, USNM 15851, and 11 paralectotypes USNM 5341, *Albatross* sta 3698, Japan, Sagami Bay, 4.5 miles SE of Manazuru Saki (~35°08'N, 139°10'E), 278 m, green mud, volcanic ash and sand, beamtrawl.

COMMENTS ON MATERIAL EXAMINED.—The lectotype was isolated as USNM 15851; this specimen and one complete specimen with 111 setigers from USNM 5341 had been dissected by Moore. The description is based on the specimen from 15851.

DESCRIPTION.—Lectotype complete, with 116 setigers; total length 58 mm; maximal width 4 mm at about setiger 25; length through setiger 10, 8 mm. Body cylindrical, tapering relatively slowly towards both ends.

Prostomium (Figure 75a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Palpal region distinguished by transverse frontal furrows. Eyes posterior to bases of A-I, very large, brown, not clearly visible in all specimens. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering to very narrow tips without articulations. A-I apparently articulated in some specimens due to irregular muscle contractions rather than structural features. A-I to setiger 2; A-II to setiger 10; A-III to setiger 13. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring ~2/3 of total peristomial length. Peristomial cirri attached at extreme frontal edge of posterior peristomial ring, reaching beyond tip of prostomium, same length as A-I, slender and tapering, without articulations.

Summary maxillary formula for 2 syntypes 1+1, 7-8+7-8, 7-8+0, 6+8, and 1+1. Syntype from USNM 5341 with consistently lower numbers of teeth where numbers differ.

Branchiae (Figure 75c) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 34; in other syntypes last branchiae on setigers 29-33. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 pairs single filaments; maximum 15 slender filaments. Branchial stems slender, erect.

Anterior neuropodial acicular lobes distally truncate or rounded, becoming distinctly triangular posteriorly; aciculae emerging above midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Ventral cirri basally inflated in branchial region. Inflated bases ovate; narrow tips tapering. Postbranchial ventral cirri increasingly slender, tapering, resembling notopodial cirri closely, but consistently shorter. All notopodial cirri slender, tapering, with gently inflated bases, without articulations. Notopodial cirri long in prebranchial region, becoming shorter through branchial region, so in last of branchial setigers notopodial cirri no longer than branchial filaments. Postbranchial notopodial cirri about half as long as those in prebranchial region.

Limbate setae slender, marginally smooth. Pectinate setae

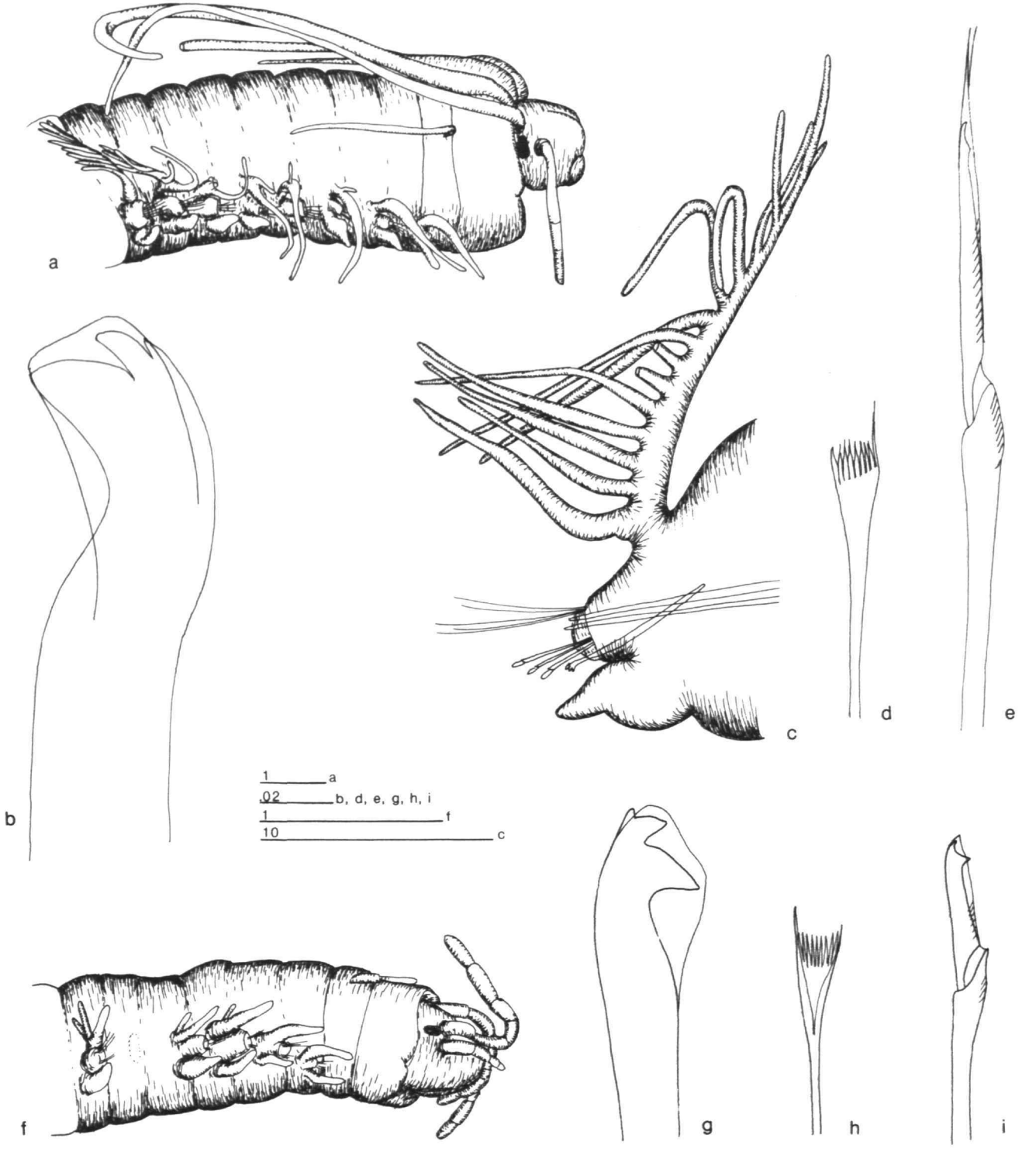

FIGURE 75.—*Eunice mucronata* (lectotype, USNM 15851): a, anterior end, lateral view; b, subacicular hook, parapodium 29; c, parapodium 29, anterior view; d, pectinate seta, parapodium 29; e, compound falciger, parapodium 29. *Eunice multicylindri* (holotype, USNM 63066): f, anterior end, lateral view; g, subacicular hook, parapodium 40; h, pectinate seta, parapodium 40; i, compound falciger, parapodium 40. (Scale bars in mm.)

TABLE 9.—Variable and invariable features in the type lot of *Eunice mucronata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	6	116	95	106	8.05
Total length	6	59	36	48.17	9.26
Maximum width	14	4	2	2.82	0.5
Max. width at setiger no.	14	25	15	21.07	4.87
Length through 10	14	8	6	6.71	0.64
Width at 10	14	3.5	1.75	2.46	0.44
Length of A-I	14	2	0	1.21	0.58
Length of A-II	13	12	4	8.15	2.7
Length of A-III	6	15	7	10.67	3.14
Teeth in left MxII	7	9	7	8.43	0.79
Teeth in right Mx II	7	10	8	8.29	0.76
Teeth in Mx III	7	12	8	9.86	1.35
Teeth in left Mx IV	7	9	6	8.29	1.11
Teeth in right Mx IV	7	11	8	10.14	1.07
Last branchia on setiger no.	13	34	29	32	1.63
Max. no. of branchial filaments	14	15	11	12.5	1.34
No. of anterior setigers with single filaments	14	3	2	2.93	0.27
No. of posterior setigers with single filaments	13	1	0	0.15	0.38
No. of anterior setigers with tapering ventral cirri	14	5	3	4.86	0.53
Ventral cirri inflated through setiger no.	13	40	31	36.23	2.59
No. of aciculae	14	3	2	2.07	0.27
Subacicular hooks first present from setiger no.	14	22	18	20.07	1.07
No. of subacicular hooks present	14	2	1	1.14	0.36

INVARIABLE FEATURES	N=14
Antennal articulations	absent
Peristomial cirri reach	middle or front of prostomium
Peristomial cirral articulations	absent
No. of teeth in Mx V	1
Branchiae first present from setiger no.	3
Branchiae	outreach notopodial cirri
Articulations of notopodial cirri	absent
Pectinate setae	slightly flaring; flat
No. of teeth in pectinate setae	10
Shafts of compound falcigers	slightly inflated
Acicular shape	tapering
Core-sheath construction	distinct
Subacicular hooks	in every segment after start
Dorsal edge of pygidium (N=6)	crenulated
Anal cirri (N=6)	long; without articulations

(Figure 75d) gently flared, flat. One marginal tooth longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 75e) gently inflated, marginally finely serrated. Appendages extremely long, slender, tapering to blunt, gently curved tips, bidentate. Proximal teeth low, triangular thickenings near distal ends of appendages. Guards extremely long, tapering to fine mucronate tips. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in most parapodia, yellow, slender, tapering, straight or gently curved; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 75b) yellow, tridentate. Hooks first present from setiger 22 (18–21 in other syntypes), present in all setigers thereafter, always single (except for replacements). Hooks distally curved. Fangs decreasing evenly in size from large main fangs to small tertiary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long and located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 6, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice mucronata* is listed with similar species in Tables 41 and 45. It is the only species in Table 45 with peristomial cirri clearly projecting beyond the prostomium. It is also characterized by the very long antennae and the extremely long, pointed guards in the compound falcigers.

126. *Eunice multicylindri* Shisko, 1981

FIGURE 75f–i; TABLES 10, 41, 42

Eunice multicylindri Shisko, 1981:971–973, figs. 2a–d, table 1.

MATERIAL EXAMINED.—Holotype, USNM 63066, and 2 paratypes, USNM 63067, Southern California, 32°43.87′N, 119°9.86′W, 81 m, coarse sand, 17 Feb 1956, BLM sta 24356BFI; 2 paratypes, USNM 63068, Southern California, 33°51.46′N, 119°57.13′W, 87 m, coarse sand, 13 Oct 1975, BLM sta 22952BFI; 2 paratypes, USNM 63069, Southern California, 33°39.99′N, 120°0.1′W, 120 m, sand and gravel, 19 Oct 1975, BLM sta 23087BFI; 1 paratype, USNM 63070, Southern California, 33°59.78′N, 120°22.33′W, 70 m, 6 Nov 1975, BLM sta 23170BFI.

COMMENTS ON MATERIAL EXAMINED.—Measurements of paratypes, including one juvenile, are summarized in Table 10.

DESCRIPTION.—Holotype complete with 115 setigers; total length 45 mm; maximal width 1 mm; length through setiger 10, 3.5 mm. Body cylindrical, slender, with short, inconspicuous parapodia. Anal cirri as long as last 15 setigers together.

Prostomium (Figure 75f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Eyes lateral to bases of A-II, large, dark. Antennae arranged in a horseshoe, with A-III isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, distally abruptly tapering, with a few, large cylindrical articulations; maximum 4 articulations in A-III. A-I to posterior peristomial ring. A-II and A-III to setiger 1. Peristomium cylindrical. Separation between rings distinct on all sides, but best marked dorsally and ventrally; anterior ring 2/3 of total peristomial length. Peristomial cirri to anteriormost edge of peristomium or middle of prostomium, digitiform, with 2 to 4 cylindrical articulations.

Maxillary formula of paratype from USNM 63067 1+1, 8+8, 8+0, 7+10, and 1+1. Mx III long, located behind left Mx II. Jaws very lightly sclerotinized without any trace of calcification.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 40. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 and last 10–15 branchiae single filaments; maximum 4 filaments. Filaments digitiform, about as long as notopodial cirri.

All neuropodial acicular lobes truncate or rounded; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 5–6 ventral cirri thick, tapering, basally inflated from setigers 6–7 through setiger 45–50. Inflated bases modest, ovate; narrow tips long and tapering. Inflated portion lost by setiger 50; posterior ventral cirri tapering. All notopodial cirri slightly inflated basally, tapering to digitiform tips; notopodial cirri thinner in posterior than in anterior setigers, retaining same length. Notopodial cirri without articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 75h) tapering, furled. Both marginal teeth longer than other teeth; 1 marginal tooth longer than other; ~12 teeth present. Shafts of compound falcigers (Figure 75i) slightly inflated, marginally serrated. Appendages long, slightly tapering, bidentate. Proximal teeth very much larger than distal teeth, triangular, directed slightly basally. Distal teeth distinctly hooked. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers

TABLE 10.—Variable and invariable features in the type lot of *Eunice multicylindri* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	8	1	0.1	0.51	0.26
Length through 10	8	3.5	1.2	2.63	0.78
No. of antennal articulations	8	8	4	5.63	1.30
No. of peristomial cirral articulations	8	4	0	1.25	1.75
Branchiae first present from setiger no.	8	4	3	3.38	0.52
Last branchiae on setiger no.	8	40	20	29.63	6.55
Max. no. of branchial filaments	8	4	1	2.63	0.92
Ventral cirri inflated through setiger no.	8	45	30	39.88	6.38
Subacicular hooks first present from setiger no.	8	27	13	23.50	4.66

INVARIABLE FEATURES	N=8
Separation between rings	visible on all sides
Pectinate setae	furled; tapering
Acicular color	yellow
Acicular shape	tapering; straight
Subacicular color	yellow
No. of subacicular teeth	3
Core-sheath construction	indistinct

absent. Aciculae yellow, slender, tapering, straight; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 75g) yellow, tridentate with teeth in crest. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Hooks with large curved main fang; 2 distal fangs emerging from common base; tertiary fangs very much smaller than secondary fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice multicylindri* was described from rather well-preserved material and enough specimens to allow statistical treatment of material along the same lines presented by Fauchald (in press). Variability in material is indicated in Table 10.

Eunice multicylindri is listed with similar species in Tables 41 and 42. It is characterized more by a combination of character states than by a single unique one. It is discussed in the section on *E. medicina*.

127. *Eunice multipectinata* Moore, 1911

FIGURE 76a–i; TABLES 27, 32

Eunice multipectinata Moore, 1911:248–251, pl. 15: figs. 20–23.

MATERIAL EXAMINED.—Holotype, USNM 16919, *Albatross* sta 4377, Southern California, 10.2 miles southwest of Point Loma (~32°35′N, 117°25′W), 17 Mar 1904, 232–547 m, green mud and sand, dredge; USNM 16880, *Albatross* sta 4431, 2 specimens, Southern California, 3.5 to 5.2 miles NE of Brockway Point, Santa Rosa Island (approximately 34°06′N, 120°04′W), 15 Apr 1904, 69–82 m, green and yellow mud, rock and sand, various dredges.

COMMENTS ON MATERIAL EXAMINED.—The holotype was at one time desiccated by exposure to highly concentrated alcohol and is now partially distorted; the two other specimens examined are part of the original material, but were not designated as types by Moore.

DESCRIPTION.—Holotype complete with 196 setigers; total length 172 mm; maximal width 7 mm; length through setiger 10, 16 mm. Body cylindrical, tapering slowly posteriorly. Anal cirri as long as last 12 setigers combined.

Prostomium (Figure 76d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus shallow, but distinct. Eyes between bases of A-I and A-II, dark. Antennae evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with cylindrical articulations except drop-shaped distalmost articulations in A-I. A-I to posterior peristomial ring; A-II to setiger 1; A-III incomplete in all specimens, apparently at least as long as A-II. Peristomium cylindrical; front edge of lower lip coarsely scalloped, muscular. Separation between rings distinct dorsally and ventrally; anterior ring about 5/6 of total peristomial length. Peristomial cirri to front of anterior peristomial ring; in 1 specimen to posterior end of prostomium, slender and digitiform, with 5 to 6 articulations.

Maxillary formula of specimen from USNM 16880 1+1, 8+8, 9+0, 7+11, 1+1, and 1+1. Mx VI small with barely projecting point. Mx III short; part of distal arc with left Mx IV.

Branchiae (Figure 76a,e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7–8 to setiger 196. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Single filaments in first 8–10 branchiated setigers; up to 12 slender filaments in trim series at setigers 15–20. Branchial stems slender. Filaments shorter than notopodial cirri in all setigers. Branchiae shorter than notopodial cirri except in setigers 15–30.

All neuropodial acicular lobes asymmetrically obliquely rounded; aciculae emerging from upper edge of lobes. All pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, digitiform, becoming basally inflated from about setiger 5. Inflated bases distinct, elevated ridges along lower edge of neuropodia; narrow tips tapering. Inflated bases reduced from about setiger 65, remaining visible in all but last 50–60 setigers. Far posterior ventral cirri very long, slender, digitiform, about twice as long as neuropodial acicular lobes. All notopodial cirri slender, tapering, slightly inflated basally. Anterior notopodial cirri with up to 7 indistinct articulations; articulations lost by setiger 15.

Limbate setae marginally serrated. Pectinate setae (Figure 76c,i) tapering, flat or slightly furled. One marginal tooth very much longer than all other teeth; 10–15 teeth present. Shafts of compound falcigers tapering, marginally finely serrated in anterior setigers (Figure 76b), marginally smooth in posterior setigers (Figure 76g). Anterior appendages tapering, bidentate. Proximal teeth larger than distal teeth, curved, laterally directed. Distal teeth distinctly curved. Median and posterior appendages less tapering. Proximal teeth triangular, directed laterally, straight. Distal teeth similar to those in anterior appendages. Guards bluntly to sharply symmetrically pointed, marginally sometimes frayed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 76f) paired in all but few posterior setigers, with dark brown to black cores and clear sheaths, tapering, distinctly bent. Curvature of aciculae at right angles to each other in some parapodia; cross-sections round. Subacicular hooks (Figure 76h) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setigers 37 and 39 in 2

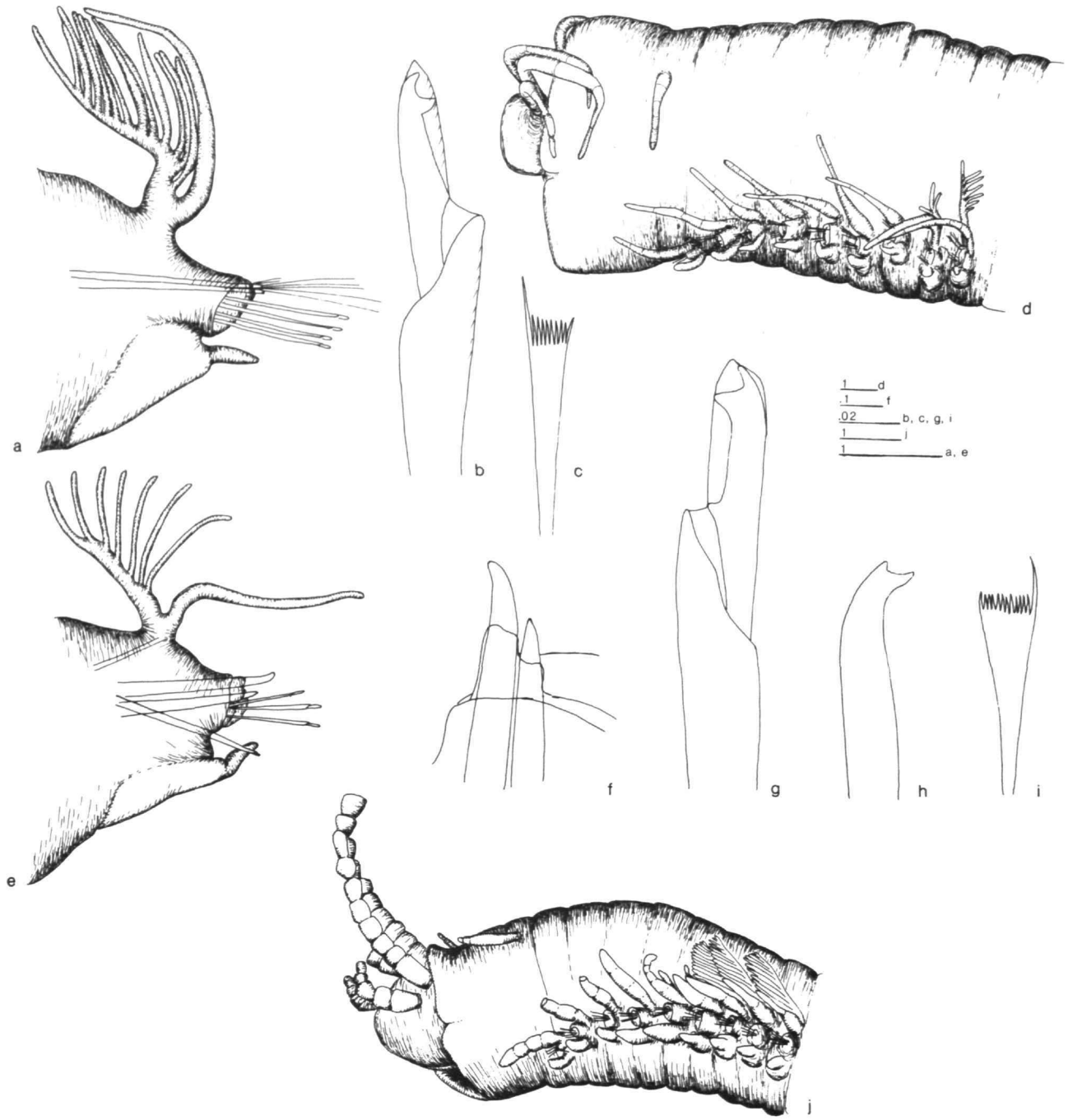

FIGURE 76.—*Eunice multipectinata* (holotype, USNM 16919): a, parapodium 20, anterior view; b, compound falciger, parapodium 20; c, pectinate seta, parapodium 20; d, anterior end, lateral view; e, parapodium 60, anterior view; f, aciculae, parapodium 60; g, compound falciger, parapodium 60; h, subacicular hook, parapodium 60; i, pectinate seta, parapodium 60. *Eunice murrayi* (holotype, BM(NH) ZK 1885.12.1.201): j, anterior end, lateral view. (Scale bars in mm.)

specimens from USNM 16880 and from setiger 45 in holotype, present in all setigers thereafter, always single (except for replacements). Hooks tapering, bent laterally towards distal; heads distinct. Proximal teeth very much larger than distal teeth, distally curved, laterally directed. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 15, 23, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice multipectinata* is listed with similar species in Tables 27 and 32. It is first and foremost characterized by gracile, strongly pectinate branchiae and slender, digitiform antennae and notopodial cirri; the subacicular hooks start rather late, compared to the two other species listed in Table 32 with 10 or more branchial filaments.

128. *Eunice murrayi* McIntosh, 1885

FIGURE 76j; TABLES 41, 45

Eunice murrayi McIntosh, 1885:288–289, figs. 48, 49, pl. 39: figs. 7, 8, pl. 20A: figs. 19, 20.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1885.12.1.201, Simon's Bay, Cape of Good Hope, dredged, 33 m, Dec 1873.

DESCRIPTION.—Holotype complete with 101 setigers; total length approximately 37 mm; maximal width 4 mm; length through setiger 10, 7 mm. Anal cirri long, articulated.

Prostomium (Figure 76j) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes not seen. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with moniliform articulations; complete left A-II with 8 articulations; incomplete A-III with 10 articulations. A-I to setiger 1; A-II to setiger 3; incomplete A-III currently to setiger 3; however, apparently originally longer than A-II. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to frontal margin of peristomium, with 3 articulations of which basal ones more than half of total cirral length.

Maxillary formula 1+1, 5+5, 5+0, 5+8, and 1+1. Mx III long, positioned directly behind left Mx II.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 28. Branchiae present to near posterior end, present on less than 55% of total number of setigers. Two first and last 5 branchiae single filaments, maximum; 9 filaments at about setiger 10. Branchial stems strong, stiff. Filaments arranged in a neat comb, relatively short.

All neuropodial acicular lobes distally truncate; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. Prebranchial ventral cirri digitiform. Between setigers 5 and 30 ventral cirri basally moderately inflated. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri increasingly digitiform, increasing in length, by setiger 50 as long and prominent as notopodial cirri. All notopodial cirri medially inflated, similar in length. Prebranchial cirri with 3 or 4 articulations; articulations increasingly indistinct posteriorly; most notopodial cirri in branchial region with single articulation; postbranchial notopodial cirri without articulations.

Nearly all setae broken. Shape of limbate and pectinate setae and aciculae currently indeterminable. McIntosh (1885, pl. 20A: fig. 19) illustrated shafts of compound falcigers as mildly inflated. Appendage large with both teeth well developed, distinctly curved. Guards blunt; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, distally pointed; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, tridentate with teeth in a crest. Hooks first present from setiger 17.

UNKNOWN MORPHOLOGICAL FEATURES.—Many setal features; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 13, 14, 23, 65–68, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice murrayi* has been considered a synonym of *E. australis*, which it resembles in distribution of branchiae and in shape of the subacicular hooks. It is listed with similar species in Tables 41 and 45. It resembles *E. prayensis* in having the separation between the peristomial rings distinct on all sides, but differs from the it in having the notopodial cirri articulated in the anterior end; in *E. prayensis* the notopodial cirri lack articulations.

129. *Eunice mutabilis* Gravier, 1900

FIGURE 77a–e; TABLES 33, 38

Eunice mutabilis Gravier, 1900:245–248, figs. 105–109, pl. 13: figs. 71–74.

MATERIAL EXAMINED.—Two syntypes, MNHN, Paris, Djibouti, coll. Jousseaume and Coutière, 1897.

COMMENTS ON MATERIAL EXAMINED.—The description is based on the shorter of the two syntypes.

DESCRIPTION.—Both syntypes complete; one with 196 setigers; total length 95 mm; maximal width 6 mm; length through setiger 10, 8 mm. Other syntype with 313 setigers; length 117 mm; maximal width 7.5 mm; length through setiger

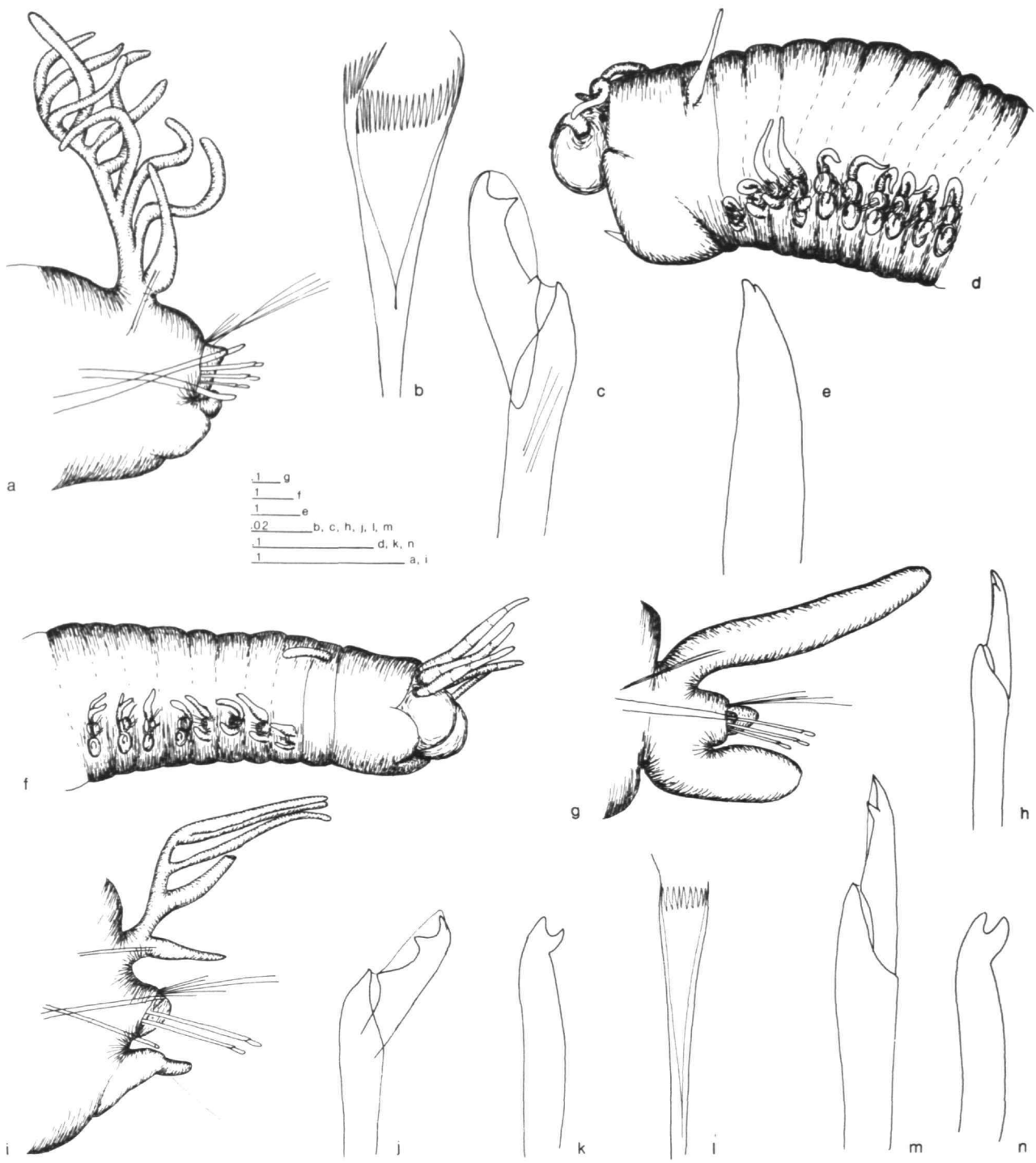

FIGURE 77.—*Eunice mutabilis* (syntype, MNHN): a, parapodium 55, anterior view; b, pectinate seta, parapodium 55; c, compound falciger, parapodium 55; d, anterior end, lateral view; e, subacicular hook, parapodium 55. *Eunice mutilata* (holotype, USNM 4789): f, anterior end, lateral view; g, prebranchial parapodium, anterior view; h, compound falciger, prebranchial parapodium; i, parapodium 30–35 (these parapodia all mounted together on a slide and not readily distinguishable), anterior view; j, compound falciger, parapodium 30–35; k, subacicular hook, parapodium 35; l, pectinate seta, parapodium 30–35; m, compound falciger, parapodium 30–35; n, subacicular hook, parapodium 30–35.

10, 8.5 mm. Anterior body cylindrical, becoming dorsoventrally flattened by setiger 50. Abruptly tapering to pygidium. Anal cirri short, without articulations.

Prostomium (Figure 77d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes lateral to bases of A-II, dark. Antennae in a horseshoe, evenly spaced, with A-I thicker than other 3. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I barely to posterior peristomial ring; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical; lower lip very muscular, forming distinct ventrolateral pad. Separation between rings distinct dorsally and ventrally only; anterior ring 4/5 of total peristomial length. Peristomial cirri to front edge of peristomium or posteriormost part of prostomium, basally inflated, tapering to slender tips, without articulations.

Summary maxillary formula 1+1, 4-5+4-5, 6+0, 4-6+6-8, and 1+1. Left Mx IV short; part of distal arc with Mx III, with 3 large and varying number of very small, knob-like teeth.

Branchiae (Figure 77a) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 17-18 to setiger 196. Branchiae present to near posterior end; present on more than 65% of total number of setigers. First 2-3 pairs single filaments; all other branchiae with 3 or more filaments. Where best developed, at about setiger 25, branchiae with 12 slender filaments; more usually branchiae with 8 to 9 filaments. Branchial stems slender, flexible. Filaments longer than notopodial cirri in all but first few and last 15-20 setigers.

Anterior neuropodial acicular lobes truncate, becoming rounded by setiger 10 and conical by setiger 30, retaining that shape through rest of body; aciculae emerging above midline. All presetal lobes low, transverse folds. Anterior postsetal lobes higher than acicular lobes, distally rounded, becoming reduced to low, transverse folds by setiger 25. Anterior ventral cirri thick, tapering, becoming basally inflated from setiger 10, retaining inflated condition through rest of body. Inflated bases gradually decreasing in importance posteriorly, forming low transverse ridges in posterior half of body; narrow tips tapering. All notopodial cirri slightly inflated basally, tapering to digitiform tips; those in first 3-4 setigers distinctly longer than those in next following setigers. Notopodial cirri decreasing slowly in length over remainder of body, becoming about half as long in last few setigers as in setiger 10. Notopodial cirri without articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 77b) in distinct fascicles of 15-20 in median and posterior setigers, furled, flared. Both marginal teeth longer than other teeth; 1 marginal tooth distinctly longer than other; ~20 teeth present. Shafts of compound falcigers (Figure 77c) slightly inflated, marginally smooth, with distinct internal striations. Appendages very large, tapering slightly to large heads, bidentate. Proximal teeth slightly larger than distal teeth, triangular, directed laterally. Distal teeth gently curved or nearly erect. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae projecting, with light to medium brown cores and clear sheaths, tapering, usually straight, slightly curved dorsally in some parapodia; cross-sections round. Subacicular hooks (Figure 77e) with light to medium brown cores and clear sheaths, bidentate. Hooks first present from setiger 22-23, present in all setigers thereafter, always single (except for replacements). Hooks tapering strongly to very small heads. Proximal teeth very much larger than distal teeth. Both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice mutabilis* is one of many species in group B-4 described from the Red Sea by Gravier; it has been considered synonymous with *E. afra* and is listed with similar species in Tables 33 and 38. It is the only species in Table 38 with more than 10 branchial filaments and with the bases of the ventral cirri inflated through posterior setigers.

130. *Eunice mutilata* Webster, 1884

FIGURE 77f-n; TABLES 27, 31

Eunice mutilata Webster, 1884:315-316, pl. 9: figs. 36, 36a-d, 37-40.

MATERIAL EXAMINED.—Holotype, USNM 4789, 1 specimen in 3 pieces, plus 5 mounted slides of parapodia, Bermuda, coll. G. Brown Goode.

COMMENTS ON MATERIAL EXAMINED.—The type lot consists of an anterior end, a median piece, and a long section with a posterior end; however, perhaps as much as 50 middle setigers are missing. The three pieces match in all characters and are here considered part of the holotype, but because an unknown number of setigers are missing, no overall measurements can be given.

DESCRIPTION.—Anterior end with 36 setigers; length 30 mm; maximal width 3.5 mm wide at setiger 10; length through setiger 10, 10 mm.

Prostomium (Figure 77f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally strongly inflated; median sulcus deep. Eyes between bases of A-I and A-II, small, black. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 5-6 very indistinct, cylindrical articulations. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical. Separa-

tion between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 77i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7, missing on last 15–20 setigers. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 3 pairs and last half of body with single filaments only; maximum 4 filaments at about setiger 25–30. Branchial stems short, tapering. Filaments in pectinate branchiae digitiform, much longer than notopodial cirri. Branchial filaments short on posterior half of body, digitiform, distinctly shorter than notopodial cirri.

Anterior neuropodial acicular lobes (Figure 77g) short and symmetrically rounded; median (Figure 77i) and posterior acicular lobes obliquely truncate with aciculae emerging from upper and higher ends. All presetal lobes low, transverse folds. Anterior postsetal lobes high narrowly rounded, symmetrical, becoming broadly rounded in median setigers, turning into low, transverse folds in far posterior setigers. Postsetal lobes recognizable as free lobes through at least setiger 35. Anterior ventral cirri thick, tapering, becoming basally inflated from about setiger 10. Inflated bases transverse welts along ventral side of neuropodia; narrow tips digitiform. Inflated bases missing in median fragment; posterior ventral cirri short, digitiform, increasingly slender. All notopodial cirri digitiform, without articulations, becoming increasingly slender posteriorly.

Limbate setae broadly limbate, marginally smooth. Pectinate setae (Figure 77l) tapering, furled. One marginal tooth longer than all other teeth; 12–15 teeth present. Shafts of compound falcigers (Figure 77h,j,m) inflated, marginally smooth. All appendages tapering, nearly triangular in shape, bidentate. Two distinctly different kinds of heads present. In most heads both teeth directed distally (Figure 77h,m); proximal teeth smaller than distal teeth. Both teeth curved; distal teeth nearly erect. In other, rarer kind of heads proximal teeth triangular (Figure 77j), directed laterally. Distal teeth distinctly bent. Both kinds present in same parapodia; relative proportions of both kinds varying along length of body, with second kind becoming more common posteriorly. Both kinds of compound hooks with pointed guards, symmetrically and asymmetrically bluntly pointed, respectively; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae dark brown to nearly black, tapering, straight or gently curved; cross-sections round. Subacicular hooks (Figure 77k,n) dark brown, bidentate. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). All hooks with narrowed, sometimes bent necks and distinct heads. Proximal teeth somewhat larger than distal teeth, curved distally. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structures; features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice mutilata* is listed with similar species in Tables 27 and 31. An apparently characterizing feature is the presence of free postsetal lobes through a long anterior section of body.

Eunice mutilata samoae Hartmann-Schröder, 1965

Eunice mutilata samoae Hartmann-Schröder, 1965a:134–135.

REMARKS.—Described as subspecies of *E. mutilata* Webster, this form is here considered separate species and treated as such below.

131. *Eunice mutilatoides* Augener, 1922

FIGURE 78a–c; TABLES 25, 26

Eunice mutilatoides Augener, 1922b:45.

MATERIAL EXAMINED.—Holotype, ZMB 6397, Bird Key, Dry Tortugas, coll. Hartmeyer, 1907.

COMMENTS ON MATERIAL EXAMINED.—Holotype has been partially dried out; its condition does not warrant illustrations of soft parts.

DESCRIPTION.—Holotype complete with 110 setigers; total length 32 mm; maximal width 1 mm; length through setiger 10, 5 mm.

Prostomium distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Median sulcus shallow. Eyes posterior to bases of A-I, dark. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform, without articulations. No antennae reaching beyond peristomium; A-I short; A-II and A-III similar in length. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, ovate, without articulations.

Jaws not examined.

Branchiae present, palmate, distinctly shorter than notopodial cirri. Branchiae from setiger 8 to setiger 48. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. All branchiae short, stubby filaments; no more than 2 filaments apparently present in any setiger.

Anterior neuropodial acicular lobes rounded or truncate; posterior acicular lobes currently sharply pointed, possibly due to condition of type. Shape of pre- and postsetal lobes cannot be

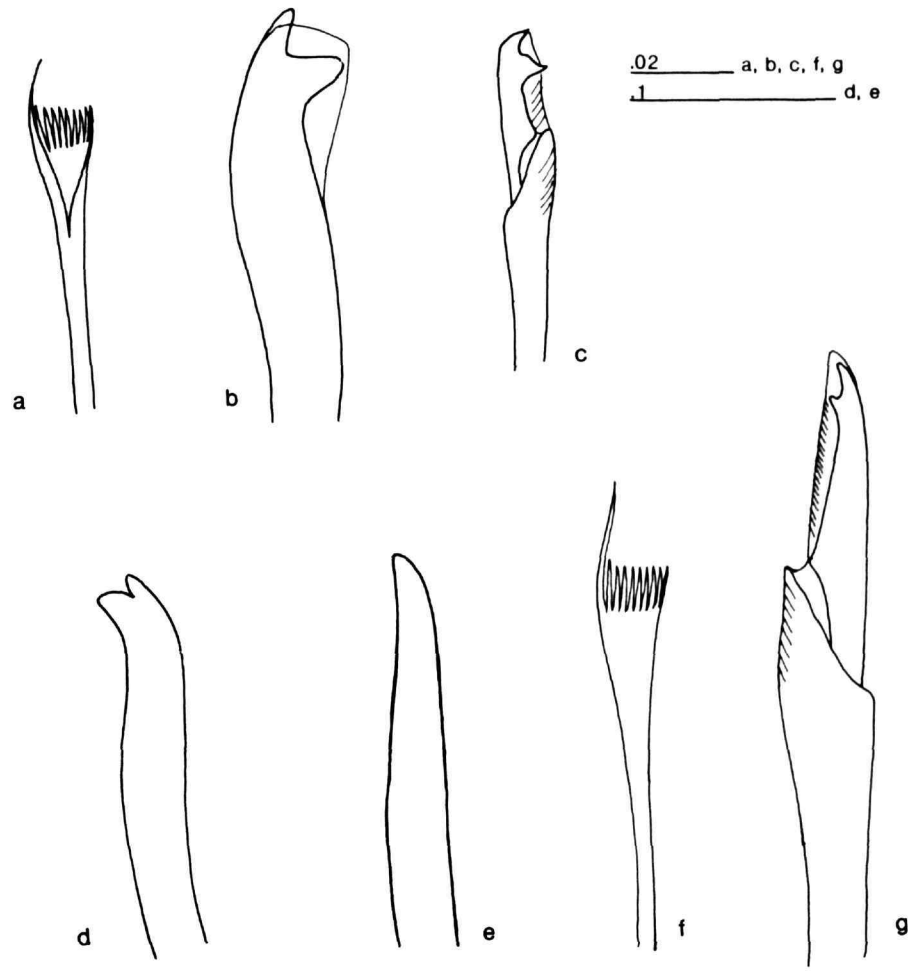

FIGURE 78.—*Eunice mutilatoides* (holotype, ZMB 6397): a, pectinate seta, parapodium 95; b, subacicular hook, parapodium 95; c, compound falciger, parapodium 95. *Eunice narconi* (syntype, BM(NH) ZB 1972.73): d, subacicular hook, about parapodium 50; e, acicula, about parapodium 50; f, pectinate seta, about parapodium 50; g, compound falciger, about parapodium 50. (Scale bars in mm.)

determined. First 7 ventral cirri tapering. Ventral cirri long ventrolateral ridge in median setigers; narrow tips tapering. Posterior ventral cirri tapering. Notopodial cirri apparently short, medially inflated. Notopodial cirri without articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 78a) long, slender, tapering, furled. One marginal tooth distinctly longer than other teeth; ~10 teeth present. Compound falcigers (Figure 78c) small. Shafts inflated, marginally serrated. Appendages short with relatively large heads, bidentate. Proximal teeth tapering to sharp, curved tips. Distal teeth abruptly tapering, directed laterally. Guards asymmetrically bluntly pointed, following outline of hooks closely; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae tan-colored, tapering to blunt tips, straight; cross-sections round. Subacicular hooks (Figure 78b) light to dark tan color, bidentate. Hooks first present from setiger 19, present in all setigers thereafter, always single (except for replacements). Hooks with distinct heads. Proximal teeth large, directed laterally. Distal teeth about as long as proximal teeth, slender, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; some parapodial features; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 33, 34. *Unknown Characters:* 4, 6–8, 44–50, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice mutilatoides* was characterized very briefly by Augener (1922b) and has remained unreported since that time. It is listed with similar species in Tables 25 and 26. In addition to *E. mutilatoides*, the only species in Table 26 with poorly developed, palmate branchiae and without articulations of the ceratostyles is *E. palauensis*. The branchiae outreach the notopodial cirri in *E. palauensis;* they are distinctly shorter than the notopodial cirri in all setigers in *E. mutilatoides*.

132. *Eunice narconi* Baird, 1869

FIGURE 78d-g; TABLES 19, 21

Eunice narconi Baird, 1869:350-351.

MATERIAL EXAMINED.—Three syntypes, BM(NH) ZB 1972.73, Narcon Island, Antarctic Seas, *Erebus* and *Terror* Southern Seas Expedition, 1839-1843.

COMMENTS ON MATERIAL EXAMINED.—The type material has been dried out at one time, so illustrating the soft-parts would be meaningless. The material consists of three anterior ends and some fragments of median and posterior setigers. One anterior end is in very bad shape and even the number of segments cannot be determined; the description is based on the other two anterior fragments.

DESCRIPTION.—Larger fragment with about 75 setigers; length 25 mm; maximal width 2 mm; length through setiger 10, 6 mm. Shorter fragment with about 50 segments; length 17 mm; maximal width 1.5 mm; length through setiger 10, 5 mm.

Prostomium distinctly shorter and narrower than peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Shape and length of antennae cannot be determined. Peristomium cylindrical. Anterior peristomial ring 3/4 of total peristomial length. Peristomial cirri short, without articulations.

Jaws not examined.

Branchiae present, palmate. Branchiae from setiger 8 to setigers 33-35. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Where best developed at around setiger 15 at least 3 filaments present.

Parapodial shape cannot be described in detail; ventral cirri with distinctly inflated bases in branchial region.

Limbate setae slender, marginally finely serrated. Pectinate setae (Figure 78f) tapering, flat. One marginal tooth very much longer and stronger than all other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 78g) distinctly inflated, marginally serrated. Appendages long, narrow, bidentate. Both teeth gently curved. Guards distally bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 78e) paired, yellow, tapering to blunt points, gently curved ventrally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 78d) yellow, bidentate. Hooks first present from setiger 35-38. Hooks distally curved. Proximal teeth larger than distal teeth. Both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; jaw structure; nearly all parapodial features; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 11-23, 25, 32-34, 39, 40, 43-52, 54, 55, 57-64, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice narconi* has been considered incompletely known (Augener, 1931:287). Hartman (1964:118) synonymized it with some doubt with *E. pennata*. It agrees with *E. pennata* in that it has yellow, bidentate subacicular hooks and branchiae limited to some anterior segments. However, *E. pennata*, at least in European waters, appears to have branchiae starting at setigers 3-4, whereas in *E. narconi* branchiae do not start before setiger 8. The two species differ about as much as any two species in the groups do, so the synonymy is here considered unacceptable.

Eunice narconi is listed with similar species in Tables 19 and 21; it is too poorly known to be included in the key.

133. *Eunice nesiotes* (Chamberlin, 1919)

FIGURE 79a-e; TABLES 27, 31

Leodice nesiotes Chamberlin, 1919a:253-256, pl. 57: figs. 6, 7.

MATERIAL EXAMINED.—Holotype, USNM 19749, *Albatross*, 1899-1900 (no station indicated), Marshall Islands, 12 fathoms, came up on anchor.

COMMENTS ON MATERIAL EXAMINED.—The holotype has been dried out or exposed to very strong alcohol at one time, so most of notopodial cirri and branchiae are badly distorted.

DESCRIPTION.—Holotype incomplete mature female with large eggs in body cavity of 101 setigers; length 90 mm; maximal width 6 mm; length through setiger 10, 10 mm.

Prostomium (Figure 79a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened, tilted laterally; median sulcus shallow, continued as ridge along prostomial midline. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, irregularly articulated with up to 5 long, cylindrical articulations in A-III. A-I to posterior edge of peristomium; A-II to setiger 7; A-III to setiger 10. Peristomium cylindrical, somewhat ribbed dorsally, ventrally folded into several shallow folds. Separation between rings distinct dorsally, and barely

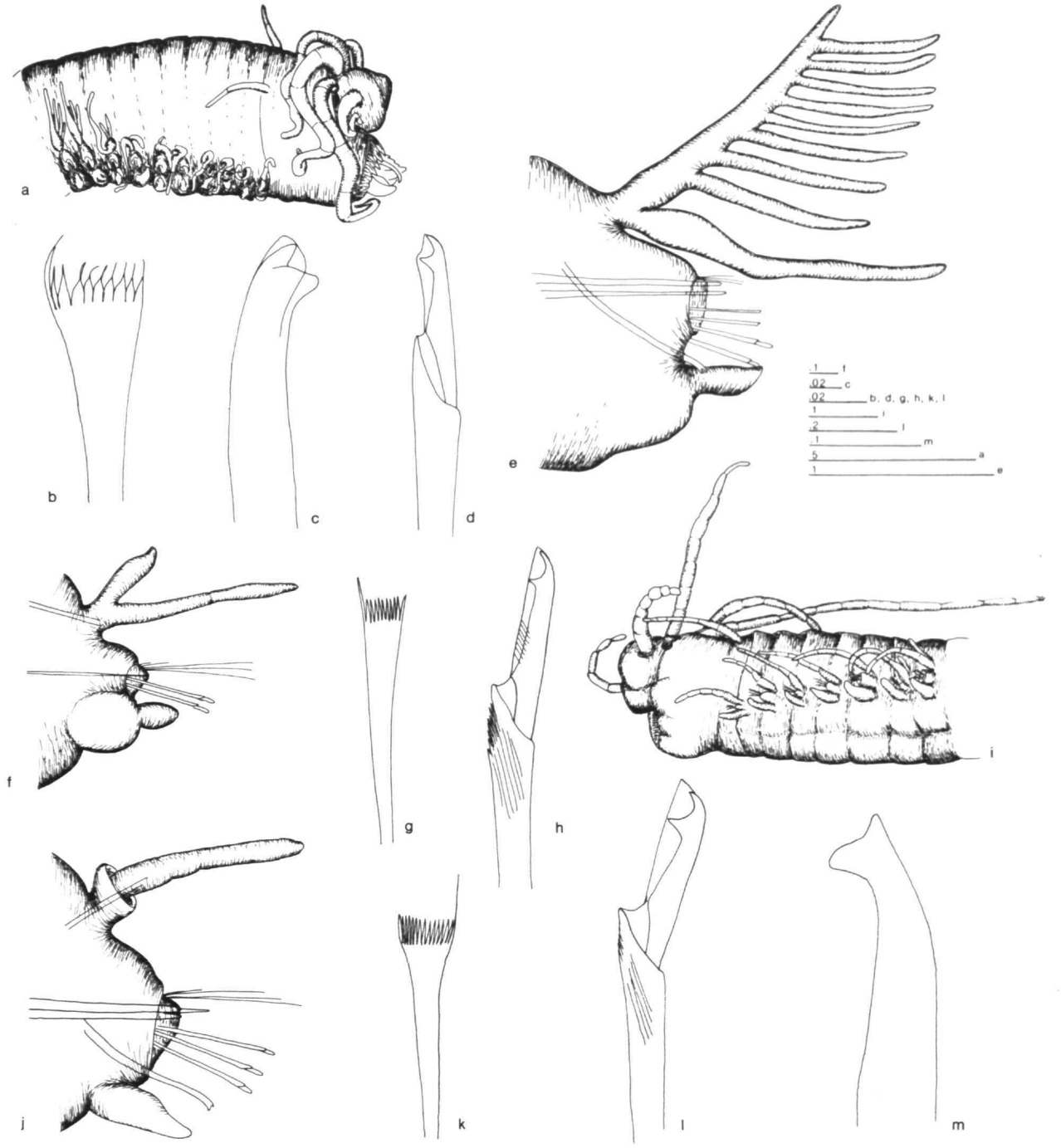

FIGURE 79.—*Eunice nesiotes* (holotype, USNM 19749): a, anterior end, lateral view; b, pectinate seta, parapodium 35; c, subacicular hook, parapodium 35; d, compound falciger, parapodium 35; e, parapodium 35, anterior view. *Eunice nicidioformis* (holotype, USNM 5213): f, parapodium 16, anterior view; g, pectinate seta, parapodium 16; h, compound falciger, parapodium 16; i, anterior end, lateral view; j, parapodium 47, anterior view; k, pectinate seta, parapodium 47; l, compound falciger, parapodium 47; m, subacicular hook, parapodium 47. (Scale bars in mm.)

visible ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri to front edge of peristomium or somewhat beyond, slender and tapering, with 2 long articulations.

Maxillary formula 1+1, 5+6, 6+0, 4+9, and 1+1. Mx III forming part of distal arc with left Mx IV.

Branchiae (Figure 79e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to end of fragment. First 2 branchiae single, short filaments; maximum 14 filaments present. Branchial stems short, tapering. Filaments long, slender.

Neuropodial acicular lobes distally rounded or truncate; aciculae emerging dorsal to midline. Pre- and postsetal lobes low, transverse folds. First 5 ventral cirri thick, tapering. Ventral cirri basally inflated in branchial region. Inflated bases thick, transverse welts; narrow tips very long, distally truncate, digitiform. Notopodial cirri very long, tapering from slightly inflated bases, less dominant in posterior than in anterior setigers. Notopodial cirri without articulations.

Pectinate setae (Figure 79b) coarse, tapering, flat. One marginal tooth slightly longer than other teeth; ~10 coarse teeth present. Shafts of compound falcigers (Figure 79d) slightly inflated, marginally smooth. Appendages slender, bidentate. Both teeth directed laterally. Guards asymmetrically bluntly pointed, with convexity covering proximal teeth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black, tapering to bluntly conical tips, straight; cross-sections round. Subacicular hooks (Figure 79c) black, bidentate. Hooks first present from setiger 31, present in all setigers thereafter, always single (except for replacements). Hooks slender. Proximal teeth twice as large as distal teeth, directed laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with posterior parapodia; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 4, 6, 13, 14, 36–38; 40, 42, 47, 50, 57–60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice nesiotes* is listed with similar species Tables 27 and 31. The ventral cirri are basally inflated through the posterior end in this species; however, the shape cannot be determined accurately. Two other species listed in Table 31 have such distribution of the inflated bases. *Eunice borneensis* has short peristomial cirri; *E. guildingi* and *E. nesiotes* have peristomial cirri reaching the middle of the prostomium. The peristomial cirri lack articulations in *E. guildingi;* they have two long articulations in *E. nesiotes.*

134. *Eunice nicidioformis* Treadwell, 1906

FIGURE 79f-m; TABLES 11, 24, 25

Eunice nicidioformis Treadwell, 1906:1169, figs. 49–51.

MATERIAL EXAMINED.—Lectotype, USNM 5213, and 5 paralectotypes, USNM 142035, *Albatross* sta 4098, Hawaiian Islands, 6.5 miles off Puniawa (= Pauwela) Point, Maui (~21°01′N, 156°12′W), 23 Jul 1902, 174–278 m, fine coral sand and foraminifera, beamtrawl. Four paralectotypes, USNM 5419, *Albatross* sta 4077, Hawaiian Islands, 6.1 miles off Puniawa (= Pauwela) Point, Maui (~21°01′N, 156°15′W), 21 Jul 1902, 181–194 m, fine coral sand and foraminifera, beamtrawl.

DESCRIPTION.—Holotype complete female with large eggs in body cavity with 97 setigers; total length 45 mm; maximal width 2 mm; length through setiger 10, 6 mm. Body slender, cylindrical with long, slender antennae and long, tapering anal cirri. Anal cirri as long as last 15 setigers combined.

Prostomium (Figure 79i) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Eyes near bases of A-II, dark. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 10 distinct articulations; articulations cylindrical, drop-shaped distally in A-I. A-I to setiger 1; A-II to setiger 7; A-III to setiger 13. Antennae of paratypes generally shorter, but A-I always outreaching peristomium and A-III longer than all other antennae in all specimens. Peristomium slightly flaring anteriorly; lower lip scalloped, muscular. Separation between rings distinct dorsally and ventrally; anterior ring ~5/6 of total peristomial length. Peristomial cirri to middle of prostomium, slender and tapering, with 9 articulations.

Maxillary formula of a paratype from USNM 5213 1+1, 7+7, 8+0, 6+12, and 1+1. Teeth small, slender. Mx III part of distal arc with left Mx IV.

Branchiae (Figure 79f) present, single filaments, distinctly shorter than notopodial cirri. Branchiae from setiger 6–8 to setigers 40–50. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 20 branchiae digitiform, slightly shorter than notopodial cirri. In last several branchial setigers branchiae short spurs on dorsal side of notopodial cirri; spurs forming part of vascularized sleeves surrounding bases of notopodial cirri (Figure 79j) in varying number of median setigers. Spurs decreasing in size posteriorly, disappearing at about setigers 40–50.

All neuropodial acicular lobes symmetrically conical; aciculae emerging at midline. Anterior presetal lobes excavate, becoming low, transverse folds by setiger 25. All postsetal lobes low, transverse folds. First 9 ventral cirri thick, tapering. Median ventral cirri basally inflated. Inflated bases very large, nearly spherical; narrow tips digitiform. From about setiger 20 inflated bases rapidly reduced, completely missing by setiger 30. Posterior ventral cirri triangular, tapering to distinct tips. Anterior notopodial cirri very long, nearly filiform, with 6 to 8 cylindrical articulations. Notopodial cirri reduced to half length by setiger 20, without articulations. Posterior notopodial cirri

TABLE 11.—Variable and invariable features of the type lot of *Eunice nicidioformis* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	10	97	58	86.70	11.15
Total length	10	47	25	36.15	7.39
Maximal width	10	2.2	1	1.80	0.33
Length through 10	10	6.5	4.2	5.21	0.67
No. of antennal articulations	9	15	5	10.22	2.77
No. of peristomial cirral articulations	10	10	4	8.60	1.78
Branchiae first from setiger no.	9	8	6	6.56	0.73
Last branchiae on setiger no.	9	50	19	32.00	10.32
Ventral cirri inflated through setiger no.	10	26	12	21.80	3.91
No. of notopodial articulations	10	6	4	4.30	0.67
Subacicular hooks first present from setiger no.	10	25	14	21.40	3.03

INVARIABLE FEATURES	N=10
Separation of rings	visible dorsally and ventrally
Max. no. of branchial filaments	1
Notopodial articulations present	anteriorly only
Acicular color	brown
Subacicular color	brown
No. of subacicular teeth	2
Core-sheath construction	indistinct

distinctly digitiform, abruptly tapering distally. Notopodial cirri longer than branchiae in all setigers.

Limbate setae marginally smooth. Anterior pectinate setae (Figure 79g) tapering, flat, becoming slightly flaring in median and posterior setigers (Figure 79k). One marginal tooth distinctly longer than all other teeth; ~10 teeth in anterior setigers; ~15 teeth in median and posterior setigers. Shafts of compound falcigers (Figure 79h,l) tapering, marginally serrated. Anterior appendages slender, slightly tapering, bidentate. Proximal teeth shorter than distal teeth, triangular. Distal teeth slender, curved. Median and posterior appendages shorter than those in anterior setigers, more distinctly tapering, bidentate. Proximal teeth longer than distal teeth, tapering, rather than triangular. Distal teeth similar to those in anterior appendages. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, brown, tapering with blunt tips, slightly bent distally; cross-section round. Subacicular hooks (Figure 79m) brown, bidentate. Hooks first present from setiger 25 (setigers 19–26 in paratypes), present in all setigers thereafter, always single (except for replacements). Hooks curved, tapering. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 33, 34, 39–42, 56, 58, 59. *Unknown Characters:* 4, 6, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice nicidioformis* is characterized by reduced branchial equipment, reflected in Treadwell's choice of specific name. The species is listed with similar species in Tables 24 and 25. The structure of the posterior branchiae is very unusual and may be unique in the genus; they form a vascularized sleeve around the base of the notopodial cirri in this species. In all other species of *Eunice* posterior single branchial filaments are similar to the anterior ones in structure in that they form a spur or a filament attached to the dorsal side of the notopodial cirrus or emerge directly from the body wall. In other features *E. nicidioformis* resembles *E. gravieri* as far as the features listed in the tables are concerned, but lacks the second pair of eyes described for the latter species.

135. *Eunice nigricans* Schmarda, 1861

FIGURE 80a–f; TABLES 27, 29

Eunice nigricans Schmarda, 1861:131, 7 figs.

Eunice macrobranchia.—Augener, 1925:27–28 [in part, not *Eunice macrobranchia* Schmarda, 1861].

Eunice aphroditois.—Hartman, 1959:311 [not *Nereis aphroditois* Pallas, 1788].

MATERIAL EXAMINED.—Holotype, ZMW, Inv. No. 1066, South of Port Royal, Jamaica, coll. L. K. Schmarda.

DESCRIPTION.—Holotype complete with 180 setigers; total length 100 mm; maximal width 7 mm at setigers 25–30; length through setiger 10, 10 mm; width at setiger 10, 6 mm. Body strongly dorsoventrally flattened.

Prostomium (Figure 80a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally obliquely truncate, dorsally excavate with thickened rim; median sulcus deep. Eyes between bases of A-I

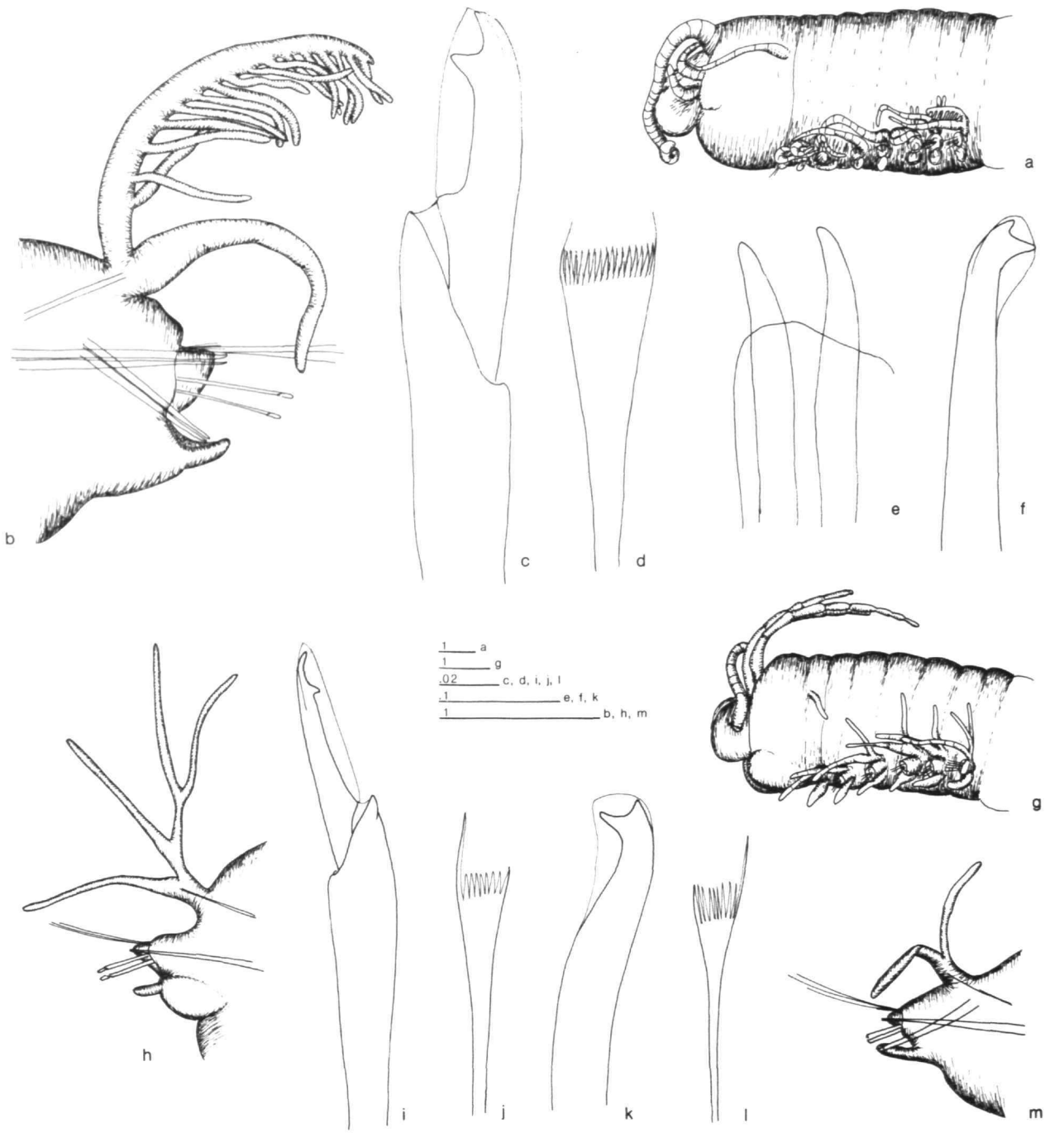

FIGURE 80.—*Eunice nigricans* (holotype, ZMW, Inv. No. 1066): a, anterior end, lateral view; b, parapodium 48, anterior view; c, compound falciger, parapodium 48; d, pectinate seta, parapodium 48; e, aciculae, parapodium 48; f, subacicular hook, parapodium 48. *Eunice northioidea* (holotype, USNM 15728): g, anterior end, lateral view; h, parapodium 19, anterior view; i, compound falciger, parapodium 19; j, pectinate seta, parapodium 19; k, subacicular hook, parapodium 41; l, pectinate seta, parapodium 41; m, parapodium 41, anterior view. (Scale bars in mm.)

and A-II. Antennae in a horseshoe, evenly spaced, with A-III thicker than other four. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 20 short, cylindrical articulations in A-III. A-I to middle of anterior peristomial ring; A-II to setiger 3; A-III to setiger 6. Peristomium cylindrical. Separation between rings visible only dorsally between bases of peristomial cirri; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of prostomium, slender, with 7 articulations.

Jaws missing. Illustration in Schmarda (1861) indicating a maxillary formula of 1+1, 4+5, 6+0, ?+6, and 1+1. Mx III forming part of distal arc with left Mx IV. Mx VI possibly present.

Branchiae (Figure 80b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 on one side and setiger 7 on other side to setiger 180. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae with 2 or more filaments; maximum 18 filaments present. Branchial stems thick, tapering, erect. Filaments distinctly shorter than notopodial cirri in all branchial setigers, thick, digitiform.

Anterior neuropodial acicular lobes distally truncate, becoming obliquely truncate by setiger 25, symmetrically conical by setiger 100; aciculae emerging dorsal to midline. All pre- and postsetal lobes low, transverse folds. First 4 ventral cirri tapering. Ventral cirri distinctly inflated between setiger 5 and setiger 30. Inflated bases ovate; narrow tips tapering. Inflated bases decreasing in importance from about setiger 30; upper face of cirri becoming excavated to form shallow scoops covering lower edge of neuropodia. Scoops becoming shallower in far posterior setigers; last few setigers with slender, tapering ventral cirri. All notopodial cirri basally inflated, tapering to slender tips, with up to 7 articulations in prebranchial setigers; numbers of articulations reduced to 3 by last setigers. Notopodial cirri dominant parapodial features in most setigers, becoming increasingly dominant in last setigers present.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 80d) in thick fascicles in median and posterior setigers, tapering, flat. Both marginal teeth distinctly longer than other teeth; 15 teeth present. Shafts of compound falcigers (Figure 80c) tapering, marginally smooth. Appendages relatively short, bidentate. Both teeth of same size. Proximal teeth triangular, directed laterally. Distal teeth directed obliquely distally. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notopodial aciculae paired, brown. Aciculae (Figure 80e) paired in most setigers, with brown cores and clear sheaths, tapering to slender tips, curved; cross-section round. Subacicular hooks (Figure 80f) with brown cores and clear sheaths, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering. Proximal teeth distinctly larger than distal teeth, directed laterally. Distal teeth curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 40, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice nigricans* was considered a synonym of *E. macrobranchia* by Augener (1925), which lead Hartman (1959:313) to refer it to *E. aphroditois*, based on the synonymy of *E. macrobranchia* with *E. aphroditois* proposed by McIntosh (1905). The species belongs to group B-2 as do other two taxa named; they are compared to other taxa in the group in Table 27. In contrast to *E. aphroditois*, which lacks articulations of the ceratostyles and notopodial cirri, both *E. macrobranchia* and *E. nigricans* have articulated ceratostyles and, in the case of the latter, also articulated notopodial cirri. Among the species listed in Table 29, peristomial cirri well outreach the peristomium in *E. kinbergi*, *E. microprion*, *E. nigricans*, *E. philocorallia*, and *E. plicata;* in the other species, including *E. macrobranchia*, the peristomial cirri are considerably shorter. Of the species with long peristomial cirri, *E. philocorallia* and *E. microprion* have short branchiae; in the other species the branchiae are about as long as the notopodial cirri or clearly outreach them. In *E. nigricans* posterior ventral cirri are tapering from the bases, in *E. kinbergi* posterior ventral cirri are scoop-shaped, and in *E. plicata* bases of posterior ventral cirri are inflated and welt-shaped.

136. *Eunice northioidea* Moore, 1903

FIGURE 80g-m; TABLES 27, 32

Eunice northioidea Moore, 1903:433-435, pl. 25: figs. 36-38.

MATERIAL EXAMINED.—Holotype, USNM 15728, *Albatross* sta 3718, Japan, 1.2 miles off Ose Zaki, Honshu Island, (~35°02'N, 138°47'E) 11 May 1900, 117 m, volcanic sand, shells and rock, beamtrawl.

DESCRIPTION.—Holotype incomplete with 86 setigers; length 58 mm; maximal width 2.5 mm; length through setiger 10, 7 mm. Body cylindrical; only slightly dorsoventrally flattened posteriorly.

Prostomium (Figure 80g) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes at bases of A-II, reddish. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; A-II and A-III with cylindrical articulations; A-I with distally drop-shaped and

proximally cylindrical articulations; maximum 9 articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 4; A-III to setiger 6. Peristomium cylindrical, with a distinct muscular lower lip. Separation between rings distinct dorsally and visible ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula 1+1, 6+6, 8+0, 5+8, and 1+1. Mx III part of distal arc with left Mx IV.

Branchiae (Figure 80h) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to end of fragment. First 3 and last 45 pairs single filaments; maximum 3–4 filaments between setigers 10–20. Filaments slender, digitiform, about as long as notopodial cirri.

Anterior neuropodial lobes symmetrically bluntly pointed; median and posterior acicular lobes (Figure 80m) conical; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5 to about setiger 25. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri tapering, conical. Anterior notopodial cirri slender, filiform, with 6 to 7 articulations. Notopodial cirri decreasing gradually in length, retaining same shape in all setigers; articulations lost in first part of branchial region.

Limbate setae marginally serrated. Pectinate setae (Figure 80j,l) tapering, flat. One marginal tooth much longer than other teeth; 7 teeth in anterior setigers; ~12 teeth in posterior setigers. Shafts of compound falcigers (Figure 80i) slightly inflated, marginally smooth. Appendages long, tapering, bidentate. Proximal teeth very much shorter than distal teeth, triangular, directed laterally. Distal teeth distinctly hooked. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in anterior parapodia, single in median and posterior parapodia, with brown cores and clear sheaths, tapering, bluntly pointed, straight; cross-section round. Subacicular hooks (Figure 80k) with dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Hooks tapering, slightly bent. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth short, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.–All features associated with posterior setigers and pygidium.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36–40, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice northioidea* is listed with similar species in Tables 27 and 32. It is first and foremost characterized by having long, slender branchial filaments and long, strongly articulated antennae. All species in Table 32, with the exception of *E. northioidea*, have articulated peristomial cirri; these cirri are short and completely without articulations in *E. northioidea*.

137. *Eunice norvegica* (Linnaeus, 1767)

FIGURE 81a–e; TABLES 27, 30

Nereis norvegica Linnaeus, 1767:3116.—Gunnerus, 1768, pl.2: fig. 7.
Nereis madreporae pertusae Gunnerus, 1768:45–51, pl. 2: fig. 11.
Leodice norwegica Lamarck, 1818:323 [in part].—Örsted, 1845:402, 406 [in part].
Leodice gunneri Storm, 1881:92–95.
Eunice norwegica.—Cuvier, 1817:525 [? in part].—Audouin and Milne Edwards, 1833:219 [in part].—Grube, 1850:292.

MATERIAL EXAMINED.—Neotype and 1 additional specimen, KNVSM, No. 63, Röberg, Statsbygd, Trondheimsfjorden, Norway, 2 specimens.

DESCRIPTION.—Both specimens complete; one with 115 setigers of which last 15 in regeneration. Neotype with 157 setigers with last 20 discolored, possibly regenerating; total length 200 mm; maximal width 9 mm; length through setiger 10, 13 mm.

Prostomium (Figure 81a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes hidden below overhanging peristomial fold, located behind bases of A-II, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 16 distinct cylindrical articulations in A-III. A-I to middle of peristomium; A-I to setiger 3; A-III to setiger 4. Peristomium massive, muscular, cylindrical; frontal margin folded into series of short scallops. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri to front edge of prostomium, slender, with one long and 7 short, bead-like articulations.

Maxillary formula of neotype 1+1, 7+7, 9+0, 4+9, 1+1, and 1+1. Mx III long; however, forming a distal arc with very short left Mx IV.

Branchiae (Figure 81e) present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7 to setiger 155. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and last 3 branchiae single filaments, all others pectinate with up to 7 branchial filaments. Filaments short, digitiform.

Anterior neuropodia truncate, becoming rounded in posterior setigers; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 6 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 7 through setiger 80. Inflated bases ovate; narrow tips digitiform. Inflated bases gradually decreasing posteriorly; last 50 ventral cirri

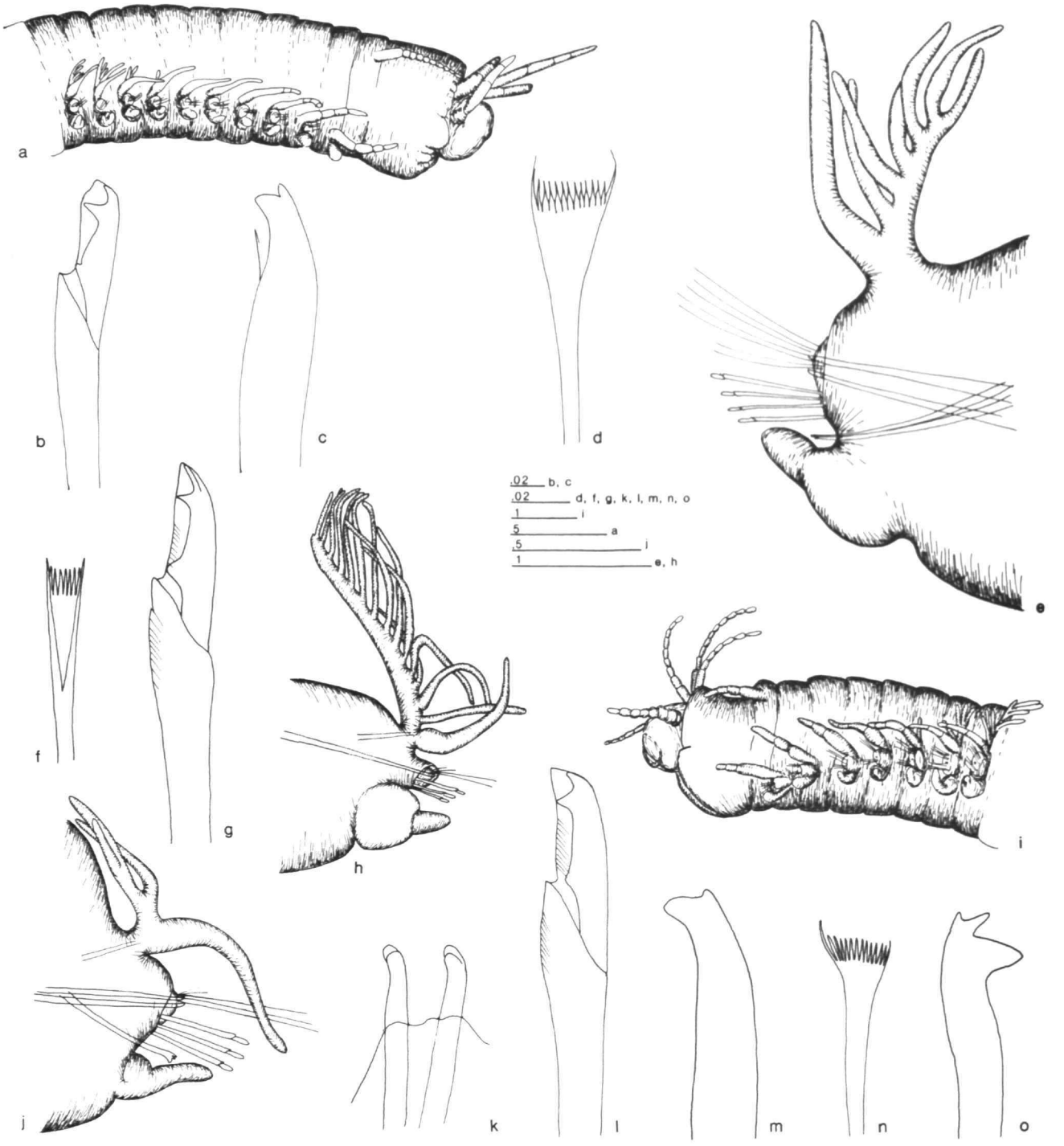

FIGURE 81.—*Eunice norvegica* (neotype, KNVSM No. 63): a, anterior end, lateral view; b, compound falciger, parapodium 54; c, subacicular hook, parapodium 54; d, pectinate seta, parapodium 54; e, parapodium 54, anterior view. *Eunice ornata* (syntype, USNM 4874): f, pectinate seta, parapodium 15; g, compound falciger, parapodium 15; h, parapodium 15, anterior view; i, anterior end, lateral view; j, parapodium 40, anterior view; k, aciculae, parapodium 40; l, compound falciger, parapodium 40; m, acicula, parapodium 40; n, pectinate seta, parapodium 45; o, subacicular hook, parapodium 45. (Scale bars in mm.)

digitiform. Anterior notopodial cirri long, tapering, with 3 cylindrical articulations. Notopodial cirri retaining same size and shape throughout, being especially prominent in posterior setigers; articulations lost by beginning of branchial region.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 81d) tapering, flat. Both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 81b) tapering, marginally smooth. Appendages short, tapering to very large heads, bidentate. Proximal teeth larger than distal teeth, tapering, directed laterally. Distal teeth curved. Guards distally irregularly, symmetrically blunt; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae amber or chestnut colored, tapering, straight; cross-section round. Subacicular hooks (Figure 81c) from dark amber or chestnut colored, bidentate. Hooks first present from setiger 42 (44 in other specimen), present in all setigers thereafter, sometimes paired. Hooks strongly tapering to small heads. Proximal teeth very much larger than distal teeth. Both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—No type material is available for this species. Linnaeus accepted the species as new in a letter to Bishop Gunnerus in Trondheim dated 1 December 1766 (Gunnerus, 1768:51, footnote) and published a brief description next year (Linnaeus, 1767). It is not clear from Gunnerus' remarks or from the original description if Linnaeus saw any specimens or just reacted to Gunnerus' description and appended illustrations, which are excellent. Incidentally, the species is called *Nereis norvegica* on Gunnerus (1768, pl. 2: fig. 7) even if he used a different name in his text.

Gunnerus (1768) is a description of deep-water corals of Norway and their faunal associates; he mentioned several localities including Statsbygd (Gunnerus, 1768:38). He specifically stated that he had seen fresh material of corals from Statsbygd and that he had found his *Nereis madreporae pertusae* on fresh coral material (pp. 44–45).

The reef at Röberg, which is in Statsbygd, is here considered the type locality for the species and one of two specimens listed above has been designated as neotype to define and delimit a species that has been reported from a variety of localities worldwide.

For most of last century two species, both present on ahermatypic reefs, were confounded under the name *E. norvegica*. This synonymy led to the description of *Leodice gunneri* by Storm; this problem is discussed in some detail above.

Eunice norvegica belongs to group B-2 as the groups were defined by Hartman (1944) and Fauchald (1970), but aciculae and subacicular hooks are relatively light-colored compared to the dark-brown to black aciculae and hooks present in most species in the group. It is listed with similar species in Tables 27 and 30. It is the only species in Table 30 to combine short branchiae with inflated bases of ventral cirri limited to median setigers.

138. *Eunice notata* (Treadwell, 1921)

TABLES 33, 37–39

Leodice notata Treadwell, 1921:52–54, figs. 164–173, pl. 4: fig. 12.
?Eunice afra.—Hartman 1956:282 [in part, not Peters, 1854].

COMMENTS ON MATERIAL EXAMINED.—The type material has been lost. The description by Treadwell, although somewhat incomplete, is sufficient to characterize the species.

DESCRIPTION.—Complete specimen with 95 setigers; total length 40 mm; width about 1 mm.

No antennae outreaching peristomium, without articulations. Peristomial cirri short, without articulations.

Maxillary formula 1+1, 4+4, 5+0, 3+6, and 1+1; Mx III illustrated as short; part of distal arc with left Mx IV.

Branchiae present, not reduced in mid-body region. Branchiae from setiger 14 to setiger 70. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. Small specimens with single, strap-like filaments only; larger specimens with up to 3 filaments.

Ventral cirri basally inflated from about setiger 10; distribution of inflated bases otherwise unknown. Notopodial cirri short, tapering, supported by internal aciculae in all setigers. Notopodial cirri without articulations.

Limbate setae marginally smooth. Pectinate setae tapering, furled. Both marginal teeth longer than other teeth; ~20 teeth present. Shafts of compound falcigers inflated, marginally serrated. Appendages with nearly parallel sides, bidentate. Proximal teeth larger than distal teeth, triangular, directed slightly basally. Distal teeth distinctly curved. Guards symmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae tapering, distally slightly bent. Aciculae and subacicular hooks with light- to dark-brown cores and clear sheaths. Subacicular hooks bidentate. Both teeth directed distally; proximal teeth somewhat larger than distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features from all parts of the body.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 39, 40 *Unknown Characters:* 4–19, 23–26, 28, 32, 42–50, 52, 54–60, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The species was described from Tobago in the Windward Islands and is listed with similar species in Tables 33 and 37-39. It was well characterized by Treadwell; however, without access to type material or new material from the type locality, it is difficult to relate it to any of many species assigned to group B-4. It was omitted from the key.

Eunice (Marphysa) novaehollandiae (Kinberg, 1865)

Nauphanta novae Hollandiae Kinberg, 1865:564; 1910:43, pl. 16: figs. 23, 23B-23G.—Augener, 1922d:26.—Fauchald, 1987:378-379, fig. 2.
Eunice (Marphysa) novae Hollandiae.—Grube, 1878b:165-166.

REMARKS.—This species has usually been considered a synonym of *Nauphanta mossambica.* It was redescribed by Fauchald (1987) as type species of the genus *Nauphanta.*

Eunice oerstedii Stimpson, 1854

Eunice oerstedii Stimpson, 1854:34-35.
?Eunice oerstedii.—McIntosh, 1885:273-275, pl. 38: figs. 1, 2, pl. 19A: figs. 14, 15.
Eunice oerstedii.—Fauvel, 1914:143-145, pl. 10: figs. 5-10.

REMARKS.—No original material is available. The only information of any value in Stimpson's description concerns the distribution of branchiae, which should be present from setiger 4 and be absent posterior to setiger 40 with maximum of 5 filaments. McIntosh (1885) and Fauvel (1914) discussed two very different species under this name. An examination of McIntosh's material shows that his species belongs to group A-1, possibly to an undescribed species. Fauvel's species belongs to group B-1. The only feature the two species have in common is the branchial distribution, which approximates the one specified by Stimpson. This kind of branchial distribution is found in many different species (e.g., *E. pennata* and *E. vittata*) and cannot be used by itself to identify any taxon. The fauna of the type area in the northwest Atlantic is known to include several species.

Eunice oerstedii is here considered indeterminable, not least because two different traditions have developed in identifying the species.

139. *Eunice oliga* (Chamberlin, 1919)

TABLES 46, 47

Leodice oliga Chamberlin, 1919a:244-248, pl. 55: fig. 11, pl. 56: figs. 2-9.

COMMENTS ON MATERIAL EXAMINED.—The types are no longer available. The following is a summary of Chamberlin's description.

DESCRIPTION.—Type with 82 segments; length 16.5 mm; maximal width 2 mm.

Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Eyes not mentioned. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 30 short, nearly moniliform articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 7; A-III to setiger 14. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally. Peristomial cirri to middle of prostomium, slender and tapering, with 8 articulations.

Maxillary formula 1+1, 8+8, 9+0, ?+10, and presumably 1+1.

Branchiae present, palmate, reduced in mid-body region. Branchiae from setiger 5 to setiger 82. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and last branchiae single filaments; maximum 3 filaments at about setiger 12-16. Filaments slender, tapering. Branchial stems short. Several median setigers with single filaments; numbers increasing to 2 in a short pre-pygidial region.

Neuropodial acicular lobes truncate. Anterior and posterior ventral cirri tapering; median ventral cirri basally inflated. Notopodial cirri tapering, with 5 to 6 articulations.

Pectinate setae tapering, flat. One marginal tooth very much longer than other teeth; ~10 teeth present. Shafts of compound falcigers inflated, marginally smooth; internal striation present. Appendages thick, tapering, with large heads, bidentate. Proximal teeth shorter than distal teeth, tapering, directed laterally. Distal teeth curved, tapering, directed laterally. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, tapering to pointed tips; cross-section round. Separation of cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, tridentate with teeth in a crest. Hooks tapering, with distinct necks. Proximal fang large, directed laterally. Secondary and tertiary fangs emerging from joint bases, curved; tertiary fangs very small.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features associated with prostomium; parapodia and setal structures; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 58, 59. *Unknown Characters:* 4-6, 10-17, 24, 26, 32, 44-52, 54-56, 60, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice oliga* was described from a single specimen from Makemo Island, Paumotou Islands, in shallow water. It is listed with similar species in Tables 46 and 47. *Eunice oliga* is one of two species listed in Table 47 with palmate branchiae (i.e., with reduced branchial stem); the other species is *E. bicirrata.* The latter is poorly known; the two species may be best compared by matching the descriptions directly.

Eunice oliga papeetensis (Chamberlin, 1919)

Leodice oliga papeetensis Chamberlin, 1919a:248-249

REMARKS.—Originally described as subspecies, this form is here considered a distinct species and described as such below.

140. *Eunice ornata* Andrews, 1891

FIGURE 81f-o; TABLES 12, 46, 48

Eunice ornata Andrews, 1891:284-285, pl. 13: figs. 6-13.

MATERIAL EXAMINED.—Eight syntypes, USNM 4874 and 4875, Beaufort, North Carolina, 1885.

COMMENTS ON MATERIAL EXAMINED.—Data for all syntypes is summarized in Table 12. Syntype in USNM 4875 is a juvenile, apparently of the same species, but is not further considered in this description.

DESCRIPTION.—Syntype described complete with 110 setigers; total length 45 mm; maximal width 2 mm wide; length through setiger 10, 6 mm. Body cylindrical, slightly dorsoventrally flattened posteriorly. Anal cirri slender, as long as last 15 setigers combined, without articulations.

Prostomium (Figure 81i) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally strongly inflated; median sulcus deep. Palpal regions distinct by frontal grooves. Eyes between bases of A-I and A-II, indistinct. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 15 moniliform to drop-shaped articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 3. A-III always longer than A-II. Peristomium cylindrical, with distinct muscular lower lip. Separation between rings distinct dorsally and ventrally, indistinct only over a very short lateral distance; anterior ring 3/4 of total peristomial length. Peristomial cirri to posterior edge of prostomium or front edge of peristomium, slender and tapering, with up to 7 long, cylindrical articulations; most specimens with 4 to 5 articulations.

Summary maxillary formula 1+1, 8+8-9, 7-9+0, 6+9-10, and 1+1. Mx III long, located behind left Mx II.

Branchiae (Figure 81h) present, pectinate, distinctly longer than notopodial cirri, reduced in mid-body region in some syntypes, erect. Branchiae from setiger 5 to setiger 110. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Only first branchiae single filaments; all other branchiae with 3 or more filaments, up to 20 filaments present. Branchial stems erect, tapering. Filaments about as long as notopodial cirri in anterior and median setigers, slender and digitiform. In second half of body number of filaments reduced to 3 (Figure 81j); filaments decreasing in length so in last 1/3 of body notopodial cirri longer than branchiae. Most specimens with no increase in number of filaments towards posterior end; in 1 specimen an increase to 4 filaments in posterior end was noted.

Anterior neuropodial lobes asymmetrically conical with aciculae emerging on dorsal side; farther posteriorly acicular lobes become flattened and symmetrically rounded; aciculae emerging at midline. All presetal lobes obliquely transverse folds. Anterior postsetal lobes forming collars, about as high as acicular lobes; by setiger 30 postsetal lobes reduced to low, transverse folds. First 9 ventral cirri thick and tapering. Bases of ventral cirri inflated, with nearly spherical glandular structure from about setiger 10 to setiger 35-40; narrow tips digitiform. Inflated bases reduced over next 5-10 setigers. Far posterior ventral cirri slender and digitiform, very nearly as long as notopodial cirri. Anterior notopodial cirri tapering, with 3 to 5 articulations. Articulations lost in first branchial setigers; all other notopodial cirri slender, tapering, increasingly more prominent as branchiae become reduced.

Limbate setae marginally frayed. Anterior pectinate setae (Figure 81f) tapering, furled. Both marginal teeth of about same length; 10 teeth present. Median and posterior pectinate setae (Figure 81n) slightly flaring, flat. One marginal tooth distinctly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 81g,l) slightly inflated, marginally serrated. Anterior appendages tapering, bidentate. Proximal teeth shorter than distal teeth, slender, directed laterally. Distal teeth slender, directed obliquely distally. Posterior appendages bidentate with proximal teeth longer than distal teeth, triangular, directed laterally. Distal teeth tapering, bent. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow; anterior aciculae tapering to blunt cones, bent; cross-section round. Median and posterior aciculae (Figure 81k) flattened in anterior-posterior axis with distal end distinctly bidentate, bent dorsally. Proximal teeth larger than distal teeth (Figure 81m), directed laterally. Distal teeth erect. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 81o) yellow, tridentate with teeth in a crest. Hooks first present from setiger 22-25, present in all setigers thereafter, always single (except for replacements). Hooks with large main fang and 2 distal fangs emerging from common base.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice ornata* is listed with similar species in Tables 46 and 48. The structure of median and posterior aciculae is unusual as is the shift between pectinate setae with even marginal teeth to ones with one long marginal tooth from anterior to posterior setigers. It has up to 20 branchial

TABLE 12.—Variable and invariable features in the type lot of *Eunice ornata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	3	131	110	123.33	11.59
Total length	3	83	45	67.00	19.70
Maximal width	5	4	0	2.54	1.25
Length through 10	5	8	1.7	5.74	2.41
No. of antennal articulations	6	15	5	11.33	3.33
No. of peristomial cirral articulations	5	9	4	7.00	2.12
Max. no. of branchial filaments	7	20	9	16.43	3.87
Ventral cirri inflated through setiger no.	6	46	20	36.83	9.09
No. of notopodial articulations	7	5	4	4.71	0.49
Subacicular hooks first present from setiger no.	7	25	14	22.57	3.91

INVARIABLE FEATURES	N=7
Separation of rings	visible dorsally and ventrally
Peristomial cirri reach	prostomium
Branchiae first present from setiger no.	5
Notopodial articulations	anteriorly only
Acicular color	yellow
Acicular shape	bent; bifid or bidentate
Subacicular color	yellow
No. of subacicular teeth	3

filaments; no other species listed in Table 48 has more than eight.

Andrews (1891:285) stated that this species is "not uncommon on sponges, etc., in 2 to 3 fathoms in sheltered sounds. The young were also found cast up on the Fort beach, after storms, upon seaweeds."

141. *Eunice ovalifera* Fauvel, 1936

TABLES 24, 27, 31

Eunice ovalifera Fauvel, 1936:67–69, fig. 1a–h.

COMMENTS ON MATERIAL EXAMINED.—The type is not available. The following represents a summary of information in the original description.

DESCRIPTION.—Type a posteriorly regenerating specimen; length 21.5 mm; width 5 mm with parapodia; regenerating portion 1.5 mm long. Number of segments 37 in region preceding regenerate.

Prostomium very short, with clavate antennae; A-III to setiger 1, with 4 large, slightly barrel-shaped articulations.

Jaws not examined.

Branchiae present, pectinate. Branchiae from setiger 5, present on last segment in non-regenerating part of body. Maximum number of filaments 5–6.

Ventral cirri apparently inflated in most of branchial region. Notopodial cirri clavate, without articulations.

Pectinate setae illustrated with both marginal teeth longer than other teeth, narrow, tapering with ~10 teeth. Shafts of compound falcigers tapering. Appendages short, with large heads, bidentate. Proximal teeth larger than distal teeth. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks black. Subacicular hooks bidentate. Hooks first present from setiger 35. Proximal teeth larger than distal teeth, directed laterally. Hooks with distinct subterminal inflated region.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features from all parts of the body.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 60. *Unknown Characters:* 1, 2, 4–19, 23–29, 32–34, 36–40, 42–56, 58, 59, 65, 67, 74–76, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—This species belongs to group B, but cannot safely be assigned to a subgroup, because the branchial distribution in intact animals remains unknown; for that reason it has been listed both in Tables 24 and 27 as well as in Table 31. It is too poorly known to be safely identified from the original description. The species was reported from southern Japan.

142. *Eunice pacifica* Kinberg, 1865

FIGURE 82a–e; TABLES 33–35

Eunice pacifica Kinberg, 1865:562 [in part]; 1910:41–42, pl. 15: fig. 15 [in part].—Hartman, 1948:75–76 [in part].

MATERIAL EXAMINED.—Lectotype and 2 paralectotypes,

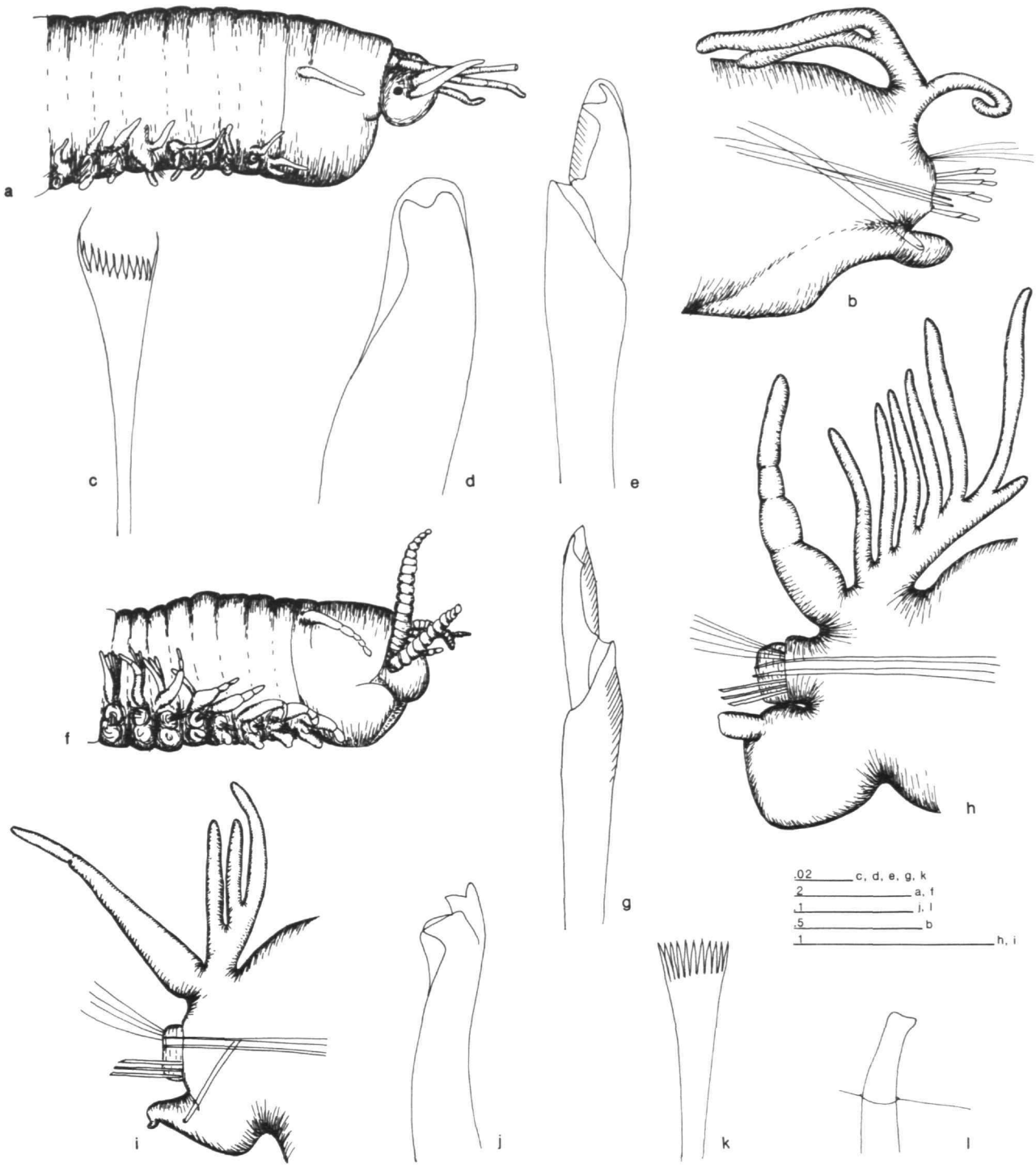

FIGURE 82.—*Eunice pacifica* (lectotype, RM 310): a, anterior end, lateral view; b, parapodium 34, anterior view; c, pectinate seta, parapodium 34; d, subacicular hook, parapodium 34; e, compound falciger, parapodium 34. *Eunice panamena* (holotype, USNM 19354): f, anterior end, lateral view; g, compound falciger, parapodium 10; h, parapodium 10, anterior view; i, parapodium 69, anterior view; j, subacicular hook, parapodium 69; k, pectinate seta, parapodium 69; l, acicula, parapodium 69. (Scale bars in mm.)

RM 310, Eimeo (= Moorea), Society Islands, *Eugenie* Expedition 1159. Kinberg (1865:562) gave the locality information as "Insula Tahiti et Eimeo mar pacifici, inter corallia fundo pedis."

COMMENTS ON MATERIAL EXAMINED.—The three syntypes and two posterior fragments all have been dried out at one time. The smaller, complete specimen was selected as lectotype for the species. A fourth specimen present belongs to a different species and is described above as *E. eimeorum*. Two pairs of maxillae were isolated in a small vial; the two pairs are very similar, and are here assumed to belong to this species, rather than to *E. eimeorum*.

DESCRIPTION.—Paralectotypes incomplete with 121 and 158 setigers respectively. Lectotype complete with 102 setigers of which last 20 in regeneration; total length 33 mm; maximal width 3 mm at setiger 10; length through setiger 10, 6 mm.

Prostomium (Figure 82a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus shallow. Eyes posterior to bases of A-I. Antennae in a horseshoe; A-I and A-II close together, well separated from A-III; A-III slimmer than other 4. Ceratophores long in all antennae, without articulations. Ceratostyles tapering and slender, with 4 or 5 indistinct long articulations. A-I to middle of anterior peristomial ring; A-II to posterior peristomial ring; A-III to setiger 1. Peristomium massive, cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, medially inflated, without articulations.

Maxillary formula 1+1, 4+4-5, 6+0, 4+8-10, and 1+1. Mx III part of distal arc with left Mx IV. Mx VI absent.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 17 to setiger 102 in lectotype and from setigers 20-21 in paralectotypes. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Maximum number of filaments 5 from about setiger 40 and continued to posterior end.

Anterior neuropodial acicular lobes distally truncate; median acicular lobes rounded (Figure 82b); posterior acicular lobes conical; aciculae emerging at midline. Neuropodia carried on lateral ridges from about setiger 60 to posterior end. All pre- and postsetal lobes following outline of acicular lobes closely. First 9 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 10, retaining inflated glandular bases at least through median setigers, forming ventral ridges in most parapodia examined; narrow tips digitiform. Far posterior ventral cirri with reduced basal inflation, digitiform. Anterior notopodial cirri medially inflated, becoming digitiform farther posteriorly, without articulations.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 82c) tapering or slightly flaring, flat. Both marginal teeth slightly longer than other teeth; 12 teeth present. Shafts of compound falcigers (Figure 82e) slightly inflated, marginally smooth. Appendages short, rather thick, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth slender, curved, directed obliquely laterally. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, brown, tapering, blunt, straight; cross-section round. Subacicular hooks (Figure 82d) brown, bidentate. Hooks first present from setiger 23 in lectotype and from setigers 27-28 in paralectotypes, present in all setigers thereafter, always single (except for replacements). Hooks narrowing distally to small, distinct heads. Teeth similar in size, blunt, directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 39-40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The presence of two species in the type lot forced the selection of one specimen as lectotype. The lectotype matches both Kinberg's and Hartman's descriptions. *Eunice pacifica* resembles *E. afra* and related species and is listed with similar species in Tables 33, 34, and 35. Four species in Table 34 have long ceratophores in all antennae; in addition to *E. pacifica*, this includes *E. modesta*, *E. petersi*, and *E. sonorae*. Of these species, *E. modesta* has exclusively single branchial filaments; the other three species have more complex branchiae. *Eunice sonorae* has simple, falcate or tapering subacicular hooks; the subacicular hooks are bidentate in *E. petersi* and *E. pacifica*. In *E. pacifica* both teeth of the subacicular hooks are directed distally, in *E. petersi*, the proximal teeth are directed distinctly laterally.

Due to the poor condition of the specimens it is difficult to ascertain where the inflated bases of the ventral cirri ends.

Kinberg (1865:562) indicated that he had seen specimens from Tahiti as well as from Eimeo; all present specimens are from Eimeo.

143. *Eunice palauensis* Okuda, 1937

TABLES 24, 26, 27, 28

Eunice palauensis Okuda, 1937:285-286, figs. 29, 30.

COMMENTS ON MATERIAL.—This species was described from near Guarakabaru Island, Palau Islands; no type material is known to have survived. The information given by Okuda is summarized below.

Okuda had four anterior ends to his disposal, the longest of these with 42 setigers for 20 mm length. Posterior ends were also present, but none of the specimens were complete.

DESCRIPTION.—Body cylindrical and very slender.

Prostomium distinctly shorter than peristomium, about as wide as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Presence of eyes not indicated. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, smooth or faintly articulated. A-I to posterior peristomial ring; A-II to setiger 7; A-III to setiger 18. Separation between peristomial rings apparently distinct on all sides; anterior ring ~3/4 of total peristomial length. Slender, tapering peristomial cirri to front edge of peristomium or possibly to posterior end of prostomium, without articulations.

Jaw apparatus symmetrical according to Okuda. His illustration (fig. 30g) indicates a maxillary formula of 1+1, 7+8, 8+0, 7+9, 1+4, and 1+1 (Okuda's formula: 1+1, 6+6-7, 10+8-9).

Branchiae present, palmate, distinctly longer than notopodial cirri. Branchiae from setiger 6-8. Branchiae terminating well before posterior end. First 5-9 branchiae single filaments; maximum number of filaments 3; last 20 segments abranchiate.

Acicular lobes symmetrically conical anteriorly, becoming rounded in median setigers; aciculae emerging at midline. Pre-and postsetal lobes low folds or follow outline of the acicular lobes closely. Ventral cirri moderately inflated in median setigers. Inflated bases ovate. Posterior ventral cirri without basal inflations. Notopodial cirri thick and tapering in anterior setigers; articulations absent.

Limbate setae smooth and rather thick. Pectinate setae flaring, flat with 1 marginal tooth longer than other teeth; total number of teeth 11-13. Shafts of compound falcigers inflated and marginally smooth. Appendages short, tapering with a small head, bidentate. Distal tooth nearly erect; proximal tooth illustrated as triangular, short and wide-based. Guard symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, dark, pointed; cross-section round. Subacicular hooks yellowish brown, bidentate. Hooks first present from setigers 19-22. Hooks with small heads. Proximal tooth directed laterally; distal tooth erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Many features from all parts of the body.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58. *Unknown Characters:* 1-6, 12-14, 24, 33, 36, 38, 40, 42, 51, 52, 55, 59, 60, 63, 74, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,1.

REMARKS.—*Eunice palauensis* was considered a member of group B-2 by Fauchald (1970); it is compared to other species in that group in Tables 27 and 28. The possible branchial distribution patterns and color of aciculae and subacicular hooks could make this species a member of group B-1 as well, so the species has been included also in Tables 24 and 26. The problem cannot be resolved without access to well-preserved, complete specimens from the type area.

The species is too poorly known to be included in the key. Some comments can be made on its relations to other species listed in the two tables. Of species in Table 24 with less than five (but more than single) branchial filaments, three have, at least in part, non-articulated ceratostyles. These include, in addition to *E. palauensis, E. barvicensis* and *E. mutilatoides. Eunice barvicensis* has a distinct branchial stem and thus pectinate branchiae; the other two have reduced branchial stems and palmate branchiae. Separation between *E. mutilatoides* and *E. palauensis* is difficult based on current descriptions and material, but the two species differ minimally in the shape and relative size of the appendages of the compound hooks. These are barely tapering, with large proximal teeth in the former and strongly tapering, with small heads according to Okuda (1937, fig. 30g).

Because the total number of setigers was not mentioned, it is unclear what significance the absence of branchiae on 20 posterior setigers might be. Of the species listed in Table 28 only four have five or fewer branchial filaments. Of these *E. polybranchia* has peristomial cirri reaching the middle of the prostomium; the other three species have peristomial cirri reaching at most the middle of the peristomium. Of the remaining species, *E. unidentata* has short antennae, barely reaching beyond the prostomium; *E. palauensis* and *E. rullieri* have A-III distinctly longer than A-II. The notopodial cirri are slender in *E. palauensis* and medially strongly inflated in *E. rullieri.*

Eunice (Eriphyle) paloloides Moore, 1909

Eunice (Eriphyle) paloloides Moore, 1909:235-295, pls. 7-9.

REMARKS.—Examination of the type material demonstrated that this species has the jaw structure and setal complement of the genus *Palola;* it was so considered previously by Hartman (1938 and 1944).

144. *Eunice panamena* (Chamberlin, 1919)

FIGURE 82f-l; TABLES 46, 48

Leodice panamena Chamberlin, 1919a:256-260, pl. 59: figs. 4-8, pl. 60: figs. 1-5.

MATERIAL EXAMINED.—Holotype, USNM 19354, near Panama (Pacific Ocean), shore, *Albatross,* 1891.

DESCRIPTION.—Holotype incomplete with 71 setigers; length 30 mm; maximal width 3.5 mm; length through setiger 10, 6 mm. Color dark gray with black patches scattered over anterior end.

Prostomium (Figure 82f) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, slightly dorsally flattened dorsally, sloping away from midline; median sulcus deep. Eyes at bases

of A-I. Antennae in a horseshoe, with A-III isolated by a gap, with A-III slimmer than other 4. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles medially inflated; articulations nearly moniliform; maximum 16 articulations in A-II and A-III. A-I to middle of anterior peristomial ring; A-II and A-III to setiger 1. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~4/5 of total peristomial length. Peristomial cirri to front edge of peristomium, slender and tapering, with 5 articulations.

Maxillary formula 1+1, 5+6, 8+0, 4+7, and 1+1.

Branchiae (Figure 82h) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to end of fragment. First branchia single filaments; all others pectinate; maximum number of filaments 8 at about setiger 15. Number of filaments decreasing to 3 by setiger 35; this number maintained to last segment present (Figure 82i).

All neuropodial acicular lobes distally transverse aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. From setiger 4 ventral cirri basally inflated. Inflated bases very large, bag-like, glandular; narrow tips first digitiform, later short and button-shaped. Notopodial cirri basally inflated, tapering to blunt tips, with 2 to 4 distinct, cylindrical articulations.

Limbate setae with narrow limbation, marginally serrated. Pectinate setae (Figure 82k) tapering, flat. Marginal teeth no larger than other teeth, ~12 teeth present. Shafts of compound falcigers (Figure 82g) distally inflated, marginally serrated. Appendages short; head small, bidentate. Proximal teeth very much smaller than distal teeth, forming a slight triangular elevation on side of appendage. Distal teeth tapering, nearly erect. Guards asymmetrically bluntly pointed, marginally distinctly serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Most aciculae broken; those present yellow, bluntly and weakly hammer-headed (Figure 82l); cross-section round. Separation of cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 82j) yellow, tridentate with teeth in a crest. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Hooks with teeth decreasing evenly in size from large proximal fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; various setal features; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 4, 6, 36-38, 40, 47, 50, 57-60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice panamena* was considered a member of group A-5 on the strength of Chamberlin's (1919a:260) specific statement that the subacicular hooks should be bidentate; they are however tridentate. The species is listed in Tables 46 and 48. It has A-II and A-III similar in length as does *E. stigmatura* also listed in Table 48. However, the separation between the anterior and posterior peristomial rings is distinct dorsally and ventrally only in *E. panamena;* the separation is distinct also laterally in *E. stigmatura.*

145. *Eunice papeetensis* (Chamberlin, 1919)

FIGURE 83a-f; TABLES 41, 44

Leodice oliga papeetensis Chamberlin, 1919a:248-249, pl. 55: figs. 8-10, pl. 56: fig. 1.

MATERIAL EXAMINED.—Holotype, USNM 19397, Papeete, Tahiti, intertidal, 9 Nov 1899, *Albatross.*

DESCRIPTION.—Holotype incomplete with 37 setigers; length 8.5 mm; maximal width 2 mm; length through setiger 10, 2.5 mm.

Prostomium (Figure 83f) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus shallow. Eyes behind bases of A-I, dark. Antennae in a horseshoe, with A-III isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 20 moniliform articulations in A-III. A-I to posterior edge of peristomium; A-II to setiger 8; A-III to setiger 9. Peristomium cylindrical. Separation between rings distinct ventrally and dorsally. Anterior ring 5/6 of total peristomial length. Peristomial cirri to frontal edge of peristomium, slender, with 6 articulations.

Maxillary formula 1+1, 6+7, 8+0, 7+10, and 1+1. Mx III part of distal arc with left Mx IV.

Branchiae present, palmate, not reduced in mid-body region. Branchiae from setiger 6 to setiger 30 on one side and 33 on other side. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 and last 5 pairs single filaments; all other branchiae with 2 or maximally 3 filaments.

Anterior neuropodia distally truncate; median acicular lobes rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 4. Inflated bases ovate; narrow tips tapering. Notopodial cirri long, basally inflated. Anterior notopodial cirri with about 5 articulations, with 3 or 4 articulations in posteriormost segments.

Pectinate setae (Figure 83a) small, flaring, flat. One marginal tooth distinctly longer than other, with ~10 teeth present. Shafts of compound falcigers (Figure 83d) distally inflated, marginally serrated. Appendages rather large; head distinct, bidentate. Both teeth well developed, directed laterally. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae at least

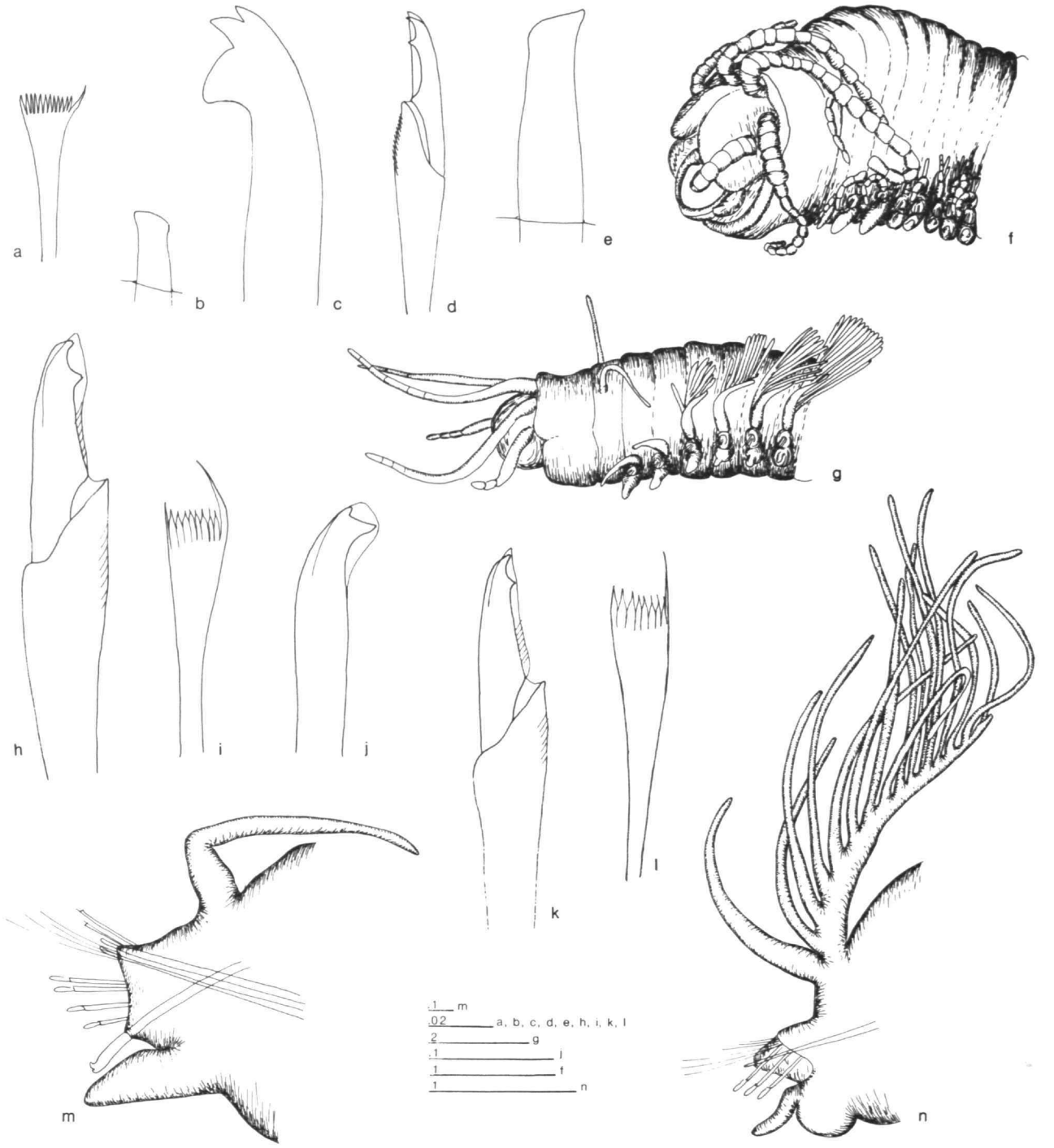

FIGURE 83.—*Eunice papeetensis* (holotype, USNM 19397): a, pectinate seta, parapodium 25; b, acicula, parapodium 25; c, subacicular hook, parapodium 25; d, compound falciger, parapodium 30; e, acicula, parapodium 30; f, anterior end, lateral view. *Eunice parasegregata* (holotype, ZMH P-14273): g, anterior end, lateral view; h, compound falciger, first parapodium of posterior fragment; i, pectinate seta, first parapodium of posterior fragment; j, subacicular hook, first parapodium of posterior fragment; k, compound falciger, parapodium 30; l, pectinate seta, parapodium 30; m, first parapodium of posterior fragment, anterior view; n, parapodium 30, anterior view. (Scale bars in mm.)

paired, yellow, distally truncate or gently hammer-headed (Figure 83b,e); cross-section round. Separation of cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 83c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 21. Hooks with well-developed, distinct fangs.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56. *Unknown Characters:* 1, 2, 4, 6, 32, 42, 47, 50, 57-60, 63, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice papeetensis* was described as a subspecies of *E. oliga;* it differs at the species level from that species in that it has branchiae limited to a short anterior region; *E. oliga* has branchiae continued to near the posterior end.

Eunice papeetensis is listed with similar species in Tables 41 and 44. It has maximally three branchial filaments, whereas all other species in Table 44 have at least eight filaments where the branchiae are best developed.

146. *Eunice parasegregata* Hartmann-Schröder, 1965

FIGURE 83g-n; TABLES 19, 21-23

Eunice parasegregata Hartmann-Schröder, 1965b:168-172, figs. 140-144.

MATERIAL EXAMINED.—Holotype, ZMH P-14273, off Punta Lavapie, Chile, 37°08.7'S, 73°38.6'W, 58 m, fine sand with rocks and dead algae, dredge and grab, 10 Mar 1960, coll. Exp. Mar. Chile I.

COMMENTS ON MATERIAL EXAMINED.—The holotype is currently in three pieces: an anterior end of 33 setiger, a median piece of 10 branchiated setigers, and a mid-posterior abranchiate piece of 22 setiger. A number of segments are missing between both the anterior end and the short median fragment and between the latter and the medioposterior fragment, but exactly how many segments are missing cannot currently be estimated.

DESCRIPTION.—Anterior end with 33 setigers; length 22 mm; maximal width 3 mm; length through setiger 10, 8 mm.

Prostomium (Figure 83g) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes under peristomial fold, posterior to bases of A-I, brown. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; A-I with 3-4 drop-shaped articulations; A-II and A-III with 5 to 6 irregular, cylindrical articulations; all articulations on distal half of ceratostyles. A-I to posterior peristomial ring; A-II to setiger 5; A-III to setiger 6. Peristomium cylindrical. Separation between distinct on all sides; anterior ring twice as long as posterior ring. Peristomial cirri to middle of prostomium, slender and digitiform, without articulations.

Maxillary formula 1+1, 14+16, 13+0, 10+16, and 1+1. Mx III long, located behind left Mx II. Mx VI missing.

Branchiae (Figure 83n) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to end of fragment, present on all setigers of median fragment, missing on medioposterior fragment. Branchiae terminating well before posterior end. All branchiae with 2 or more filaments; maximum 18 filaments at setiger 10; branchiae on median fragment with 2 to 3 filaments; those of last segments in anterior end with at least 7 filaments. All filaments slender, tapering, as long as notopodial cirri except in first branchial segment.

Anterior neuropodial acicular lobes distally obliquely truncate, becoming distinctly truncate in last segments present; aciculae emerging dorsal to midline. In medioposterior fragment acicular lobes reduced, equally supported by aciculae and subacicular hooks (Figure 83m). Anterior pre- and postsetal lobes low, transverse folds. Posterior pre- and postsetal lobes follow outline of acicular lobes closely. First 5 ventral cirri thick, tapering, becoming distinctly basally inflated in branchiated setigers. Inflated bases nearly spherical; narrow tips digitiform. Postbranchial ventral cirri slender and nearly digitiform. All notopodial cirri basally slightly inflated, tapering to slender tips, without articulations.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 83i,l) tapering, flat. One marginal tooth much longer and heavier than other teeth, ~10 teeth present. Shafts of compound falcigers (Figure 83h,k) distally inflated, marginally serrated. Appendages triangular, bidentate. Proximal teeth smaller than distal teeth, triangular, directed laterally. Distal teeth gently curved. Guards distally asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, distally tapering, gently curved; cross-section round. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 83j) yellow, bidentate. Hooks present on median and medioposterior fragments, present in all setigers, always single (except for replacements). Hooks tapering. Proximal teeth larger than distal teeth, directed laterally. Distal teeth very short, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Parapodial and setal features of far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36, 38, 40, 80.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice parasegregata* may belong to either group A-1 or A-2 and has been listed in Tables 19 and 22 as well as in Tables 21 and 23. Because of the fragmented state of

the type, there is little in the numerically arranged features that appears unique and the setal structures are similar to what is present in several species. Six species in Table 21 have articulated ceratostyles; of these only *E. parasegregata* and *E. tridentata* have moniliform or drop-shaped articulations distally in the ceratostyles; the other four species have cylindrical articulations to the tips of the antennae. In *E. parasegregata* the appendages of the compound falcigers are tapering, not particularly small in relation to the shafts of the falcigers; in *E. tridentata* the appendages are very small, slender, and barely tapered. *Eunice parasegregata* is easily separated from other species in Table 23, because it has as many as 18 branchial filaments; of other species in this table, *E. johnsoni* comes the closest with 10 filaments where the branchiae are best developed.

The dorsal aciculae of setiger 2 were illustrated by Hartmann-Schröder as strongly curved; this observation cannot be confirmed without damaging the specimen severely, but would, if confirmed, represent a wholly unique feature to this species.

The structure of median and posterior parapodia is unusual, but the relation between these features and conditions of preservation have yet to be elucidated.

The numbers of maxillary teeth reported here are slightly higher than those reported by Hartmann-Schröder (1965b); the basal teeth are very small and easily overlooked.

Eunice parca Grube, 1878

Eunice parca Grube, 1878a:99.

REMARKS.—This species was listed in Grube's tabularly formatted paper as having branchiae limited to the anterior and median part of the body and distinctly articulated antennae. No further description was given, no locality was indicated, and no specimens are available in German or Polish collections. The species is here considered indeterminable rather than as a nomen nudum, because some indication of its features has been given by its position in Grube's paper.

206. *Eunice parva* Hansen, 1882

FIGURE 84a–h; TABLES 41, 44

Eunice parva Hansen, 1882:7, pl. 2: figs. 4–7.

MATERIAL EXAMINED.—Holotype, ZM Leiden, no. 1481, Rio de Janeiro, coll. E. v. Beneden.

COMMENTS ON MATERIAL EXAMINED.—The holotype is now in two pieces and the anterior end has been ventrally dissected.

DESCRIPTION.—Holotype complete, of unknown sex, with 59 setigers; total length 17 mm; maximal width 0.75 mm at setiger 10; length through setiger 10, 4 mm. Body anteriorly cylindrical; posterior half dorsoventrally flattened, anteriorly truncate, posteriorly slowly tapering to the posterior end. Pygidium damaged; only short anal cirri present.

Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Palpal region set off by horizontal frontal grooves. Prostomium distinctly narrower than peristomium, shorter than peristomium and more than half the depth of the peristomium. Eyes behind bases of A-II, faded purple. Antennae in horseshoe, evenly spaced, similar in thickness. Ceratophores short, ring-shaped. Ceratostyles tapering; maximum 12 moniliform articulations in A-III. A-I to posterior edge of anterior peristomial ring; A-II to setiger 3; A-III to setiger 5. Anterior peristomial ring tapering anteriorly; posterior peristomial ring cylindrical. Nuchal fold with lateral notches; lower lip with medial notch. Separation between rings distinct dorsally and ventrally; anterior ring $^2/_3$ of total peristomial length. Peristomial cirri to posterior edge of prostomium, slender, tapering, with 2 distinct articulations.

Jaws missing; maxillary formula 1+1 4+7, 10+0, 5+7, and 1+1 according to Hansen (1882, pl. 2: fig. 6). Mx III long, straight, located behind left Mx II. Left Mx IV short, curved. Mx VI missing.

Branchiae from setiger 5 to setiger 20; first 2 and last 2 pairs single filaments; maximum 4 filaments at setiger 10. Branchiae longer than notopodial cirri. Stems slightly shorter than notopodial cirri, cylindrical, erect. Filaments slightly shorter than notopodial cirri, digitiform, slightly thinner than notopodial cirri.

Anterior neuropodial acicular lobes asymmetrically truncate; median and posterior acicular lobes asymmetrically rounded; all with aciculae emerging from upper edge. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri tapering, thereafter basally inflated; inflated bases large, spherical. Free tips tapering; ~$^1/_2$ as wide as the inflated bases. Inflated bases decreasing from about setiger 20; totally absent from about setiger 30. Posterior ventral cirri longer than those in anterior setigers, digitiform or slightly tapering, distinctly shorter than notopodial cirri. Anterior notopodial cirri tapering with 4 to 5 distinct articulations; articulations lost in early branchial setigers; notopodial cirri gradually elongating in postbranchial region, becoming long, digitiform in far posterior setigers.

Limbate setae about as long as compound hooks, thick, marginally serrated. Posterior pectinate setae slender, small; shafts cylindrical. Blades flat, slightly flaring; marginal teeth no longer or thicker than other teeth; ~10 teeth present. Shafts of anterior compound hooks distinctly inflated, without distinct beaks, marginal serrations or internal striations. Appendages short, tapering with distinct heads. Proximal teeth slightly shorter than distal teeth, narrowly tapering, directed laterally. Distal teeth tapering, slender, directed obliquely distally, gently curved. Hoods asymmetrically bluntly pointed, without mucros, marginally serrated. Shafts of posterior compound hooks distinctly inflated, without distinct distal beaks; marginal serrations and internal striations present. Appendages short, tapering, chunky with large heads. Proximal teeth larger than distal teeth, broadly triangular, directed laterally. Distal teeth

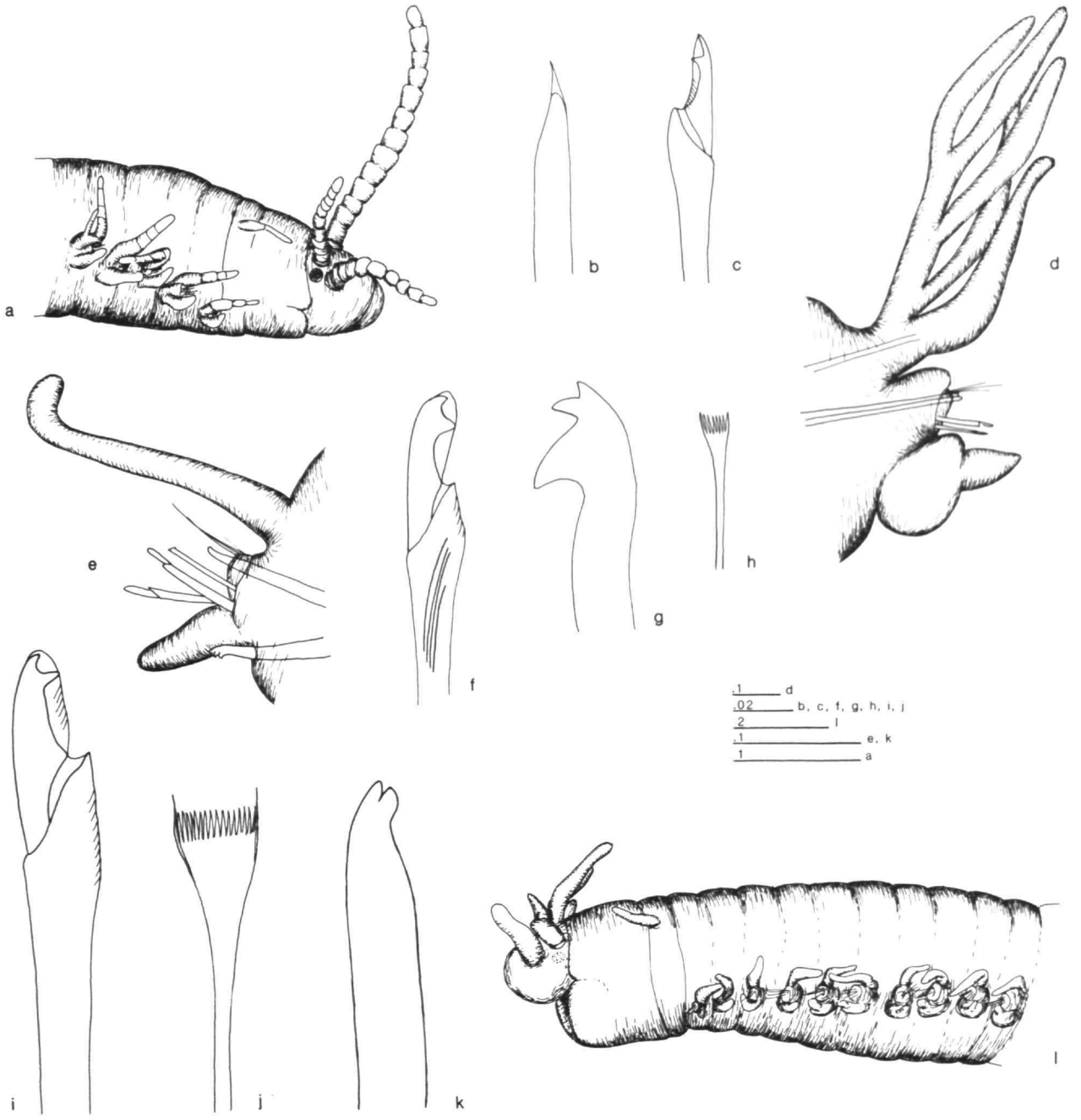

FIGURE 84.—*Eunice parva* (holotype, Leiden, no. 1481): a, anterior end, lateral view; b, acicula, parapodium 11; c, compound falciger, parapodium 11; d, parapodium 11, anterior view; e, parapodium 40, anterior view; f, compound falciger, parapodium 40; g, subacicular hook, parapodium 40; h, pectinate seta, parapodium 40. *Eunice parvibranchis* (syntype, ZMH V-804): i, compound falciger, parapodium 50; j, pectinate seta, parapodium 50; k, subacicular hook, parapodium 50; l, anterior end, lateral view. (Scale bars in mm.)

directed laterally, tapering, thick. Hoods symmetrically rounded; mucros and marginal serrations absent. Aciculae single, yellow, tapering to blunt tips, anteriorly straight with narrow hood, posteriorly gently curved, without hoods. Subacicular hooks from setiger 24, single, yellow, tridentate. Hooks with distinct bent neck; heads large. Fangs decreasing evenly in size, evenly spaced. Proximal fangs triangular, parrot-beaked. Secondary fangs slender, nearly straight. Tertiary fangs triangular, tapering, straight.

UNKNOWN MORPHOLOGICAL FEATURES.—Anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 65, 66.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—A note in Augener's handwriting in the vial with the holotype refers this specimen to *Eunice rubra* as a juvenile. The species by definition belongs to group C-1 and is compared to similar taxa in Tables 41 and 44; it is the only species in Table 44 to have hooded tapering aciculae. The setae resemble those of species in group C-2 as well.

147. *Eunice parvibranchis* Grube, 1870

FIGURE 84j–m; TABLES 33, 39

Eunice parvibranchis Grube, 1870b:55.

MATERIAL EXAMINED.—Two syntypes, ZMH V-804, Upolu, Fiji Islands; ZMB Q 2266, Fiji Islands, coll. Godeffroy.

COMMENTS ON MATERIAL EXAMINED.—Both syntypes are incomplete and are now very soft. A posterior fragment present in same vial as the Hamburg syntype appears to belong to a species of *Palola* in that it lacks subacicular hooks and pectinate setae. At one time, the Berlin syntype has been dry and is now difficult to measure in detail. The description is based on the Hamburg specimen, with notes on the Berlin specimen where it differs. As indicated the specimens are very soft, and so the structure, especially of the parapodia, cannot be determined very accurately.

DESCRIPTION.—Hamburg syntype incomplete with 133 setigers; length 144 mm; maximal width 4 mm; length through setiger 10, 10 mm. Berlin syntype incomplete with ~145 setigers; length about 65 mm.

Prostomium (Figure 84l) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes posterior to bases of A-I, faded. Antennae in a semicircle with A-I well in front of other antennae, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform; none outreaching peristomium; A-III longest. Peristomium cylindrical, with distinct muscular lower lip. Separation between rings distinct on all sides; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, without articulations.

Jaws on left hand side all missing in Hamburg syntype; lining of oral cavity intact; left-hand jaws possibly shed or never developed. Formula for right hand side 1, 6, 10, and 2 (Mx III missing). Maxillary formula of Berlin syntype 1+1, 5+5, 7+0, 2+9, 1+1. Mx III and left Mx IV part of distal arc.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 20 to end of fragment (from setiger 19 in Berlin syntype), most branchiae with 2 filaments. Where best developed, around setiger 40, 3 filaments present. Filaments longer than notopodial cirri except in first 3–4 branchial segments, slender and digitiform.

Neuropodial acicular lobes probably rounded or truncate. All presetal lobes low, transverse folds. Anterior postsetal lobes possibly as high as acicular lobes, becoming low, transverse folds in median and posterior setigers. Anterior ventral cirri tapering; basally inflated from about setiger 5–6 at least through setiger 50. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri tapering. Notopodial cirri short and medially inflated, without articulations.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 84j) distally flaring, slightly furled. Both marginal teeth slightly longer than other teeth; ~16 teeth present. Shafts of compound falcigers (Figure 84i) distinctly inflated, marginally serrated. Appendages short and tapering, bidentate. Proximal teeth about as large as distal teeth, narrowly triangular, directed laterally. Distal teeth gently curved. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae brown, lighter in posterior than in anterior setigers, slightly tapered, truncate, straight; cross-section round. Subacicular hooks (Figure 84k) brown, bidentate. Hooks from setiger 19 (from setiger 17 in Berlin syntype), present in all setigers thereafter, always single (except for replacements). Hooks abruptly tapering distally. Proximal and distal teeth similar in size. Proximal teeth thick, short. Distal teeth about one-half as thick as proximal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; parapodial and setal characters of far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56. *Unknown Characters:* 1, 2, 4, 6, 36–40, 44, 47, 50, 57–60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice parvibranchis* belongs to group B-4 and closely resembles several other species in the group as indicated in Tables 33 and 39. Most species listed in Table 39 have subacicular hooks starting about 10 segments later than

the first start of the branchiae. *Eunice denticulata* has the reverse relationship, with the branchiae starting about 10 segments later than the subacicular hooks; in three species, *E. parvibranchis, E. paupera,* and *E. spongicola,* the branchiae and the subacicular hooks start within a few segments of each other. Among these three species, *E. spongicola* has hammer-headed aciculae; *E. parvibranchis* and presumably *E. paupera* have pointed aciculae. The latter is poorly known, but has, as described, about half the number of teeth in each of the maxillae.

Eunice parvibranchis appears to differ from most other species in the group by having brown, rather than black aciculae and subacicular hooks and by the fact that the color of the aciculae is lighter towards the posterior than in the anterior end, a reverse of the customary condition in the genus.

Eunice paucibranchis Grube, 1866

FIGURE 85a–c

Eunice paucibranchis Grube, 1866a:64.
Eunice australis.—Grube, 1870a:294–295 [not *Eunice australis* Quatrefages, 1866].

MATERIAL EXAMINED.—?Holotype, ZMH V-805, Samoa, ZMB Q 3434, 3 parapodia in 2 vials, Samoa.

REMARKS.—The specimen from Hamburg is a posterior end of a large specimen. It is completely branchiated with maximally five very short branchial filaments, with black aciculae and subacicular hooks; the latter are bidentate.

The three parapodia in ZMB Q 3434 have large branchiae (Figure 85a) with up to 10 branchial filaments arranged on a stiff branchial stem. Ventral cirri are basally inflated with thick, tapering tips. Notopodial cirri are short and tapering. Limbate setae are marginally smooth. Pectinate setae (Figure 85c) taper and are flat. One marginal tooth is longer than other teeth and about 15 teeth are present. Shafts of the compound falcigers (Figure 85b) are slightly inflated and lack marginal serrations. The appendages are triangular. Proximal teeth are short and triangular. The distal teeth are nearly erect. Guards are distally asymmetrically bluntly pointed. Aciculae are light brown or chestnut colored and taper distally to a blunt, straight tip. Subacicular hooks are not present in any of the parapodia.

The parapodia from Berlin do not belong to the same species as the posterior end from Hamburg judging from the color of the aciculae. Neither parapodia nor posterior end can belong to *E. australis* as suggested by Grube (1870). *Eunice australis* has yellow, tridentate subacicular hooks (Fauchald, 1986).

Eunice paucibranchis is here considered indeterminable.

148. *Eunice paupera* Grube, 1878

TABLES 33, 39

Eunice paupera Grube, 1878b:160–161.
Eunice afra paupera.—Fauvel in Pruvot, 1930:69.—Fauvel, 1930a:537.

COMMENTS ON MATERIAL.—No type material is available. This form has been recorded as a subspecies of *E. afra,* separated from the main form primarily by the reduced branchiae (Fauvel, 1930b, 1932; Fauchald, 1970).

DESCRIPTION.—Type with 127 setigers.

Ceratostyles digitiform, without articulations, barely longer than prostomium. Anterior peristomial ring 4/5 of total peristomial length. Peristomial cirri short.

Maxillary formula 1+1, 4+3, 4+0, 2+6, and presumably 1+1.

Branchiae present, palmate. Branchiae present from setiger 23; maximum 3 filaments.

First 3 ventral cirri tapering. Ventral cirri basally inflated in mid body, again becoming tapering in second half of body. Notopodial cirri long in first 4 setigers, as long as antennae, thereafter relatively short through remainder of prebranchial and early branchial setigers, increasing in length in segments with bifid and trifid branchiae, decreasing in length in far posterior setigers. Notopodial cirri without articulations.

Compound falcigers with short, bidentate appendages. Pseudocompound falcigers and compound spinigers absent. Aciculae black. Subacicular hooks black, bidentate, first present from setiger 23.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; relationship between Mx III and left Mx IV; most parapodial and setal features; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 2–19, 24, 25, 28, 29, 32–34, 36–40, 42–50, 52, 54, 55, 60, 65–68, 70, 74–76, 78, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice paupera* clearly belongs to group B-4 and has been rather widely reported (Fauvel, 1930a, 1953). Fauvel apparently used the name *E. afra paupera* as a name for all species similar to *E. afra* with poorly developed branchiae. How many of the reports refer to similar taxa (see Table 39) is difficult to determine without careful review of material from the Philippines.

Eunice paupera is listed with similar taxa in Tables 33 and 39; it was discussed above in relation to *E. parvibranchis.* It is too poorly known to be included in the key.

149. *Eunice pauroneurata* (Chamberlin, 1919)

FIGURE 85d–i; TABLES 27, 31

Leodice pauroneurata Chamberlin, 1919a:249–253, pl. 57: figs. 8-9, pl. 58: figs. 1-9, pl. 59: figs. 1-3.

MATERIAL EXAMINED.—Holotype, USNM 19756, *Albatross* sta 3401, off Galapagos Islands, 0°59′S, 88°58′30″W, 722 m, *Globigerina* ooze, 28 Mar 1891.

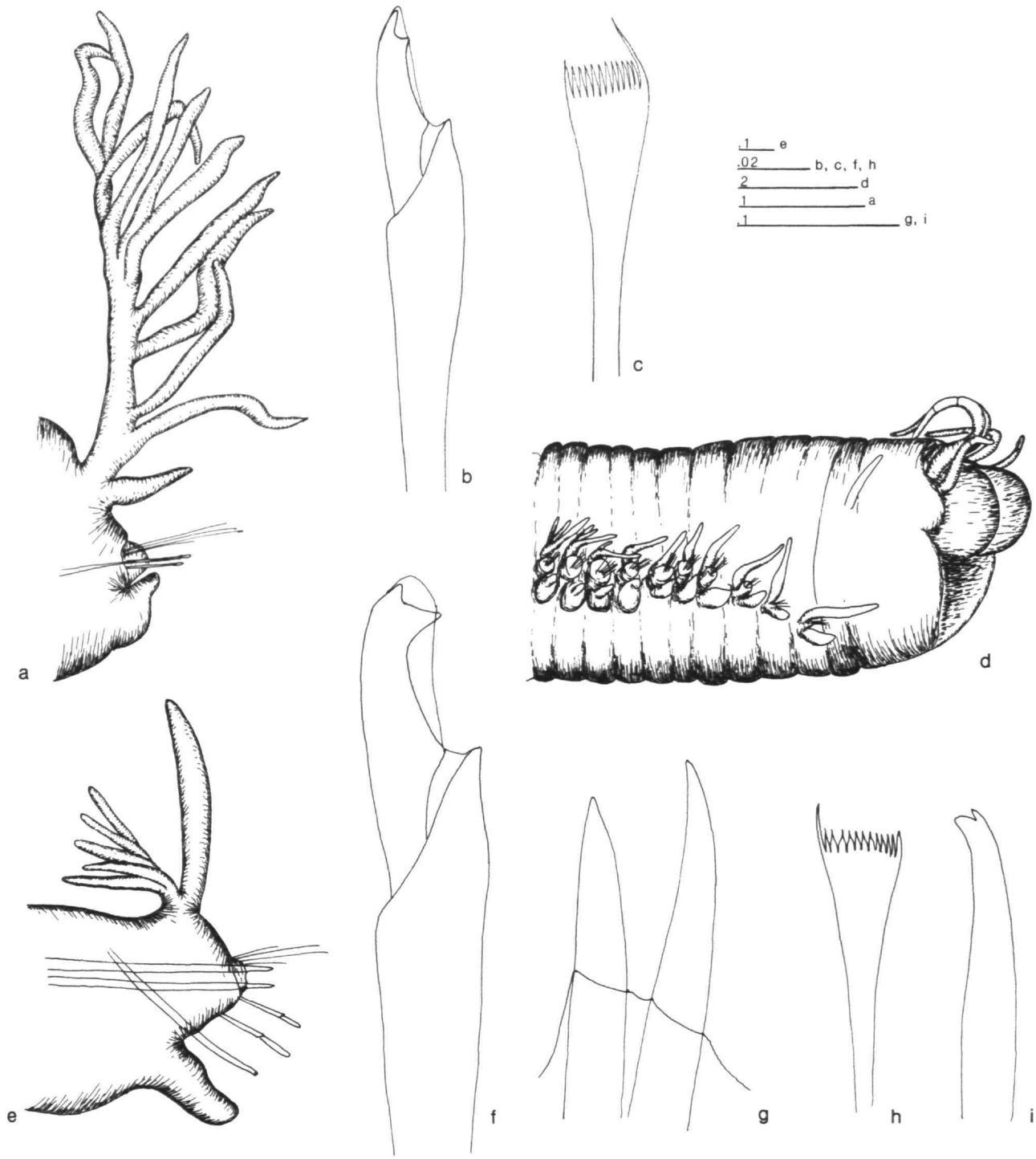

FIGURE 85.—*Eunice paucibranchis* (slides of type, ZMB Q 3434): a, ?median parapodium, anterior view; b, compound falciger, ?median parapodium; c, pectinate seta, ?median parapodium. *Eunice pauroneurata* (holotype, USNM 19756): d, anterior end, lateral view; e, parapodium 90, anterior view; f, compound falciger, parapodium 90; g, aciculae, parapodium 90; h, pectinate seta, parapodium 90; i, subacicular hook, parapodium 90. (Scale bars in mm.)

COMMENTS ON MATERIAL EXAMINED.—The holotype has been deeply dissected frontally; the illustration of the anterior end is a partial reconstruction, especially of the outline of the lower lip.

DESCRIPTION.—Holotype incomplete female with 97 setigers; length 42 mm; maximal width 5.5 mm; length through setiger 10, 6 mm.

Prostomium (Figure 85d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes not observed. Bases of antennae hidden below peristomial fold. Antennae in a horseshoe, evenly spaced, with A-III considerably heavier than other 4. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, A-I and A-II with 3 or 4 long cylindrical articulations along distal half. A-I to posterior peristomial ring; A-II to setiger 8; A-III incomplete. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula 1+1, 7+7, 8+0, ?+8, 1+1. Mx III long and located immediately behind left Mx II. Left Mx IV missing.

Branchiae (Figure 85e) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 8 to end of fragment. First branchiae single filaments; maximum 5 filaments at setiger 15; most segments with 3 or 4 filaments; some with 5 even in last segments present. Branchial stems short, tapering. Filaments digitiform.

Neuropodial acicular lobes distally rounded or truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5. Inflated bases ovate; narrow tips digitiform. Inflated bases reduced from about setiger 50. By setiger 70–75 ventral cirri short, slender and digitiform. All notopodial cirri prominent, basally inflated, tapering to blunt tips, without articulations.

Pectinate setae (Figure 85h) tapering, flat. One marginal tooth slightly longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 85f) tapering, marginally smooth. Appendages large, with distinct heads, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth curved. Guards distally rounded, margin smooth, mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 85g) paired, dark, sharply pointed, straight or gently curved; cross-section round. Subacicular hooks (Figure 85i) dark, bidentate. Hooks first present from setiger 27, present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering. Proximal teeth about twice as large as distal teeth. Both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—All characters associated with far posterior setigers, pygidium, and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 23, 36–38, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice pauroneurata* is listed with similar species in Tables 27 and 31. The shape of the appendages of the compound hooks resembles the condition in *E. collini*, but the two species can be separated on the structure of the antennae and aciculae. Two additional species in Table 31 may have short, flexible branchiae. In *E. bipapillata* the flexibility was not noted, so it is here assumed present for the purpose of the discussion; in this species, branchiae are first present from setiger 4 with a maximum of seven filaments; in *E. pulvinopalpata* branchiae are present from setiger 3 with a maximum of 25 filaments. In *E. pauroneurata* branchiae are first present from setiger 8 with a maximum of five filaments.

Chamberlin (1919a:253) claimed that the unpaired Mx III was missing; this is incorrect: Mx III is present, but left Mx IV is missing.

150. *Eunice pectinata* Grube, 1869

FIGURE 86a–e; TABLES 19, 20

Eunice pectinata Grube, 1869:492–493.

MATERIAL EXAMINED.—Holotype, ZMB F 2005, Tor, Red Sea, coll. Ehrenberg.

COMMENTS ON MATERIAL EXAMINED.—A note on the label translates as: "according to Grube's original label = *E. pennata* O.F. Müller."

DESCRIPTION.—Holotype incomplete with 51 setigers; length 27 mm; maximal width 2 mm; length through setiger 10, 6 mm. Body cylindrical.

Prostomium (Figure 86a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes large, frontally rounded; median sulcus deep. Eyes posterior to A-I, faded. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 12 closely spaced, short, articulations. Articulations cylindrical basally, becoming drop-shaped distally. A-I to posterior peristomial ring; A-II to setiger 2; A-III to setiger 3. Peristomium cylindrical; lower lip thick, forming ventral cushion. Separation between rings distinct on all sides; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 6 articulations.

Maxillary formula 1+1, 5+5, 6+0, 4+8, 1+1. Jaws very soft and friable. Mx III form part of distal arc with left Mx IV.

Branchiae (Figure 86b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 5 to end of fragment. First 2 pairs single filaments; maximum 10 filaments; even last setigers with 5

FIGURE 86.—*Eunice pectinata* (holotype, ZMB F 2005): a, anterior end, lateral view; b, parapodium 49, anterior view; c, subacicular hook, parapodium 49; d, pectinate seta, parapodium 49; e, compound falciger, parapodium 49. *Eunice pelamidis* (holotype, MNHN, A.1(R.)-1868-no. 57a): f, subacicular hook, parapodium 110; g, acicula, parapodium 110; h, pseudocompound falciger, parapodium 110; i, pseudocompound falciger, parapodium 110; j, pectinate seta, parapodium 110; k, compound falciger, parapodium 5; l, pectinate seta, parapodium 5; m, parapodium 5, anterior view.

filaments. Branchial stems long and slender, increasingly flexible in posterior setigers. Filaments digitiform, longer than notopodial cirri.

Neuropodial acicular lobes distally rounded, becoming broadly transverse in last setigers present; aciculae emerging at midline. Pre- and postsetal lobes low folds following outline of acicular lobes closely. First 3 ventral cirri tapering; ventral cirri moderately basally inflated in rest of segments. Bases ovate; narrow tips digitiform. Notopodial cirri basally inflated, articulated. Anterior notopodial cirri with up to 6 closely spaced articulations; number of articulations decreasing to 3 in last setigers present.

Limbate setae slender, marginally smooth-edged. Pectinate setae (Figure 86d) flaring, flat. One marginal tooth slightly longer than all other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 86e) tapering, marginally smooth. Appendages slender, bidentate. Proximal teeth shorter than distal teeth, tapering, directed distally. Distal teeth distinctly thicker than proximal teeth, curved. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, narrow, tapering, straight or gently curved; cross-sections round. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 86c) yellow, bidentate. Hooks first present from setiger 41, present in all setigers thereafter, always single (except for replacements). Hooks wide-shafted. Proximal teeth larger than distal teeth, directed laterally. Distal teeth thick, truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—All characters of posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 4, 6, 36–38, 40, 42, 47, 50, 57–60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,2; 38,2.

REMARKS.—*Eunice pectinata* differs distinctly from *E. pennata* despite Grube's initial impression (see above) and is listed with similar species in Tables 19 and 20. Among other differences, all notopodial cirri are articulated in *E. pectinata* and are articulated only in anterior setigers in *E. pennata*. Additionally, the guards of the compound falcigers are distally blunt in *E. pectinata* and distally sharply pointed in *E. pennata*.

151. *Eunice pelamidis* Quatrefages, 1866

FIGURE 86f–m; TABLES 52, 53

Eunice pelamidis Quatrefages, 1866:322–323.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, A.1(R.)-1868-no. 57a, Payta, Peru, coll. Gaudichaud.

COMMENTS ON MATERIAL EXAMINED.—The holotype is in two pieces and is extremely poorly preserved; total length was not measured. It has been dissected for the jaw apparatus and no meaningful illustrations of the anterior end is possible.

DESCRIPTION.—Holotype complete with 221 setigers. Anterior end with 113 setigers; length approximately 100 mm; maximal width 12 mm; length through setiger 10, 20 mm.

Prostomial lobes frontally obliquely truncate, dorsally flattened, tapering ventrally from posterior edge, median sulcus shallow. Eyes behind bases of A-I, dark. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering smoothly; up to 21 moniliform articulations in A-III. A-I to middle of anterior peristomial ring; A-II and A-III to posterior edge of anterior peristomial ring. Peristomial rings distinct ventrally and in part dorsally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, with 4 or 5 articulations.

Maxillary formula 1+1, 5+5, 6+0, 5+8, 2+2. Mx VI absent. Mx III long, located behind left Mx II.

Branchiae (Figure 86m) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 220. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae strongly pectinate; maximum 24 long, slender filaments at about setiger 20.

Anterior neuropodial acicular lobes distally rounded, becoming triangular in median and posterior setigers; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. All ventral cirri basically tapering and thick. Ventral cirri very indistinctly inflated basally from about setiger 10 through setiger 25. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri tapering. All notopodial cirri basally slightly inflated, tapering to thick, blunt tips, with 2 to 4 cylindrical, often indistinct articulations.

Limbate setae marginally serrated or frayed. Shafts of anterior pectinate setae (Figure 86l) thick; blade forming scoops at end of setae. Both marginal teeth slightly thicker and longer than other teeth; ~10 teeth present. Shafts of median and posterior pectinate setae (Figure 86j) wide and flat; blades flat, flaring. Marginal teeth about as long as other teeth; ~15 teeth present. True compound falcigers (Figure 86k) in anterior setigers only; joints increasingly indistinct posteriorly; by setiger 50 no truly jointed setae present. Shafts of compound falcigers tapering. Appendages very short, stout, bidentate. Proximal teeth shorter than distal teeth, directed distally. Distal teeth tapering, directed distally. Guards not seen. Pseudocompound falcigers (Figure 86h,i) in posterior end distally evenly furcate, rather than bifid; reduced joint sometimes visible only as slight thickenings along 1 side with some faint lines running obliquely across setae, sometimes more distinct with fused appendages at distinct angle to shafts. Pseudocompound falcigers amber-colored, very nearly as large as subacicular hooks in posteriormost setigers. Compound spinigers absent. Aciculae usually paired, amber-colored to brown, tapering to blunt tips (Figure 86g), distally geniculate or distinctly curved; cross-section round. Subacicular hooks (Figure 86f) amber-

colored, tridentate with teeth in a crest. Hooks from setiger 63, scattered in next 10–15 setigers, in all neuropodia in posterior setigers, always single (except for replacements). Hooks slender, tapering, with distinct heads. Proximal fangs large, curved. Two smaller fangs in crests.

UNKNOWN MORPHOLOGICAL FEATURES.—Several prostomial features; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 10–12, 15–17, 24, 70, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice pelamidis* has remained unreported since it was first described. The species is characterized by having pseudocompound falcigers in the posterior end as does *E. afuerensis*. In *E. afuerensis* the articulations of the ceratostyles are drop-shaped or moniliform distally only; in *E. pelamidis* the articulations are moniliform throughout. Peristomial cirri are articulated in *E. pelamidis* and lack articulations in *E. afuerensis*. The two species are listed in Tables 52 and 53.

152. *Eunice pellucida* Kinberg, 1865

FIGURE 87a–f; TABLES 41, 44

Eunice pellucida Kinberg, 1865:562.
Eunice vittata.—Hartman, 1948:77 [in part, not *Nereis vittata* Chiaje, 1828].

MATERIAL EXAMINED.—Two syntypes, RM Typ 433, St. Thomas, West Indies, coll. Werngren. Kinberg (1865:562) gave locality information as "St. Thomas, fundo 10–12 orgyiarum, unde retulit Verngren."

COMMENTS ON MATERIAL EXAMINED.—The type lot consists of two rather poorly preserved anterior ends and a long posterior end, which may be part of the longer of the two syntypes. The shorter anterior end has been dissected ventrally.

DESCRIPTION.—One syntype with 35 anterior setigers. Other syntype with 58 anterior setigers; length 22 mm; maximal width 2 mm wide; length through setiger 10, 3.5 mm. Posterior fragment with 60 setigers; length 32 mm.

Prostomium (Figure 87a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes absent. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 30 moniliform articulations in A-III in short syntype; 20 articulations in A-III in long syntype. A-I to setiger 2; A-II to setiger 5; A-III to setiger 11. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring $^4/_5$ of total peristomial length. Peristomial cirri to posterior edge of prostomium, with 3 articulations.

Maxillary formula 1+1, 7+7, 6+0, 7+10, and 1+1. Mx III long, located behind left Mx II. All jaws currently very soft.

Branchiae present, pectinate, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 28 on long syntype; on other syntype branchiae from setiger 6 and present to last segment with 2 very short filaments, corresponding in size to branchiae on last branchial segments in other syntype. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximally 8 filaments. Branchial stems erect. Filaments slender. Posterior fragment entirely abranchiate.

Anterior neuropodial acicular lobes truncate; median and posterior acicular lobes (Figure 87f) distally rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5 through about setiger 30. Inflated bases ovate; narrow tips digitiform. From about setiger 45 ventral cirri long, slender and digitiform, increasing in relative length posteriorly. Anterior notopodial cirri medially inflated, becoming digitiform in posterior setigers, retaining same absolute length, thus much more dominant in posterior than in anterior setigers. Notopodial cirri without articulations.

Limbate setae marginally serrated. Pectinate setae (Figure 87d) tapering, flat. Both marginal teeth slightly longer than other teeth; 12 teeth present. Shafts of compound falcigers (Figure 87e) distally inflated. Appendages short, slender; heads large, bidentate. Proximal teeth triangular, directed laterally. Distal teeth curved. Guards asymmetrically bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 87b) paired, yellow, distally hammer-headed, nearly bifid in some segments. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 87c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 21 or 23, present in all setigers thereafter, always single (except for replacements). Hooks with large curved main fangs; distal fangs emerging from joint base, decreasing evenly in size.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with far posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 14, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 32, 39, 40, 42, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice pellucida* was considered as a possible synonym of *E. vittata* by Hartman (1948). It belongs to group C-1 as does *E. vittata*, but differs clearly from the latter in that it has hammer-headed aciculae and moniliform antennal articulations. *Eunice vittata* has smoothly tapering aciculae and long, cylindrical antennal articulations. *Eunice pellucida* is listed with similar species in Tables 41 and 44. Most species listed in Table 44 have tapering, pointed aciculae; *E.*

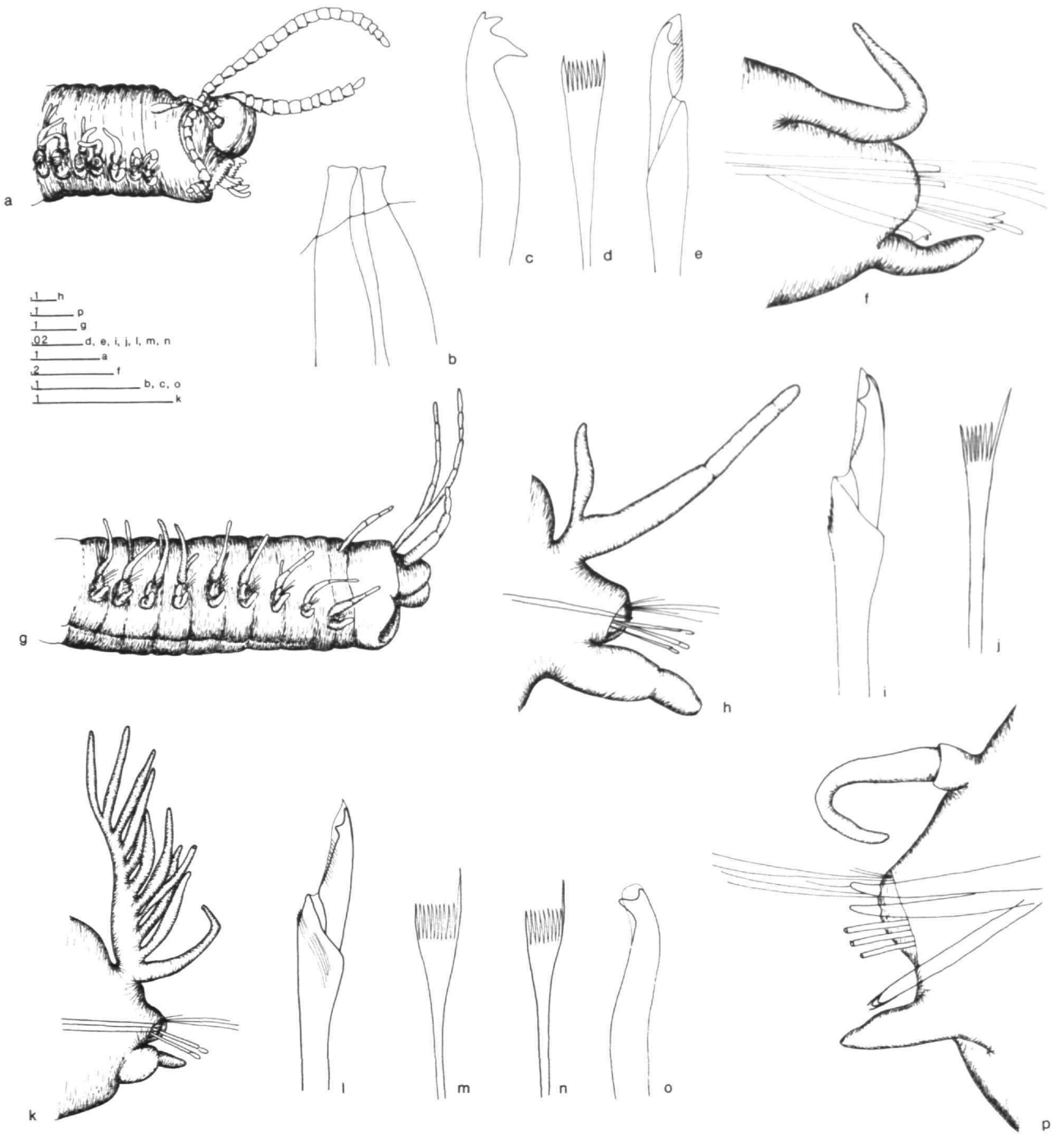

FIGURE 87.—*Eunice pellucida* (syntype, RM Typ 433): a, anterior end, lateral view; b, aciculae, parapodium 54; c, subacicular hook, parapodium 54; d, pectinate seta, parapodium 54; e, compound falciger, parapodium 54; f, parapodium 54, anterior view. *Eunice pennata* (USNM 97393): g, anterior end, lateral view; h, parapodium 3, anterior view; i, compound falciger, parapodium 3; j, pectinate seta, parapodium 3; k, parapodium 20, anterior view; l, compound falciger, parapodium 20; m, pectinate seta, parapodium 20; n, pectinate seta, parapodium 50; o, subacicular hook, parapodium 50; p, parapodium 50, anterior view. (Scale bars in mm.)

papeetensis has expanded and knobbed aciculae and *E. pellucida* has distinctly hammer-headed aciculae. Branchiae are distinctly pectinate in *E. pellucida* and palmate in *E. papeetensis*.

153. *Eunice pennata* (Müller, 1776)

FIGURE 87g–p; TABLES 19, 20

Nereis pennata Müller, 1776:217; 1779:60–61, pl. 29: figs. 1–3.
Leodice norwegica Lamarck, 1818:323.—Savigny, 1820:51.—Audouin and Milne Edwards, 1833:219.—Örsted, 1845:402, 406, pl. 2: figs. 13–15.—Grube, 1850:202 [in part, not *Nereis norvegica* Linnaeus, 1767].
Eunice pennata.—Fauvel, 1923:400–401, fig. 156h–o.

MATERIAL EXAMINED.—Two specimens, USNM 97393, Storskjær, Oslofjorden, Norway, 8 June 1982, dredged, coll. and id. Inger Winsnes.

DESCRIPTION.—Both specimens complete, mature females with large oocytes in body cavity. Specimen illustrated with 114 setigers; total length 73 mm; maximal width 3 mm; length through setiger 10, 7.5 mm. Other specimen in posterior regeneration, with 100 setigers; last 20 in regenerating portion; length 57 mm long of which 9 mm in regenerating portion; maximal width 5 mm wide; length through setiger 10, 9 mm. Body dorsally strongly convex with flattened ventral surface, tapering abruptly frontally and slowly towards posterior end. Anal cirri slender, without articulations; long ones as long as last 3–4 setigers in illustrated specimen.

Prostomium (Figure 87g) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally inflated; median sulcus shallow. Eyes lateral to bases of A-II, purple. Antennae in a horseshoe, with A-III isolated by a gap, with A-I thicker than other 3. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering to fine tips, with long, irregularly spaced articulations; in A-I articulations drop-shaped distally. A-III lost or incomplete in both specimens. A-I to posterior peristomial ring; A-II to setiger 4 or 5. Peristomium cylindrical. Separation between rings distinct on all sides, but especially well marked dorsally and ventrally; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of prostomium, slender, with 3 or 4 irregular, but relatively long articulations.

Maxillary formula (examined in one specimen only) 1+1, 6+7, 9+0, 6+11, and 1+1. Mx III long, located behind left Mx II. Teeth of Mx II relatively coarse and triangular; other teeth small, even in size and distally blunt.

Branchiae (Figure 87h,k) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 39 or 41. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 5 and last 2 pairs single filaments; maximally 12 filaments at about setiger 15. Branchial stems slender, erect, tapering. Filaments shorter than notopodial cirri. All filaments flattened, medially expanded, with knife-shaped tips.

Prebranchial and branchial neuropodial acicular lobes obliquely truncate with aciculae emerging from upper, higher part. Postbranchial acicular lobes (Figure 87p) obliquely rounded. All presetal lobes low, slightly excavate, transverse folds. Prebranchial and branchial postsetal lobes free, symmetrically rounded lobes, visible behind acicular lobes in most setigers; postbranchial postsetal lobes following outline of acicular lobes closely. Anterior ventral cirri relatively slender, tapering, becoming basally inflated from about setiger 6–7, but even in first setigers, distal tips set off from remainder of ventral cirri by a groove. Inflated bases ovate, rather modest; narrow tips very large and tapering. From about setiger 35 basal inflation gradually lost, absent from about setiger 40. Posterior ventral cirri slender, tapering, nearly conical. Anterior notopodial cirri long, digitiform, with 3 to 4 articulations reduced to 1 to 2 in early branchiated setigers. In branchial region notopodial cirri more distinctly tapering, gradually loosing all traces of articulations. Postbranchial notopodia with distinct ring-shaped bases and slender, tapering notopodial cirrostyles.

Limbate setae marginally smooth. Pectinate setae (Figure 87j,m,n) tapering, flat. One marginal tooth longer than other teeth; number of teeth increasing from 8 to 12 from anterior to posterior setigers. Shafts of compound falcigers (Figure 87i,l) inflated, internally striated, marginally serrated. Appendages tapering, bidentate. Proximal teeth smaller than distal teeth, broadly triangular, directed laterally. Distal teeth nearly erect or gently curved. Guards asymmetrically sharply pointed in anterior setigers, becoming symmetrically sharply pointed in median and posterior setigers, marginally serrated in median and posterior setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae usually paired, yellow, tapering to slender tips, gently curved or straight; cross-section round. Separation of cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 87o) yellow, bidentate. Hooks first present from setiger 35 or 43, present in all setigers thereafter, sometimes paired. Hooks tapering to small heads. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 23.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Müller first mentioned this species in a brief note (1776) and then expanded the description in 1779; the types are lost, but the type locality was given as Storskjær in Christianiafjord (= Oslofjord). In the 1779 publication Müller also describes a *Nereis pinnata* from *Madrepora pertusa* reefs and refers to *Nereis noruegica* (note spelling) and *Nereis madreporae pertusae* of Gunnerus as synonyms of his *Nereis pennata*.

Three species of *Eunice* are associated with ahermatypic coral reefs off Norway; all of these are present on the reef at Storskjær in the Oslofjord (Inger Winsnes, pers. comm.). These species are readily identified: one has branchiae along most of body and black subacicular hooks (*E. norvegica*); the two other species have branchiae limited to a short anterior region. The two latter species are separable on a variety of features, but perhaps most easily on the fact that one has yellow (*E. pennata*), the other dark brown or black subacicular hooks and aciculae (*E. dubitata*).

Some confusion has arisen as to the identity of *E. pennata* as opposed to *E. pinnata*. Traditionally, *E. pennata* has been assigned to a species in group A-1 sensu Fauchald (1970). Nothing in Müller's description contradicts this tradition; for that reason, this tradition is here accepted. *Nereis pinnata* (= *Eunice pinnata* auctores) is treated below.

As the first described species in group A-1, *E. pennata* has been widely reported and appeared at one time to have a bipolar distribution. Records of this species from the southern hemisphere (cf. Hartman, 1964:118, 1967:99) have yet to be confirmed.

Perhaps the most unique feature of the species is the presence of ring-shaped bases in posterior notopodia; this is a feature that has been reported from only one other species of *Eunice* (*E. nicidioformis*); it resembles the structure of the notopodia among onuphids more than in the eunicids.

Eunice pennata is listed with similar species in Tables 19 and 20. Of species listed in Table 20, the following have branchiae starting on setiger 3: *E. biannulata, E. caeca, E. kobiensis, E. mexicana, E. pennata, E. segregata, E. valens,* and *E. websteri;* the other species have branchiae first present from setiger 4 or later. Of the species listed, *E. caeca* has as many as 24 branchial filaments where the branchiae are best developed; *E. mexicana* has 18 filaments; *E. biannulata* and *E. kobiensis* have 8 filaments; the remaining species have 11–15 filaments where the branchiae are best developed. *Eunice pennata* and *E. websteri* have distally moniliform or drop-shaped articulations in the ceratostyles; *E. segregata* and *E. valens* have cylindrical articulations. In *E. pennata* the first five branchiae are single filaments; in *E. websteri* only one anterior segment has single filaments. In contrast, at the posterior end of the branchiated region, *E. pennata* has two segments with single filaments; *E. websteri* has 10 segments. Note that *E. pennata* is the only species in Table 20 with distinct ring-shaped notopodial bases in posterior notopodia.

154. *Eunice perimensis* Gravier, 1900

FIGURE 88a–e; TABLES 33, 39

Eunice perimensis Gravier, 1900:239–242, figs. 94–99, pl. 12: figs. 61, 62.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, Red Sea, Par, Perimen, 1894, coll. J. Jousseaume.

COMMENTS ON MATERIAL EXAMINED.—The anterior end was been compressed dorsoventrally to evert pharynx during fixation and is distorted as illustrated.

DESCRIPTION.—Holotype incomplete with 79 setigers; length 50 mm; maximal width 5 mm at setiger 70; length through setiger 10, 10 mm. Anterior part of body cylindrical; becoming strongly dorsoventrally flattened by setiger 10; segments short; crowded.

Prostomium (Figure 88a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsally somewhat flattened; median sulcus deep. Eyes between bases of A-I and A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. No antennae reaching beyond anterior peristomial ring; A-I shortest; A-III longest. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~2/3 of total peristomial length, possibly distorted. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula 1+1, 4+4, 7+0, 4+7, 1+1. Left Mx IV very small; part of distal arc with Mx III and left Mx V. Jaws heavily calcified.

Branchiae (Figure 88b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae present from setiger 17 to end of fragment. All but first branchia with 2 or more filaments; maximum 8 filaments from about setiger 30 to end. Branchial stems slender, tapering and flexible. Filaments distinctly longer than notopodial cirri except in first branchial segments.

Neuropodial acicular lobes distally truncate to rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 9 ventral cirri tapering. Ventral cirri distinctly basally inflated by setiger 10. Inflated bases moderate, ovate; narrow tips tapering. Ventral cirri remaining basally inflated through rest of fragment. Notopodial cirri supported by internal aciculae. Prebranchial notopodial cirri long, digitiform, not increasing in length through prebranchial region, becoming slightly medially inflated in last prebranchial segments, becoming reduced in length in branchial region, without articulations.

Limbate setae slender, distinctly frayed. Shafts of pectinate setae (Figure 88c) slender; blades slightly furled, flared. One marginal tooth longer than all other teeth; ~20 teeth present. Posterior fascicles with up to 10 pectinate setae each. Shafts of compound falcigers (Figure 88d) distally inflated, with distinct peak, marginally smooth. Appendages short with very large distinct heads, bidentate. Proximal teeth slightly longer than distal teeth, triangular, directed slightly basally. Distal teeth curved. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae usually single, sometimes paired, light to dark brown, thick, tapering, straight, projecting well beyond tip of parapodia in posterior setigers; cross-section round. Separation of cores and sheaths indistinct in both

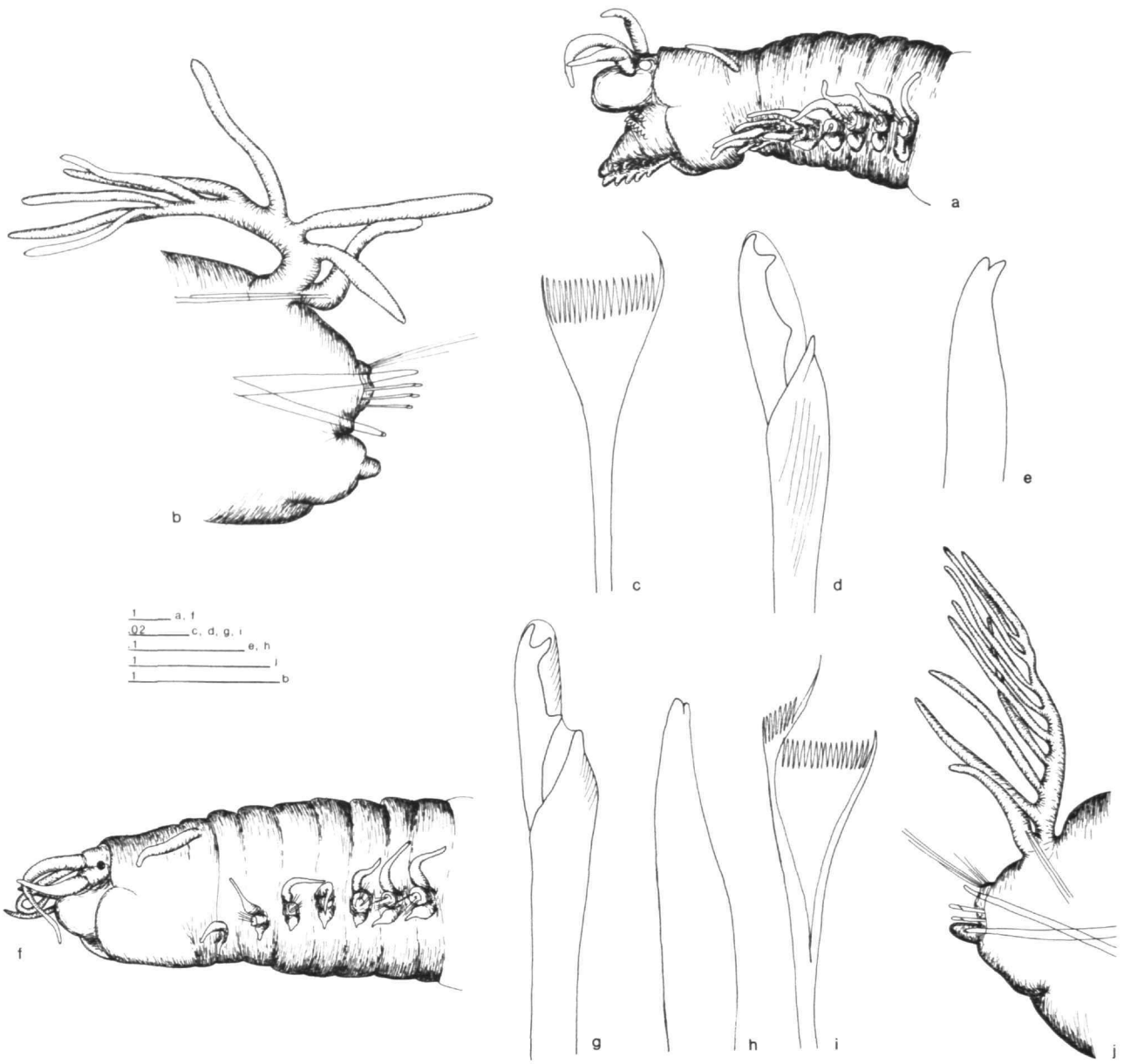

FIGURE 88.—*Eunice perimensis* (holotype, MNHN): a, anterior end, lateral view; b, parapodium 52, anterior view; c, pectinate seta, parapodium 52; d, compound falciger, parapodium 52; e, subacicular hook, parapodium 52. *Eunice perrieri* (holotype, MNHN): f, anterior end, lateral view; g, compound falciger, parapodium 75; h, subacicular hook, parapodium 75; i, pectinate seta, parapodium 75; j, parapodium 75, anterior view. (Scale bars in mm.)

aciculae and subacicular hooks. Subacicular hooks (Figure 88e) light to dark brown, bidentate. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks tapering towards very small heads. Proximal teeth slightly thicker than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56. *Unknown Characters:* 1, 2, 6, 36-38, 40, 47, 50, 57-60, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice perimensis* is listed with similar species in Tables 33 and 39. Of species listed in Table 39, four have more than three branchial filaments where the branchiae are best developed; these include *E. complanata, E. flavapunctata, E. magnifica,* and *E. perimensis.* The peristomial cirri reach beyond the prostomium in *E. complanata* and do not outreach the peristomium in *E. flavapunctata* and *E. perimensis;* the length of the cirri is unknown for *E. magnifica.* The separation between the two peristomial rings is distinct on all sides in *E. flavapunctata* and is limited to the dorsal and ventral sides in *E. perimensis;* the separation is unknown for *E. magnifica.* Finally, the branchiae are held stiffly erect in *E. magnifica* and are flexed in *E. perimensis.*

155. *Eunice perrieri* Gravier, 1900

FIGURE 88f-j; TABLES 33, 37

Eunice perrieri Gravier, 1900:232-236, figs. 83-88, pl. 12: figs. 57-59.

MATERIAL EXAMINED.—Holotype, MNHN, Paris, Red Sea, Djibouti, coll. Coutière, no. 29, 1897.

DESCRIPTION.—Holotype complete with 185 setigers; total length 135 mm; maximal width 5 mm; length through setiger 10, 12 mm. Body cylindrical throughout, with very modest flattening of dorsum towards posterior end.

Prostomium (Figure 88f) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Eyes on lateral sides of ceratophores of A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores long in all antennae, without articulations. All ceratostyles tapering, without articulations. A-I to posterior peristomial ring; A-II and A-III to setiger 1. Peristomium tapering slightly anteriorly, but basically cylindrical. Lower lip thick, inflated, distinctly set off from rest of anterior ring. Separation between rings distinct dorsally and ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to anterior third of anterior peristomial ring, slender and digitiform, without articulations.

Maxillary formula 1+1, 4+4, 6+0, 4+8, and 1+1. Jaws small in relation to size of specimen. Teeth on Mx IV small. Left Mx IV part of distal arc with Mx III.

Branchiae (Figure 88j) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 18 to setiger 170, absent from last 15 setigers of body. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 2-3 and last 4-5 pairs single filaments; maximum 10 slender filaments where best developed, at about setiger 30. Branchial stems slender.

Anterior neuropodial acicular lobes wide, rather flattened, becoming about as high as wide in posterior end, retaining smoothly rounded outlines; aciculae emerging at midline. All presetal lobes low, transverse folds. Postsetal lobes about twice as high as acicular lobes in first 20 setigers; distally rounded. Postsetal lobes reduced to following outline of acicular lobes by about setiger 30; posterior postsetal lobes low, transverse folds. First 9 ventral cirri basally thick, abruptly tapering with slender, pointed tips. Ventral cirri basally inflated from about setiger 10 through about setiger 100. Inflated bases thick, transverse welts; narrow tips tapering. Far posterior ventral cirri slender, digitiform, increasing slightly in length, approximating length of notopodial cirri. Notopodial cirri basally slightly inflated in anterior 2/3 of body, digitiform in last third of body. All notopodial cirri without articulations.

Limbate setae slender, marginally smooth. Shafts of pectinate setae (Figure 88i) very slender; blades strongly furled and flared. One marginal tooth very much longer than other teeth; ~20 teeth present. Shafts of compound falcigers (Figure 88g) inflated, marginally serrated. Appendages small with nearly parallel sides; heads large, distinct, bidentate. Proximal teeth slightly larger than distal teeth, tapering, directed laterally or slightly basally. Distal teeth tapering, directed obliquely laterally. Gap between teeth somewhat variable. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae usually single, with dark copper-colored to dark brown cores and clear sheaths, tapering, distally gently curved; cross-section round. Subacicular hooks (Figure 88h) with dark copper-colored cores and clear sheaths, bidentate. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Hook distally strongly tapering; heads indistinct. Teeth similar in size, short, indistinct, directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice perrieri* resembles *E. afra* closely and has been considered a synonym of that species. A non-type specimen in the collections of MNHN, Paris, from Djibouti, labeled in Fauvel's handwriting, was identified as "*E. afra* (= *E. perrieri*)."

Eunice perrieri is listed with similar species in Tables 33 and 37. It is the only species in Table 37 with as many as 10 branchial filaments. It has long ceratophores in all antennae, feature it shares with only one species in Table 37, *E. aciculata.*

These two species are very similar; branchiae have single filaments in the first 10 setigers in *E. aciculata* and only in two to three setigers in *E. perrieri;* in addition, the latter has twice as many (10) branchial filaments where the branchiae are best developed as the former.

157. *Eunice petersi*, new name

FIGURE 89a-i; TABLES 33, 35

Eunice punctata Peters, 1854:611.—Ehlers, 1897:166.

MATERIAL EXAMINED.—Holotype, ZMB 44, Mozambique, 2 slides marked type, BM(NH) ZB 1984.71 and 72.

COMMENTS ON MATERIAL EXAMINED.—The holotype is now in three pieces.

DESCRIPTION.—Holotype complete with 302 setigers; total length 130 mm; maximal width 5 mm; length through setiger 10, 7 mm. Body cylindrical; segments short and crowded throughout.

Prostomium (Figure 89a) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes behind bases of A-I, faded, covered by peristomial fold. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores long in all antennae, without articulations. Ceratostyles digitiform, tapering slightly, with 2 to 3 indistinctly marked cylindrical articulations. A-I and A-II to setiger 1; A-III to setiger 3. Peristomium cylindrical; lower lip muscular. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to frontal edge of peristomium, digitiform, with 3 cylindrical articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 13 to setiger 200; occurrence of branchiae sporadic posterior to setiger 100. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Where best developed branchiae with 4 short, thick filaments on short, truncate branchial stems. Posterior to setiger 70 most branchiae single, short, truncate filaments.

All neuropodial acicular lobes (Figure 89e) wide, rounded; aciculae emerging at midline. All presetal lobes low, transverse folds. Anterior and median postsetal lobes free, rounded. Posterior to setiger 100 postsetal lobes follow outline of acicular lobes closely. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5. Inflated bases thick, ventrolateral ridges between setigers 6 and setiger 75; narrow tips short and button-shaped. Posterior ventral cirri slender and tapering. All notopodial cirri basally slightly inflated, tapering to slender tips. Anterior and median notopodial cirri with 2 articulations; posterior notopodial cirri without articulations.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 89d,i) tapering, flat. One marginal tooth longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 89b,h) distinctly inflated, marginally serrated or smooth. Appendages short; heads very large, bidentate. Proximal teeth longer than distal teeth, triangular, directed laterally. Distal teeth curved, tapering. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 89f) single, with brown cores and clear sheaths, tapering, slender, straight; cross-section round. Subacicular hooks (Figure 89c,g) with brown cores and clear sheaths, bidentate. Hooks first present from setiger 26, present in all setigers thereafter, always single (except for replacements). Hooks tapering, slender, with small heads. Proximal teeth larger than distal teeth, tapering, laterally directed. Distal teeth slender, directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 39, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The slides in BM(NH) are numbered 71 and 72. Slide 71 contains a median parapodium showing dark brown aciculae, compound hooks with both teeth well developed, and blunt, rounded guards, and slender limbate setae and groups of narrow pectinate setae without distinctly long marginal teeth. Number of teeth in each pectinate seta appears to be about 15. Subacicular hook tapers towards the tip and the proximal tooth is at nearly right angles with the shaft and about twice the size of the distal tooth. Aciculae are conical and abruptly tapered.

Slide 72 contains two very similar neuropodia. Branchiae are not visible on either slide.

Eunice petersi is listed with similar species in Tables 33 and 35. Perhaps most characteristic is the scattered distribution of branchiae over the posterior half of the body. It is one of two species in Table 35 with notopodial cirri articulated in the anterior end; the other species is *E. fauveli*. The latter has mucronate compound falcigers; *E. petersi* has distally rounded guards on the compound falcigers.

A new name is necessary, because the specific name *punctata* was pre-occupied in combination *Eunice punctata* (Risso, 1826).

The name honors the scientist responsible for describing a very valuable, early collection from Mozambique.

158. *Eunice philocorallia* Buchanan, 1893

FIGURE 89j-q; TABLES 27, 29

Eunice philocorallia Buchanan, 1893:173-176, pl. 9: figs. 2-6, pl. 10: figs. 7-9, pl. 11.

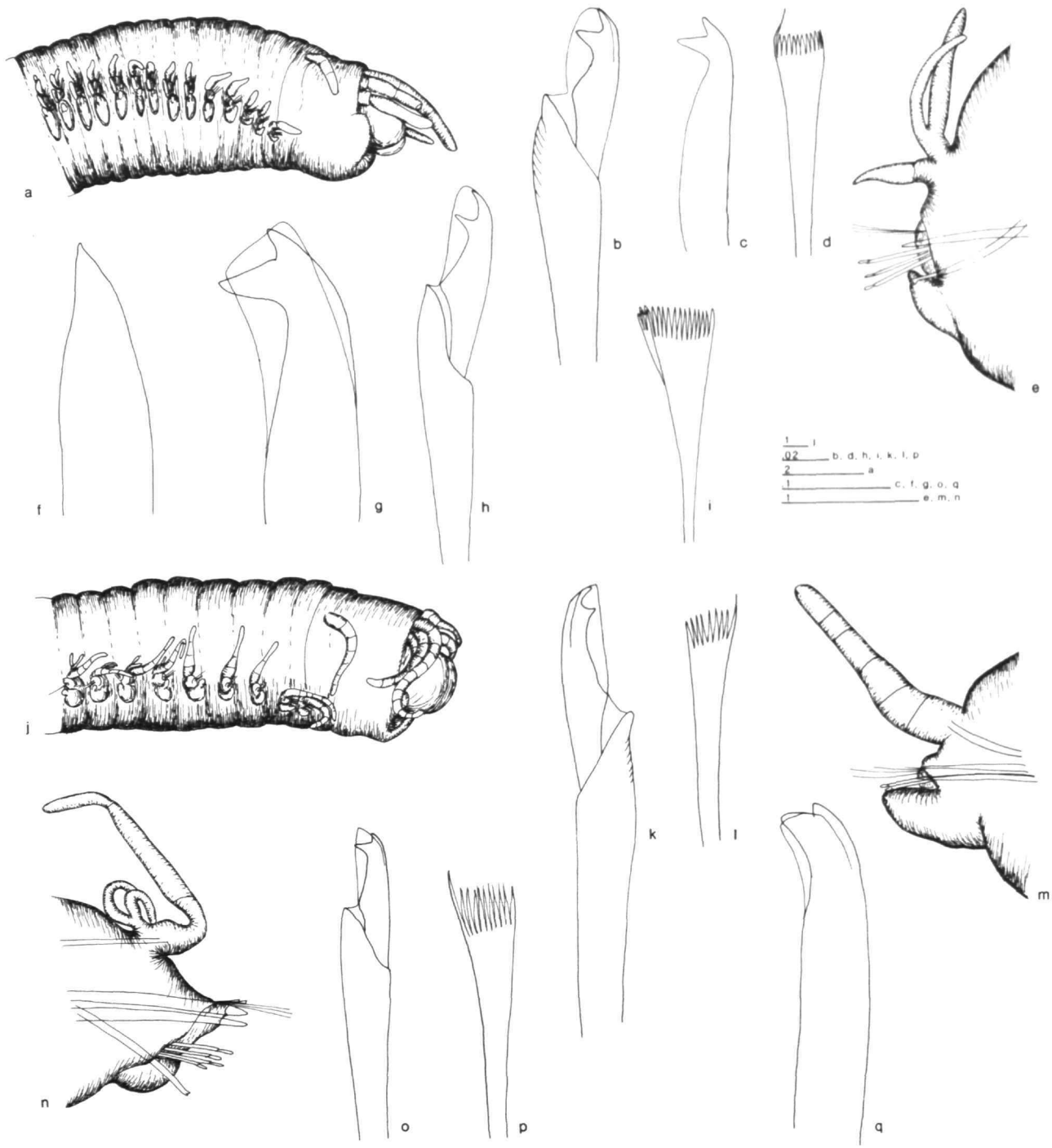

FIGURE 89.—*Eunice petersi*, new name (holotype, ZMB 44 (a–e) slides, BM(NH) ZB 1984.71 and 72 (f–i): a, anterior end, lateral view; b, compound falciger, parapodium 63; c, subacicular hook, parapodium 63; d, pectinate seta, parapodium 63; e, ?median parapodium, anterior view; f, acicula, ?median parapodium; g, subacicular hook, ?median parapodium; h, compound falciger, ?median parapodium; i, pectinate seta, ?median parapodium. *Eunice philocorallia* (holotype, BM(NH) 1920.1.5.1): j, anterior end, lateral view; k, compound falciger, parapodium 3; l, pectinate seta, parapodium 3; m, parapodium 3, anterior view; n, parapodium 96, anterior view; o, compound falciger, parapodium 96; p, pectinate seta, parapodium 96; q, subacicular hook, parapodium 96. (Scale bars in mm.)

MATERIAL EXAMINED.—Holotype, BM(NH) 1920.1.5.1, 50 miles off Bolus Head, Kerry, Ireland; dredged, 375 m, in parchment-like tubes on *Lophophelia prolifera*. Royal Dublin Society Survey of Western Ireland, 1891.

DESCRIPTION.—Holotype complete, of unknown sex, with 136 setigers; total length 115 mm; maximal width 6 mm; length through setiger 10, 15 mm. Anterior end cylindrical; middle and posterior ends dorsoventrally flattened with prominent parapodia. Anal cirri as long as last 15 setigers.

Prostomium (Figure 89j) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium, bent ventrally. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes between bases of A-I and A-II, hidden below peristomial fold in illustration. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles cylindrical, with up to 12 cylindrical, poorly marked articulations in A-III. A-I and A-II to middle of posterior peristomial ring; A-III to setiger 2. Peristomium ~3 times as long as prostomium, cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of prostomium, tapering, with 8 cylindrical articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 6 to setiger 135. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchia single filaments; maximum 4 filaments. Stems very short, truncated. Filaments slender, digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes (Figure 89m) distally rounded; posterior acicular lobes increasingly obliquely conical with the high side dorsally (Figure 89n); aciculae emerging dorsal to midline. Presetal lobes low, oblique folds with high side dorsally. Postsetal lobes folds following outline of acicular lobes closely. Anterior ventral cirri broadly attached below ventral edge of acicular lobes, tapering to blunt tips. Ventral cirri strongly inflated basally from about setiger 4 through setiger 45; inflated bases completely reduced by setiger 50. Inflated bases nearly spherical; narrow tips tapering. Posterior ventral cirri short and tapering, blunt, emerging from posterior parapodial faces, directed posteriorly and dorsally. Anterior notopodial cirri basally slightly inflated, with 6 articulations. Notopodial cirri increasing in length posteriorly, becoming slightly longer than body width in last setigers, retaining at least 2 articulations in all setigers.

Limbate setae narrow, marginally smooth. Pectinate setae (Figure 89l,p) narrow, tapering, flat. One marginal tooth longer than other teeth, with ~10 teeth. Shafts of anterior compound falcigers (Figure 89k) inflated, marginally indistinctly serrated; distal beaks present. Appendages thick; heads small, bidentate. Proximal teeth slightly shorter than distal teeth, thick, triangular. Distal teeth slender, curved or bent. Guards asymmetrically bluntly pointed; mucros absent. Shafts of posterior compound falcigers (Figure 89o) tapering, marginally smooth; beaks absent. Appendages distinctly tapering; heads distinct. Proximal teeth larger than distal teeth, narrowly triangular, directed laterally. Distal teeth short, blunt, nearly erect. Guards symmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae at least paired, with dark brown to black cores and clear sheaths, bluntly pointed, straight or gently curved; cross-section round. Notopodial aciculae slender, straw-colored to light brown. Subacicular hooks (Figure 89q) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setiger 34, present in all setigers thereafter, single in most setigers, up to 3 hooks present in some setigers. Proximal teeth very much larger than distal teeth, directed laterally. Distal teeth nearly erect, often nearly missing.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice philocorallia* is listed in Table 27 and 29. Of the species listed in Table 29, four have less than 10 branchial filaments where the branchiae are best developed; these include *E. microprion*, *E. philocorallia*, *E. plicata*, and *E. tribranchiata*. The peristomial cirri reach the prostomium in *E. microprion* and *E. philocorallia* and do not outreach the peristomium in the two other species. Posterior ventral cirri are broadly attached, triangular in *E. microprion* and tapering from a small base in *E. philocorallia*.

Eunice pinnata (Müller, 1779)

Nereis pinnata Müller, 1779:62–63, pl. 29: figs. 4–7.
Eunice pinnata.—Cuvier, 1817:525.—Audouin and Milne Edwards, 1833:219.

REMARKS.—This species, originally reported from an ahermatypic coral reef, presumably in the Oslofjord, was not characterized well enough by Müller to allow identification with any of the three species present at the Storskjær reef in the Oslofjord (i.e., *E. norvegica*, *E. dubitata*, and *E. pennata*). No type specimens exist and the other authors cited limit themselves to quoting Müller's description. The species is here considered indeterminable.

159. *Eunice plicata* Baird, 1869

FIGURE 90; TABLES 27, 29

Eunice plicata Baird, 1869:348–349.—Fauchald, 1986:253, figs. 51–55.

MATERIAL EXAMINED.—Holotype, BM(NH) ZH

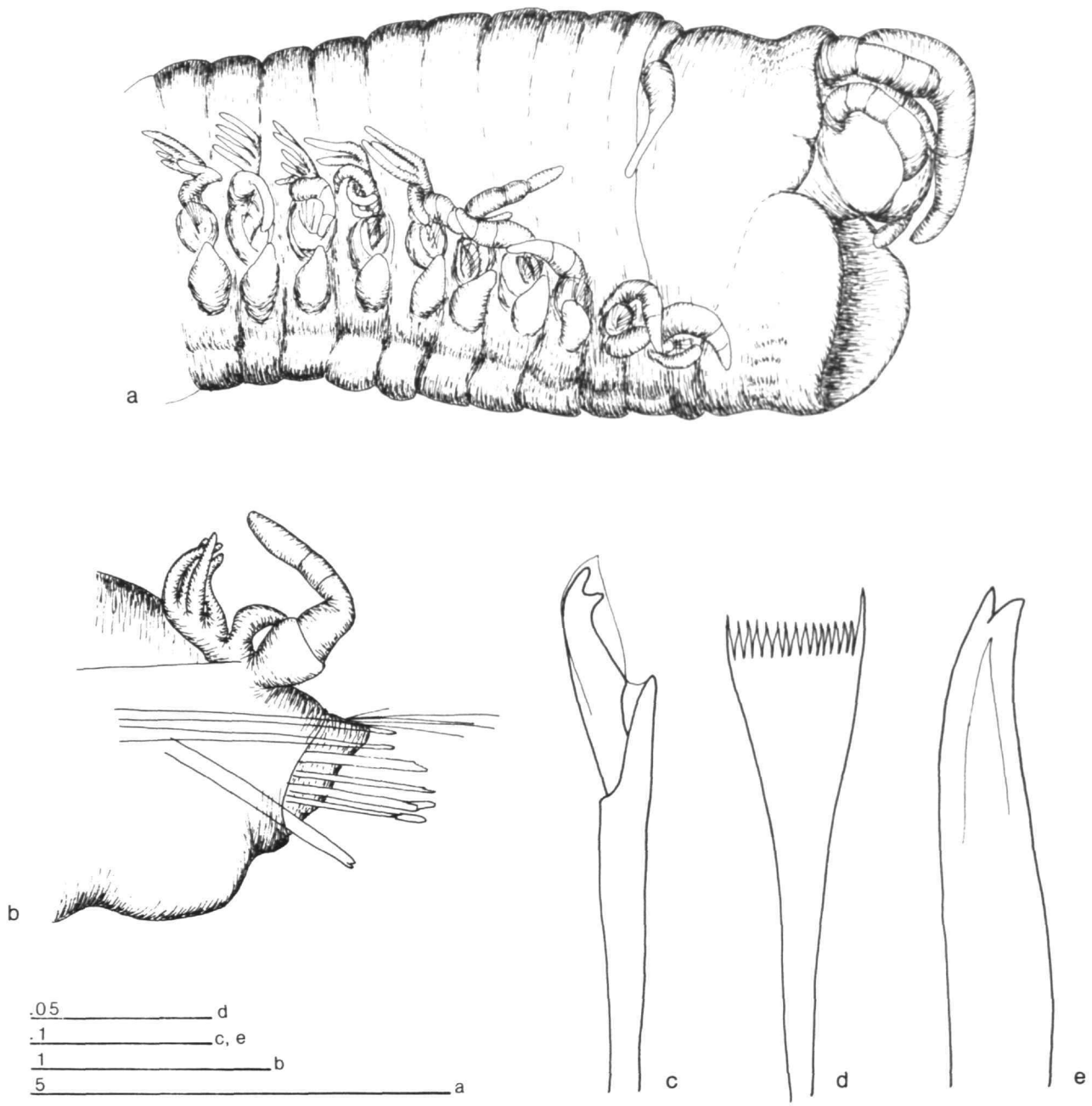

FIGURE 90.—*Eunice plicata* (holotype, BM(NH) ZH 1861.9.20.25): a, anterior end, lateral view; b, parapodium 46, anterior view; c, compound falciger, parapodium 46; d, pectinate seta, parapodium 46; e, subacicular hook, parapodium 46. (Scale bars in mm.)

1861.9.20.25, Fremantle, Australia, coll. Bowerbank.

DESCRIPTION.—Holotype complete with 126 setigers; total length 80 mm long; maximal width 5 mm; length through setiger 10, 8 mm.

Prostomium (Figure 90a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Antennae in a horseshoe,

evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles very thick, digitiform, with 2 or 3 long, cylindrical articulations. A-I to posterior edge of anterior peristomial ring; A-II and A-III to setiger 2. Peristomium anteriorly flared; lower lip muscular and very distinct. Separation between rings distinct only dorsally; anterior ring ~$^{9}/_{10}$ of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula 1+1, 4+4, 6+0, 6+7, and 1+1.

Branchiae (Figure 90b) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 7 to setiger 115. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Last 30 branchiae single filaments; maximum 5 filaments present. Branchial stems very short; branchiae appearing nearly palmately branching. Filaments short, thick, shorter than notopodial cirri in all but a few median segments.

Neuropodial acicular lobes triangular; aciculae emerging at midline. All presetal lobes low, transverse folds. Anterior postsetal lobes free, as long as acicular lobes, following outline of acicular lobes by setiger 30, similar to presetal folds in posterior setigers. Anterior ventral cirri thick, tapering, as long as postsetal lobe, becoming strongly inflated in median setigers. Inflated bases thick, transverse welts; narrow tips short and button-shaped. By setiger 50 ventral cirrus present only as inflated glandular ridges ventral to neuropodia; narrow tips absent. All notopodial cirri thick, basally somewhat inflated, with 2 or 3 distinct articulations.

Pectinate setae (Figure 90d) flared, flat. One marginal tooth slightly than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 90c) tapering, marginally smooth. Appendage short, triangular; head distinct, bidentate. Proximal teeth shorter than distal teeth, tapering, directed laterally. Distal teeth tapering, curved, directed laterally. Guards symmetrically bluntly pointed; margins smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notopodial aciculae black. Neuropodial aciculae up to 3 in a neuropodium, black, tapering, bluntly pointed, straight; cross-section round. Subacicular hooks (Figure 90e) black, bidentate. Hooks first present from setiger 25, present in all setigers thereafter, always single (except for replacements). Hooks tapering; both teeth of about same size, directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 4, 6, 13, 14, 42, 51, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—As far as is known, this species has remained unreported since it was briefly described by Baird (1869); it belongs to group B-2 (Fauchald, 1970). Relations between *E. plicata* and similar taxa are indicated in Tables 27 and 29. It is the only species in Table 29 other than *E. kinbergi* to have the ventral cirri basally inflated throughout the body. It can be separated from the latter on the structure of the prostomium, which is bilobate in *E. plicata* and quadrilobate in *E. kinbergi.*

160. *Eunice polybranchia* (Verrill, 1880)

FIGURE 91a–h; TABLES 13, 27, 28

Leodice polybranchia Verrill, 1880:358; 1881:323; 1885:428–429.

Eunice floridana.—Hartman, 1942:49–50, 52 [in part, not *Eunice floridana* Ehlers, 1887].

Eunice norvegica.—Pettibone, 1963:240–242, fig. 63f [in part, not *Nereis norvegica* Linnaeus, 1767].

MATERIAL EXAMINED.—Lectotype and 6 paralectotypes, YPM 2731, *Fish Hawk* sta 871, 40°02′54″N, 70°23′40″W, 210 m, fine sand with some mud, dredged.

COMMENTS ON MATERIAL EXAMINED.—The description is based on two incomplete specimens; variability of the species has been indicated in Table 13.

DESCRIPTION.—Long syntype incomplete with 85 setigers; length 52 mm; maximal width 3 mm; length through setiger 10, 8 mm. Short syntype incomplete with 42 setigers; length 23 mm; maximal width 3 mm; length through setiger 10, 8 mm.

Prostomium (Figure 91a) distinctly shorter than peristomium, about as wide as peristomium, as deep as $^{1}/_{2}$ of the peristomium. Prostomial lobes thick, frontally rounded, dorsally inflated; median sulcus shallow. Eyes between bases of A-I and A-II, dark. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations, sometimes with contraction rings. A-I to posterior peristomial ring or to setiger 1; A-II to setigers 4–6; A-III to setigers 6–11; A-III broken. Peristomium cylindrical, with distinctly inflated lower lip. Separation between rings distinct dorsally and ventrally; anterior ring $^{4}/_{5}$ of total peristomial length. Peristomial cirri to posterior part of prostomium, tapering, without articulations.

Maxillary formula 1+1, 6+5, 8+0, 5+9, and 1+1. Mx III long, located behind left Mx II. Mx VI absent.

Branchiae (Figure 91e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setigers 7–8 to last of segments present (85 setigers). First branchia short, tapering filaments; maximum 5 filaments reached at about setiger 15 and maintained over next 10–15 setigers. Filaments thick, stiff, bent posteriorly, so branchiae project over next posterior intersegmental furrow.

All neuropodial acicular lobes conical; anterior acicular lobes asymmetrical, becoming more and more symmetrical in median setigers (Figure 91h); aciculae emerging at tip of acicular lobes. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick and tapering. From about setiger 5 ventral cirri basally inflated; from about setiger 15 through

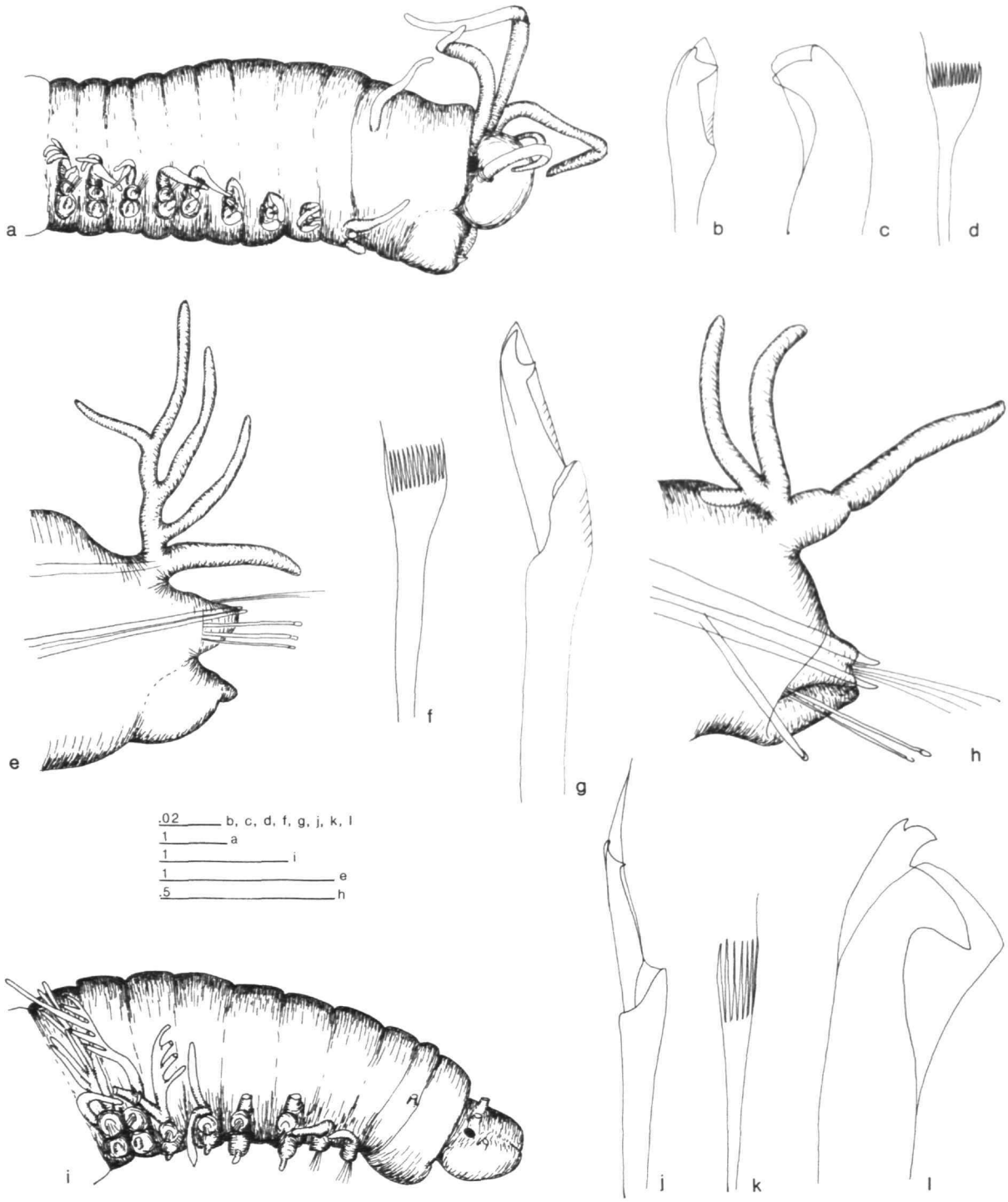

FIGURE 91.—*Eunice polybranchia* (lectotype, YPM 2731): a, anterior end, lateral view; b, appendage of compound falciger, parapodium 75; c, subacicular hook, parapodium 75; d, pectinate seta, parapodium 75; e, parapodium 15, anterior view; f, pectinate seta, parapodium 15; g, compound falciger, parapodium 15; h, parapodium 75, anterior view. *Eunice prayensis* (syntype, RM 428): i, anterior end, lateral view; j, compound falciger, parapodium 25; k, pectinate seta, parapodium 25; l, subacicular hook, parapodium 25. (Scale bars in mm.)

TABLE 13.—Variable and invariable features in the type lot of *Eunice polybranchia* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	7	5	2.5	3.71	0.99
Length through 10	7	13	6	8.71	2.29
Branchiae first present from setiger no.	7	8	7	7.71	0.49
Max. no. of branchial filaments	7	5	4	4.86	0.38
Subacicular hooks first present from setiger no.	6	36	24	29.17	4.36

INVARIABLE FEATURES	N=7
Antennal articulations	absent
Separation of rings	visible dorsally and ventrally
Peristomial cirri reach	prostomium
Peristomial cirral articulations	absent
No. of teeth in pectinate setae	15
Acicular color	black
Acicular shape	tapering; straight
Subacicular color	black
No. of subacicular teeth	2
Core-sheath construction	distinct
No. of teeth in pectinate setae	15

setiger 50 ventral cirri thick ventrolateral ridges; narrow tips short and button-shaped. Inflated bases reduced from about setiger 50; ventral cirri gradually displaced to posterior face of neuropodia, directed dorsally behind acicular lobes. In last setigers present ventral cirri thick, tapering. Notopodial cirri digitiform, without articulations. Posterior notopodial cirri curved over next posterior intersegmental furrows.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 91d,f) flaring, furled. One marginal tooth distinctly larger than other teeth; 15 teeth present. Shafts of compound falcigers (Figure 91g) inflated, marginally serrated. Appendages (Figure 91b,g) tapering; heads distinct, bidentate. Proximal and distal teeth similar in size in anterior and median setigers; proximal teeth longer than distal teeth in posterior setigers. Proximal teeth triangular, directed laterally. Distal teeth gently curved. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notopodial aciculae slender, brown. Aciculae paired, with dark brown to black cores and clear sheaths, tapering, gently curved, considerably more prominent in posterior than in anterior setigers; cross-section round. Subacicular hooks (Figure 91c) with dark brown to black cores and clear sheaths, bidentate. Hooks first present from setiger 24-36 (29 and 30 in 2 syntypes described), present in all setigers thereafter, always single (except for replacements). Proximal tooth twice as large as distal teeth, directed laterally. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36-38, 40, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—Verrill (1880) discussed material from a series of *Fish Hawk* stations (865-895). The species was described in a footnote on page 358. The paragraph to which the footnote is attached discusses hard-bottom fauna from a series of stations, "especially from stations 865-867," but no particular station is mentioned as the type locality for the species. For that reason, all material identified by Verrill as *Leodice polybranchia* from *Fish Hawk* stations 865-895 must be considered syntypes and are treated as such here. In order to stabilize the description, a lectotype has been designated above.

Eunice polybranchia resembles *E. norvegica* as first noted by Verrill (1880), and is listed with this and other similar species in Table 27. In contrast to *E. norvegica* it lacks antennal articulations and is listed with other species with which it shares this features in Table 28. It is the only species in that table to combine long peristomial cirri with having A-III distinctly longer than A-II.

161. *Eunice prayensis* Kinberg, 1865

FIGURE 91i-l; TABLES 41-45

Eunice prayensis Kinberg, 1865:563.

?Eunice vittata.—Hartman, 1948:77 [in part, not *Nereis vittata* Chiaje, 1828].

MATERIAL EXAMINED.—Two syntypes, RM 428, Atlantic Ocean, Rio de Janeiro, *Eugenie* Expedition. Kinberg (1865:563) gave locality information as "Portus ad Praya grande juxta Rio Janerio."

DESCRIPTION.—One headless fragment of 42 setigers, probably starting at setigers 3-5. Other syntype incomplete,

with 61 setigers; length 31 mm; maximal width 2 mm; length through setiger 10, 4.5 mm.

Prostomium (Figure 91i) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus shallow. Eyes between bases of A-I and A-II, black. Antennae in a horseshoe, evenly spaced. Ceratophores long in all antennae, without articulations. All ceratostyles missing. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring somewhat more than 1/2 of total peristomial length. Peristomial cirri missing.

Jaws missing.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 33. Branchiae terminating well before posterior end. First branchiae single filaments; all others pectinate with up to 9 filaments at about setiger 12. Branchial stems slender, erect. Filaments long, slender.

Neuropodial acicular lobes distally truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse lobes. First 2 ventral cirri tapering. Ventral cirri basally inflated from setiger 3 through setiger 35. Inflated bases nearly spherical; narrow tips tapering. Posterior ventral cirri thick and tapering. Notopodial cirri slightly inflated basally, without articulations. Notopodial cirri without articulations.

Limbate setae marginally finely serrated. Pectinate setae (Figure 91k) very slender, tapering, flat. One marginal tooth longer than other teeth; 5–7 long, slender teeth present. Shafts of compound falcigers (Figure 91j) distally slightly inflated, marginally smooth. Appendages long, narrow, bidentate. Proximal teeth triangular, directed basally. Distal teeth nearly erect in anterior appendages, sharply curved in median appendages. Guards tapering to sharp tips, mucronate. Pseudocompound falcigers compound spinigers absent. Aciculae numbering 2 or 3, yellow, tapering, straight; cross-section round. Subacicular hooks (Figure 91l) yellow, tridentate with teeth in a crest. Hooks first present from setiger 18, present in all setigers thereafter, usually single, rarely paired. Main fang very large, curved; secondary and tertiary fangs in crests; especially tertiary fang very small.

UNKNOWN MORPHOLOGICAL FEATURES.—Structure of ceratostyles; jaw structure; features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 17, 20–23, 27–29, 38, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice prayensis* was considered synonymous with *E. vittata* by Hartman (1948:77). It belongs to group C-1, as does *E. vittata*, and is listed with similar species in Tables 41–45.

Kinberg (1865:563) described the antennae as follows: "Appendices lobi cephalici breves nec moniliformes; tentacula media et impar segmentum 3 non attingentia, aequalia." (prostomial appendages short and not moniliform; A-II and A-III do not reach third segment and are equal). Assuming that antennal articulations were cylindrical, the most probable comparison is between *E. prayensis* and species listed in Table 42. The subacicular hooks are occasionally paired, but are certainly not present in a vertical series as in *E. vittata* and a few similar species in Table 45. The only other species with such distribution of the subacicular hooks in Table 42 is *E. flavocuprea*. *Eunice flavocuprea* has maximally four branchial filaments and the 10 last pairs of branchiae are single filaments; *E. prayensis* has maximally nine filaments and the branchiae have at least two filaments in the last branchiae present.

Kinberg stated that branchiae should be present from setiger 3; this cannot be confirmed. Note that the notopodial cirri of setigers 3–4 are damaged, and branchiae may have been present.

Eunice procera Grube, 1866

Eunice procera Grube, 1866b:68; 1878a:100.

REMARKS.—According to the original description, *E. procera* has branchiae starting on setiger 22 and continued to far posterior end with a maximum of 11 filaments at setigers 59–72.

Grube (1878a:100) in addition, by the placement of the species in his review, implied that the species should lack articulations in the ceratostyles.

No specimens are available and the information is clearly insufficient to characterize the species. It is here considered indeterminable.

162. *Eunice prognatha* McIntosh, 1885

FIGURE 92a–e; TABLES 27, 31, 33, 36

Eunice prognatha McIntosh, 1885:268–270, figs. 29–31, pl. 37: figs. 16, 17, pl. 19A: figs. 10, 11.

MATERIAL EXAMINED.—Holotype, BM(NH) ZK 1885.12.1.192, off Ascension Island, 7°54′20″S, 14°28′20″W, 768 m, volcanic sand, *Challenger* sta 344, 3 Apr 1876.

COMMENTS ON MATERIAL EXAMINED.—The holotype is currently in two pieces and the anterior end has been deeply dissected. The specimen is otherwise in good condition.

DESCRIPTION.—Holotype complete with 122 setigers; total length 80 mm; maximal width 7.5 mm; length through setiger 10, 16 mm.

Prostomium (Figure 92d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Peristomial fold large, covering bases of antennae and eyes at bases of A-II. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores

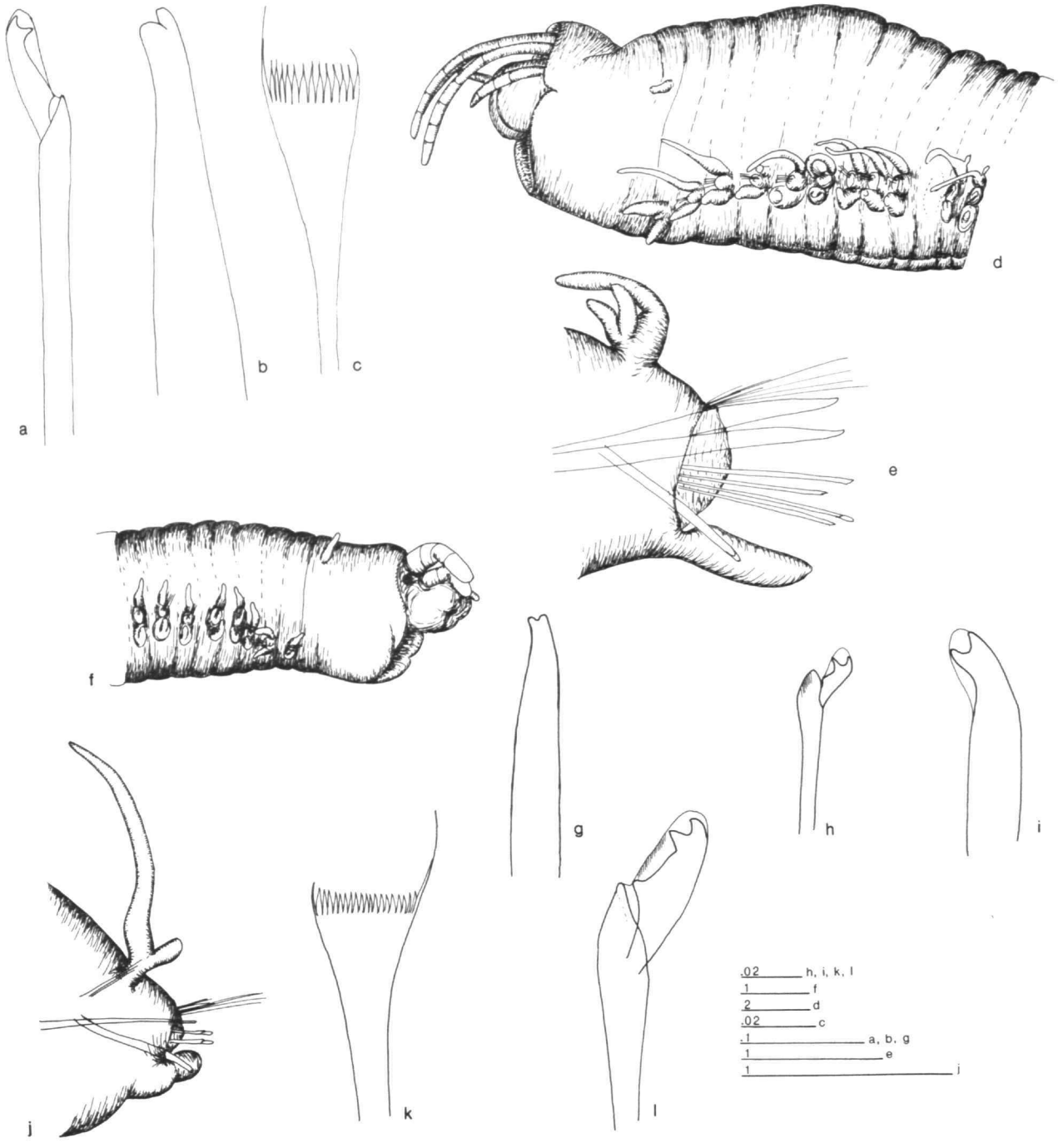

FIGURE 92.—*Eunice prognatha* (holotype, BM(NH) ZK 1885.12.1.192): a, compound falciger, parapodium 74; b, subacicular hook, parapodium 74; c, pectinate seta, parapodium 74; d, anterior end, lateral view; e, parapodium 74, anterior view. *Eunice pruvoti*, new name (MNHN, Paris, syntype of *E. anceps;* h and i of smaller syntype): f, anterior end, lateral view; g, subacicular hook, parapodium 58; h, compound falciger, parapodium 40; i, subacicular hook, parapodium 40; j, parapodium 58, anterior view; k, pectinate seta, parapodium 58; l, compound falciger, parapodium 58. (Scale bars in mm.)

ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform; maximum 5-6 long articulations in A-II and III. Three median antennae to middle of setiger 1; A-I to middle of peristomium. Peristomium with deeply flaring pocket on dorsal side, otherwise conically expanding posteriorly. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Remnants of peristomial cirri present.

Maxillary formula 1+1, 6+6, 8+0, 5+12, 2+1, and 1+1. Mx III very short. Unusual features include 2 teeth on left Mx V and presence of distinct Mx VI.

Branchiae present, palmate, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 10 on left side and 13 on right side to setiger 110. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. Most branchiae single, short filaments; some scattered segments with 2 or 3 short, cylindrical branchial filaments (Figure 92e); last few filaments short, nearly button-shaped.

Neuropodial acicular lobes rounded in anterior setigers, slightly more conical in posterior setigers; aciculae emerging dorsal to midline. All pre- and postsetal lobes low, transverse folds. First 9 ventral cirri digitiform. Ventral cirri distinctly basally inflated in setigers 10 through setiger 30. Inflated bases ovate; narrow tips tapering. Far posterior ventral cirri digitiform, resembling notopodial cirri in shape and length. All notopodial cirri basally slightly inflated, distally tapering with slender, digitiform tips, without articulations.

Limbate setae slender, nearly capillary. Ten or more pectinate setae in median and posterior setigers. Pectinate setae (Figure 92c) flaring, flat. One marginal tooth longer and thicker than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 92a) tapering, with poorly defined internal striations, without marginal teeth. Appendages short, slender, bidentate. Both teeth similar in size. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single anteriorly, paired in median and posterior setigers, black, tapering. Aciculae strongly projecting in median setigers; cross-sections knife-edged, distally pointed. Subacicular hooks (Figure 92b) black, bidentate. Hooks first present from setiger 35, present in all setigers thereafter, always single (except for replacements). Hooks tapering smoothly to small head. Proximal teeth about twice as large as distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 4, 6, 13, 14, 27-29, 39, 40, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice prognatha* belongs to either group B-2 or to group B-4; the branchial start is exactly at the (rather arbitrarily determined) breakoff point between the two groups. It is listed with similar species in both groups (Tables 27 and 31, and Tables 33 and 36). It is unique in Table 31 in that it has palmate branchiae with only three filaments; all other species in this table have pectinate branchiae (i.e., a distinct, elongated branchial stem is present). It is the only species listed in Table 36 with branchiae distinctly shorter than the notopodial cirri.

McIntosh (1885) reported that the peristomial cirri reached the frontal margin of the peristomium and that up to five branchial filaments could be present in a branchia; neither one of these statements can be confirmed.

9. *Eunice pruvoti*, new name

FIGURE 92f-l; TABLES 33, 36

Eunice anceps Pruvot, 1930:69.

Eunice afra.—Fauvel in Pruvot, 1930:69 [in part, not *Eunice afra* Peters, 1854].

MATERIAL EXAMINED.—One syntype, MNHN, Paris, Kuts, Ile de Pino, Nouvelle Caledonie, 1928, coll. Mme Pruvot; 1 syntype, MNHN, Paris, Collection Francais, Nouvelle Caledonie, forme jeune no. 10.

COMMENTS ON MATERIAL EXAMINED.—Both syntypes are currently labeled *Eunice afra*, and the labels are in Pierre Fauvel's handwriting; the second specimen also has a label naming it as "*?Eunice* jeune no. 10." The small syntype is nearly translucent, slender, and narrow and not distinctly dorsally flattened; the anterior end has been deeply dissected and the jaws are now missing. The description is based on the larger of the syntypes.

DESCRIPTION.—Large syntype complete, of unknown sex, with 115 setigers; total length 34 mm long; maximal width 3 mm; length through setiger 10, 5 mm. Anterior body cylindrical, becoming dorsally flattened and rather wide with crowded setigers by setiger 10; posterior end abruptly tapering and flattened. Anal cirri as long as the last 15 setigers, without articulations. Small syntype complete, of unknown sex, with about 100 setigers; total length 22 mm; maximal width 1 mm wide; length through setiger 10, 3 mm.

Prostomium (Figure 92f) distinctly shorter than peristomium, distinctly narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsally somewhat flattened; median sulcus deep. Palpal regions set off by horizontal, frontal grooves. Eyes between bases of A-I and A-II, large, dark. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick, sausage-shaped, digitiform, with 1 or 2 cylindrical, distinct articulations. Antennae to middle of anterior peristomial ring. Peristomium slightly flaring anteriorly, with distinct, muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring ~4/5 of total peristomial length.

Peristomial cirri to posterior end of anterior peristomial ring, digitiform, without articulations.

Jaws not examined.

Branchiae (Figure 92j) single filaments, present from setiger 15 to setiger 115. All branchiae distinctly longer than notopodial cirri, strap-like, proximally flattened, nearly as long as half body width in median and posterior setigers. Branchiae present to near posterior end, present on more than 65% of total number of setigers.

Median acicular lobes distally rounded with aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. Anterior ventral cirri thick, tapering, becoming basally modestly inflated by setiger 10, retaining inflated bases through most of body. Bases ovate or spherical; narrow tips tapering. Far posterior ventral cirri tapering, rather slender. Prebranchial notopodial cirri tapering, basally slightly inflated, becoming digitiform in branchial region; all notopodial cirri short, rather inconspicuous, without articulations.

Limbate setae slender, marginally smooth. Pectinate setae (Figure 92k) flaring, flat. One marginal tooth distinctly longer than other teeth, with ~15 teeth. Anterior setigers with 2-3 pectinate setae; median and posterior setigers with up to 25 pectinate setae. Shafts of compound falcigers (Figure 92l) distally inflated, marginally smooth, with distinct distal beaks. Appendages short, tapering, with rather large heads, bidentate. Proximal teeth triangular, directed laterally. Distal teeth distinctly shorter than proximal teeth, distinctly bent, distally blunt. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Neuropodial aciculae single, light brown, tapering to blunt, straight tips; cross-sections round. Subacicular hooks (Figure 92f) light brown, bidentate. Hooks first present from setiger 19, present in all setigers thereafter, always single. Hooks tapering narrow heads. Teeth directed distally; both teeth similar in size.

COMMENTS ON ADDITIONAL SPECIMEN EXAMINED.—Antennae of small syntype short, without articulations.

Branchiae absent.

Shafts of compound falcigers (Figure 92h) inflated, marginally smooth. Appendages very short. Guards symmetrically rounded. Teeth slender. Proximal teeth longer than distal teeth, narrowly tapering, directed laterally. Distal teeth tapering, directed laterally. Subacicular hooks (Figure 92i) from about setiger 25. Hooks with narrowed necks and distinct heads. Both teeth directed distally and similar in size.

UNKNOWN MORPHOLOGICAL FEATURES.—Location of maximum width and width at setiger 10. Condition of dorsal edge of pygidium. Jaw structure.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III forming arc with left Mx IV; Mx VI absent.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 39-42, 56, 58, 59. *Unknown Characters:* 4, 6, 32, 33.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice anceps* was first used in a list of synonyms of *E. afra* with "Pruvot M.S." (Fauvel in Pruvot, 1930:69) as author. The name has never been used as a valid name for the taxon and is thus not available as a name according to the Code. The new name honors the person responsible for recognizing the distinct status of the species, G. Pruvot.

The larger of the two specimens belong to the same group of species as *E. afra* and appears to be distinguishable from that species. The features observable indicate that the smaller specimen belongs to the same species as the larger one, but some features crucial for species identification are missing and the association between the two specimens is by no means certain. The species, as defined by the large syntype, is compared to other species in group B-4 in Tables 33 and 36.

Eunice pruvoti is the only species listed in Table 36 with exclusively single branchial filaments.

163. *Eunice pulvinopalpata* Fauchald, 1982

FIGURE 93; TABLES 27, 31

Eunice pulvinopalpata Fauchald, 1982b:781-785, fig. 1a-f.

MATERIAL EXAMINED.—Holotype and paratype, USNM 74304 and 74305, Pacific Ocean off western Mexico, 20°50'N, 109°06'W, 2633 m, *Alvin* dive 1214, sample #7, 20 Apr 1982, at base of white smoker. (Other paratypes in BM(NH) and AHF).

DESCRIPTION.—Holotype incomplete with 348 setigers; length 450 mm long; maximal width 11 mm; length through setiger 10, 23 mm. Paratype examined complete with 353 setigers; total length 320 mm with posterior end in regeneration; maximal width 11 mm; length through setiger 10, 18 mm. Body anteriorly cylindrical, becoming ventrally flattened by setiger 100, retaining strongly convex dorsum in all setigers. Body tapering abruptly anteriorly and slowly posteriorly; even in last setigers body 6 mm wide.

Prostomium (Figure 93a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally excavate with a thickened rim; median sulcus deep. Peristomial fold deep. Eyes not observed. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 19 irregularly cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 2. Peristomium tapering anteriorly, with a distinct muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle or front edge of prostomium, slender and tapering, with ~12 irregular, cylindrical articulations.

Maxillary formula (examined in USNM 74305) 1+1, 17+17,

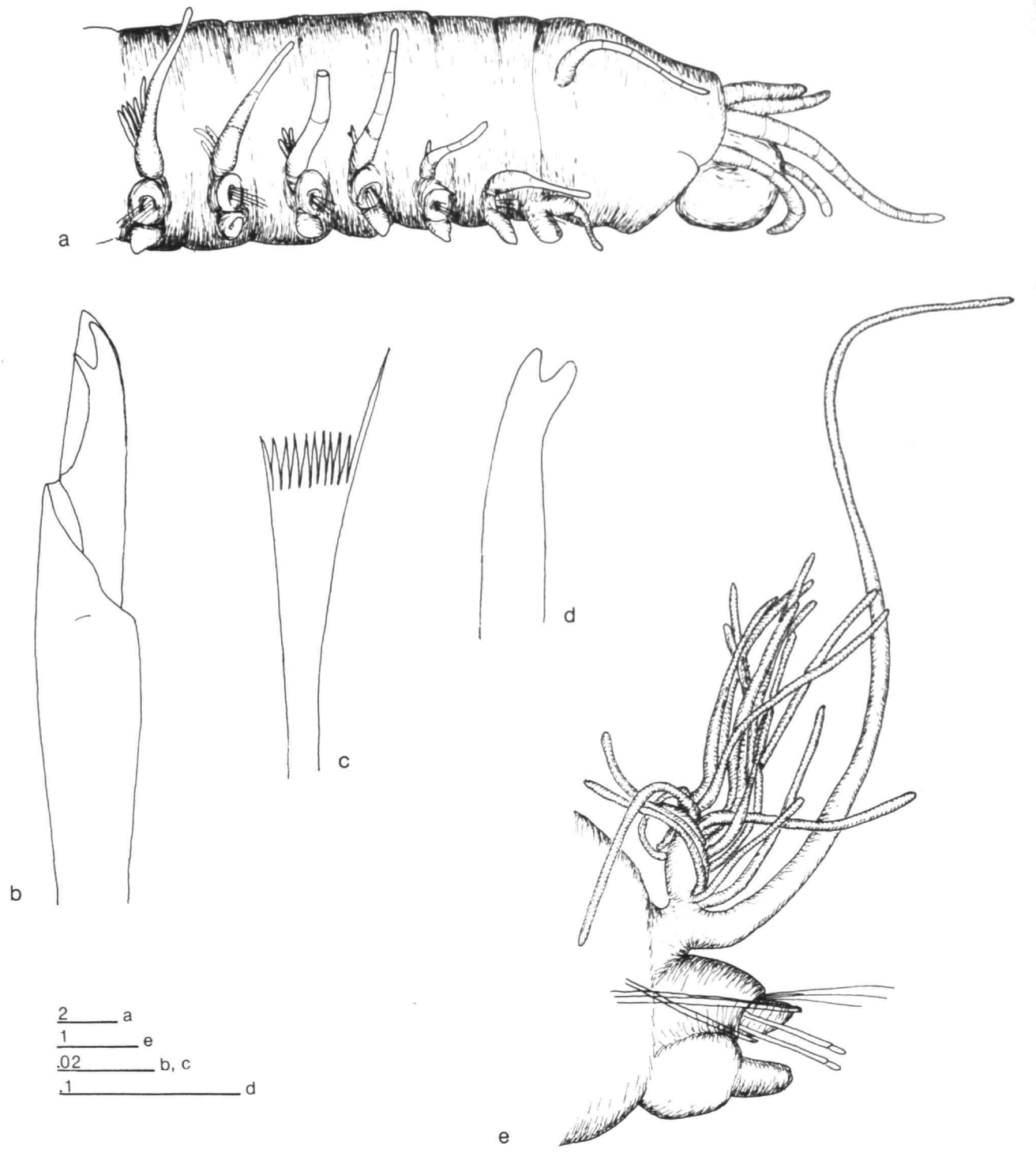

FIGURE 93.—*Eunice pulvinopalpata* (holotype, USNM 74304): a, anterior end, lateral view; b, compound falciger, parapodium 105; c, pectinate seta, parapodium 105; d, subacicular hook, parapodium 105; e, parapodium 105, anterior view. (Scale bars in mm.)

18+0, 12+12, and 1+1. Mx III behind left Mx II. Both Mx IV with same number of teeth. All teeth very small and even in size.

Branchiae (Figure 93e) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 3 to end of body. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First pair single filaments, all other branchiae with at least 4 filaments; maximally 25 filaments from setiger 15 to setiger 275; thereafter number slowly reduced; 15 filaments present in last setigers. Branchial stem thick, folded over in most parapodia. Filaments filiform.

Neuropodial acicular lobes asymmetrically rounded with aciculae emerging on dorsal side. All presetal lobes obliquely truncate. All postsetal lobes low, transverse folds. First 5 or 6 ventral cirri thick, digitiform. Ventral cirri basally inflated by setigers 6-7; inflated bases retained through about setiger 250. Inflated bases nearly spherical; narrow tips tapering. Far posterior ventral cirri tapering. Notopodial cirri very long, especially in anterior part of body. Where best developed, at about setiger 100, longer than width of body, slender, tapering, without articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 93c) tapering, flat. One marginal tooth very much longer than other teeth; 8 teeth present. Shafts of compound falcigers (Figure 93b) slightly inflated, marginally smooth. Appendages tapering, bidentate. Both teeth of same size, slender, tapering. Proximal teeth directed distally; distal teeth gently curved. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Most aciculae in triplets, dark brown to black, with tapering slender tips, straight; cross-section round. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 93d) dark brown to black, bidentate. Hooks first present from setiger 68 in holotype (from setigers 62-72 in paratypes), present in all setigers thereafter, always single (except for replacements). Hooks slender, tapering to a small head. Proximal teeth slightly larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 36.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice pulvinopalpata* is a member of group B-2; however, it also resembles some of the deep-water members of group A-1 and should be compared to these species as well (Tables 19-21). It is branchiated to near the posterior end, in contrast to most other deep-water species. It is listed with similar species in group B-2 in Tables 27 and 31. The only other species in Table 31 with more than 20 branchial filaments is *E. franklini*. The branchial filaments in the latter are very short and stubby; those in *E. pulvinopalpata* are slender, digitiform and certainly not unusually short.

Eunice punctata (Risso, 1826)

Leodice punctata Risso, 1826:421-422.
Eunice punctata.—Quatrefages, 1866:331.

REMARKS.—This species, of which no authoritative material exists, was considered either indeterminable or doubtfully as a member of *Marphysa fallax* by Fauvel (1923:451). The species described by Heider (1925) under this name cannot be a *Marphysa* because it has peristomial cirri; it is here considered as *E. harassii*. *Eunice punctata* (Risso) is indeterminable.

Eunice punctata Peters, 1854

Eunice punctata Peters, 1854:611.

REMARKS.—The specific name is preoccupied in the combination *E. punctata* (Risso, 1826). Peters' species is redescribed above as *E. petersi*.

Eunice punctata Grube, 1856

Eunice punctata Grube, 1856:59-60.
Eunice binominata Quatrefages, 1866:327.

REMARKS.—Quatrefages (1866:327) pointed out that Grube's specific name was pre-occupied by Risso (1826); Quatrefages apparently had overlooked Peters' use of the name, issued two years before Grube's paper, so the name was in fact doubly pre-occupied by the time Quatrefages reviewed the matter. Grube's species is here discussed as *E. binominata*.

164. *Eunice purpurea* Grube, 1866

FIGURE 94; TABLES 27, 30

Eunice purpurea Grube, 1866b:68.
Eunice violacea.—Grube, 1861:60-61 [not *Eunice violacea* Grube, 1856].

MATERIAL EXAMINED.—Two syntypes, ZMB F 2012, Portoré, Lesina, Adriatic Sea, coll. Grube.

COMMENTS ON MATERIAL EXAMINED.—The description is based wholly on the large specimen; some notes on the small specimen, which is a juvenile, have been appended. The peristomium of the large specimen has been ventrally dissected and the jaw apparatus torn partially loose; the illustration shows the condition with the jaws tucked back into position, but is in part a reconstruction where tissue had been removed.

DESCRIPTION.—Large syntype complete with 106 setigers; total length 53 mm; maximal width 4 mm; length through setiger 10, 9.5 mm. Other syntype with 40 setigers; length 7 mm long.

Prostomium (Figure 94a) distinctly shorter and narrower

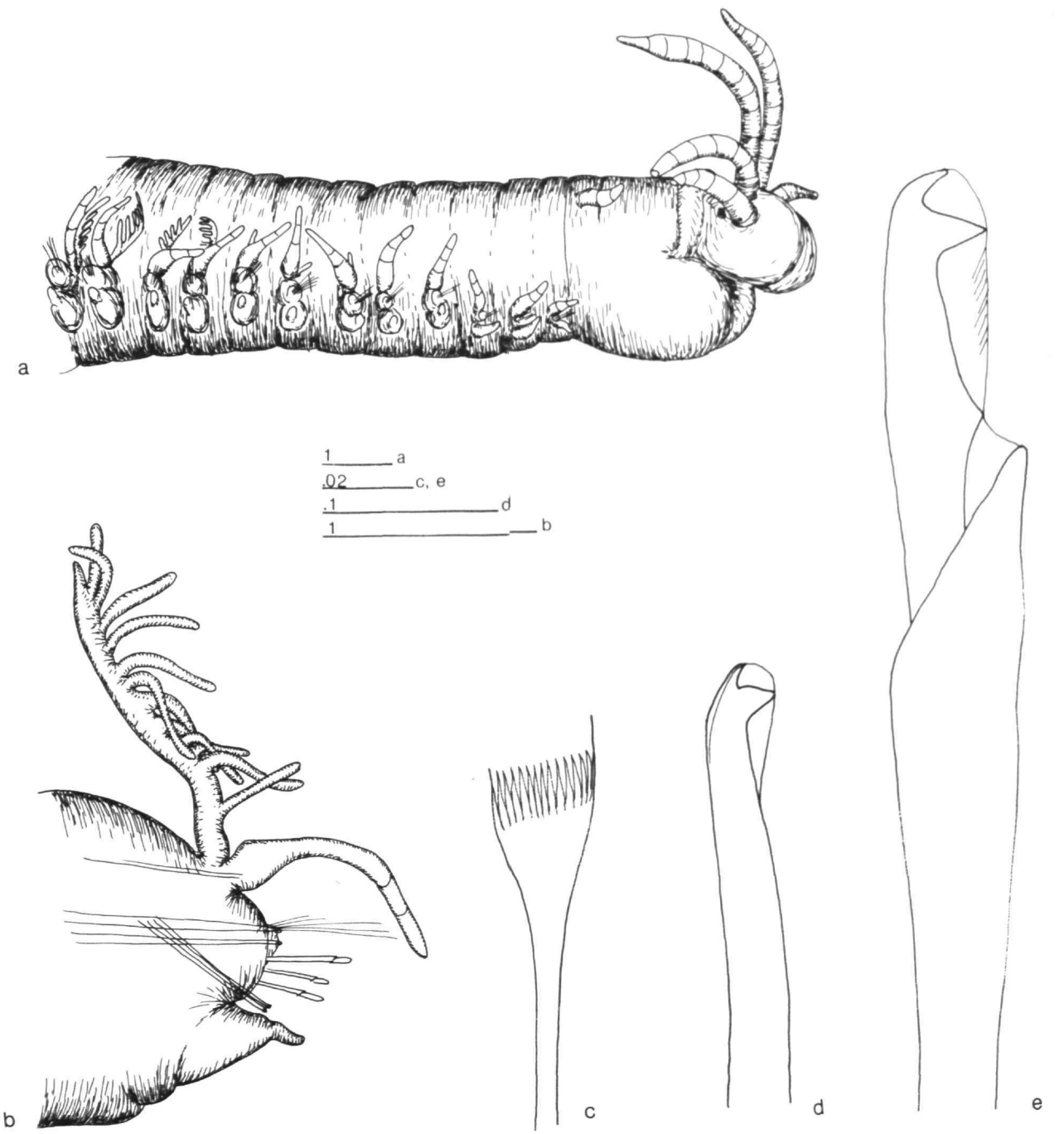

FIGURE 94.—*Eunice purpurea* (syntype, ZMB F 2012): a, anterior end, lateral view; b, parapodium 32, anterior view; c, pectinate seta, parapodium 32; d, subacicular hook, parapodium 32; e, compound falciger, parapodium 32. (Scale bars in mm.)

than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Peristomial fold completely everted making region posterior to antennal bases appear very long. Eyes between bases of A-I and A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 13 cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 2. Peristomium slightly flaring anteriorly, with distinct muscular lower lip. Separation between rings visible ventrally, slightly better marked dorsally; anterior ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, digitiform, with 3 cylindrical rings.

Maxillary formula 1+1, 4+5, 7+0, 2+7, and 1+1. Mx III part of distal arc with left Mx IV. Left Mx IV continued as edentate plate behind Mx III. Mx VI absent.

Branchiae (Figure 94b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 5 to setiger 100. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 3 and last 10 pairs single filaments; maximum 14 filaments at about setiger 20. First 2 pairs short, nearly button-shaped. Branchial stems long, erect, often curved in half corkscrew posteriorly. Filaments short, slender.

Neuropodial acicular lobes distally rounded, very low; aciculae emerging at midline. All pre- and postsetal lobes follow outline of acicular lobes closely. First 4 ventral cirri tapering. Ventral cirri with inflated bases between setigers 5 and 50. Inflated bases thick, transverse welts; narrow tips short and button-shaped. Posterior to setiger 50 ventral cirri becoming tapering, increasing in relative length, becoming about as long as notopodial cirri in last setigers present. First 50 notopodial cirri basally distinctly inflated, with decreasing numbers of articulations, up to 4 articulations; last articulated notopodial cirrus in setiger 55. Posterior notopodial cirri increasingly slender, decreasing in length to roughly 2/3 of length in anterior setigers.

Limbate setae marginally smooth. Median pectinate setae (Figure 94c) flaring, flat. One marginal tooth distinctly longer than other teeth; ~15 teeth present. Compound falcigers (Figure 94e) very large. Shafts tapering, marginally smooth. Appendages tapering, with large heads, bidentate. Proximal teeth longer than distal teeth, triangular, directed laterally. Distal teeth tapering relatively abruptly, distinctly bent. Guards symmetrically rounded, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, with brown cores and clear sheaths, tapering; cross-sections round. Subacicular hooks (Figure 94d) with brown cores and clear sheaths, bidentate. Hooks first present from setiger 19, present in all setigers thereafter, always single (except for replacements). Hooks very slender, tapering to small head. Proximal teeth very much larger than distal teeth, triangular, directed laterally. Distal teeth slender, curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice purpurea* is compared to similar species in Tables 27 and 30. Of species listed in Table 30 with 10 or more branchial filaments where the branchiae are best developed, *E. flavopicta* and *E. reducta* lack articulations in the peristomial cirri. The other heavily branchiated species have such articulations. Posterior ventral cirri are basally inflated in *E. coccinea*, widely triangular, nearly scoop-shaped in *E. laticeps* and *E. violaceomaculata*, tapering from narrow bases in *E. purpurea*, and unknown for *E. macrobranchia*. *Eunice purpurea* appears to have the branchiae distinctly outreaching the notopodial cirri; in *E. macrobranchia* the notopodial cirri are of about the same length as the branchiae.

The juvenile has lost all antennae; branchiae are present from setiger 5 and continued to near the posterior end. Where best developed at setiger 15, each branchia with two relatively long filaments. Aciculae and subacicular hooks brown; the latter are present from setiger 15. The juvenile very probably belongs to the same species as the larger specimen, but this cannot be confirmed presently.

165. *Eunice pycnobranchiata* McIntosh, 1885

FIGURE 95a-f; TABLES 14, 27, 32

Eunice pycnobranchiata McIntosh, 1885:294-297, figs. 54, 55, pl. 39: figs. 13-15, pl. 21A: figs. 4, 5.—Fauchald, 1986:253-255, figs. 56-61.

Eunice tentaculata.—Fauvel, 1917:269 [in part, not *Eunice tentaculata* Kinberg, 1865, nor *Eunice tentaculata* Quatrefages, 1866].

MATERIAL EXAMINED.—Three syntypes, BM(NH) ZK 1921.5.1.1997, *Challenger* sta 162, off East Moncoeur land, Bass Strait, 39°10′30″S, 146°37′E, 69 m, dredged, sand and shells, 2 Apr 1874. One syntype, BM(NH) ZK 1921.5.1.1998, *Challenger* sta 163A, Twofold Bay, between Melbourne and Sydney, 36°59′S, 150°20′E, 274 m, trawled, green mud.

COMMENTS ON MATERIAL EXAMINED.—The syntype from Twofold Bay was the one examined in detail by McIntosh; most of the description is based on this specimen. The specimen has been frontally dissected and the jaws are now missing.

DESCRIPTION.—Syntype described incomplete with 63 setigers; length 50 mm; maximal width 8 mm; length through setiger 10, 12 mm. Other syntype incomplete with 76 setigers; length 55 mm; maximal width 10 mm; length through setiger 10, 10 mm.

Prostomium (Figure 95a,b) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in a horseshoe, with A-III isolated by a

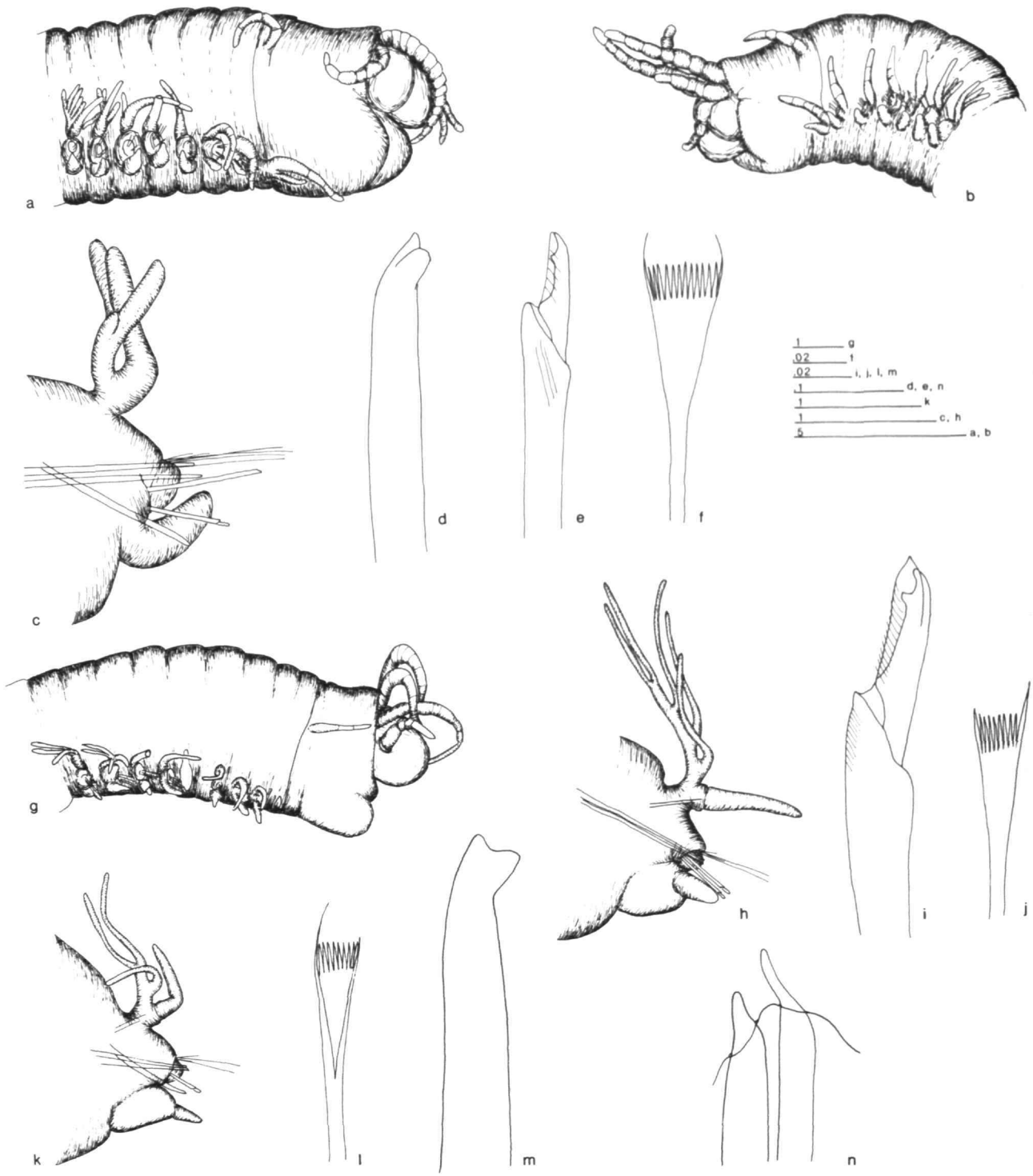

FIGURE 95.—*Eunice pycnobranchiata* (syntype, BM(NH) ZK 1921.5.1.1997 (b); BM(NH) ZK 1921.5.1.1998 (a and c–f): a, anterior end, lateral view; b, anterior end, lateral view; c, parapodium 32, anterior view; d, subacicular hook, parapodium 32; e, compound falciger, parapodium 32; f, pectinate seta, parapodium 32. *Eunice quinquefida* (holotype, USNM 15714): g, anterior end, lateral view; h, parapodium 19, anterior view; i, compound falciger, parapodium 32; j, pectinate seta, parapodium 19; k, parapodium 35, anterior view; l, pectinate seta, parapodium 35; m, subacicular hook, parapodium 35; n, aciculae, parapodium 35. (Scale bars in mm.)

TABLE 14.—Variable and invariable features in the type lot of *Eunice pycnobranchiata* (N = number of individuals examined; SD = standard deviation; measurements in mm; * = SD not calculated).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	2	140	129	134.5	*
Total length	2	105	70	87.5	*
Maximal width	4	7	2	5	2.16
Length through 10	4	13	5	9.5	3.32
No. of antennal articulations	4	17	8	11.75	3.86
No. of peristomial cirral articulations	4	5	3	4	1.15
Branchiae first present from setiger no.	4	8	5	6	1.41
Max. no. of branchial filaments	4	5	1	3.5	1.91
Ventral cirri inflated through setiger no.	4	50	32	40.75	7.37
Subacicular hooks first present from setiger no.	4	31	23	27.5	3.42

INVARIABLE FEATURES	N=4
Separation between rings distinct	dorsally and ventrally
Acicular color	brown
Aciculae distally	tapering; bent
Subacicular color	brown
No. of subacicular teeth	2

gap, with A-I slimmer than other 3. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 15 irregular, cylindrical articulations. Antennae reaching posterior peristomial ring; A-II and A-III similar in length; A-I somewhat shorter. Peristomium cylindrical with distinct muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring about 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, with 3 articulations.

Maxillary formula according to McIntosh (1885, fig. 54) 1+1, 5+5, 6+0, 6+8, 1+1. Mx III part of distal arc with left Mx IV and V.

Branchiae present, pectinate, about as long as notopodial cirri, not reduced in mid-body region. Branchiae from setiger 5–6 to end of fragments. Where best developed branchiae with 4 short thick filaments.

All neuropodial acicular lobes (Figure 95c) rounded; aciculae emerging dorsal to midline. Presetal lobes low, transverse folds. Anterior postsetal lobes forming collars around dorsal edge of acicular lobes. Median postsetal lobes low, transverse folds. Anterior ventral cirri digitiform. Median ventral cirri with barely visible inflated bases. Inflated bases ovate; narrow tips digitiform. Anterior notopodial cirri digitiform, with 2 to 4 irregular articulations. Median notopodial cirri basally somewhat inflated, without articulations.

Limbate setae slender. Pectinate setae (Figure 95f) flat, flaring. Both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 95e) tapering, marginally smooth with internal striations. Appendages short, bidentate. Proximal teeth shorter than distal teeth, triangular, directed laterally. Distal teeth tapering, nearly erect. Guards distally asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single in first few setigers, thereafter paired, black, tapering, straight; cross-section round. Subacicular hooks (Figure 95d) black, bidentate. Hooks first present from setiger 28 or 29, present in all setigers thereafter, always single (except for replacements). Proximal teeth much larger than distal teeth; both teeth directed obliquely distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; all features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 34, 36–40, 42, 47, 50, 51, 60, 63, 74.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The specimen from Bass Strait differs slightly from the specimen from Twofold Bay in length of antennae and in development of branchiae. Branchiae more prominent in Bass Strait specimens than in the other specimen. These differences are not considered to be of value as specific characters. McIntosh commented on the variability in the number of teeth in the jaws. Such variability was not observed in the current study.

Eunice pycnobranchiata is compared to similar species in Tables 27 and 32. It is the only species in Table 32 in which the branchiae and the notopodial cirri are similar in length; in two species, the branchiae are distinctly shorter and in the others, they are distinctly longer than the notopodial cirri. The length differences are very obvious in all cases.

The species has been considered a junior synonym of *E. afra* and *E. laticeps*. It differs clearly from *E. afra* by having branchiae from setigers 5–6 rather than from setiger 16. *Eunice*

laticeps has distally cylindrical antennal articulations and maximally about 18 branchial filaments; *E. pycnobranchiata* has distally drop-shaped antennal articulations and maximally four branchial filaments. The proposed synonyms cannot be accepted.

Eunice quadrioculata Grube, 1856

Eunice quadrioculata Grube, 1856:60.
Marphysa quadrioculata.—Quatrefages, 1866:337.—Grube, 1878a:101–102.

REMARKS.—This species, of which Grube actually only saw an illustration made by A.S. Örsted, has been considered a member of the genus *Marphysa* because Quatrefages first referred it to that genus.

166. *Eunice quinquefida* Moore, 1903

FIGURE 95g–n; TABLES 27, 32

Eunice quinquefida Moore, 1903:435–437, pl. 25: figs. 39–41.

MATERIAL EXAMINED.—Holotype, USNM 15714, *Albatross* sta 3698, Japan, Sagami Bay, 4.5 miles off Manazuru Zaki (approximate position 35°10′N, 139°10′E), 5 May 1900, 280 m, green mud, volcanic ash and sand, beamtrawl.

DESCRIPTION.—Holotype incomplete with 56 setigers; length 45 mm; maximal width 2.5 mm; length through setiger 10, 8 mm. Body anteriorly cylindrical, becoming slightly dorsoventrally flattened by setiger 25–30.

Prostomium (Figure 95g) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally strongly inflated; median sulcus deep. Eyes between bases of A-I and A-II, dark. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, separated irregularly into articulations; maximum 10 articulations present in A-II. Articulations cylindrical basally drop-shaped distally, especially in A-I. A-I to posterior peristomial ring; A-II to setiger 4; A-III to setiger 3 (probably incomplete). Peristomium slightly flaring anteriorly; lower lip distinct, muscular. Separation between rings very distinct dorsally and ventrally, indistinct only for a short distance laterally; anterior ring 5/6 of total peristomial length. Peristomial cirri to front edge of peristomium, slender and tapering, with 3 cylindrical articulations.

Maxillary formula 1+1, 6+6, 8+0, 8+10, and 1+1. Mx III part of distal arc with left Mx IV. Teeth on Mx II slender and sharply pointed; other teeth short and delicate.

Branchiae (Figure 95h,k) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 7 to end of fragment. All branchiae with at least 2 filaments; maximum 5 filaments at setigers 15–20. Branchial stems slender. Filaments slender, nearly filiform. Filaments as long as notopodial cirri.

All neuropodial acicular lobes symmetrically conical; aciculae emerging at midline. Presetal lobes obliquely truncate. Postsetal lobes low, transverse fold. First 4 or 5 ventral cirri thick, tapering. Ventral cirri strongly inflated basally from setiger 6–7. Inflated bases nearly spherical in setigers 15–25, changing to thick transverse welts from about setiger 26, becoming gradually reduced from about setiger 30, missing posterior to setiger 40. Narrow tips tapering in all ventral cirri with inflated bases. Far posterior ventral cirri slender, tapering. Notopodial cirri with distinct thickened cirrophores; cirrostyles thick, tapering, without articulations.

Limbate setae marginally frayed. Anterior pectinate setae (Figure 95j) tapering, flat. One marginal tooth distinctly longer than other teeth; 8–9 teeth present. Median and posterior pectinate setae (Figure 95l) distinctly furled, retaining same shape and number of teeth. Shafts of compound falcigers (Figure 95i) inflated, marginally finely serrated. Appendages tapering, bidentate. Proximal and distal teeth similar in size. Proximal teeth short, truncate, directed laterally. Distal teeth curved. Guards symmetrically sharply pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single in anterior parapodia, paired elsewhere (Figure 95n), with brown cores and clear sheaths, tapering, sharply bent, sometimes in double curves; cross-section round. Subacicular hooks (Figure 95m) with brown cores and clear sheaths, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, paired in most setigers. Hooks slender, tapering, with small head. Proximal teeth larger than distal teeth, triangular, laterally directed. Distal teeth short, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 23, 36–40, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—Because of the incomplete condition of the type of *E. quinquefida*, the species was listed in group B-5 by Fauchald (1970). It resembles species in group B-2, and is here compared to species in Tables 27 and 32. It is one of two species in 32 without articulated notopodial cirri. The other species, *E. rubella*, has very short antennae barely outreaching the prostomium. Although A-III is probably incomplete in the type of *E. quinquefida*, A-II reaches setiger 4.

Eunice quoya Quatrefages, 1866

Eunice quoya Quatrefages, 1866:318.—Fauchald, 1986:255.

REMARKS.—The original diagnosis of this species is incomplete and no material is available. It was characterized as indeterminable by Fauchald (1986) and no new evidence has been come to light to change that opinion.

167. *Eunice reducta* Fauchald, 1970

FIGURE 96a–h; TABLES 27, 30

Eunice reducta Fauchald, 1970:39–43, pl. 5: figs. a–i.

MATERIAL EXAMINED.—Holotype, AHF Poly 0338, Gulf of California, Mexico, entrance of Bahia Agua Verde, from 25°31′36″N, 111°03′15″W to 25°31′40″N, 111°04′13″W, 42–48 m, dredge, sand, mollusks, crabs, 17 Mar 1949, *Velero IV*, sta 1743-49.

DESCRIPTION.—Holotype complete with 298 setigers; total length 318 mm; maximal width 6 mm; length through setiger 10, 15 mm. Body anteriorly truncate, cylindrical, tapering slowly posteriorly to slender posterior end with crowded short segments; most body segments only slightly wider than long; parapodia strictly lateral. Paired anal cirri barely longer than pygidium, without articulations; dorsal edge of pygidium smooth.

Prostomium (Figure 96a) distinctly shorter and narrower than peristomium, as deep as 1/2 of the peristomium. Peristomial lobes frontally obliquely truncate, dorsally excavate with a thickened rim; median sulcus shallow, but wide. Eyes posterior to bases of A-I, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 3 cylindrical, indistinct articulations. A-I to middle of anterior peristomial ring; A-II and A-III to posterior peristomial ring; A-III slightly longer than A-II. Peristomium cylindrical; lower lip distinct muscular. Separation between rings distinct dorsally and ventrally; anterior peristomial ring 4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, without articulations.

Maxillary formula 1+1, 4+4, 8+0, 4+10, and 1+1 according to Fauchald (1970:42).

Branchiae (Figure 96g) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to setiger 131. Branchiae terminating well before posterior end, present on less than 55% of the total number of setigers. Last 6 pairs single filaments, all others with at least 2 filaments; maximum number of filaments 21 in a trim series. Branchial stems long, erect, tapering. Filaments short, digitiform. Some filaments furcate. Filaments and notopodial cirri similar in length.

Anterior neuropodial acicular lobes distally truncate with aciculae emerging at midline. Posterior neuropodial acicular lobes conical with aciculae emerging at tip. All pre- and postsetal lobes low folds. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from about setiger 5 through about setiger 50. Inflated ventral cirri large, irregularly rounded; narrow tips absent. Ventral cirri increasingly digitiform in far posterior setigers, but always shorter than notopodial cirri. Anterior notopodial cirri thick, medially inflated, decreasing rapidly in width posteriorly. Postbranchial notopodial cirri half as long as anterior notopodial cirri, slender, digitiform. Pre-branchial and branchial notopodial cirri with 2 or 3 articulations; postbranchial notopodial cirri without articulations.

Limbate setae tapering, marginally pilose. Pectinate setae (Figure 96d,f) with flattened shafts; blades flat, flaring. One marginal tooth very much longer than other teeth; ~20 teeth in median and posterior setae; ~10 in anterior setae. Shafts of compound falcigers (Figure 96b,e,h) thick, tapering, marginally smooth. Appendages short, triangular, bidentate. Proximal teeth very much smaller than distal teeth; anterior proximal teeth small, distally directed spur; posterior proximal teeth low, triangular elevations. Distal teeth very large, blunt, erect. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in anterior setigers, single in posterior setigers, dark brown to black, tapering, blunt-tipped; cross-section round. Subacicular hooks (Figure 96c) dark brown to black, bidentate. Hooks first present from setiger 45, present in all setigers thereafter, always single (except for replacements). Hooks tapering gently to small head. Proximal teeth about half as large as distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III forming part of a distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Fauchald (1970) indicated that subacicular hooks could be present from setigers 34–49 in non-type specimens of this species from western Mexico. *Eunice reducta* belongs to group B-2, but differs from most species in the group by having a long abranchiate posterior end. It is compared to similar species in Tables 27 and 30. The two other species in Table 30 with abranchiate posterior end, *E. coccinea* and *E. fimbriata*, have 10 and five branchial filaments respectively; *E. reducta* has 21 filaments where the branchiae are best developed.

Eunice rissoi Quatrefages, 1866

Eunice rissoi Quatrefages, 1866:315–316, pl. 10: fig. 5.
Eunice vittata.—Grube, 1870a:295 [in part, not *Nereis vittata* Chiaje, 1829].

REMARKS.—No type specimens are available.

In the original description A-III is mentioned as being very much longer than the other antennae; peristomial cirri were described as long; branchia present from setiger 3 (ring 4) with up to 5 filaments.

Grube in his review of material in the Paris Museum indicated that branchiae began on setiger 4 and were absent from the last 10 of a total of 105 segments present in a complete specimen. A-III reached setiger 4 and had a few long

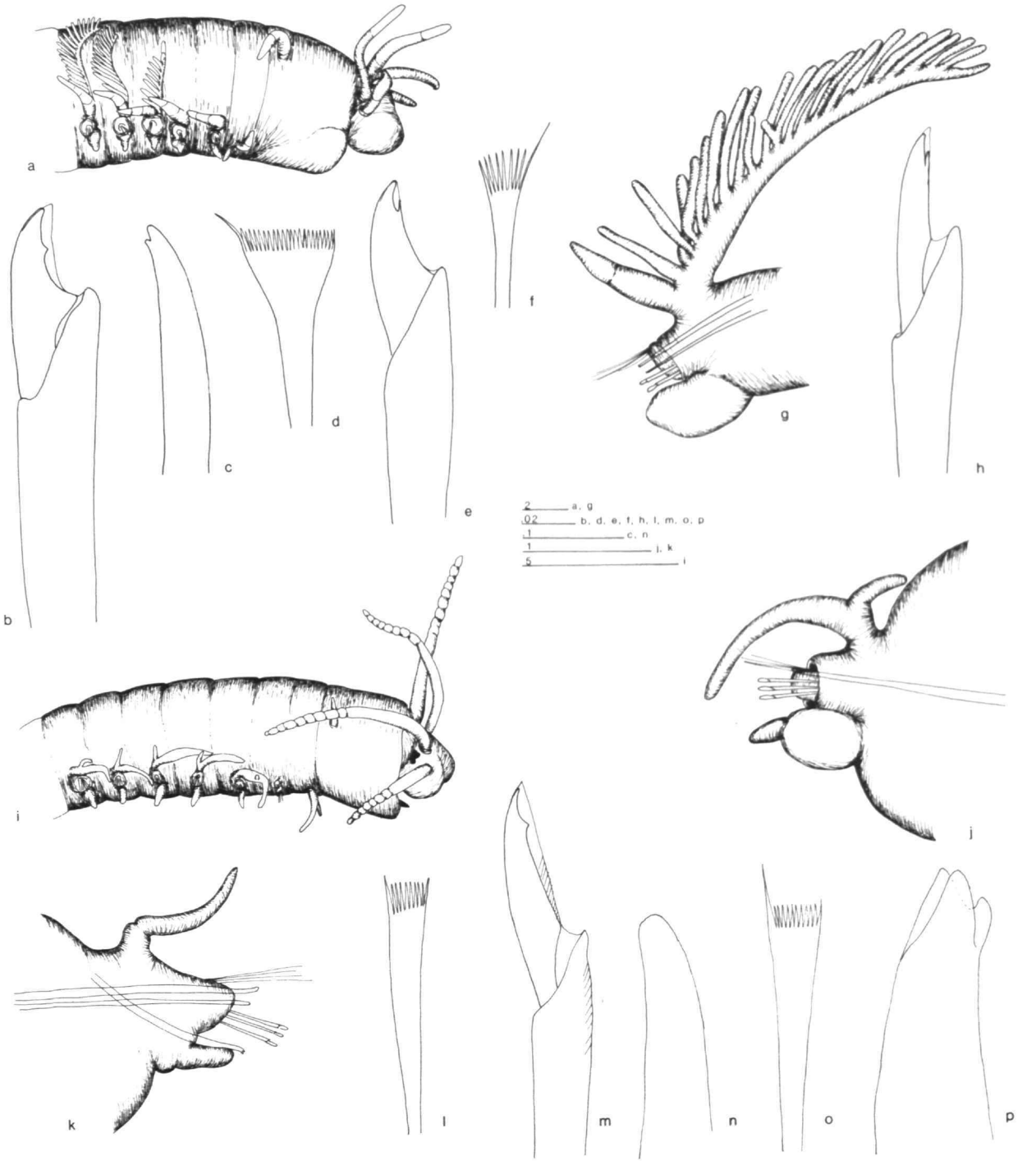

FIGURE 96.—*Eunice reducta* (holotype, AHF Poly 0338): a, anterior end, lateral view; b, compound falciger, parapodium 275; c, subacicular hook, parapodium 275; d, pectinate seta, parapodium 275; e, compound falciger, parapodium 3; f, pectinate seta, parapodium 3; g, parapodium 10, anterior view; h, compound falciger, parapodium 10. *Eunice rosaurae* (syntype, BM(NH) ZK 1941.1.1.217-221): i, anterior end, lateral view; j, parapodium 25, anterior view; k, parapodium 68, anterior view; l, pectinate seta, parapodium 25; m, compound falciger, parapodium 25; n, acicula, parapodium 68; o, pectinate seta, parapodium 68; p, subacicular hook, parapodium 68. (Scale bars in mm.)

articulations. Grube referred the species, incorrectly, to *E. vittata*. The latter lacks branchiae on the posterior half of the body.

Grube suggested that *E. rissoi* might be the same as *E. rubrocincta* Ehlers; the branchial distribution certainly is closer to the latter than it is to *E. vittata*. However, Grube's suggestion is certainly not adequate to propose a synonymy.

The information available is insufficient to characterize *E. rissoi* and it is here considered indeterminable.

168. *Eunice rosaurae* Monro, 1939

FIGURE 96i–p; TABLES 24, 25, 52, 53

Eunice rosaurae Monro, 1939:351–352, fig. 282 a–f [in part].

MATERIAL EXAMINED.—Two syntypes, ZK 1941.1.1.217-221, off St. George, Grenada, 12°05'N, 61°49'W, 720–800 m, 27 Nov 1937, trawled, *Rosaura* Expedition, Atlantic, 1937–38, sta 34.

COMMENTS ON MATERIAL EXAMINED.—Two of the three original syntypes fit the species as described by Monro; the third syntype belongs to *E. collini* and is treated above. Of the two syntypes, one had been dissected and the jaws were separated; it agrees with the specimen described in detail by Monro and forms the base of the description given below.

DESCRIPTION.—One syntype complete with 142 setigers; total length 152 mm; maximal width 4 mm; length through setiger 10, 18 mm. Other syntype nearly complete with 138 setigers; length 170 mm; maximal width 4 mm; length through setiger 10, 18 mm.

Prostomium (Figure 96i) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate, dorsally somewhat flattened; median sulcus deep. Eyes between bases of A-I and A-II, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles medially inflated; inner half without articulations; outer half of ceratostyles increasingly articulated; outer articulations distinctly moniliform; maximum 13 articulations in A-III. A-I to posterior margin of peristomium; A-II to setiger 3; A-III to setiger 3, but slightly longer than A-II. Peristomium cylindrical. Separation between rings distinct dorsally only; anterior ring 3/4 of total peristomial length. Peristomial cirri to front edge of posterior peristomial ring, medially inflated, without articulations.

Maxillary formula 1+1, 6+6, 8+0, 5+5, and 1+1.

Branchiae (Figure 96j) present, single filaments, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 3 to setiger 48–55. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and last 10 branchiae small tubercles. All other branchiae single, slender filaments.

Anterior neuropodial acicular lobes distally truncate with aciculae emerging near upper corner of lobes. Posterior acicular lobes distally triangularly rounded with both aciculae emerging centrally. Anterior and median pre- and postsetal lobes follow outline of acicular lobes closely. Posterior pre- and postsetal lobes low, transverse folds. First 5 ventral cirri basically digitiform, slightly tapering. Ventral cirri basally inflated from setiger 6 through branchial region. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri retaining short, inflated bases as sausage-shaped thickenings along ventral edge of parapodia; narrow tips digitiform. Prebranchial notopodial cirri slender, gently inflated basally; branchial notopodial cirri somewhat more inflated. Postbranchial notopodial cirri (Figure 96k) slender with distinct separation between cirrophores and cirrostyles.

Limbate setae slender, marginally obscurely serrated. Pectinate setae (Figure 96l,o) tapering, flat. One marginal tooth distinctly longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 96m) distally tapering, marginally serrated. Appendages short, bidentate. Proximal teeth smaller than distal teeth, very short, tapering, curved laterally. Distal teeth gently curved, slender. Guards bluntly pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae mostly paired, single in anterior setigers, with black cores and clear sheaths, distally tapering, gently curved (Figure 96n). Subacicular hooks (Figure 96p) with black cores and clear sheaths, sometimes including all teeth; some hooks distally tridentate with 2 large distal teeth in tandem and small, nearly clear proximal teeth. In other hooks distal teeth fused, so hooks apparently bidentate. Bidentate hooks in full lateral view identical in appearance to tridentate ones, with both teeth pointing distally. Hooks first present from setiger 38 (32 in the other specimen), present in all setigers, always single (except for replacements).

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 39–42, 56, 60. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice rosaurae* is listed with similar species in Tables 24 and 25. It resembles two additional species in Table 25 in having short branchiae consisting of single strap-like filaments. These two species, *E. gravieri* and *E. nicidioformis*, have exclusively bidentate subacicular hooks. Tridentate subacicular hooks with the teeth in tandem present in some neuropodia have not been found in any other species in group B1. A total of four species are known to have the distal teeth in tandem in the genus; these are listed in Tables 52 and 53. Two of these have light yellow aciculae and subacicular hooks. The only other species with dark aciculae and subacicular hooks is *E. cirrobranchiata*. All aciculae are pointed in *E. rosaurae*; the aciculae are in part hammer-headed in *E. cirrobranchiata*.

169. *Eunice roussaei* Quatrefages, 1866

FIGURE 97; TABLES 27, 28

Eunice roussaei Quatrefages, 1866:309-311, pl. 10: fig. 1-4.—Grube, 1870a:298.—Fauvel, 1917:220-225, fig. 19a-e, pl. 8 [in part].
Eunice gigantea Cuvier, 1830:200 [not *Leodice gigantea* Lamarck, 1818].

MATERIAL EXAMINED.—MNHN, Paris, 8 parapodia of specimen from Santander, identified by Fauvel.

DESCRIPTION.—The following comments are based on the original description and the other reports cited above, in addition to the examination of the parapodia available.

Antennae smooth or vaguely articulated, reaching setigers 3-4 (Fauvel, 1917). Peristomial cirri smooth or vaguely articulated, often as long as peristomium (Fauvel, 1917).

Branchiae from setigers 6-8 (Grube, 1870a), or from 6 to 10, most frequently from setigers 8-9 (Fauvel, 1917); maximum number of filaments 47 according to Grube (1870a). Maximum 30 filaments arranged in a single row along the very long, erect, stiff branchial stems in parapodia examined. Filaments filiform with slender, tapering tips, about as long as notopodial cirri except in anterior branchiated setigers. Branchiae distinctly outreach notopodial cirri in all parapodia examined.

Neuropodial acicular lobes bilobed (Figure 97a,f,j,n); lobes deeply to shallowly separated; aciculae emerging at midline. Presetal lobes low transverse folds. Anterior postsetal lobes (Figure 97a) distinct free, distally rounded lobes; median postsetal lobes follow outline of acicular lobes closely. Ventral cirri basally inflated early, perhaps from about setiger 10, forming distinct transverse inflated ridge in all other setigers examined; narrow tips short and button-shaped in all setigers. Notopodial cirri basally inflated, without articulations, decreasing in size posteriorly, both absolutely and in relation to the length of the branchiae.

Limbate setae slender and marginally frayed. Pectinate setae (Figure 97c,e,i,l) tapering with an abruptly flaring distal end in all setigers, flat. One marginal tooth larger than other teeth; ~10 relatively short and wide teeth present. Shafts of compound falcigers (Figure 97b,d,h,k) tapering, marginally smooth with distinct internal striations. Appendages relatively narrow, tapering with distinct large heads, bidentate. Both teeth equally well developed; proximal teeth triangular and distal teeth distinctly curved. Guards asymmetrically bluntly pointed and marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, with dark brown cores and light colored sheaths, tapering to slender, straight tips; cross-section round. Subacicular hooks (Figure 97g,m) bidentate. Hooks paired. Hooks tapering to small heads with both teeth well developed; distal tooth longer than proximal tooth. Both teeth directed distally; most hooks with faded core and sheath development.

UNKNOWN MORPHOLOGICAL FEATURES.—All features associated with anterior end; jaw structure; distributional characters; all characters associated with posterior end.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1-20, 24-26, 28, 29, 33, 36-40, 42, 47, 50-52, 57-60, 63, 80, 81

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—This species was originally named by Quatrefages for the very large *Eunice* species reported from the Antilles Islands by Cuvier (1830). Quatrefages contrasted it with the large species from the Indian Ocean referred to above as *E. aphroditois*. The different usages of the name *E. gigantea* have been explored above.

Fauvel (1917) reviewed the large species of *Eunice* with dark aciculae and subacicular hooks and separated this species from *E. aphroditois* and related taxa. In the process he synonymized a series of other described species into the two species named; as indicated elsewhere, these synonyms are not acceptable in toto. All of these species are compared in Table 27 and a subgroup without antennal articulations is compared in Table 28.

Eunice roussaei appears to differ from most species in Table 28 in that it has paired subacicular hooks in most segments; the only other species in the table to have this feature is *E. rullieri*, from which *E. roussaei* can be separated by having pectinate branchiae with up to 47 filaments rather than palmate branchiae with five filaments.

170. *Eunice rubella* Knox, 1951

FIGURE 98a-e; TABLES 27, 32

Eunice rubella Knox, 1951:66-69, figs. 6-12.—Fauchald, 1986:255-256; figs. 62-66.

MATERIAL EXAMINED.—Holotype, Canterbury Museum, NZ, Banks Peninsula, 146 m.

COMMENTS ON MATERIAL EXAMINED.—The holotype was originally described as being in three pieces including a total of 112 segments and measuring 60 mm. Now it consists of two fragments, anterior and posterior, with a total of 94 segments, 48 mm long, so presumably a middle piece consisting of 16 segments 12 mm long is now missing.

DESCRIPTION.—Anterior fragment with 46 segments; length 27 mm; maximal width 2 mm; length through setiger 10, 8 mm. Posterior fragment with pygidium with 48 segments; length 21 mm.

Prostomium (Figure 98a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally truncate, dorsally excavate with a thickened rim; median sulcus shallow. Nuchal fold everted. Eyes between bases of A-I and A-II, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all

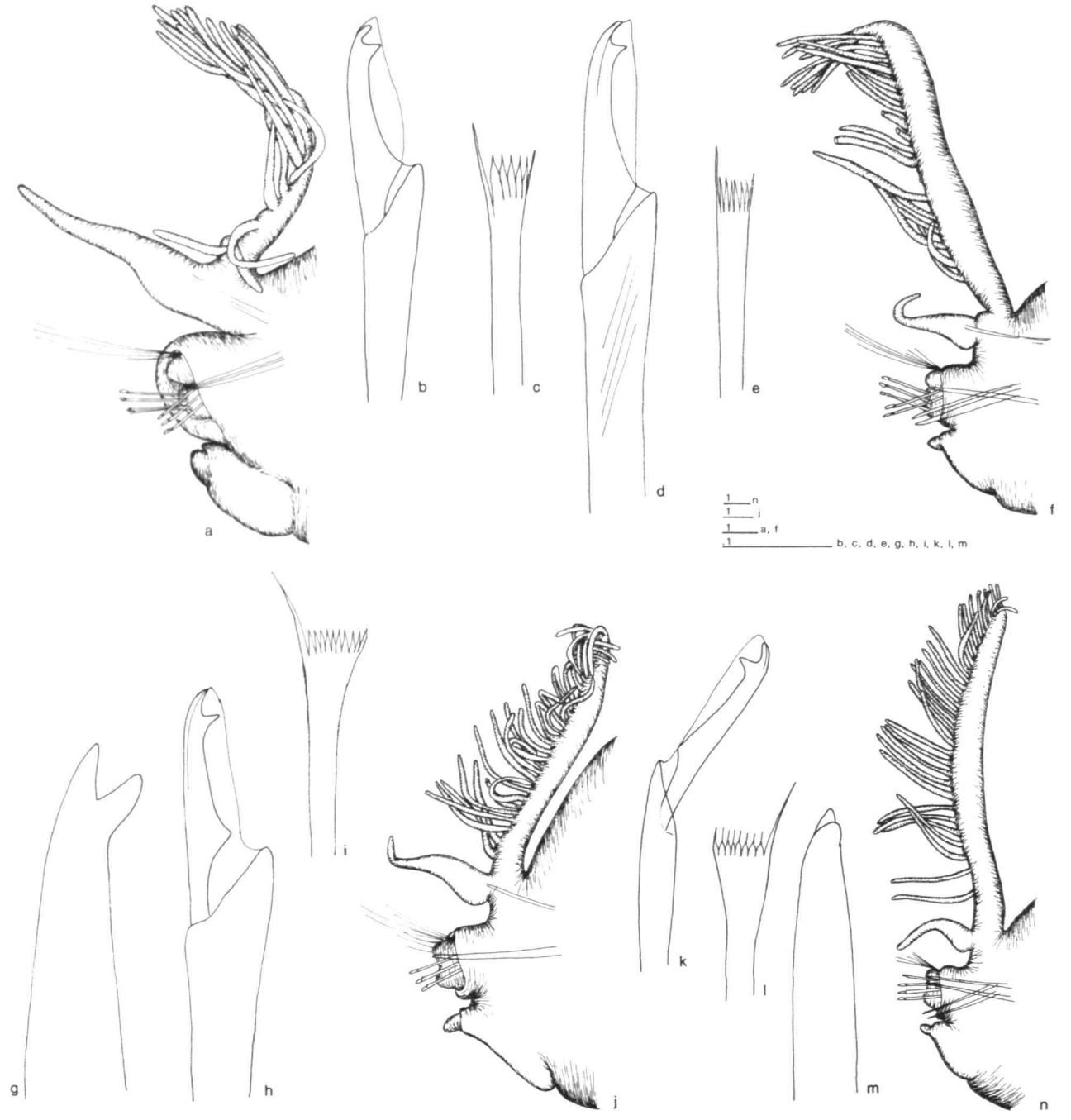

FIGURE 97.—*Eunice roussaei* (MNHN, slides from Santander): a, anterior parapodium, anterior view; b, compound falciger, anterior parapodium; c, pectinate seta, anterior parapodium; d, compound falciger, medioposterior parapodium; e, pectinate seta, medioposterior parapodium; f, medioposterior parapodium, anterior view; g, subacicular hook, medioposterior parapodium; h, compound falciger, median parapodium; i, pectinate seta, median parapodium; j, median parapodium, anterior view; k, compound falciger, posterior parapodium; l, pectinate seta, posterior parapodium; m, subacicular hook, posterior parapodium; n, posterior parapodium, anterior view. (Scale bars in mm.)

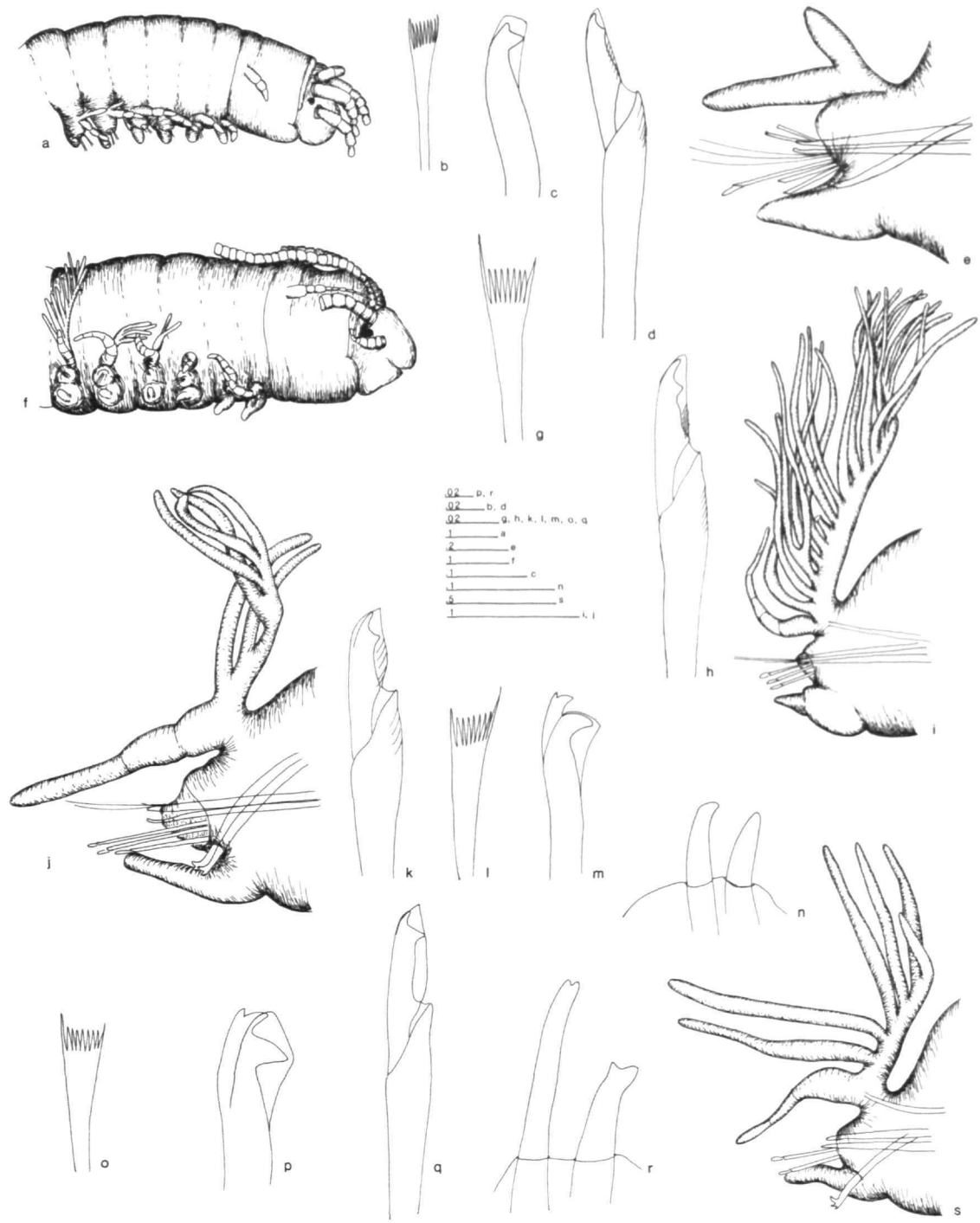

FIGURE 98.—*Eunice rubella* (holotype, Canterbury Museum): a, anterior end, lateral view; b, pectinate seta, parapodium 45; c, subacicular hook, parapodium 45; d, compound falciger, parapodium 45; e, parapodium 45, anterior view. *Eunice rubra* (holotype, ZMC): f, anterior end, lateral view; g, pectinate seta, parapodium 20; h, compound falciger, parapodium 20; i, parapodium 20, anterior view; j, parapodium 49, anterior view; k, compound falciger, parapodium 49; l, pectinate seta, parapodium 49; m, subacicular hook, parapodium 49; n, aciculae, parapodium 49; o, pectinate seta, parapodium 111; p, subacicular hook, parapodium 111; q, compound falciger, parapodium 111; r, aciculae, parapodium 111; s, parapodium 111, anterior view.

antennae, without articulations. Ceratostyles relatively stout and digitiform, with up to 7 moniliform articulations in A-II; innermost articulations half length of each antenna. Antennae reaching middle of peristomium. Peristomium cylindrical, more than twice as long as prostomium. Separation between rings distinct dorsally and laterally, indistinct ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to about middle of peristomium, tapering, with 3 articulations.

Jaws now missing. Maxillary formula 1+1, 5+6, 6+0, 6+7, and 1+1 according to Knox.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 5 to end of fragment. Where best developed, between setigers 7 and 29, branchiae with 2 short, thick filaments; otherwise all branchiae with single filaments (Figure 98e).

Anterior neuropodial acicular lobes very short, distally truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 7 ventral cirri thick, tapering. Ventral cirri basally from setiger 8 through setiger 27. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri large; open scoops covering emergent parts of subacicular hooks. Anterior notopodial cirri thick and medially inflated, with 3 articulations. Notopodial cirri retaining same size in all segments present, becoming digitiform by setiger 20, without articulations.

Pectinate setae (Figure 98b) tapering, flat. Both marginal teeth slightly longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 98d) tapering, marginally finely dentate. Appendage short, rather wide, bidentate. Both teeth similar in size, short and blunt. Guards bluntly truncate, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in median and posterior parapodia, black, very thick, tapering, bent dorsally; cross-sections round. Subacicular hooks (Figure 98c) black, bidentate. Hooks first present from setiger 28, present in all setigers thereafter, always single (except for replacements). Hooks curved, with large head. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth directed dorsally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; some features associated with posterior setigers; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36–38, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice rubella* differs from most other species with black, bidentate subacicular hooks by having very strongly beaded ceratostyles and by the poor development of branchiae. It is listed with similar species in Tables 27 and 32; it is the only species in Table 32 with the separation between peristomial rings visible only dorsally; in all other species the separation is visible also ventrally.

Branchiae were present to setiger 80 according to Knox; the distribution on the fragments present agrees with this pattern.

171. *Eunice rubra* Grube, 1856

FIGURE 98f–s; TABLES 46, 47

Eunice rubra Grube, 1856:59.

MATERIAL EXAMINED.—Holotype, ZMC, St. Thomas, West Indies, coll. A.S. Örsted and H. Kröyer.

DESCRIPTION.—Holotype nearly complete with 118 setigers; length 177 mm; maximal width 3 mm; length through setiger 10, 7.5 mm.

Prostomium (Figure 98f) about as long as peristomium, distinctly narrower than peristomium, as deep as 1/2 of the peristomium. Prostomial lobes forming blunt 3-sided pyramid, frontally obliquely truncate, dorsally flattened; median sulcus shallow. Palpal region marked off by shallow horizontal groove. Eyes between bases of A-I and A-II. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 23 moniliform articulations in (apparently incomplete) A-III. A-I to middle of anterior peristomial ring. Longest A-II to setiger 1; incomplete A-III to setiger 3. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and tapering, with 10 cylindrical articulations.

Jaws not examined.

Branchiae (Figure 98i,j,s) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 4 to end of fragment (~15 setigers missing). First branchia with 2 filaments; all other branchiae strongly pectinate with at least 6 filaments. Maximum filaments 21 at about setiger 15. Number of filaments reduced to 6 by setiger 40; this number retained in rest of specimen. No increase in number of filaments towards posterior end, but a slight increase in length of filaments present.

All neuropodial acicular lobes distally rounded; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. Presetal lobes distinctly shorter than acicular lobes in anterior and median setigers, following outline of acicular lobes closely in posterior setigers. First 3 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 4 through setiger 40. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri increasingly digitiform, about half as long as notopodial cirri in median and posterior setigers. All notopodial cirri tapering from slightly inflated bases. Anterior notopodial cirri with up to 6 articulations; median and posterior notopodial cirri with 3 to 4 articulations.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 98g,l,o) tapering, flat. One marginal tooth distinctly

longer than other teeth; ~10 teeth present. Shafts of anterior and median compound falcigers (Figure 98h,k) inflated, marginally serrated; those of posterior falcigers tapering and smooth (Figure 98q). Appendages thick with very nearly parallel sides, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth nearly straight, directed obliquely distally. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow. Anterior aciculae tapering to blunt tips, gently curved or straight. In median setigers inferior aciculae (Figure 98n) blunt-tipped, distinctly sharply bent. Posteriorly inferior aciculae (Figure 98r) indistinctly bifid, slender; superior aciculae distinctly bifid with teeth of different sizes, thick; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 98m,p) yellow, tridentate with teeth in a crest. Hooks first present from setiger 27, present in all setigers thereafter, paired in some setigers. Two distal fangs grouped on common bases; tertiary fangs very small in median setigers, becoming more distinct in posterior setigers.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6,23, 36-38, 40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice rubra* is listed with similar species in Tables 46 and 47. It has both pointed and weakly bidentate aciculae. Other than *E. elseyi,* it has a far higher number of branchial filaments than any other species with modified aciculae listed in Table 47. *Eunice rubra* has crested tridentate subacicular hooks; *E. elseyi* has hooks with the distal pair of teeth in tandem.

172. *Eunice rubrivittata* (Treadwell, 1921)

FIGURE 99a-e; TABLES 41, 42

Leodice rubrivittata Treadwell, 1921:34-36, figs. 85-94, pl. 1: fig. 18.
Eunice vittata.—Augener, 1927:40.—Hartman, 1956:252 [in part, not *Nereis vittata* Chiaje, 1829].

MATERIAL EXAMINED.—Holotype, AMNH 1263, Buccoo Bay, Tobago land, 8 Apr 1918.

DESCRIPTION.—Holotype incomplete with 97 setigers; length 56 mm; maximal width 1.2 mm; length through setiger 10, 5.1 mm.

Prostomium and peristomium about equal in length (Figure 99a), distinctly narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally slightly flattened; median sulcus deep. Eyes not observed. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles distally blunt, digitiform, with 2 or 3 irregularly arranged, cylindrical articulations. A-I to middle of peristomium; A-II and A-III to setiger 1. Peristomium cylindrical. Separation between rings distinct on all sides of body; anterior ring slightly longer than posterior ring. Anterior ring with frontal, yoke-shaped thickening covering at peristomial fold. Peristomial cirri incomplete, probably slender and digitiform.

Jaws not available.

Branchiae (Figure 99e) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 3 to setiger 56. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 6 branchiae single, long filaments which increase somewhat in length posteriorly. From setiger 9 another filament added; maximum 5 filaments from setiger 25 to 40. Number of filaments reduced to 1 by setiger 45.

Anterior neuropodial acicular lobes distally obliquely transverse with distinct, rounded lobes dorsal to emergence of aciculae; posterior acicular lobes increasingly withdrawn into body wall with aciculae emerging from tips; subacicular hooks supporting a secondary, flattened conical structure along ventral edge of parapodium (Figure 99b). All pre- and postsetal lobes follow outline of acicular lobes closely. First 5 or 6 ventral cirri digitiform. Ventral cirri basally inflated from setiger 6 through setiger 50. Inflated bases nearly spherical; narrow tips digitiform. Ventral cirri digitiform from setiger 60, emerging well distal to bases of parapodia. Anterior notopodial cirri tapering, with 2 or 3 indistinct cylindrical articulations. Posterior notopodial cirri long, digitiform, without articulations.

Limbate and pectinate setae not observed. Shafts of compound falcigers (Figure 99c) inflated, marginally smooth. Appendages bidentate. Proximal teeth much larger than distal teeth. Distal teeth directed obliquely distally. Guards with very short distal mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae single, yellow, tapering, straight; cross-sections round. Notopodial aciculae distinct in anterior and median setigers. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 99d) yellow, tridentate with teeth in a crest. Hooks first present from setiger 31, present in all setigers thereafter, always single (except for replacements). Hooks with very large, curved main fangs; fangs decreasing in size to very short tertiary fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pectinate setae; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 27-29, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

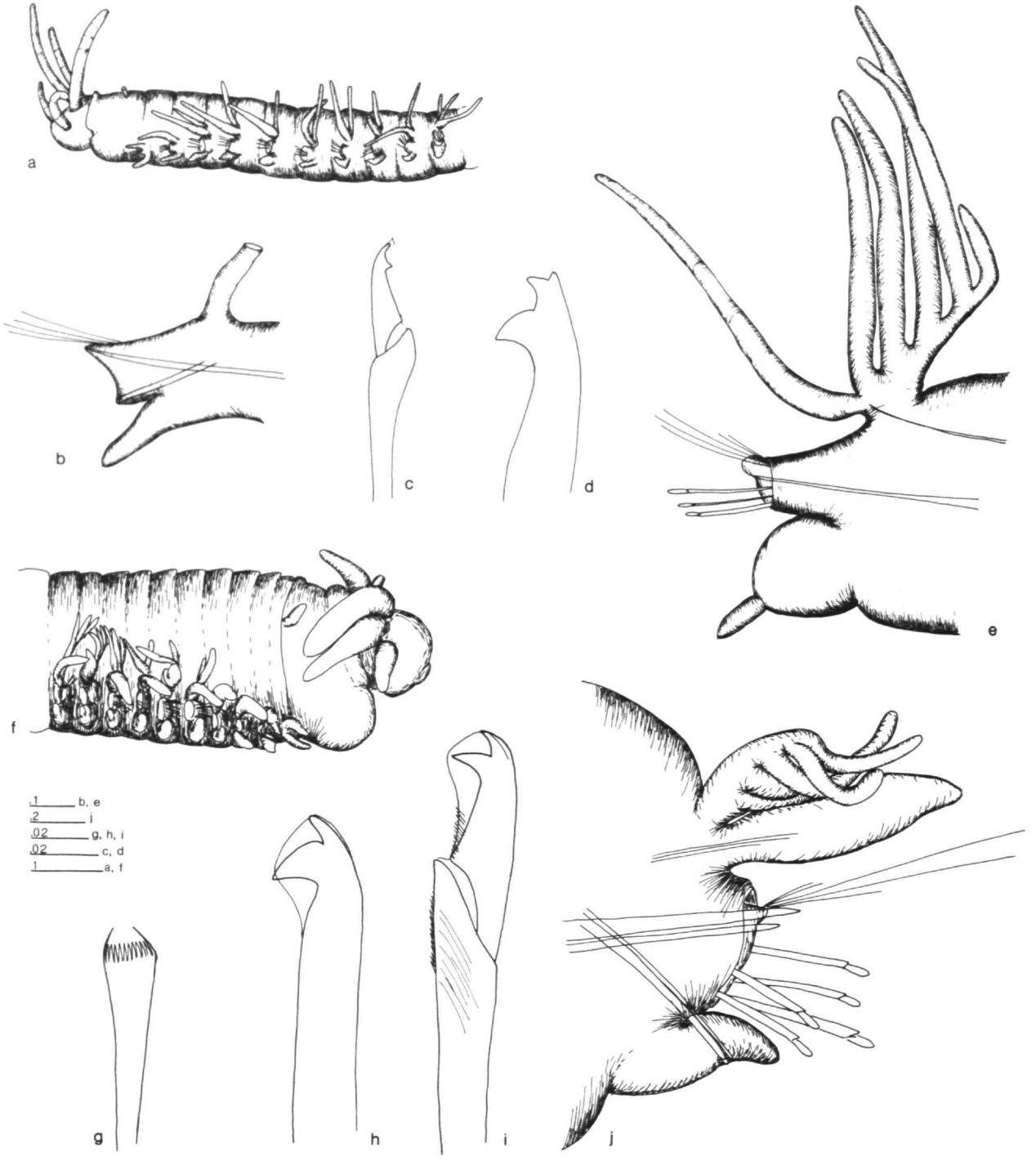

FIGURE 99.—*Eunice rubrivittata* (holotype, AMNH 1263): a, anterior end, lateral view; b, parapodium 70, anterior view; c, compound falciger, parapodium 29; d, subacicular hook, parapodium 29; e, parapodium 29, anterior view. *Eunice rullieri* (syntype, Zool. Mus., Tel-Aviv University, 7563): f, anterior end, lateral view; g, pectinate seta, parapodium 27; h, subacicular hook, parapodium 27; i, compound falciger, parapodium 27; j, parapodium 27, anterior view. (Scale bars in mm.),

REMARKS.—*Eunice rubrivittata* is listed with similar species in Tables 41 and 42. The only other species with notopodial articulations limited to anterior setigers in Table 42 is *E. medicina*. In the latter posterior branchiae have at least paired filaments; in the former the last 10-11 pairs of branchiae are single filaments.

173. *Eunice rubrocincta* Ehlers, 1868

TABLES 19, 21

Eunice rubrocincta Ehlers, 1868:344-347, pl. 15: figs. 4-14.

COMMENTS ON MATERIAL EXAMINED.—No material is available, the notes below are based on the original description and illustrations.

DESCRIPTION.—A live specimen with 100 segments 68 mm long and 3 mm wide; a preserved specimen with 106 segments 45 mm long and 3.5 mm wide.

Ceratostyles digitiform, without articulations. A-III to setiger 1, A-I and A-II to middle of peristomium. Peristomial rings distinct on all sides. Peristomial cirri to posterior part of prostomium, without articulations. Antennae and peristomial cirri slender, nearly filiform.

Maxillary formula 1+1, 6+7, 7+0, 3+8, 1+1, and 1+1. Mx III part of a distal arc with left Mx IV. Mx VI very small, but distinct.

Branchiae present, pectinate, distinctly longer than notopodial cirri, erect. Branchiae from setiger 3 to setiger 80. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. Maximum number of filaments 8; posterior half of body with very small, single branchial filaments. Branchiae of a median segment illustrated as having strong, tapering branchial stems and digitiform filaments.

Ventral cirri distinctly inflated basally in median region, tapering in anterior and posterior setigers. Notopodial cirri medially inflated, without articulations.

Pectinate setae illustrated as flared and furled with both marginal teeth longer than other teeth and a total of ~15 teeth. Shafts of compound falcigers may have been inflated with internal striations. Appendages illustrated as strongly tapering with very short heads, bidentate. Both teeth directed laterally and similar in size. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae yellow, tapering; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, bidentate. Hooks with large, laterally directed proximal teeth and smaller, obliquely directed distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; jaw structure; details of parapodial structures.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 58, 59. *Unknown Characters:* 4-19, 24, 26, 33, 39, 42-51, 54-56, 60, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Described from Kvarner Gulf in the Adriatic Sea, this species has been considered the same as *E. harassii* (Fauvel, 1923:399). Ehlers was aware of the similarities and gave a differential description, demonstrating at what points he believed his species differed from *E. harassii*. *Eunice rubrocincta* has branchiae ending well before the end of the body; *E. harassii* has (apparently) branchiae continued to the far posterior end. *Eunice rubrocincta* has light yellow aciculae and subacicular hooks; *E. harassii* has light brown aciculae and subacicular hooks.

Eunice rubrocincta belongs to group A-1 rather than to B-2 as suggested by Fauchald (1970) and is listed with similar species in Tables 19 and 21. Of species without articulated ceratostyles listed in Table 21, only two have less than 10 branchial filaments where the branchiae are best developed. Of these two species, *E. manihine* and *E. rubrocincta*, the former has branchiae present from setiger 8, the latter has branchiae from setiger 3.

174. *Eunice rullieri*, new name

FIGURE 99f-j; TABLES 27, 28

Eunice aphroditois punctata Fishelson and Rullier, 1969:74-76, fig. 2a-e.

MATERIAL EXAMINED.—Two syntypes, Zoological Museum, Tel-Aviv University, 7134 and 7563, ?Cundabilu, Red Sea.

DESCRIPTION.—Large syntype (7563) complete with 72 setigers; total length 24 mm; maximal width 3 mm; length through setiger 10, 5 mm. Other syntype with 49 setigers; length 15 mm; maximal width 3 mm; length through setiger 10, 4 mm. Remaining color pattern a grayish brown base color, with 3 rows of large white blotches dorsally. Body rather wide anteriorly, tapering to slender posterior end, basically conical with both dorsal and ventral side convex. Anal cirri long, subdistally inflated.

Prostomium (Figure 99f) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes at bases of A-II, small. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles thick and digitiform, without articulations. Three median antennae to posterior peristomial ring; A-I to middle of anterior peristomial ring. Peristomium cylindrical with thickened yoke forming nuchal fold; lower lip thickened and slightly set off from rest of peristomium. Separation between rings distinct only dorsally; anterior ring $^5/_6$ of total peristomial length. Peristomial cirri to posterior edge of anterior peristomial ring, ovate, without articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 5 to setiger 70. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All branchiae, except last 4–5 pairs, with 2 or more filaments; maximum 5 filaments at about setiger 10. Branchial stems tapering, flexible. Filaments digitiform, thick, shorter than notopodial cirri.

Neuropodial acicular lobes symmetrically rounded, becoming narrower posteriorly, with elevated portions where superiormost aciculae emerge. All presetal lobes low, transverse folds. Anterior postsetal lobes rounded, outreaching acicular lobes, becoming low transverse folds from about setiger 15. First 4 ventral cirri thick, tapering. Ventral cirri basally inflated from setiger 5 to about setiger 30. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri broadly attached, tapering. All notopodial cirri prominent, thick, spindle-shaped, strongly inflated medially (Figure 99j), without articulations, very much longer than branchiae in posterior half of body.

Limbate setae marginally serrated. Pectinate setae (Figure 99g) tapering, flat. Both marginal teeth slightly longer than other teeth; ~10 teeth present. Number of pectinate setae increasing posteriorly, becoming dominant setal element in dorsal fascicle. Shafts of compound falcigers (Figure 99i) tapering, marginally serrated, with distinct internal striations. Appendages triangular, tapering to large heads, bidentate. Proximal teeth larger than distal teeth, slender, tapering, directed laterally. Distal teeth distinctly bent. Guards angularly bluntly and symmetrically rounded, strongly serrated towards base; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, with dark brown cores and clear sheaths, tapering, distally straight, projecting well beyond tip of acicular lobes; cross-sections round. Subacicular hooks (Figure 99h) with dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 19, present in all setigers thereafter, paired in most setigers. Hooks slender, tapering to small heads. Proximal teeth larger than distal teeth, curved, directed laterally. Distal teeth narrow, obliquely curved.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice rullieri* was originally described as a subspecies of *E. aphroditois*. The name applied to the subspecies, *punctata*, is preoccupied in several different combinations (see above) and because the material examined is of a distinct species, a new name had to be applied.

The current specimens are small and differ from other species in group B-2 (Tables 27 and 28) by several major features, including distribution and shape of subacicular hooks. Some of these features are rather juvenile in appearance; however, the overall appearance of the specimens is not that of a juvenile. *Eunice rullieri* is one of three species listed in Table 28 with routinely more than single subacicular hooks in every segment with such hooks; the other two species are *E. roussaei* and *E. sebastiani*. The relationship between *E. roussaei* and *E. sebastiani* was discussed above. *Eunice sebastiani* has about 40 branchial filaments where the branchiae are best developed, *E. rullieri* has five.

ETYMOLOGY.—It is a pleasure to name this species for the well-known polychaete expert, the late Dr. F. Rullier.

175. *Eunice samoae* Hartmann-Schröder, 1965

FIGURE 100a–h; TABLES 24, 25

Eunice mutilata samoae Hartmann-Schröder, 1965a:134–135.

MATERIAL EXAMINED.—Holotype ZMH P 14272, Samoa, Tutuila, Matu'u Bay, 21–23 Oct 1959, algae on edge of fringing reef, coll. G. Hartmann and G. Hartmann-Schröder.

DESCRIPTION.—Holotype incomplete with 128 setigers; length 50 mm; maximal width 4 mm at setiger 15; length through setiger 10, 5 mm.

Prostomium (Figure 100a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate; dorsal surface flattened; median sulcus deep. Eyes not seen. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles medially inflated, thick and digitiform, with up to 5 cylindrical, indistinctly marked articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 2; A-III to setiger 4. Peristomium flaring anteriorly. Separation between rings distinct on all sides; anterior ring ~3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, medially inflated, without articulations.

Maxillary formula 1+1, 5+4, 6+0, 9+10, and 1+1. Mx III part of distal arc with left Mx IV.

Branchiae (Figure 100d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 51. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 and last 10 pairs single filaments; other branchiae pectinate with maximum 6 filaments at setiger 15. Filaments thick with abruptly tapering, narrow tips, about as long as notopodial cirri.

Anterior neuropodial acicular lobes rounded, becoming triangular in far posterior setigers (Figure 100e); aciculae emerging above midline. Presetal lobes low, transverse folds. Postsetal lobes free, rounded lobes in first 30–35 setigers, outreaching acicular lobes in first 30 setigers. Median postsetal lobes follow outline of acicular lobes closely. Posterior

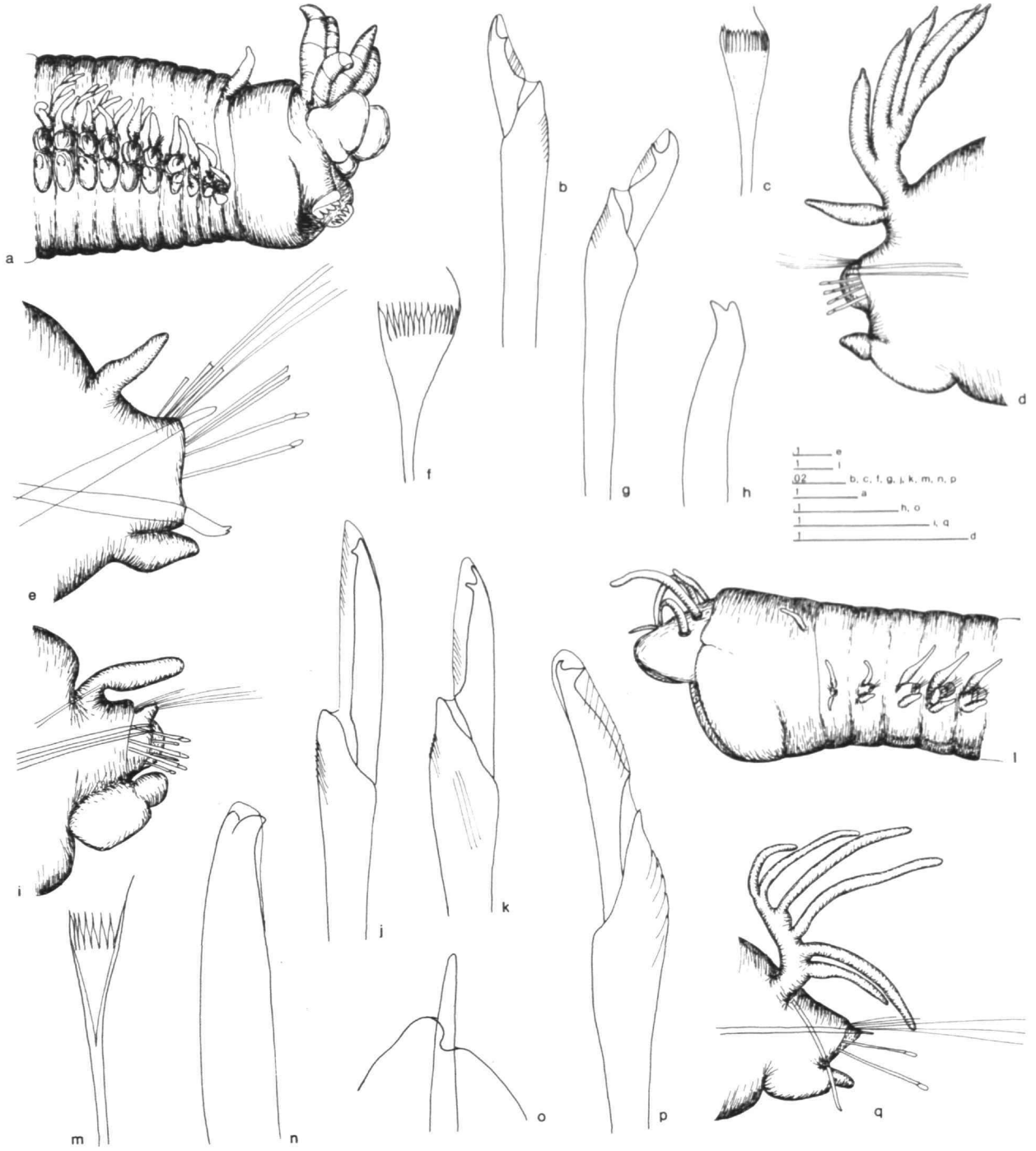

FIGURE 100.—*Eunice samoae* (holotype, ZMH P 14272): a, anterior end, lateral view; b, compound falciger, parapodium 20; c, pectinate seta, parapodium 20; d, parapodium 20, anterior view; e, parapodium 100, anterior view; f, pectinate seta, parapodium 100; g, compound falciger, parapodium 100; h, subacicular hook, parapodium 100. *Eunice schizobranchia* (MNHN): i, parapodium 14, anterior view; j, compound falciger, parapodium 14; k, compound falciger, parapodium 14; l, anterior end, lateral view; m, pectinate seta, parapodium 683; n, subacicular hook, parapodium 683; o, acicula, parapodium 683; p, compound falciger, parapodium 683; q, parapodium 683, anterior view. (Scale bars in mm.)

postsetal lobes low, transverse folds. First 5 ventral cirri thick and tapering. Ventral cirri basally inflated from setiger 6 through setiger 40. Inflated base large, transverse welts; narrow tips tapering. Posterior ventral cirri thick and tapering and about as long as notopodial cirri, but distinctly thicker. All notopodial cirri thick, basally inflated, without articulations.

Limbate setae slender, marginally smooth. Anterior pectinate setae (Figure 100c) furled, slightly flaring. One marginal tooth distinctly longer than other teeth; ~15 teeth present. Posterior pectinate setae (Figure 100f) slightly less furled, distinctly more flared. One marginal tooth longer than other teeth; ~20 teeth present. Shafts of compound falcigers (Figure 100b,g) distinctly inflated, marginally serrated; beak distinct. All appendages similar in size, triangular with distinct heads, bidentate. Proximal teeth narrow, slender, directed or curved slightly distally. Distal teeth distinctly larger than proximal teeth, gently curved. All guards symmetrically bluntly pointed, nearly rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single or paired, dark brown, tapering, nearly straight, blunt-tipped; cross-sections round. Separation between core and sheath indistinct in aciculae. Subacicular hooks (Figure 100h) with dark brown cores and clear sheaths, bidentate. Hooks first present from setiger 26, present in all setigers thereafter, always single (except for replacements). Hooks tapering, slightly bent. Proximal teeth larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 6, 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice samoae* was originally described as a subspecies of *E. mutilata*. The branchial distribution differ markedly in the two forms. The former has branchiae limited to a short anterior part of the body, the latter has branchiae distributed over most of the body. The shape of the branchiae and the compound falcigers are also different.

Eunice samoae is listed with similar species in Tables 24 and 25. Of the four species in Table 25 that have cylindrical articulations in the ceratostyles, two species, *E. coccinea* and *E. samoae*, have short peristomial cirri; in the other two species the peristomial cirri reach at least the peristomium. *Eunice samoae* differs from *E. coccinea* in that it has the ventral cirri inflated only in the median region; in the latter the ventral cirri are basally inflated to near the posterior end.

The ceratostyles are very thick, nearly sausage-like, and the branchial filaments are thick and distally abruptly tapering with a slender tip; both features are missing in other species listed in Table 24.

176. *Eunice savignyi* Grube, 1878

TABLES 19, 20

Eunice savignyi Grube, 1878b:150–151.

DESCRIPTION.—Grube had available a single specimen, which apparently now has been lost; the notes below are based on his description.

Type specimen incomplete with 105 segments (nearly complete according to Grube); length 63 mm.

Ceratostyles with long, cylindrical articulations. A-III to setiger 16 with 14 articulations. Peristomial cirri reaching beyond peristomium, with 5 articulations.

Maxillary formula 1+1, 6+6, 7+0, 5+9, and 1+1.

Branchiae pectinate. Branchiae from setiger 4 to setiger 45. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximum 12 filaments.

Limbate and pectinate setae and compound falcigers unknown. Aciculae and subacicular hooks yellow. Subacicular hooks bidentate.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; jaw structure; all parapodial features; limbate and pectinate setae; compound falcigers.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* None known. *Unknown Characters:* 1–20, 23–26, 28, 32–34, 39, 40, 42–72, 74–76, 78, 80–82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—69,1; 71,2; 72,2.

REMARKS.—The species was well characterized by Grube; but some crucially important features were not mentioned by Grube. It has been included in Tables 19 and 20 with similar species, but has been excluded from the key.

Eunice savignyi cannot be distinguished from similar species without examination of fresh material. The original specimen came from an unnamed locality in the Philippines.

Eunice schemacephala Schmarda, 1861

Eunice schemacephala Schmarda, 1861:132, 7 figs., pl. 32: fig. 260.—Ebbs, 1966:527–534, fig. 9a–j.
?Staurocephalus gregaricus Mayer, 1900:1.
?Mayeria gregaricus.—Verrill, 1900:650.

REMARKS.—Schmarda's original description and illustrations identify the species as a member of the genus; the only relatively unique feature appears to be the short, unidentate appendages of the compound falcigers. Ebbs identified the species with the Atlantic palolo. However, the shape of the appendages of the compound falcigers is not unique to this species, nor does the color pattern described by Ebbs agree with that illustrated by Schmarda.

Mayer described the Atlantic palolo as *Staurocephalus gregaricus;* Verrill (1900) moved this species into a new genus,

Mayeria, on the grounds that Mayer's eunicid species could not be referred to a dorvilleid genus. I am not convinced that the Atlantic palolo can be identified with *E. schemacephala* and prefer to use the name *E. fucata* Ehlers for the species described in great detail by Ebbs; presumably the same seen by Mayer. The names associated with Mayer's species are listed also under *E. fucata*.

Eunice schemacephala is indeterminable.

177. *Eunice schizobranchia* Claparède, 1870

FIGURE 100i–q; TABLES 22, 23

Eunice schizobranchia Claparède, 1870:394, pl. 2: fig. 6.—Fauvel, 1923:407–408, fig. 160 a–k.

MATERIAL EXAMINED.—One specimen, MNHN, Paris, Gulf of Naples, Oct. 1899, identified by P. Fauvel.

DESCRIPTION.—Specimen complete with 731 setigers plus short, regenerating posterior end with pygidium; total length 655 mm; maximal width 5 mm at setiger 10; length through setiger 10, 10 mm. Body cylindrical through first half, thereafter tapering very nearly imperceptibly towards posterior end. All segments of about the same length, with relatively short laterally situated parapodia.

Prostomium (Figure 100l) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened, sloping from posteromedial region obliquely forwards; median sulcus distinct ventrally, very short dorsally. Eyes not observed. Antennae in a horseshoe with A-I and A-II emerging close together, well lateral to midline; A-III isolated on small medial elevation, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, without articulations. A-I and A-III to middle of anterior peristomial ring; A-II to setiger 1. Peristomium flaring anteriorly; lower lip large and muscular. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri barely reaching posterior 1/3 of anterior peristomial ring, slender and digitiform, without articulations.

Maxillary formula 1+1, 4+4, 6+0, 2+6, and 1+1. Mx III part of arc with left Mx IV. Mx V reduced with barely distinct teeth. Mx VI absent.

Branchiae (Figure 100q) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 67 to setiger 730. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 100 branchiae single filaments; maximum seven filaments. Number of filaments retained through rest of body; even in last branchiated setigers 6 filaments may be present. Branchial stems short, strongly tapering. Filaments long and digitiform, outreaching notopodial cirri in all but few first setigers.

Anterior neuropodial acicular lobes (Figure 100i) rounded with aciculae emerging above midline, above emergence of aciculae distinct, tapering cirri present. Median and posterior neuropodial acicular lobes triangular, retaining small superior tab even in last setigers. All presetal lobes low, transverse folds. Anterior postsetal lobes higher than acicular lobes and rounded, following outline of acicular lobes closely from about setiger 30. First 9 ventral cirri tapering to digitiform tips. Ventral cirri basally inflated from setiger 10 through rest of body. Inflated bases nearly spherical; narrow tips tapering. Bases of posterior ventral cirri thick, transverse welts; narrow tips short and button-shaped. All notopodial cirri basally slightly inflated, retaining same length throughout, decreasing in thickness posteriorly, without articulations.

Limbate setae marginally serrated. Pectinate setae (Figure 100m), apparently missing in first 20 setigers, slender, tapering, furled with thickened margins. One marginal tooth very long; ~7 rather coarse teeth present. Compound falcigers in thick, double fascicles in anterior setigers, decreasing in numbers posteriorly, reduced to single anterior fascicle by setiger 25. Shafts of compound falcigers (Figure 100j,k,p) slightly inflated, marginally serrated; internal striations and beaks distinct. Appendages of hooks in anterior fascicles of anterior setigers (Figure 100k) long and slender, tapering, bidentate. Both teeth distinct and slender. Proximal teeth slightly smaller than distal teeth, directed laterally. Distal teeth slender and nearly erect. In posterior fascicles of anterior setigers, especially towards upper ends of fascicles appendages relatively longer and teeth reduced (Figure 100j). Proximal teeth small knobs and distal teeth short, erect knobs. In posterior setigers appendages long, slender and tapering (Figure 100p); head large. Proximal teeth large, laterally directed, triangular. Distal teeth curved, very much smaller than proximal teeth. Guards longer than appendages in all hooks, symmetrically rounded and marginally strongly serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. All aciculae (Figure 100o) tapering, distally straight; cross-sections round. In anterior setigers up to 4 aciculae in oblique series, in posterior setigers all aciculae single. Anterior aciculae black, becoming lighter posteriorly, light brown near posterior end. Subacicular hooks (Figure 100n) clear and translucent, rather than yellow, bidentate. Hooks first present from setiger 60, first irregularly occurring, by setiger 300 present in all setigers, always single (except for replacements). All hooks emerging nearly at right angles with aciculae, projecting well beyond ventral cirrus in all setigers. Hooks distally tapering. Proximal teeth larger than distal teeth; both teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 13, 14, 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Claparède did not leave any type material; the specimen examined is one of the specimens on which Fauvel based his definition of the species; it agrees with Claparède's description and confirms the description of the species given by Fauvel and used in all later publications. The species is listed with similar species in Tables 22 and 23. *Eunice schizobranchia* is unique in having translucent, nearly clear subacicular hooks and dark aciculae. Branchiae start very late and are continued to the far posterior end.

208. *Eunice scombrinis* Quatrefages, 1866

FIGURE 101; TABLES 27, 28

Eunice scombrinis Quatrefages, 1866:319-320.—Grube, 1870a:296-297.

MATERIAL EXAMINED.—MNHN, Paris A.1(R.)-1868-no. 54a, Guayaquil, Ecuador, coll. Eydoux and Souleyet.

DESCRIPTION.—Holotype complete, of unknown sex, with 130 setigers. Total length 47 mm; maximal width 4 mm at setiger 10. Length through setiger 10, 7 mm. Anterior half of body cylindrical; posterior half strongly dorsoventrally flattened. All segments short and crowded.

Prostomium frontally rounded, dorsally inflated; median sulcus deep. Prostomium distinctly shorter than peristomium, about as wide as peristomium, less than 1/2 as deep as peristomium. Both prostomial lobes separated into lobes by transverse frontal grooves. Eyes not observed. Antennae in a deep horseshoe, evenly spaced, similar in thickness. Ceratophores short and ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I to second peristomial ring; A-II and A-III to setiger 3; A-III slightly longer than A-II. Peristomium cylindrical with distinct muscular, scalloped lower lip. Separation between peristomial rings distinct dorsally and ventrally; anterior ring 9/10 of total peristomial length. Peristomial cirri barely outreach posterior peristomial ring. Peristomial cirri tapering, without articulations.

Maxillary formula 1+1, 9+?, 8+0, 7+9, 1+1, 1+1. Right Mx II damaged. Mx III long; located left Mx II. All teeth long and delicate.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchial stems flexible. Branchiae present from setiger 7 to posterior end. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First and last 5 pairs of branchiae single filaments. Maximum 17 branchial filaments present. Branchial filaments slender, shorter than notopodial cirri, digitiform.

Neuropodial acicular lobe distally truncate; aciculae emerging dorsal to midline. All presetal lobes low transverse folds. Anterior postsetal lobes project as free, rounded lobes; median and posterior postsetal lobes follow outline of acicular lobes closely. Anterior ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 6; inflated bases continued through rest of body. Inflated bases thick, transverse welts. Ventral cirri with short, button-shaped free tip in all setigers. Upper, free edge of ventral cirri scoop-shaped in median and posterior setigers. Notopodia supported by internal aciculae; all notopodial cirri basally strongly inflated, strongly tapered. Inferior lower edge produced as small, free lobe in all except first 2 parapodia. Notopodial cirri without articulations.

Limbate setae smooth, slender. Pectinate setae numbering 2-3 in median and posterior parapodia. Pectinate setae tapering, flat. One marginal tooth slightly longer than other teeth; total number of teeth ~15. Shafts of compound falcigers tapering; distal beak; marginal serrations and internal striations absent. Appendages short, strongly tapering to large head, bidentate. Proximal tooth conical, shorter than distal teeth, directed laterally. Distal teeth directed obliquely distally, distinctly curved. Guards asymmetrically bluntly pointed, marginally smooth, without mucro. Pseudocompound and falcigers and compound spinigers absent. Aciculae paired, dark brown, tapering, distally pointed, straight; cross-section round. Separation between sheath and core distinct in both aciculae and subacicular hooks. Subacicular hooks light brown anteriorly, dark brown posteriorly, bidentate, tapering to small heads. Subacicular hooks first present from setiger 29, present in all setigers thereafter, usually 3 in a vertical series with slimmest hook dorsalmost and coarsest hook ventralmost. Both teeth directed obliquely distally; distal tooth distinctly larger than proximal teeth. Guards distally smoothly rounded.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 13, 14, 65, 66.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice scombrinis* is compared to similar species in Tables 27 and 28. In addition to *E. scombrinis*, the only species listed in Table 28 to have multiple subacicular hooks in most parapodia is *E. sebastiani*. In *E. sebastiani*, the appendages of the compound falcigers are very slender and are supported by distinctly inflated shafts; in *E. scombrinis*, the appendages are short and tapering and the shafts are distally tapering. The subacicular hooks are bidentate in *E. scombrinis* and distally simple and falcate in *E. sebastiani*.

178. *Eunice sebastiani* Nonato, 1965

FIGURE 102; TABLES 27, 28, 50

Eunice sebastiani Nonato, 1965:133-139, figs. 1-4.

MATERIAL EXAMINED.—Praia do Aracá, Sa Sebastiao,

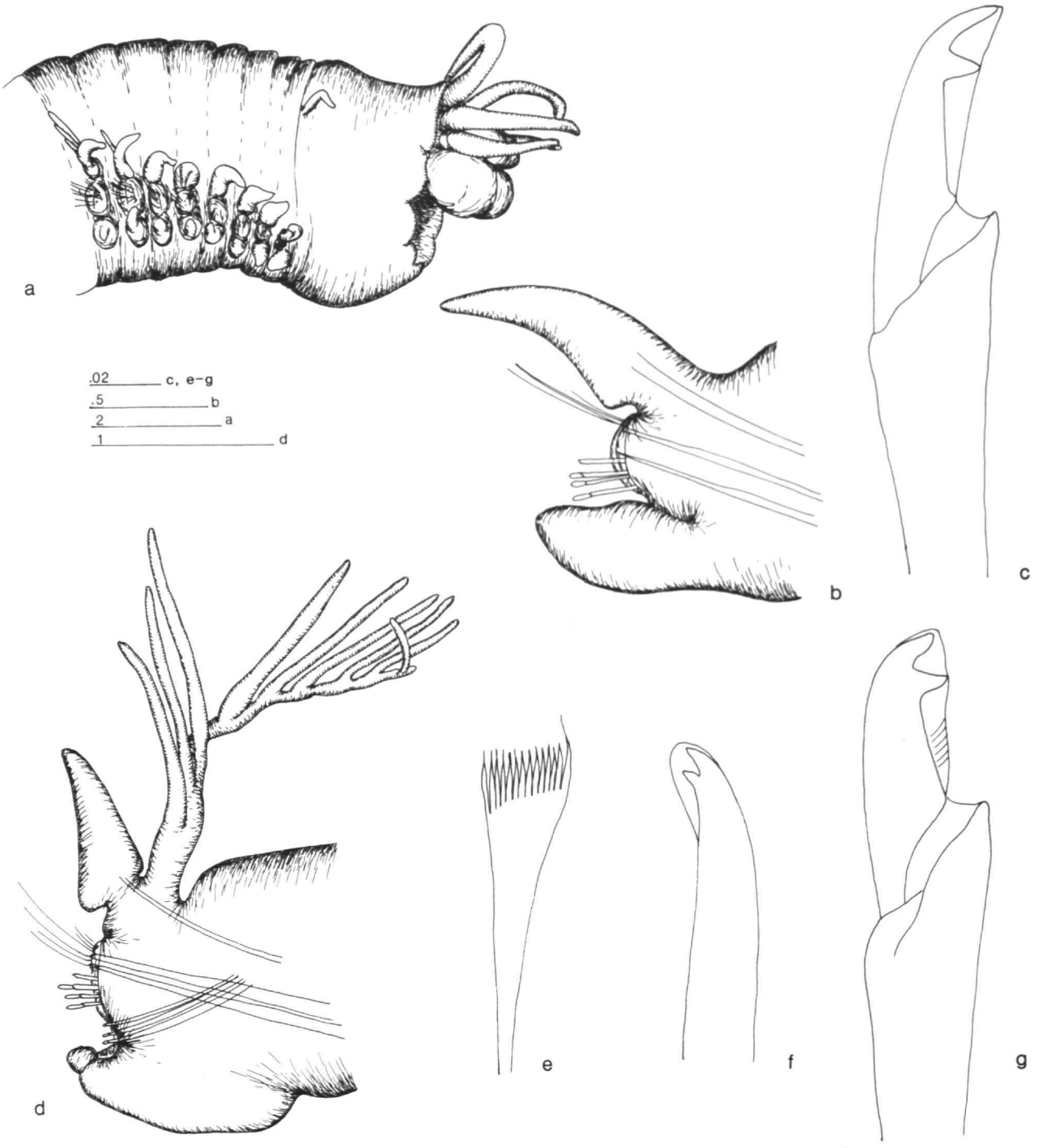

FIGURE 101.—*Eunice scombrinis* (holotype, MNHN, Paris, A.1(R.)-1868-no. 54a): a, anterior end, lateral view; b, parapodium 5, anterior view; c, compound falciger, parapodium 5; d, parapodium 59; e, pectinate seta, parapodium 59; f, subacicular hook, parapodium 59; g, compound falciger, parapodium 59. (Scale bars in mm.)

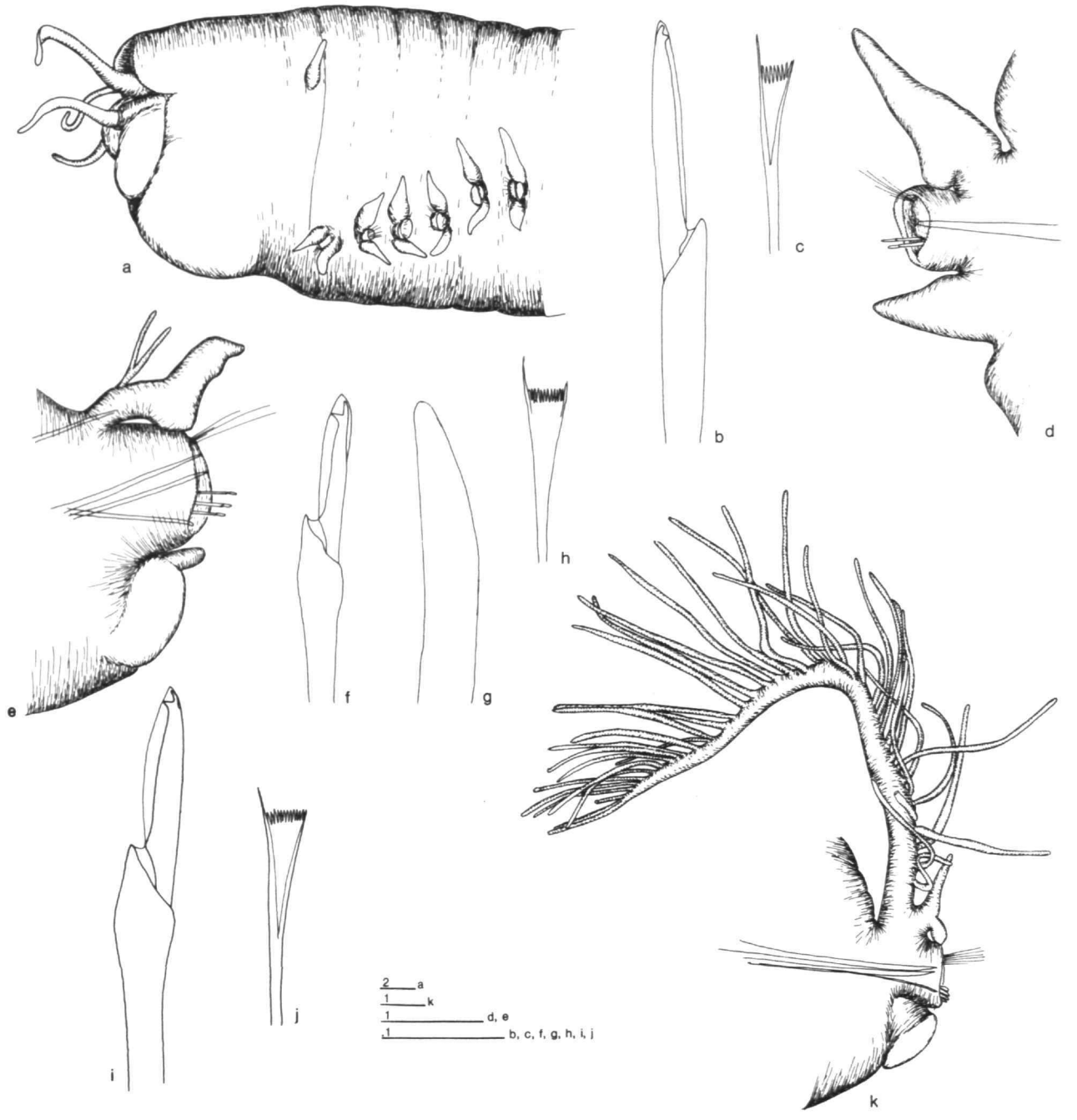

FIGURE 102.—*Eunice sebastiani* (Praia do Baraqueçaba, Sao Sebastiao, Brazil): a, anterior end, lateral view; b, compound falciger, parapodium 3; c, pectinate seta, parapodium 3; d, parapodium 3, anterior view; e, parapodium 681, anterior view; f, compound falciger, parapodium 681; g, subacicular hook, parapodium 681; h, pectinate seta, parapodium 681; i, compound falciger, parapodium 75; j, pectinate seta, parapodium 75; k, parapodium 75, anterior view. (Scale bars in mm.)

Brazil, 23°49′S, 45°25′30″W, muddy beach intertidal zone, 21 June 1986, coll. A.E. Migotto and M.A. da Mota, 1 specimen. Praia do Baraqueçaba, Sao Sebastiao, Brazil, 23°50′S, 45°26′W, fine sand, intertidal, 23 Jun 1986, coll. Moisés A. da Mota, 1 specimen.

COMMENTS ON MATERIAL EXAMINED.—The types are not available; the two specimens examined come from the type locality; they were made available by A.E. Migotto through P. da Cunha Lana. The specimen illustrated and described is from Praia do Baraqueçaba.

DESCRIPTION.—Specimen described in detail complete with 706 setigers; total length 1455 mm; maximal width 23 mm at setiger 25; length through setiger 10, 35 mm; width at setiger 10, 21 mm. Other specimen complete with 689 setigers; total length 1370 mm; maximal width 20 mm at setiger 20; length through setiger 10, 30 mm. Anterior part of body through setiger 100 cylindrical with small parapodia; both dorsum and ventrum convex. Body dorsoventrally flattened posteriorly, tapering slowly over the last 250 setigers to posterior end, which is ~5 mm wide. Anterior end abruptly tapering. Anal cirri missing in both specimens. Both specimens dark-bronze colored as preserved; anterior appendages and notopodial cirri light colored with darker cross-bands or spots.

Prostomium (Figure 102a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely, dorsally inflated; median sulcus shallow, nearly vertically directed, narrow. Each prostomial lobe divided longitudinally in large lateral part and smaller medial part. Lateral parts ovate, frontally and dorsally flattened, sloping from high edge at junction with medial parts laterally; medial parts inflated, frontally rounded. Antennae in a horseshoe, with A-I directly in front of A-II; with A-III isolated by a gap, similar in thickness. Bases of A-I and A-II located in continuation of lines separating lateral from medial portions of each half prostomial half; base of A-III at head of median prostomial sulcus. Ceratophores long in A-I and ring-shaped in other 3, without articulations. Ceratostyles slender and tapering, none reaching beyond anterior peristomial ring, without articulations. A-II thicker and somewhat longer than A-III. Peristomium cylindrical, massive; lower lip muscular. Separation between rings distinct dorsally and barely visible ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri barely reaching beyond front edge of posterior peristomial ring, basally inflated, without articulations.

Maxillary formula 1+1, 9+5, 6+0, 3+8, 1+1, and 1+1. All teeth, except Mx VI slender, tapering and circular in cross-section and strongly opalized with dark, nearly black tips. Mx VI low, knife-edged ridges. Mx III long and located behind left Mx II.

Branchiae (Figure 102e,k) present, pectinate, distinctly longer than notopodial cirri; length of branchiae ~2/3 width of body where best developed, not reduced in mid-body region, erect. Branchiae from setiger 7–14 to setiger 686. Branchiae present to near posterior end, present on more than 65% of total number of setigers. All except for last 3 pairs pectinate; maximum 40 filaments from about setiger 35. Number of filaments slowly reduced posteriorly; in last 200 segments less than 20 filaments present in each branchia. Branchial stems long, slender and tapering. All filaments longer than notopodial cirri except in last 100 branchiated setigers.

Anterior neuropodial acicular lobes (Figure 102d) bilobed, with aciculae emerging from depressions between halves; neuropodial acicular lobes low, rounded to truncate from early branchial setigers through rest of body. Presetal lobes low transverse folds. Postsetal lobes follow outline of acicular lobes closely. Anterior ventral cirri short, nearly conical with pointed tips. Ventral cirri basally inflated from first branchial setigers; inflated bases retained in all remaining setigers. From about setiger 40 through setiger 500 ventral cirri thick, flattened ridges supported on thick folds of tissue; distal tips entirely absent. Far posterior ventral cirri with thick tapering tips. All notopodial cirri with ventrally directed expansion attached near bases; especially in anterior branchial region, this accessory notopodial lobe pendant and nearly drop-shaped. Distal end of anterior notopodial cirri conical, tapering to slender tips. Distal end of median notopodial cirri tapering to slender tips, becoming rather thick and nearly triangular in posterior setigers. Notopodial cirri without articulations.

Limbate setae short, tapering and marginally pilose. Anterior pectinate setae (Figure 102c,j) tapering, furled, becoming nearly flat in posterior setigers (Figure 102h). One marginal tooth longer than other distinctly short, trim teeth; ~12 teeth present. Shafts of compound falcigers (Figure 102b,f,i) inflated and marginally smooth; inner ends of shafts dark brown or black in most setigers. Appendages long, slender, with nearly parallel sides and a very small head, bidentate. Relative length of appendages decreasing posteriorly. Proximal teeth triangular, directed laterally. Distal teeth nearly erect in most hooks, gently curved in some median setigers. Guards symmetrically bluntly to sharply pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae usually numbering 3–4, black, tapering, blunt with straight tips; cross-sections round. Separation of acicular cores and sheaths indistinct. Subacicular hooks (Figure 102g) with dark brown to black core and clear sheath, tapering to slender, slightly curved, simple tips. Hooks first present from setiger 51 or 56, present in all setigers thereafter; multiple hooks in most setigers, up to 4 hooks present.

UNKNOWN MORPHOLOGICAL FEATURES.—Anal cirri.

EXPECTED STATE OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—This species was originally described with bidentate subacicular hooks, which appear to be present in

smaller specimens. Most species that become as large as this species does tend to have modified occurrence and structure of the subacicular hooks, and the fact that the hooks in these large specimens are unidentate is not here considered to be of great importance. The species is compared to similar species in Tables 27 and 28 and with other species with simple, spine-like subacicular hooks in Table 50.

Of the four species in Table 28 with very short antennae, *E. aphroditois* and *E. suviensis* have bidentate subacicular hooks, as far as known at all times; *E. unidentata* always has simple, spine-like subacicular hooks and *E. sebastiani* may have both. *Eunice unidentata* was described with long, articulated ceratophores; the ceratophores of *E. sebastiani* are long in A-I; they are short and ring-shaped in A-II and A-III; they all lack articulations. *Eunice sebastiani* also resembles *E. scombrinis* and is discussed above in relation to that species.

179. *Eunice segregata* (Chamberlin, 1919)

FIGURE 103; TABLES 19, 20

Leodice segregata Chamberlin, 1919a:237–240, pl. 54: figs. 1–4 [in part].
Eunice segregata.—Fauchald, 1969:6–8. fig. 3a–g.

MATERIAL EXAMINED.—USNM 19153, *Albatross* sta D5695, off southern California 33°33′N, 120°17′30″W, 26 Apr 1911, 977 m, green sand, *Globigerina*, beam trawl.

COMMENTS ON MATERIAL EXAMINED.—As indicated by Fauchald (1969), none of the original specimens remaining fit the description given by Chamberlin (1919a); these specimens were described as a new species by Fauchald (1969). The specimen here described is the one Fauchald (1969) used in the re-description of this species.

DESCRIPTION.—Specimen incomplete female with 92 setigers; length 60 mm; maximal width 4 mm at setiger 15; length through setiger 10, 5 mm; width at setiger 10, 3.5 mm. Anterior body dorsally convex with flattened ventrum, becoming cylindrical by about setiger 25.

Prostomium (Figure 103a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus shallow. Palpal region marked by horizontal grooves. Eyes between bases of A-I and A-II, hidden by peristomial fold, faded purple. Antennae in a nearly straight line, with A-I only slightly in front of other antennae, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender, slightly tapering, but basically digitiform, with up to 10 indistinct, cylindrical articulations in A-III. A-I to setiger 1; A-II to setiger 5; A-III to setiger 8. Peristomium cylindrical with slightly inflated posterior ring, ~1/3 wider than prostomium; lower lip distinct, muscular. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender, tapering to slender tips, with 5 to 6 long, cylindrical articulations.

Maxillary formula 1+1, 7+8, 9+0, 6+10, and 1+1. Mx III long, straight and located behind left Mx II. Mx VI absent.

Jaws very badly decalcified; very soft.

Branchiae (Figure 103e) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 39. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 pairs single filaments; all other branchiae with at least 2 filaments; maximum 15 filaments present between setigers 25 and 30. Filaments slender, tapering to fine tips, about as long as notopodial cirri.

Anterior neuropodial acicular lobes (Figure 103b) symmetrically conical, retaining same shape through branchial region, becoming lower and more flattened posteriorly (Figure 103h); aciculae emerging at midline. Postbranchial neuropodial acicular lobes flattened conical with tip associated with inferior aciculae. Presetal lobes low, transverse folds. Pre-branchial and branchial postsetal lobes high, rounded free lobes; postbranchial postsetal lobes follow outline of acicular lobes closely. First 7 ventral cirri tapering. Ventral cirri with inflated bases from about setiger 8, gradually lost from about setiger 30. Inflated bases nearly spherical; narrow tips digitiform. Postbranchial ventral cirri digitiform. Anterior notopodial cirri long, slender, tapering to fine tips, about as long as peristomial cirri in first few setigers. Notopodial cirri less prominent in branchial region, retaining about same shape. Postbranchial notopodial cirri long, basally slightly inflated and distally digitiform. Anterior notopodial cirri with up to 5 cylindrical, indistinct articulations; articulations gradually lost in branchial region. Postbranchial notopodial cirri without articulations.

Limbate setae slender, tapering with narrow, marginally smooth limbation, longer than compound falcigers in all setigers. Anterior pectinate setae (Figure 103d) slender, tapering, furled. One marginal tooth large, rather thick; ~5 teeth present. Median and posterior pectinate setae (Figure 103g,l) flat, distally slightly flaring. One marginal tooth distinctly longer and thicker than other teeth; ~10 teeth present. Shafts of anterior and posterior compound falcigers (Figure 103c,i) tapering; distal beaks present, marginally smooth. Shafts of median falcigers (Figure 103f) inflated; distal beaks present, marginally indistinctly serrated. Appendages similar in all setigers, long, tapering to small heads, bidentate. Proximal teeth smaller than distal teeth, reduced triangular, directed laterally. Distal teeth nearly erect, tapering. Guards sharply and asymmetrically pointed, without mucros. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 103j) paired, yellow, tapering, pointed. Most aciculae distally straight with both aciculae similar; in posterior setigers superior aciculae with distinct core and sheath construction and thicker than inferior acicula, gently curved; cross-sections round. Subacicular hooks (Figure 103k) yellow, bidentate. Separation between cores and sheaths indistinct in all subacicular hooks. Hooks first present from setiger 36, present in all setigers

FIGURE 103.—*Eunice segregata* (USNM 19153): a, anterior end, lateral view; b, parapodium 3, anterior view; c, compound falciger, parapodium 3; d, pectinate seta, parapodium 3; e, parapodium 21, anterior view; f, compound falciger, parapodium 21; g, pectinate seta, parapodium 21; h, parapodium 75, anterior view; i, compound falciger, parapodium 75; j, aciculae, parapodium 75; k, subacicular hook, parapodium 75; l, pectinate seta, parapodium 75. (Scale bars in mm.)

thereafter, always single (except for replacements). Hooks tapering towards small heads. Proximal teeth nearly twice as large as distal teeth, directed laterally. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 47, 50, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice segregata* is listed with similar species in Tables 19 and 20. Of species in Table 20 with branchiae starting from setiger 3, two species, *E. biannulata* and *E. kobiensis*, have eight branchial filaments where the branchiae are best developed; one species, *E. caeca* has 24 filaments; the other species have from 11 to 18 filaments. Of the remaining species, *E. mexicana*, *E. pennata*, and *E. websteri* have distally drop-shaped to moniliform articulations of the ceratostyles; *E. segregata* and *E. valens* have cylindrical articulations throughout. The two peristomial rings are distinct on all sides in *E. segregata;* the separation are distinct only dorsally and ventrally in *E. valens*. The relationship between this species and similar species was also explored in Fauchald (1969).

180. *Eunice semisegregata* Fauchald, 1969

FIGURE 104a–d; TABLES 19, 21

Eunice semisegregata Fauchald, 1969:8–10, fig. 4a–e.
Leodice segregata Chamberlin, 1919a:237–240, pl. 54: figs. 1–4 [in part].

MATERIAL EXAMINED.—Paratype, USNM 19398, *Albatross* sta 3417, off southwestern Mexico, 16°32′00″N, 99°48′00″W, 11 Apr 1891, 902 m, green mud, small beam trawl.

DESCRIPTION.—Paratype incomplete with 84 setigers; length 55 mm; maximal width 6 mm; length through setiger 10, 9 mm. Body cylindrical, slightly flattened posteriorly, essentially truncate anteriorly.

Prostomium (Figure 104d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes posterior to bases of A-I. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 8 cylindrical articulations in A-III. A-I to middle of anterior peristomial ring; A-II to setiger 4; A-III to setiger 5. Peristomium inflated, barrel-shaped. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slender and digitiform, without articulations.

Maxillary formula 1+1, 8+9, 10+0, 9+9, and 1+1. Mx III long, located behind left Mx II. Mx VI absent.

Branchiae (Figure 104a) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 65 in paratype and 69 in holotype. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. All branchiae pectinate; maximum 38 filaments from about setiger 15. Branchial stems slender, tapering, erect. Filaments slender, nearly filiform.

Neuropodial acicular lobes symmetrically rounded, rather broadly in anterior setigers, becoming nearly conical in median and posterior setigers (Figure 104a); aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 5 through setiger 40; inflated bases totally missing by setiger 50. Inflated bases modest, ovate, narrow tips tapering. Posterior ventral cirri slender and tapering. Anterior notopodial cirri about as thick as antennae, tapering. In branchial region notopodial cirri slender and tapering from slightly inflated bases. Postbranchial notopodial cirri slender, nearly filiform. Notopodial cirri without articulations.

Limbate setae marginally serrated. Pectinate setae (Figure 104c) tapering, flat. One marginal tooth longer and thicker than other teeth; 7 teeth present. Shafts of compound falcigers (Figure 104c) distally inflated, marginally serrated. Appendages long, tapering towards small heads, bidentate. Proximal teeth smaller than distal teeth, short, broadly triangular, directed laterally. Distal teeth gently curved, tapering. Guards symmetrically sharply pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in most parapodia, yellow, tapering to blunt tips, distally bent; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks yellow, bidentate. Hooks first present from setiger 51 in holotype and from setiger 55 in paratype, present in all setigers thereafter always single (except for replacements). Hooks tapering to small heads. Teeth similar in size and directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Features associated with posterior parapodia; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 47, 50, 63, 65–68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice semisegregata* was separated from type material of *E. segregata* on a series of distributional features detailed in part in Tables 19 and 21. *Eunice semisegregata* has branchiae extending farther back or with many more branchial filaments, or both, than other species in listed in Table 19, with the exception of *E. megabranchia* and *E. validobranchiata*. Subacicular hooks are first present from setiger 35 in *E. megabranchia* and from setigers 37–40 in *E. validobranchiata*.

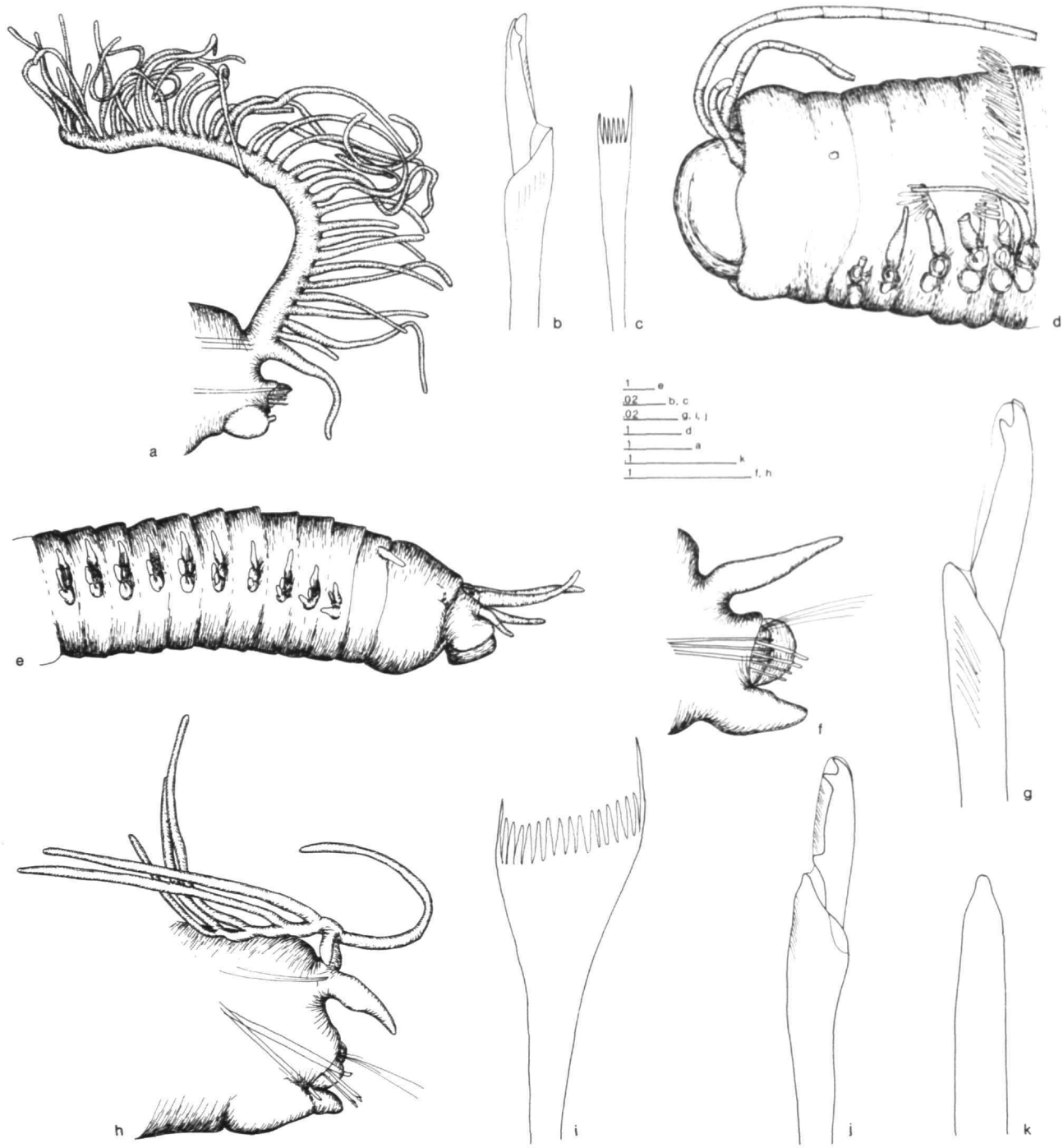

FIGURE 104.—*Eunice semisegregata* (paratype, USNM 68947): a, parapodium 40, anterior view; b, compound falciger, parapodium 4; c, pectinate seta, parapodium 18; d, anterior end, lateral view. *Eunice sonorae* (holotype, AHF Poly 0283): e, anterior end, lateral view; f, parapodium 6, anterior view; g, compound falciger, parapodium 6; h, parapodium 380, anterior view; i, pectinate seta, parapodium 380; j, compound falciger, parapodium 380; k, subacicular hook, parapodium 380. (Scale bars in mm.)

The ceratostyles lack articulations in *E. megabranchia;* they have cylindrical articulations to the tip in *E. semisegregata* and have distally drop-shaped articulations in *E. validobranchiata.*

Eunice siciliensis Grube, 1840

Eunice siciliensis Grube, 1840:83.

REMARKS.—Examination of the type material demonstrated that this species has the jaw structure and setal complement of the genus *Palola.*

Eunice simplex Peters, 1854

Eunice simplex Peters, 1854: 611.

REMARKS.—Grube (1878a:101) referred this species to *Palola (= Eunice) siciliensis* under some doubt. There is nothing in Peters' original description to contradict such a conclusion. The issue will be further discussed in a review of the genus *Palola.*

181. *Eunice sonorae* Fauchald, 1970

FIGURE 104e–k; TABLES 33, 35, 50, 51

Eunice sonorae Fauchald, 1970:45–48, pl. 6: figs. a–g.

MATERIAL EXAMINED.—Holotype, AHF Poly 0283, Puerto Penasco, Sonora, Mexico, rocky intertidal, 8 Apr 1967, coll. P. Pickens.

DESCRIPTION.—Holotype complete with 586 setigers; total length 345 mm; maximal width 6 mm; length through setiger 10, 14 mm. Anterior body cylindrical, tapering slowly, with numerous, very crowded segments posteriorly. Anal cirri long, tapering, without articulations.

Prostomium (Figure 104e) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus deep. Eyes behind bases of A-I, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores long, confluent with prostomium, without articulations. Ceratostyles slightly tapering, with a maximum of 4 irregular, cylindrical articulations in A-III. A-I to anterior peristomial ring; A-II to posterior edge of peristomium; A-III to setiger 1. Peristomium with very voluminous, muscular lower lip, otherwise cylindrical. Separation between rings distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Jaws not examined.

Branchiae (Figure 104h) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 41 to setiger 530. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. First branchia with 2 filaments; maximum 6 filaments from about setiger 65; from about setiger 400 number of filaments decreasing and length of filaments decreasing rapidly. From setiger 475 branchiae very short, tapering single filaments decreasing in size posteriorly. Branchial stem very slender. Filaments very long, slender, nearly filiform.

Anterior neuropodial acicular lobes (Figure 104f) obliquely truncate with aciculae emerging near midline. Posterior acicular lobes symmetrically rounded with aciculae emerging slightly superior to middle. All presetal lobes low, transverse folds. Anterior postsetal lobes twice as high as acicular lobes, symmetrically rounded. Postsetal lobes decreasing in size posteriorly, retained as short rounded free lobes superior to and behind acicular lobe in all setigers. First 4 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 5 through rest of body. Inflated bases thick, elongated welts, less conspicuous posterior to setiger 450; narrow tips tapering. Anterior notopodial cirri medially inflated; posterior notopodial cirri tapering from a wide base, retaining about same length in all setigers. Notopodial cirri without articulations.

Anterior setigers with thick supra-acicular and posterior fascicles of limbate setae and masses of compound falcigers in subacicular and anterior positions; pectinate setae absent. Median and posterior setigers with thinner fascicles of limbate setae and compound falcigers; pectinate setae present. Limbate setae slender, marginally smooth. Posterior pectinate setae in large numbers; some pectinate setae (Figure 104i) unusually large; shafts flattened; blade flat, widely flaring. One marginal tooth longer than other teeth; ~16 teeth present. Shafts of anterior compound falcigers (Figure 104g) tapering, with distinct internal striations, marginally smooth, without distal beak. Appendages slender, slightly tapering, bidentate. Proximal teeth much smaller than distal teeth, tapering, directed distally. Distal teeth nearly erect, thick, blunt. Shafts of posterior compound falcigers (Figure 104j) inflated, without internal striation, marginally finely serrated; distal beak present. Appendages shorter than in anterior setigers; heads distinct, rather large, bidentate. Proximal teeth larger than distal teeth, triangular, laterally directed. Distal teeth tapering, directed laterally. Guards symmetrically rounded in all setigers, smooth-edged in anterior setigers, marginally serrated in posterior setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Notopodial aciculae honey-colored and especially prominent in posterior setigers. Aciculae up to 4 in anterior setigers, becoming reduced to 1 in posterior setigers, with dark brown to black cores and clear sheaths, tapering to slender, straight tips; cross-sections round. Subacicular hooks (Figure 104k) with dark brown to black cores and clear sheaths, tapering to slender single tips. Hooks first present from setiger 54, present in all setigers thereafter, always single (except for replacements). Hooks slender, distally abruptly tapering to simple, blunt tips.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 60. *Unknown Characters:* 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice sonorae* belongs to the small group of species with dark, simple spine-like subacicular hooks and was compared to other species in group D4 by Fauchald (1970). It is listed with similar species in Tables 33, 35, 50, and 51. It has multiple aciculae in anterior setigers and subacicular hooks first present from setiger 54; other species in Table 35 have single aciculae and the subacicular hooks are present much farther forward; in addition, the subacicular hooks are simple and spine-like in *E. sonorae* and are bidentate in the other species in this table.

Eunice splendida Grube, 1856

Eunice splendida Grube, 1856:58.

REMARKS.—No material is available of this species. The original description indicates that A-III should reach setiger 5 and have 26 moniliform articulations. The peristomial cirri have cylindrical articulations and reach the prostomium. The notopodial cirri lack articulations. Branchiae from setiger 5 to posterior end of the complete specimen; maximum 15 filaments; number of filaments decrease posteriorly.

The specimen, which was collected at Valparaiso, Chile, resembles *E. lucei* according to Grube.

The features mentioned are consistent with species in group C-2, but without information about setal structures the species cannot be assigned to a group.

The information is inadequate to characterize the species and it is here considered indeterminable.

182. *Eunice spongicola* (Treadwell, 1921)

FIGURE 105a–f; TABLES 33, 39

Leodice spongicola Treadwell, 1921:25-27, figs. 53a-j.

Eunice filamentosa.—Hartman, 1956:283 [in part, not *Eunice filamentosa* Grube, 1856].

MATERIAL EXAMINED.—Holotype, AMNH 1383, Montego Bay, Jamaica, Jul 1921.

DESCRIPTION.—Holotype complete with 152 setigers; total length 68 mm; maximal width 1.75 mm at setiger 10; length through setiger 10, 6.0 mm. Body tapering evenly towards posterior end from widest point at about setiger 10.

Prostomium (Figure 105a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally truncate, dorsoventrally flattened; median sulcus deep. Eyes behind bases of A-I, black. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. All antennae outreaching tip of prostomium, none outreaching peristomium. Peristomium nearly twice as long as prostomium, nearly twice as wide, cylindrical. Separation between rings distinct only ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to posterior edge of anterior peristomial ring, digitiform, without articulations.

Jaws half everted. Maxillary formula 1+1, ?+?, 7+0, 3+5, and 1+1; dentition of Mx II not determinable without destroying specimen.

Branchiae (Figure 105b) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 24 to setiger 150. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 5 branchiae with single filaments; maximum filaments 3 reached at midbody and maintained to near posterior end. Branchial stems very short, tapering. All filaments very long, digitiform, longer than notopodial cirri in most setigers.

Anterior neuropodial acicular lobes distally truncate; posterior acicular lobes conical; aciculae emerging at midline. All presetal lobes low, transverse folds. Anterior postsetal lobes distinct free lobes, about as high as acicular lobes; posterior postsetal lobes low, transverse folds. First 3 ventral cirri digitiform. Ventral cirri basally inflated between setigers 4 and 50. Inflated bases large, ovate; narrow tips digitiform. Inflated bases rapidly reduced from setiger 50; posterior ventral cirri digitiform. Anterior notopodial cirri digitiform, about twice as long as ventral cirri, increasing in length posteriorly, nearly as long as branchial filaments in last setigers. Notopodial cirri without articulations.

Limbate setae long, slender, marginally finely dentate. Pectinate setae (Figure 105c) flat, widely flaring. Both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 105e) distally inflated, marginally serrated, without distinct beak. Appendages with distinct heads, slightly tapering, bidentate. Proximal and distal teeth similar in size. Proximal teeth tapering, directed slightly basally. Distal teeth strongly tapered, directed laterally. Guards symmetrically rounded, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 105f) single, amber-colored, darker near base than at tip, darker in posterior than in anterior setigers, distally expanded dorsoventrally into hammer-headed structures; shafts straight; cross-sections round. Subacicular hooks (Figure 105d) amber colored, darker near base than at tip, darker in posterior than in anterior setigers, bidentate. Hooks first present from setiger 26, present in all setigers thereafter, always single (except for replacements). Hooks with narrow necks; large heads. Proximal teeth larger than distal teeth, parrot-beaked, directed basally. Distal teeth nearly digitiform, distally blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEA-

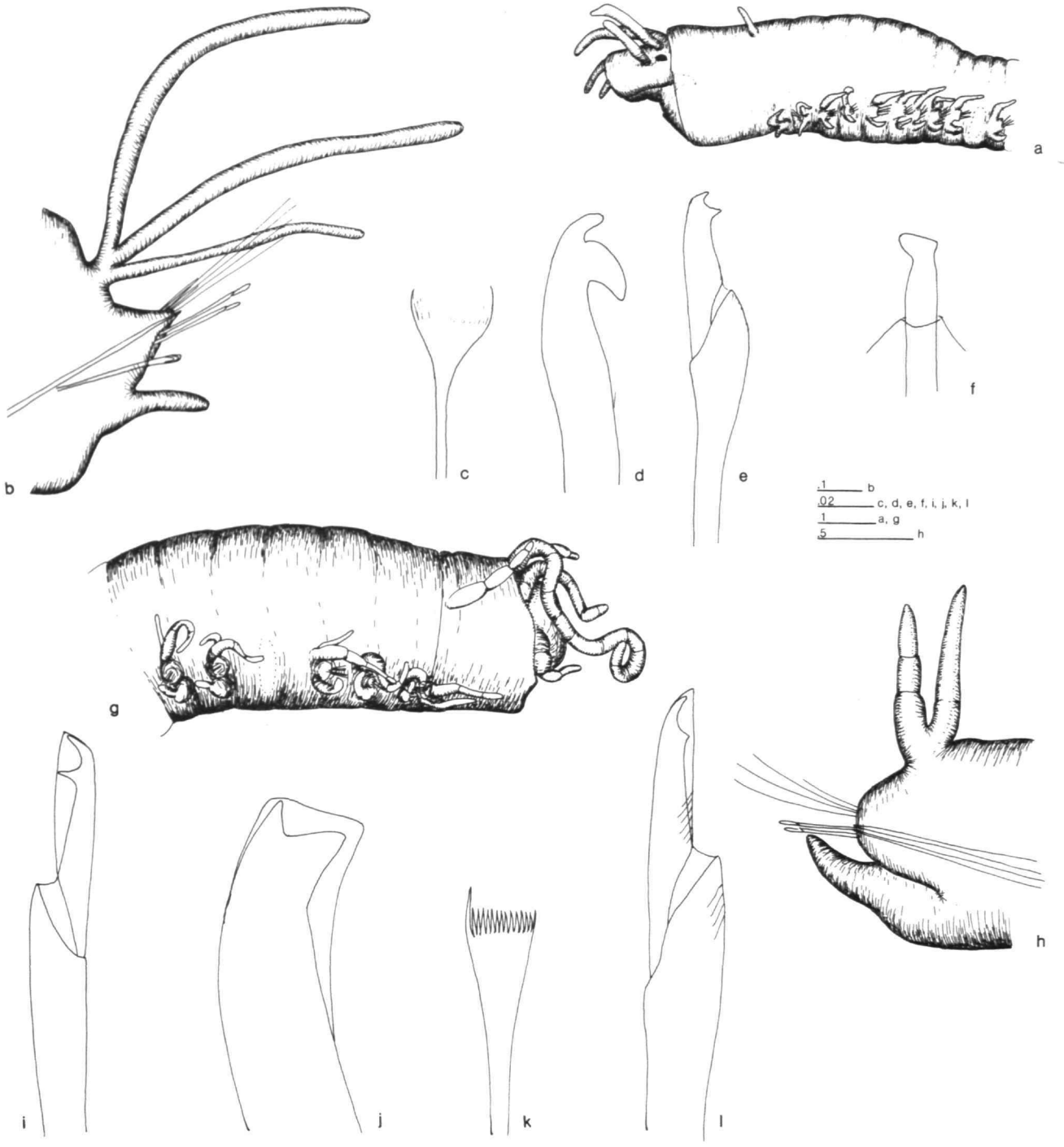

FIGURE 105.—*Eunice spongicola* (holotype, AMNH 1383): a, anterior end, lateral view; b, parapodium 66, anterior view; c, pectinate seta, parapodium 66; d, subacicular hook, parapodium 66; e, compound falciger, parapodium 66; f, acicula, parapodium 66. *Eunice stanleyi*, new species (holotype from MCZ 810, one syntype of *Eunice antillensis*): g, anterior end, lateral view; h, parapodium 10, anterior view; i, compound falciger, parapodium 70; j, subacicular hook, parapodium 70; k, pectinate seta, parapodium 10; l, compound falciger, parapodium 10. (Scale bars in mm.)

TURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 42, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice spongicola* was considered a synonym of *E. filamentosa* by Hartman (1956); the former has very short antennae and the inflated bases of the ventral cirri are ovate; in *E. filamentosa* the antennae reach well beyond the tip of the antennae and the inflated bases form thick transverse ridges.

Eunice spongicola is listed with similar species in Tables 33 and 39. It is one of two species with hammer-headed aciculae listed in Table 39, the other being *E. denticulata*. The ceratophores are long in all antennae in *E. denticulata;* they are short and ring-shaped in *E. spongicola*. In *E. denticulata* the subacicular hooks start ~10 segments before the start of the branchiae; in *E. spongicola* the start of branchiae and subacicular hooks are separated only by two segments.

183. *Eunice stanleyi*, new species

FIGURE 105g–l; TABLES 24, 25

Eunice antillensis Ehlers, 1887:84–85 [in part].

MATERIAL EXAMINED.—Holotype, MCZ 810, 1 syntype of *Eunice antillensis* Ehlers, *Blake* sta 45, 25°33′N, 84°21′W, 185 m.

COMMENTS ON MATERIAL EXAMINED.—As indicated above, the material of *E. antillensis* was composed of two species, one of which appears to have been overlooked previously.

DESCRIPTION.—Holotype complete, of unknown sex, with 130 setigers; total length 58 mm; maximal width 4 mm wide; length through setiger 10, 7 mm. Body cylindrical; parapodia very short; anterior end truncate.

Prostomium (Figure 105g) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes posterior to bases of A-I, black, hidden below peristomial fold. Antennae in shallow horseshoe; A-I separated from A-II and III by distinct gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with up to 11 cylindrical articulations in A-III. A-I to posterior edge of peristomium; A-II to setiger 3; A-III to setiger 6. Peristomium cylindrical, somewhat longer ventrally than dorsally. Separation between rings distinct dorsally and barely noticeable ventrally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of peristomium, tapering, with 4 articulations.

Jaws not examined.

Branchiae present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 4 to setiger 33. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 8 and last 8 branchiae single filaments (Figure 105h); maximum 2 filaments, found scattered from setiger 12 through setiger 25. Filaments short, thick, longer than notopodial cirri in most setigers.

Anterior neuropodial acicular lobes distally truncate, becoming rounded to triangular posteriorly; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri thick, tapering, rather prominent. In branchial region ventral cirri with indistinctly inflated bases; postbranchial ventral cirri tapering. Inflated bases ovate; narrow tips tapering. Notopodial cirri basally slightly inflated, tapering to digitiform tips, with 3 distinct articulations.

Limbate setae slender, with narrow limbations. Pectinate setae (Figure 105k) short, flaring, flat. One marginal tooth thicker and longer than other teeth, with ~15 teeth. Shafts of anterior compound falcigers (Figure 105l) slightly inflated, marginally serrated. Shafts of posterior falcigers (Figure 105i) tapering, marginally smooth. Anterior appendages with very low, triangular, laterally directed proximal teeth and gently curved distal teeth, bidentate. Posterior appendages with long, tapering proximal teeth and distal teeth more distinctly bent than in anterior appendages. Guards asymmetrically bluntly pointed; anterior guards marginally serrated; posterior guards marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, dark brown, tapering, straight; cross-sections round. Subacicular hooks (Figure 105j) dark brown to black, bidentate. Hooks first present from setiger 29, present in all setigers thereafter, always single (except for replacements). Hooks tapering. Proximal teeth much larger than distal teeth, triangular, directed laterally. Distal teeth narrow, tapering, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III forming distal arc with left Mx IV; Mx VI absent.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 4, 6, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice stanleyi* is listed with similar species in Tables 24 and 25. It was discussed in relation to the rather similar *E. dubitata* above. In addition to the distributional differences mentioned there, the two species differ in the structure of the compound hooks. The appendages of these hooks have nearly erect, distal teeth in *E. dubitata* and have distinctly bent distal teeth in *E. stanleyi*. In the subacicular hooks of *E. dubitata*, the proximal teeth are narrower than the distal teeth; in *E. stanleyi*, the proximal teeth are very much thicker than the distal teeth.

ETYMOLOGY.—The species is named for Mr. Stanley S. Hirsch, who at a very important time gave the author much needed assistance.

184. *Eunice stigmatura* (Verrill, 1900)

FIGURES 106, 22, 23, 46, 48

Leodice stigmatura Verrill, 1900:641-643.—Treadwell, 1921:20-22, figs. 31-40, pl. 1: figs. 10-13.
Eunice vittata.—Hartman, 1942:9 [in part, not *Nereis vittata* Chiaje, 1829].

MATERIAL EXAMINED.—Two syntypes, YPM 1232, Bermuda Islands, low water, 1898, A.E. Verrill; YPM 1041 and 2095, Bermuda Islands, low water, 1898, coll. A.E. Verrill, 3 specimens; YPM 2094, Castle Harbor, Bermuda Islands, 1898, coll. A.E. Verrill, 3 specimens; YPM 1296, Bermuda Islands, low water, 1901, coll. A.E. Verrill.

DESCRIPTION.—Large syntype incomplete mature female with 116 setigers; length 42 mm; maximal width 2 mm; length through setiger 10, 4 mm. One specimen from YPM 2095 (presumably part of original material, but not designated as type) complete with 151 setigers, length 60 mm.

Prostomium (Figure 106d) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus shallow. Eyes hidden beneath peristomial fold, posterior to bases of A-I. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 15 short, cylindrical articulations in A-III of short syntype; A-III lost in large syntype. A-I to setiger 1, A-II to setiger 8; A-III (in short syntype) to setiger 10. Peristomium cylindrical, with somewhat expanded lower lip. Separation between rings very distinct on all sides; anterior ring 2/3 of total peristomial length. Peristomial cirri to tip of prostomium, slender and digitiform, with 8 to 9 short, cylindrical articulations.

Maxillary formula of specimen from YPM 2095 1+1, 6+6, 8+0, 6+8, and 1+1. Max III long, located behind left Max II. Max VI absent. Jaws poorly sclerotinized.

Branchiae (Figure 106a) present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 110. Branchiae on setigers 70-80 very short and easily overlooked (Figure 106e); filaments increase in length in last 10-15 branchiated setigers. Branchiae present to near posterior end, more than 65% of total number of setigers. First 4 and roughly last 40 branchiae single filaments; maximum 5 filaments at about setiger 15. Branchial stems short, slender. Most filaments long and slender.

Anterior neuropodial acicular lobes obliquely rounded with aciculae emerging near upper edge; median and posterior acicular lobes symmetrically rounded with aciculae emerging above distal point of neuropodia. All pre- and postsetal lobes low, transverse folds. First 6 ventral cirri long and tapering. Ventral cirri basally somewhat inflated from about setiger 7 through setiger 45. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri digitiform with rounded tips, increasingly prominent posteriorly. All notopodial cirri prominent, increasing in length from setiger 1 through setiger 7-8, thereafter decreasing slowly in length, but distinctly longer than branchiae in all branchiated setigers. Anterior notopodial cirri with up to 13 distinct articulations; articulations become less distinct and fewer posteriorly; last 25 notopodial cirri without obvious articulations.

Limbate setae slender, marginally finely serrated. Pectinate setae (Figure 106f,k) very narrow, tapering, flat. One marginal tooth about twice as thick and long as other teeth; 5-6 teeth present in pectinate setae from all parts of body. Shafts of compound falcigers (Figure 106c,g) distally inflated, marginally finely serrated; distinct beak present. Appendages decreasing in length from anterior to posterior setigers, bidentate. Anterior appendages with proximal teeth smaller than distal teeth, short, tapering, blunt-tipped, directed distally. Distal teeth very slender, directed obliquely distally. Posterior appendages with proximal teeth about as long as distal teeth, triangular, directed basally. Distal teeth tapering, directed obliquely distally. All guards asymmetrically bluntly pointed, becoming distinctly more symmetrical in posterior setigers, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 106b) paired, yellow, distally abruptly tapering. Superior aciculae always thinner than inferior aciculae; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 106h,i,j) yellow, bi- or tridentate. Hooks first present from setigers 29 and 31 in syntypes (from setigers 27-35 in other material), present in all setigers thereafter, always single (except for replacements). All hooks with large, laterally directed proximal fang. Distal ends with thick; broad shafts crowned by either 2 fangs or terminated bluntly as a single, thick, angular fang. Tertiary fang small in most specimens. Hooks not obviously worn; newly forming hooks with 2 or 3 distinct teeth present.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Specimens that are not listed as types above are assumed to be part of the original material.

Treadwell (1921) gave no evidence of having seen the types, but did examine material from the type locality.

Eunice stigmatura has been considered synonymous with *E. vittata*, but the branchial distribution is different in that the former has branchiae continued to near the posterior end; the latter has branchiae terminating well before the posterior end. The two syntypes have exclusively single, thick, truncate distal teeth, rather than paired fangs in the subacicular hooks; the other specimens of the original material have three teeth. Only a single specimen, from YPM 2094, was observed to have some subacicular hooks with single large teeth and others with three fangs.

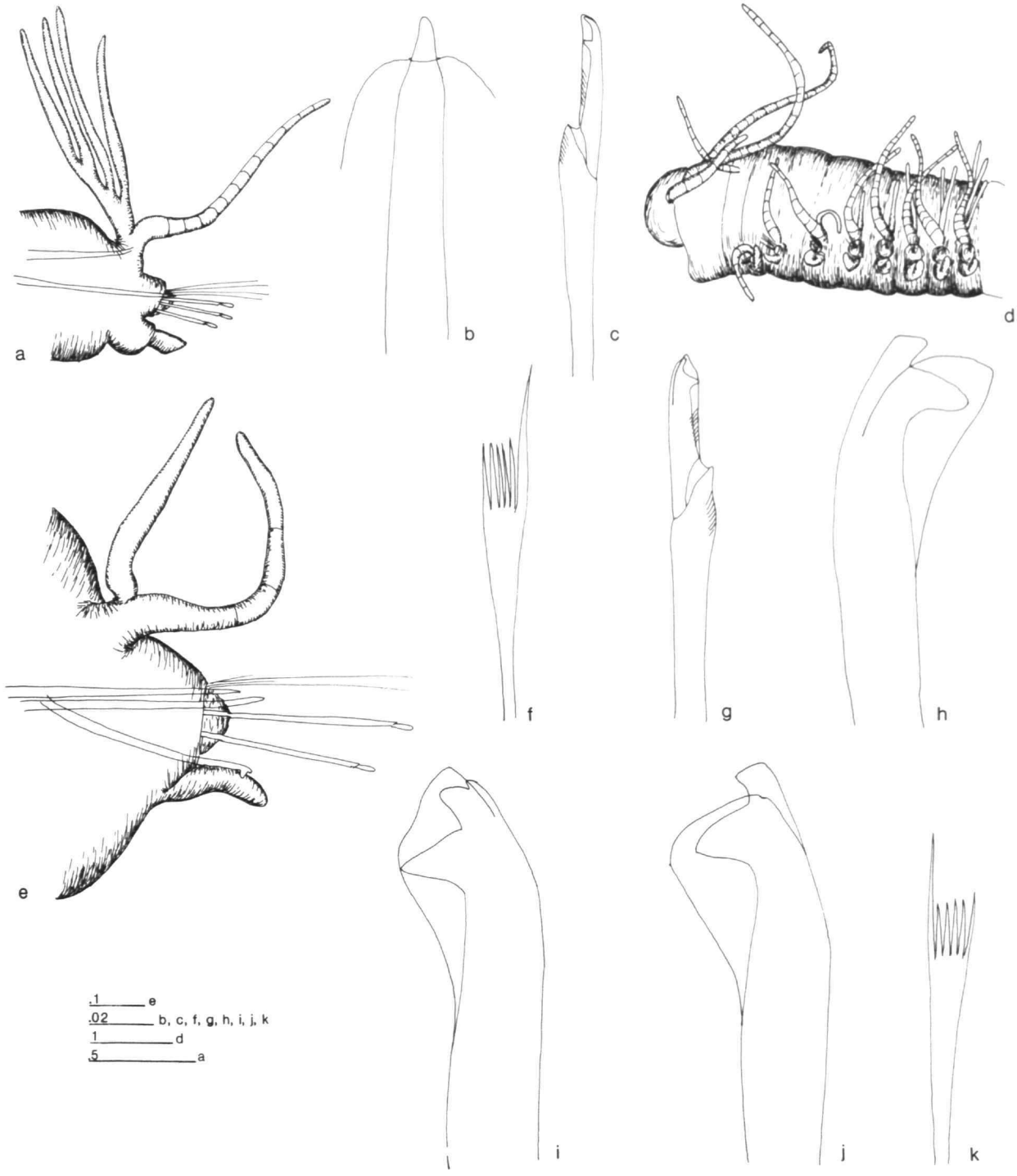

FIGURE 106.—*Eunice stigmatura* (syntype, YPM 1232): a, parapodium 13, anterior view; b, acicula, parapodium 13; c, compound falciger, parapodium 13; d, anterior end, lateral view; e, parapodium 79, anterior view; f, pectinate seta, parapodium 79; g, compound seta, parapodium 79; h, subacicular hook, parapodium 79; i, subacicular hook, parapodium 85; j, subacicular hook, parapodium 102; k, pectinate seta, parapodium 102. (Scale bars in mm.)

Eunice stigmatura is listed with similar species in Tables 46 and 48. It is also listed in Tables 22 and 23 among species with bidentate subacicular hooks. The thick, blunt distal teeth in the subacicular hooks present in part of the material make the species by definition a member both of groups A-2 and C-2, even if all other characters suggest that it to be a member of C-2 only.

The separation between anterior and posterior rings of the peristomium is distinct on all sides in *E. stigmatura* and *E. havaica*. In *E. havaica* A-III is distinctly longer than A-II; in *E. stigmatura* they are similar in length. Of the three species in Table 23 with long, cylindrical articulations in the ceratostyles, *E. johnsoni* has short peristomial cirri; in *E. gracilicirrata* and *E. stigmatura* the peristomial cirri reach at least the middle of the prostomium. In *E. gracilicirrata* the branchiae clearly outreach the notopodial cirri; in *E. stigmatura* they are of about the same length.

Eunice stragulum Grube, 1878

Eunice stragulum Grube, 1878b:163-164.
Marphysa stragulum.—Crossland, 1903:136.

REMARKS.—This species was described in detail and listed by Grube in what he recognized informally as section *Marphysa* within the genus *Eunice*. It was formally transferred to *Marphysa* by Crossland and will be treated in a forthcoming review of that genus.

Eunice subdepressa Grube, 1866

Eunice subdepressa Grube, 1866b:68; 1878a:101.

REMARKS.—Described from Puerto Cabello, Venezuela, this species was characterized as having branchiae starting on setiger 24 and continued to end of the fragmented specimen (203 setigers). Maximum number of branchial filaments is four and A-III does not reach beyond the peristomium. The listing in Grube (1878a:101) implies that the antennae lack articulations.

The information is clearly inadequate to characterize the species; no specimen is available and the species is here considered indeterminable.

185. *Eunice suviensis* (Treadwell, 1922)

TABLES 27, 28

Leodice suviensis Treadwell, 1922:138-139, figs. 12-16, pl. 2: figs. 8-13.
Eunice afra.—Hartman, 1956:282 [in part, not *Eunice afra* Peters, 1854].

COMMENTS ON MATERIAL EXAMINED.—The type is no longer available in AMNH. The following notes are based on Treadwell's description.

DESCRIPTION.—Total length 370 mm; maximum width 9 mm.

Eyes dark, lateral to bases of A-II. Antennae in a horseshoe. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles without articulations. A-III to setiger 1; other antennae slightly shorter. Peristomial cirri to middle of anterior peristomial ring, without articulations.

Maxillary formula 1+1, 5+5, 7+0, 6+8, and 1+1; Mx III short; forming an arc with left Mx IV.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 9 through 160 segments (however, as total number of setigers was not mentioned, the fraction of branchiated setigers cannot be estimated). Maximum number of filaments 9. Branchial stems long and slender. Filaments slender and digitiform, very much longer than short, tapering notopodial cirri.

Ventral cirri inflated from about setiger 10 at least through setiger 50. Posterior ventral cirri without basal inflation. Notopodial cirri short and tapering in all setigers, without articulations.

Pectinate setae slightly flaring with 1 long marginal tooth, with 16 teeth. Shafts of compound falcigers inflated. Appendages short with both teeth well developed and directed obliquely distally. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae and subacicular hooks "very black." Aciculae tapering and distally blunt, presumably straight. Subacicular hooks tapering with large, laterally directed proximal teeth and erect, smaller distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; parapodial features.

EXPECTED STATE OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 58, 59. *Unknown Characters:* 1, 4-12, 16, 17, 20, 24-26, 28, 29, 37-40, 42-52, 54-56, 60, 65, 67, 74, 78, 80-82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The shape of the subacicular hooks, branchial distribution, and development of branchiae indicate that the synonymy proposed by Hartman (1956) cannot be correct. The species was well characterized, but not sufficiently to be included in the key; it is compared to similar species in Tables 27 and 28. Compared to other species with short antennae and bidentate subacicular hooks listed in Table 28, *E. suviensis* has slender, tapering notopodial cirri, rather than medially or basally strongly inflated ones. New material from Rat Passage, Suva Harbor, from which it was originally described, should be examined to establish features that cannot be determined from original description.

Eunice taenia Claparède, 1864

Eunice taenia Claparède, 1864:580-581, pl. 4: fig. 11.—Quatrefages, 1866:653-654.
Eunice siciliensis.—Grube, 1866b:68.—Ehlers, 1868:353-358.

REMARKS.—No material is available; nothing in the description or illustrations argues against the synonymy proposed first by Grube (1866b).

Eunice tahitana Kinberg, 1865

Eunice tahitana Kinberg, 1865:562; 1910:42, pl. 16: fig. 17.
Eunice antennata.—Hartman, 1948:78–79 [in part, not *Leodice antennata* Lamarck, 1818].

REMARKS.—No material is available in Riksmuseet, Stockholm (R. Oleröd, in litt.); when Hartman examined the material, only fragments without an anterior end were left of this species. The species was characterized as having antennae with moniliform articulations and articulated peristomial and notopodial cirri, and branchiae from setiger 4 with up to six filaments. Hartman (1948:79) mentioned that the subacicular hooks were yellow and tridentate; that the aciculae were yellow, tapering and distally slightly curved; and that the compound falcigers were distally bidentate.

Eunice tahitana belongs to group C-2, but cannot be adequately characterized without access to fresh material. The species is here considered indeterminable.

186. *Eunice tentaculata* Kinberg, 1865

FIGURE 107a–d; TABLES 41, 42

Eunice tentaculata Kinberg, 1865:562; 1910:41, pl. 15: fig. 13.
Eunice valenciennesii Grube, 1878b:55.—Hartman, 1948:76–77.

MATERIAL EXAMINED.—Two syntypes, RM 434, 2°30′S, 107°30′E, 88 m.

COMMENTS ON MATERIAL EXAMINED.—Both syntypes are in poor condition and the soft parts cannot be illustrated meaningfully. Most of the description is based on the larger of the syntypes. A set of maxillae are present in the vial; it is approximately of the size to be expected for the longer of the two syntypes and is here considered belonging to this species.

DESCRIPTION.—One syntype with 9 setigers only, frontally dissected; jaws missing. Other syntype nearly complete with about 75 setigers; length 50 mm.

Prostomium apparently frontally rounded; median sulcus shallow. Eyes present. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles with up to 8 long, cylindrical articulations in A-III. A-I to middle of peristomium; A-II to setiger 3 and A-III to setiger 10. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri nearly to frontal margin of prostomium, tapering, with 4 articulations.

Maxillary formula 1+1, 5+6, 7+0, 8+9, and 1+1. Mx III long, located behind left Mx II. Mx V very soft, possibly due to poor preservation.

Branchiae present, pectinate, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 28. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First branchiae single filaments; all other branchiae pectinate, with possible exception of last few. Maximum number of filaments 9 according to Kinberg (1865).

Shape of neuropodial acicular lobes indeterminable. Ventral cirri inflated in some median setigers. Notopodial cirri medially inflated at least in branchial region.

Limbate setae marginally smooth. Pectinate setae with both marginal teeth slightly longer than other teeth; ~15 teeth present. Shafts of anterior compound falcigers (Figure 107a) distally inflated, marginally smooth. Shafts of posterior compound falcigers (Figure 107b) barely inflated, marginally distinctly serrated. Anterior appendages tapering, with distinct head, bidentate. Proximal teeth smaller than distal teeth, triangular, directed laterally. Distal teeth sharply tapering, curved. Anterior guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Posterior appendages tapering, with distinct head, tridentate. Proximal teeth smaller than distal teeth, narrowly triangular, nearly tapering, directed laterally. Distal teeth replaced by large, erect shaft terminating in 2 small blunt teeth. Guards symmetrically sharply pointed, marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 107d) yellow, tapering, distinctly bent distally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 107c) yellow, tridentate with teeth in a crest. Hooks first present from setiger 23, present in all setigers thereafter, single in setiger 23; most setigers with 4 or 5 hooks in dorsoventral row. Hooks tapering to narrow necks and distinct heads. Main fang large, triangular, directed slightly basally; secondary and tertiary fangs on same bases; fangs decreasing evenly in size from main to tertiary fangs. Some hooks with paired protuberances on both sides of main fang appearing as laterally placed additional teeth under certain light conditions.

UNKNOWN MORPHOLOGICAL FEATURES.—Most prostomial and peristomial features; parapodial features; all features associated with posterior setigers.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long; located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 58, 59. *Unknown Characters:* 1–6, 8, 10–12, 14–17, 20, 32, 42–52, 54–56, 60, 61, 63, 64.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The name *E. tentaculata* was proposed by Kinberg (1865) for this taxon; a year later Quatrefages (1866) used the same name for a completely different species (for a detailing of problem see Fauchald, 1986); the latter species was renamed *E. laticeps* by Ehlers (1868). Grube (1878b:55) renamed Kinberg's species, in the mistaken belief that Kinberg's paper was issued after Quatrefages' massive tomes. Hartman (1948) repeated Grube's mistake.

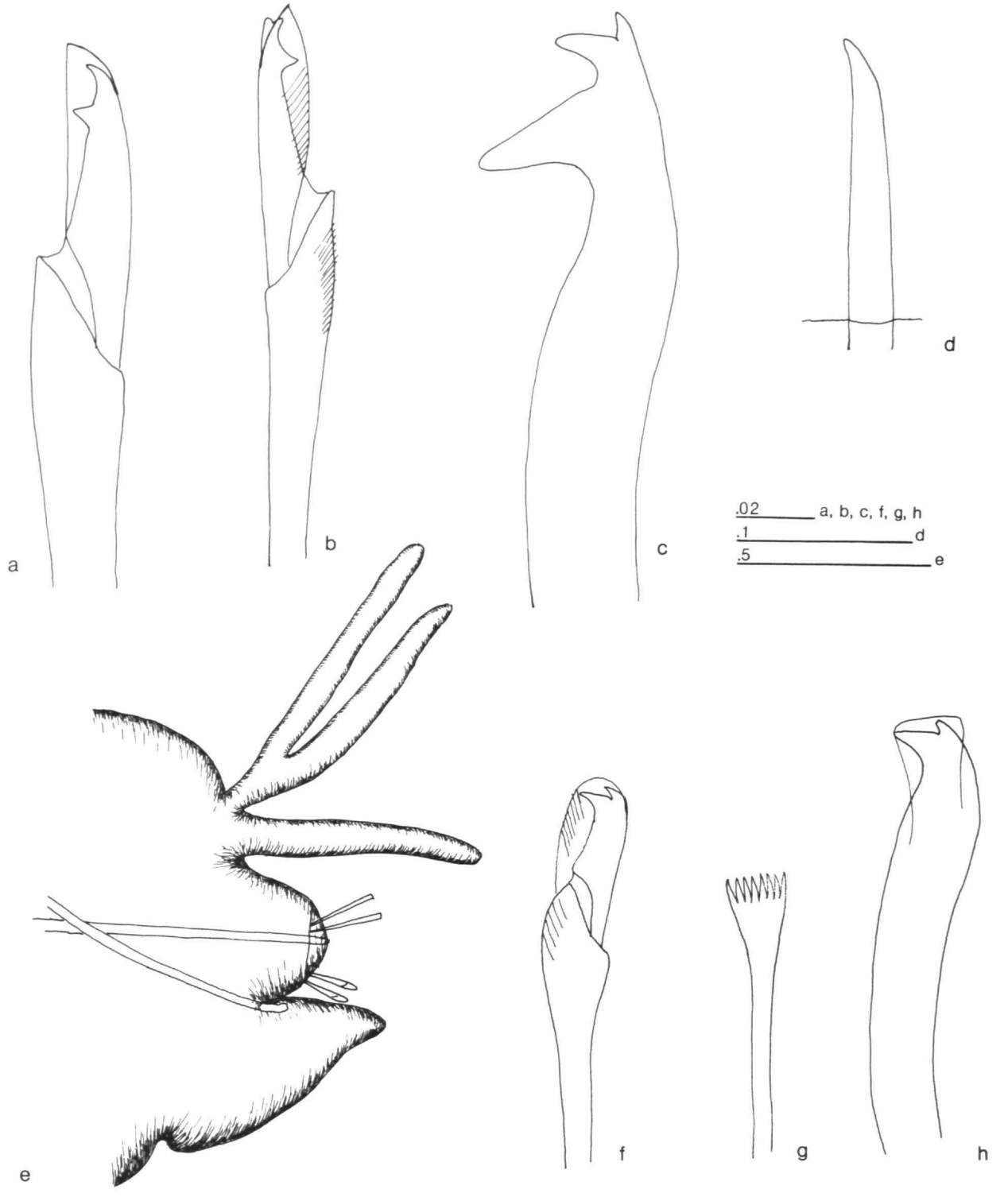

FIGURE 107.—*Eunice tentaculata* (syntype, RM 434): a, compound falciger, parapodium 9; b, compound falciger, parapodium 45; c, subacicular hook, parapodium 45; d, acicula, parapodium 45. *Eunice tenuis* (holotype, AMNH 1913-1271): e, parapodium 103, anterior view; f, compound falciger, parapodium 103; g, pectinate seta, parapodium 103; h, subacicular hook, parapodium 103. (Scale bars in mm.)

Kinberg (1865:562) gave the original locality as "Mare pacificum, long. orient. 107°10′, lat. austr. 2°30′, in fundo 48 orgyiarum. VERNGREN." Kinberg (1910) repeated the same information and the label in the vial is the same. Hartman (1948:76) indicates that specimens should have been found off Clipperton Island in the Pacific Ocean, i.e., at 107°WEST rather than EAST. It is here assumed that label and Kinberg's information is correct and that the specimens were found in the strait between Sumatra and Borneo.

Eunice tentaculata is listed with similar species in Tables 41 and 42. The maximum number of branchial filaments indicated by Kinberg appears to be correct, but cannot be absolutely confirmed, due to the poor state of preservation of the material. *Eunice tentaculata* has, at least in part, tridentate appendages in the compound falcigers; furthermore the guards of these setae are blunt, rather than mucronate. The relationship with other species with multiple subacicular hooks was discussed in the remarks on *E. indica*.

Eunice tentaculata Quatrefages, 1866

Eunice tentaculata Quatrefages, 1866:317–318.
Eunice laticeps Ehlers, 1868:312.—Fauchald, 1986:251–252, figs. 46–50.

REMARKS.—As detailed by Fauchald (1986) the valid name of this species is *E. laticeps* and it has been treated as such above.

Eunice tenuicirrata (Verrill, 1900)

Leodice tenuicirrata Verrill, 1900:643–644.—Hartman, 1942:9.
Leodice stigmatura.—Treadwell, 1921:20–22, figs. 31–40, pl. 1: figs. 10–13 [not *Leodice stigmatura* Verrill, 1900].

REMARKS.—The type is not present in the Peabody Museum, Yale University, and has been missing at least for 40 years (Hartman, 1942; W. Hartman, in litt.). Treadwell did not justify referring this species to *E. stigmatura* and did not mention examining the types of either species. There is insufficient information in the original description to allow any identification of the species; it is here considered indeterminable.

187. *Eunice tenuis* (Treadwell, 1921)

FIGURE 107e–h; TABLES 33, 38

Leodice tenuis Treadwell, 1921:51–52, figs. 154–163, pl. 4: fig. 11.
?Eunice tenuis.—Hartman, 1956:284.

MATERIAL EXAMINED.—Holotype, AMNH 1913-1271, Dry Tortugas, Florida.

COMMENTS ON MATERIAL EXAMINED.—The anterior end of the holotype has been sliced off frontally, so only a remnant of the peristomial rings is present on the dorsal side. The specimen is complete ventrally only from setiger 5–6; thus no illustrations could be made of the anterior end.

DESCRIPTION.—Holotype complete with 695 setigers; total length 460 mm; maximal width 2 mm; length through setiger 10, ~4.5 mm.

Prostomium according to Treadwell (1921:51) conspicuously bilobed. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, without articulations. Outreaching prostomium, with A-III longest. Peristomial rings distinct on all sides; relative length of rings indeterminable. Peristomial cirri short, ovate, without articulations.

Jaws missing; maxillary formula 1+1, 7+5, 7+0, 3+6, and 1+1 (rewritten after statement in Treadwell, 1921:52).

Branchiae (Figure 107e) present, palmate, distinctly longer than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 81 to posterior end. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First 10 branchiae single filaments; number of filaments increasing to 3 by setiger 150, finally to 4 by setiger 400. Numbers of filaments decreasing to 3 in last 100 segments; last few segments with reduced branchiae.

All neuropodial acicular lobes distally rounded; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 200 ventral cirri digitiform. Ventral cirri basally inflated in middle 200 segments. Inflated bases ovate; narrow tip tapering. Posterior ventral cirri short, nearly tubercular, without inflated bases. All notopodial cirri digitiform. Notopodial cirri without articulations.

Limbate setae missing in scattered setigers, gently curved, marginally frayed. Pectinate setae (Figure 107g) long and prominent in posterior setigers, narrow, tapering, flat. Marginal teeth no longer than other teeth; less than 10 teeth present. Shafts of compound falcigers (Figure 107f) distally inflated, marginally serrated. Appendages short, stout, bidentate. Proximal teeth very much larger than distal teeth, tapering, directed laterally. Distal teeth tapering, sharply bent. Guards symmetrically rounded, marginally frayed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, light amber-colored, tapering to blunt tips, straight; cross-sections round. Subacicular hooks (Figure 107h) light amber-colored, bidentate. Hooks first present from setiger 124, present in all setigers thereafter, paired in most setigers. Proximal teeth very much larger than distal teeth, directed laterally. Distal teeth directed distally.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 34, 56, 58, 59. *Unknown Characters:* 4, 6–8, 10–17, 24, 26, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice tenuis* was compared to *E. cariboea* by

Hartman (1956, as *E. (Nicidion) cariboea*) after a re-examination of the types of the former. The latter lacks branchiae and has black subacicular hooks and aciculae; the former has branchiae and amber-colored subacicular hooks and aciculae. *Eunice tenuis* is listed with similar species in Tables 33 and 38; it differs from all other species in that group by the very late appearance of branchiae, from setiger 81 in *E. tenuis* and from setiger 28 in *E. tentaculata*, the species with the next highest number. It is the only species listed in Table 38 to have paired subacicular hooks in most setigers; other species have single hooks. It has light amber-colored aciculae and subacicular hooks, rather than dark brown to black as usual in most other species.

Eunice teretiuscula Schmarda, 1861

Eunice teretiuscula Schmarda, 1861:129, 6 figs., pl. 32: fig. 259.
Marphysa teretiuscula.—Quatrefages, 1866:337.—Ehlers, 1868:359.

REMARKS.—This species was originally described as lacking peristomial cirri, a feature characteristic of the genus *Marphysa*. The species will be treated in a forthcoming review of that genus.

188. *Eunice thomasiana* Augener, 1922

FIGURE 108a–i; TABLES 24, 25

Eunice thomasiana Augener, 1922b:45.

MATERIAL EXAMINED.—Two syntypes, ZMH V-9763 and ZMB 6398, St. Thomas, West Indies, Kükenthal and Hartmeyer coll.

COMMENTS ON MATERIAL EXAMINED.—The Hamburg syntype is complete and in good condition; the Berlin syntype is incomplete and has been partially dehydrated. The description and illustrations are based on the Hamburg syntype with comments where the Berlin syntype differs.

DESCRIPTION.—Hamburg syntype complete female with small eggs, with 99 setigers; total length 45 mm; maximal width 3 mm; length through setiger 10, 6 mm. Body with roughly circular cross-section, tapering evenly towards posterior end. Berlin syntype incomplete with 97 setigers; length about 40 mm; maximal width 3 mm.

Prostomium (Figure 108a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus shallow. Eyes between bases of A-I and A-II. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 11 long, distally well-separated, ovate articulations in A-III, basally articulations cylindrical. A-I to setiger 3; A-II to setiger 5; A-III to setiger 6. Peristomium contracted in fixation, cylindrical. Separation between rings distinct dorsally only; anterior ring 4/5 of total peristomial length; anterior ring dorsally folded into several longitudinal folds. Peristomial cirri to front edge of peristomium, digitiform, with 5 articulations.

Maxillary formula unknown.

Branchiae present, palmate, distinctly shorter than notopodial cirri, not reduced in mid-body region. Branchiae from setiger 4 to setiger 79, from setiger 4 to last setiger present in incomplete syntype. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. Most branchiae single filaments (Figure 108e); maximum number of filaments 3 in a few setigers around setiger 15. Filaments short, digitiform.

First few neuropodial acicular lobes symmetrically rounded (Figure 108d); all other acicular lobes distally conical; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 5 through setiger 40. Inflated bases thick, transverse welts; narrow tips tapering. Posterior ventral cirri tapering, without basal inflations. All notopodial cirri digitiform, longer than branchiae, with up to 4 articulations anteriorly; posterior setigers usually with 2 articulations; distalmost articulation ovate.

Limbate setae slender, marginally finely serrated in anterior setigers, marginally smooth in posterior setigers. Anterior pectinate setae (Figure 108b) furled, flaring. One marginal tooth distinctly longer than other teeth; ~15 teeth present. Posterior pectinate setae (Figure 108f) tapering, otherwise similar to anterior pectinate setae. Shafts of compound falcigers distally tapering, marginally smooth, without distal beak. Anterior appendages (Figure 108c) tapering, with distinct head, bidentate. Proximal teeth larger than distal teeth, triangular, directed laterally. Distal teeth nearly erect, tapering. Posterior appendages (Figure 108h) less distinctly tapering, bidentate. Proximal teeth larger than distal teeth, narrow, directed laterally. Distal teeth distinctly bent than in anterior appendages. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 108i) paired, brown, curved slightly dorsally, flattened, knife-edged, tapering to blunt tips. Subacicular hooks (Figure 108g) brown, bidentate. Hooks first present from setiger 22 (from setiger 24 in Berlin syntype), present in all setigers thereafter, mostly single, rarely paired. Hooks tapering to narrow necks; heads large. Proximal teeth larger than distal teeth, tapering, directed laterally, but distally slightly upturned. Distal teeth erect, tapering.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 34, 56, 58, 59. *Unknown Characters:* 4, 6, 39, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

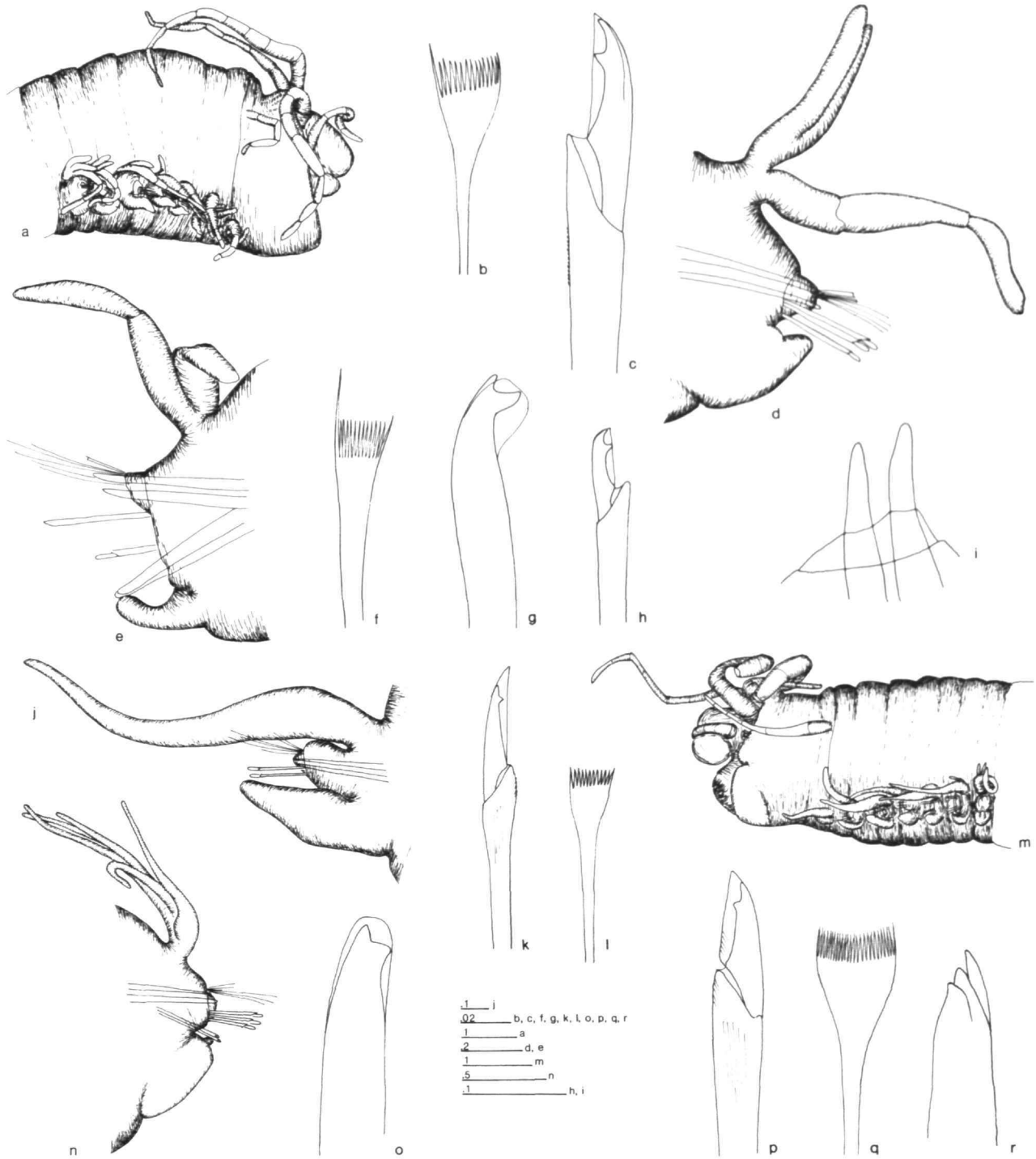

FIGURE 108.—*Eunice thomasiana* (holotype, ZMH V-9763): a, anterior end, lateral view; b, pectinate seta, parapodium 10; c, compound falciger, parapodium 10; d, parapodium 10, anterior view; e, parapodium 58, anterior view; f, pectinate seta, parapodium 58; g, subacicular hook, parapodium 58; h, compound falciger, parapodium 58; i, aciculae, parapodium 58. *Eunice tibiana* (lectotype, MCZ): j, parapodium 3, anterior view; k, compound falciger, parapodium 3; l pectinate seta, parapodium 3; m, anterior end, lateral view; n, parapodium 35, anterior view; o, subacicular hook, parapodium 35; p, compound falciger, parapodium 35; q, pectinate seta, parapodium 35; r, subacicular hook, parapodium 35. (Scale bars in mm.)

REMARKS.—*Eunice thomasiana* has not been reported since its original description. It is listed with similar species in Tables 24 and 25. It can be separated from all other species in these tables by the presence of knife-edged aciculae, a feature more common in species in Table 27.

189. *Eunice tibiana* (Pourtalès, 1867)

FIGURE 108j-r; TABLES 27, 31

Marphysa tibiana Pourtalès, 1867:108.
Eunice tibiana.—Ehlers, 1887:90-91, pl 27: figs. 1-13.

MATERIAL EXAMINED.—Lectotype, MZC, Caribbean Sea, 22°09'30"N, 82°21'30"W, 443 m, *Sigsbee* sta 11.

DESCRIPTION.—Lectotype complete, of unknown sex, with 165 setigers; total length 73 mm; maximal width 3 mm; length through setiger 10, 5.5 mm. Body roughly circular in cross-section, tapering abruptly anteriorly, tapering gently towards posterior end. Anal cirri as long as last 3 setigers, basally inflated.

Prostomium (Figure 108m) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median sulcus rather shallow. Eyes posterior to bases of A-I, chestnut-colored. Antennae in transverse row, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 20 irregular, indistinct cylindrical articulations in A-III. A-I to setiger 1; A-II to setiger 11; A-III to setiger 13. Peristomium cylindrical. Separation between rings distinct ventrally and dorsally; anterior ring 4/5 of total peristomial length. Peristomial cirri reaching beyond tip of prostomium, slender and tapering, with 7 or 8 indistinct, irregular cylindrical articulations.

Maxillary formula 1+1, 7+8, 8+0, 8+12, and 1+1. Mx III long, located behind left Mx II.

Branchiae (Figure 108n) present, pectinate, distinctly shorter than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6 to setiger 135. Branchiae terminating well before posterior end; present on more than 65% of total number of setigers. First and last 10-15 pairs single filaments; maximum 5 filaments. Branchial stems short, tapering. Filaments digitiform, shorter than notopodial cirri.

Anterior neuropodial acicular lobes (Figure 108j) distally conical, becoming obliquely triangular in median and posterior setigers; aciculae emerging either at midline or dorsal to midline. Presetal lobes low, transverse folds. Anterior postsetal lobes nearly as high as acicular lobes, transverse, becoming reduced to low folds by setiger 30. Ventral cirri in first setiger long, tapering. Next 3 ventral cirri thick, much shorter than in setiger 1. Ventral cirri basally inflated from setiger 5 through setiger 45, thereafter inflated bases rapidly reduced over next 10 setigers. Inflated bases thick, transverse welts; narrow tips tapering. Posterior ventral cirri short, triangular, located behind subacicular hooks. Notopodial cirri basally inflated, without articulations. Notopodial cirri of setiger 1 longer than those of next following setigers and considerably less inflated basally.

Limbate setae relatively short, marginally smooth, sharply tapering. Pectinate setae (Figure 108l,p) flat, flaring. Marginal teeth no longer than other teeth, with 15 teeth. Number of compound falcigers high in first third of body; in most remaining setigers number reduced to 1 or 2 per parapodium. Shafts of compound falcigers (Figure 108k,p) inflated, marginally serrated. Appendages tapering, rather thick, especially in median and posterior setigers, bidentate. Proximal teeth thicker than distal teeth, triangular. Distal teeth gently curved, nearly erect. Guards asymmetrically sharply pointed, but not mucronate. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, honey-colored, tapering, pointed, straight; aciculae especially heavy in second third of body; cross-sections round. Subacicular hooks (Figure 108o,r) honey-colored, bidentate. Hooks first present from setiger 26, present in all setigers; up to 5 hooks in vertical row present in each setiger. Hooks very thick, with small, abruptly tapering heads. Proximal teeth slightly larger than distal teeth, directed laterally. Distal teeth erect. Ventralmost hook often worn, may appear unidentate.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 4, 6, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—The specimen selected as lectotype is one of the specimens examined and described by Ehlers (1887). Pourtalès (1867) described only the tube, as being horn-colored with alternating openings. Ehlers added the first description of the animals inhabiting these tubes. No material is left from Pourtalès study, thus the concept of this species has always been based on Ehlers' description.

Eunice tibiana is compared to similar species in Tables 27 and 31. Multiple subacicular hooks are present in two species in Table 31; of these two, *E. borneensis* has very short peristomial cirri. The peristomial cirri in *E. tibiana* outreach the prostomium. Other differences can be found by comparing entries in Table 31, illustrations, and descriptions.

190. *Eunice torquata* Quatrefages, 1866

FIGURE 109a-f; TABLES 27, 28

Eunice torquata Quatrefages, 1866:312-313, pl. 10.

MATERIAL EXAMINED.—?Holotype, MNHN, Paris, A.1(R.)-1868-no. 47a, St.-Jean-de-Luz, coll. Quatrefages.

DESCRIPTION.—Specimen incomplete with 120 setigers; length 97 mm; maximal width 4 mm; length through setiger 10,

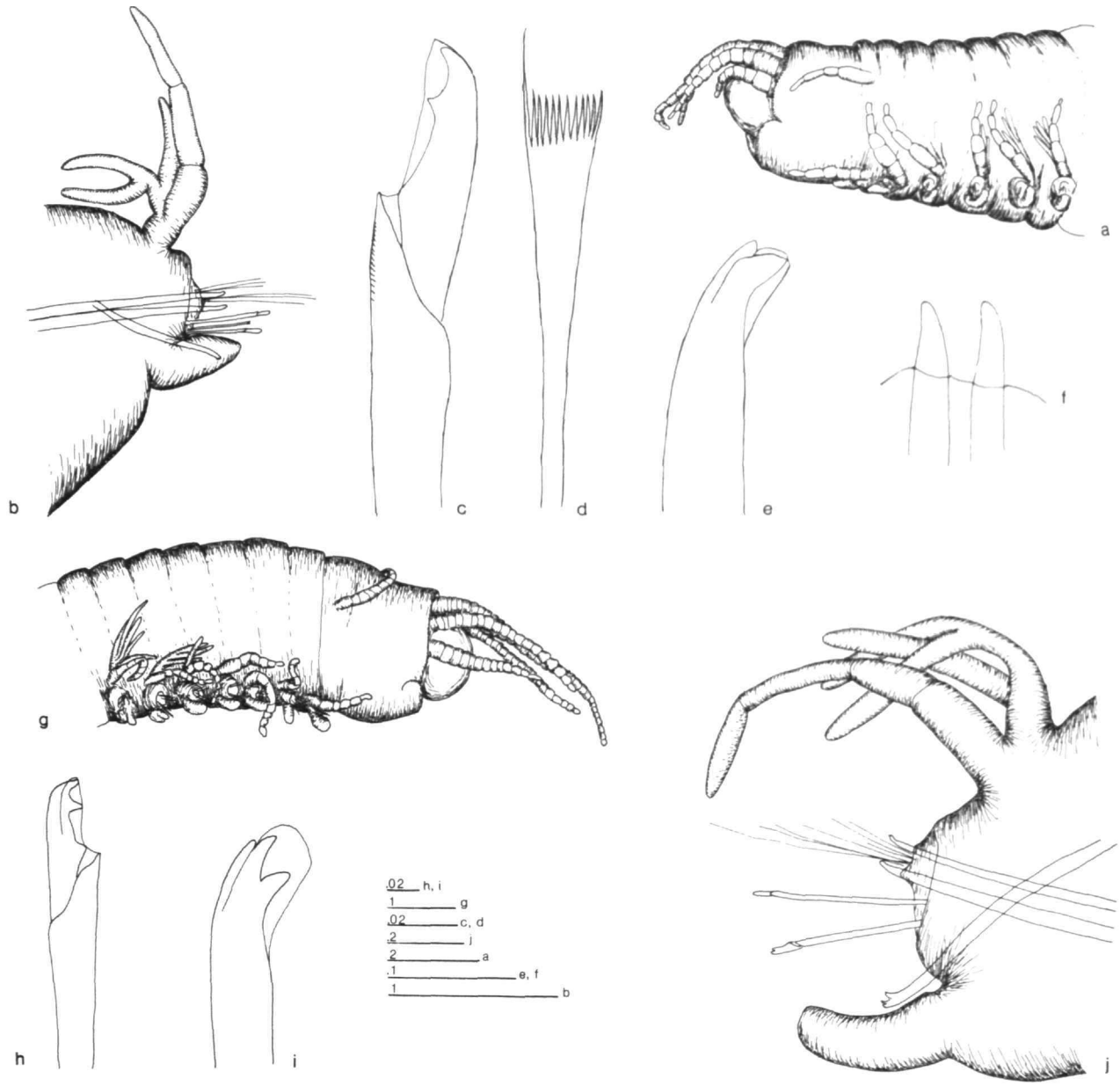

FIGURE 109.—*Eunice torquata* (?holotype, MNHN A.1(R.)-1868-no. 47a): a, anterior end, lateral view; b, parapodium 47, anterior view; c, compound falciger, parapodium 47; d, pectinate seta, parapodium 47; e, subacicular hook, parapodium 47; f, aciculae, parapodium 47. *Eunice torresiensis* (syntype, BM(NH) ZK.1885.12.1.193): g, anterior end, lateral view; h, compound falciger, parapodium 34; i, subacicular hook, parapodium 34; j, parapodium 34, anterior view. (Scale bars in mm.)

10.5 mm. Body cylindrical throughout with well-defined segments.

Prostomium (Figure 109a) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Eyes between bases of A-I and A-II, faded, hidden below peristomial fold. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae,

without articulations. Ceratostyles tapering, with up to 14 moniliform articulations in A-III. First articulation of ceratostyle long and cylindrical. A-I to posterior peristomial ring; A-II to setiger 1; A-III to setiger 2. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, tapering, with 4 long, cylindrical or drop-shaped articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through end of fragment. All branchiae with 2 or more filaments; maximum number of filaments 7 at about setiger 15. Posterior to setiger 30 most branchiae with 2 or 3 filaments (Figure 109b). Branchial stems short, tapering. Filaments short, digitiform.

Anterior neuropodial acicular lobes distally truncate; median and posterior acicular lobes distinctly more rounded; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 4 ventral cirri thick, tapering; ventral cirri with indistinctly inflated bases between setigers 5 and 30. Inflated bases ovate; narrow tips tapering. Posterior ventral cirri thick and tapering shape. Notopodial cirri basally slightly inflated, tapering. Anterior notopodial cirri with up to 5 distinct, long articulations; posterior notopodial cirri with 3 articulations.

Limbate setae marginally smooth. Pectinate setae (Figure 108d) narrow, tapering, flat. One marginal tooth longer than other teeth; ~12 teeth present. Shafts of compound falcigers (Figure 109c) tapering, marginally indistinctly serrated. Appendages short, nearly triangular, bidentate. Proximal teeth smaller than distal teeth, reduced triangular, sharp-tipped, directed laterally. Distal teeth thick, blunt, curved. Guards asymmetrically bluntly pointed, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 109f) paired, chestnut-brown, tapering, slightly curved dorsally; cross-sections round. Separation between core and sheath distinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 109e) with chestnut-brown shafts up through neck and clear heads, bidentate. Hooks first present from setiger 32, present in all setigers thereafter, paired in some setigers. Hooks tapering to narrow necks; heads small. Proximal teeth larger than distal teeth, directed obliquely distally. Distal tooth blunt, directed obliquely distally. Guards blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short; forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 36–38, 40.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—*Eunice torquata* is compared to other species in group B-2 in Table 27; in addition to *E. torquata*, only one additional species in this Table, *E. annulicornis*, has strongly moniliform articulations in the ceratostyles. The two species have been compared above in the discussion of *E. annulicornis*. *Eunice torquata* has been widely reported from the Mediterranean Sea and adjacent areas.

191. *Eunice torresiensis* McIntosh, 1885

FIGURE 109g–j; TABLES 15, 46, 47

Eunice torresiensis McIntosh, 1885:270–272, figs. 32, 33, pl. 37: figs. 18–21, pl. 19A: figs. 12, 13 [in part].—Fauchald, 1986:256–258, figs. 67–70.

MATERIAL EXAMINED.—Four of the original 6 syntypes, British Museum (Natural History) ZK 1885.1.12.193, *Challenger* sta 186, Torres Strait, 10°30′S, 142°18′E, 15 m, coral sand.

COMMENTS ON MATERIAL EXAMINED.—Two additional syntypes were assigned to *E. tribranchiata* by Fauchald (1986, see below). The remaining material consists of a large and a small specimen; the large specimen is described in detail below; the small specimen, illustrated by McIntosh, consists of 16 setigers and has been cut, presumably from a much longer specimen; the remainder is now missing.

DESCRIPTION.—Large syntype complete with 72 setigers; total length 47 mm; maximal width 3 mm at setiger 10; length through setiger 10, 6.5 mm. Anterior body with highly convex dorsum and flattened ventrum, becoming circular in cross-section in mid body and dorsoventrally flattened posteriorly, abruptly tapering anteriorly, slowly tapering posteriorly.

Prostomium (Figure 109g) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated, well separated medially. Reddish eyes between bases of A-I and A-II. Antennae in a straight line, with A-I isolated by a gap, similar in thickness. Ceratophores long in all antennae, without articulations. Ceratostyles tapering, strongly articulated; distal articulations distinctly moniliform; maximal number of articulations about 30 in A-III. A-I to setiger 1; A-II to setiger 7; A-III to setiger 9. Peristomium about as wide as anterior part of body. Separation between rings very indistinct, noticeable only ventrally and at cirral bases; anterior ring nearly 3/4 of total peristomial length. Peristomial cirri to front edge of the peristomium, slender, with ~12 articulations.

Maxillary formula (rewritten from McIntosh, 1885:271, fig. 32) 1+1, 4+3, 6+0, 5-6+8, 1+1.

Branchiae present, pectinate, distinctly longer than notopodial cirri, distinctly reduced in mid-body region (Figure 109j), flexible. Branchiae from setiger 5 to setiger 70. Branchiae present to near posterior end, present on more than 65% of total number of setigers. First branchiae single filaments; all other branchiae with at least 2 filaments; maximum 7 filaments by setiger 15; thereafter number decreasing to 3; this number

TABLE 15.—Variable and invariable features in the type lot of *Eunice torresiensis* (N = number of individuals examined; SD = standard deviation; measurements in mm; * = SD not calculated).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	2	99	81	90.00	*
Total length	2	51	32	41.50	*
Maximal width	4	5	2.5	3.50	1.08
Length through 10	4	9	6	7.05	1.37
No. of antennal articulations	4	40	34	35.75	2.87
No. of peristomial cirral articulations	4	9	4	7.00	2.16
Branchiae first present from setiger no.	4	6	5	5.25	0.50
Max. no. of branchial filaments	4	7	6	6.50	0.58
Ventral cirri inflated through setiger no.	4	30	28	29.50	1.00
No. of notopodial articulations	4	10	4	6.75	3.20
Subacicular hooks first present from setiger no.	3	28	19	24.67	4.93

INVARIABLE FEATURES	N=4
Pectinate setae	tapering; flat
No. of pectinate teeth	10
Shafts of compound falcigers	tapering
Acicular color	yellow
Acicular shape	pointed or blunt
Subacicular color	yellow
No. of subacicular teeth	3

maintained in middle region of body; towards posterior end number of filaments increasing to 7; this number maintained in all but last few segments.

Neuropodial acicular lobes distally truncate; aciculae emerging at midline. All pre- and postsetal lobes low, transverse folds. First 4 ventral cirri digitiform. Ventral cirri basally inflated from setiger 5 through setiger 30. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri digitiform without inflated bases. Notopodial cirri long and digitiform; prebranchial cirri with up to 6 moniliform articulations; farther back articulations long, slightly drop-shaped; most cirri with 4 articulations.

Limbate and pectinate setae not observed. Shafts of compound falcigers (Figure 109h) tapering without ornamentation. Appendages short, with large heads, bidentate. Proximal and distal teeth similar in size. Proximal teeth triangular, directed laterally. Distal teeth tapering, sharply bent. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, yellow, distally bent tapering to sharp tips; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 109i) yellow, tridentate with teeth in a crest. Hooks first present from setiger 24, present in all setigers thereafter, always single (except for replacements). Hooks with slender main fangs; secondary teeth nearly as large as main fang and small tertiary teeth closely appressed to the secondary teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long, located behind left Mx IV; anal cirri with moniliform articulations.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—A clarification of the status of the various types of this species was issued by Fauchald (1986:257) and the species is here accepted as defined on that occasion.

Eunice torresiensis is listed with similar species in Tables 46 and 47. Of the species with reduced number of branchial filaments in a mid-body region, two, *E. margaritacea* and *E. oliga*, have long peristomial cirri reaching at least the middle of the prostomium; in the other three species, the peristomial cirri do not outreach the peristomium. *Eunice interrupta* has maximally three branchial filaments where the branchiae are best developed; the two remaining species, *E. antennata* and *E. torresiensis*, have seven filaments. *Eunice antennata* has stiff, erect branchiae; in *E. torresiensis* the branchiae are flexible.

Eunice triantennata (Risso, 1826)

Leodice triantennata Risso, 1826:422.—Fauvel, 1923:451.
Eunice triantennata.—Grube, 1850:292.

REMARKS.—Grube (1850:292) referred this species to the section he called *Leodicae Marphysae;* Fauvel (1923:451) called the species possibly a member either of *Lysidice* or possibly as *Marphysa fallax*. No material exist of Risso's species; it is here considered a *Marphysa* and will be further discussed in a review of that genus.

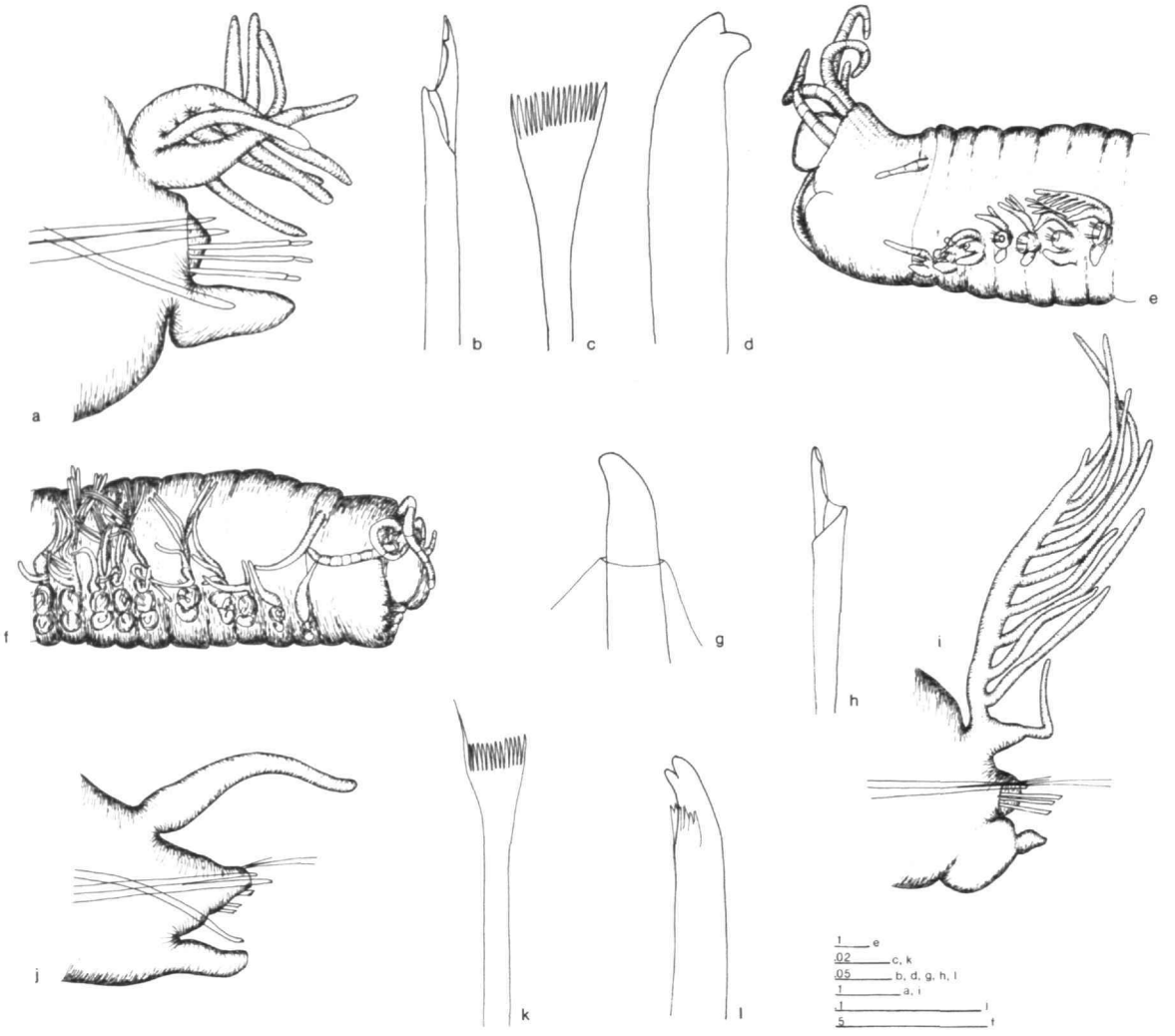

FIGURE 110.—*Eunice tribranchiata* (syntype of *Eunice torresiensis*, BM(NH) ZK.1885.12.1.193): a, parapodium 35, anterior view; b, compound falciger, parapodium 35; c, pectinate seta, parapodium 35; d, subacicular hook, parapodium 35; e, anterior end, lateral view. *Eunice tridentata* (holotype, ZMH PE699): f, anterior end, lateral view; g, acicula, parapodium 20; h, compound falciger, parapodium 20; i, parapodium 20, anterior view; j, parapodium 162, anterior view; k, pectinate seta, parapodium 162; l, subacicular hook, parapodium 162. (Scale bars in mm.)

192. *Eunice tribranchiata* McIntosh, 1885

FIGURE 110a–e; TABLES 27, 29

Eunice tribranchiata McIntosh, 1885:297, pl. 21A: figs. 6, 7.—Fauchald, 1986:258, figs. 71–75.

Eunice torresiensis McIntosh, 1885:270–272, figs. 32, 33, pl. 37: figs. 18–21, pl. 19A: figs. 12, 13 [in part].

MATERIAL EXAMINED.—Holotype and paratype, BM(NH) ZK.1885.12.1.205, 2 syntypes of *Eunice torresiensis*, BM(NH) ZK.1885.12.1.193, *Challenger* sta 186, Torres Strait, 10°30′S, 142°18′E, 15 m, coral sand.

COMMENTS ON MATERIAL EXAMINED.—An account of the material of this species can be found in Fauchald (1986:258); the description below is based on one of the two syntypes removed from the material of *E. torresiensis*.

DESCRIPTION.—Holotype a posterior fragment of 90 median and posterior setigers. Specimen described and illustrated incomplete with 35 setigers, 31 mm long; maximal width 7 mm at setiger 10; length through setiger 10, 13 mm. Other specimen with 18 setigers; length 15 mm; maximum width 8 mm; length through setiger 10, 11 mm. Body cylindrical, abruptly tapering anteriorly.

Prostomium (Figure 110e) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 6 cylindrical articulations of varying lengths in A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 1. Peristomium as wide as anterior part of body, cylindrical, with distinct muscular lower lip. Separation between rings well marked dorsally and less distinct ventrally; anterior ring ~4/5 of total peristomial length. Peristomial cirri to middle of anterior peristomial ring, slightly inflated basally, with 5 articulations.

Maxillary formula (illustrated in McIntosh, 1885, plate 37: fig. 20) 1+1, 4+4, ?+0, 6+6, 1+1; Mx III absent in illustration, but here assumed present in specimen.

Branchiae (Figure 110a) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 4 or 5 to end of fragments. All branchiae with 2 or more filaments; maximum 8 filaments. Branchial stems tapering, flexible; filaments longer than stems, digitiform.

Neuropodial acicular lobes symmetrically triangular; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 5 ventral cirri very large, digitiform. Ventral cirri basally inflated from about setiger 6. Inflated bases large, scoop-shaped (subacicular hooks emerging at bases of scoops when they start); narrow tips tapering. Notopodial cirri basally slightly inflated with 2 or 3 long, indistinct articulations.

Limbate setae slender, marginally serrated. Pectinate setae (Figure 110c) flat, flaring with thick shafts. All teeth similar in length and thickness; ~20 teeth present. Shafts of compound falcigers (Figure 110b) long, essentially un-tapering, marginally smooth. Appendages slender, tapering, bidentate. Proximal teeth larger than distal teeth, triangular and directed laterally or slightly distally. Distal teeth tapering, very nearly erect. Guards asymmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired, black, distally tapering, straight; cross-sections round. Subacicular hooks (Figure 110d) black, bidentate. Hooks first present from setiger 30, present in all setigers thereafter, always single (except for replacements). Heads small; teeth similar in size. Proximal teeth directed laterally, curved. Distal teeth triangular, directed distally. Guards short and truncate.

UNKNOWN MORPHOLOGICAL FEATURES.—Structure of Mx III and its relationship to left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III short, forming part of distal arc with left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 36–38, 40, 42, 57–60, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The relationship between *E. tribranchiata* and similar species in Australia was discussed by Fauchald (1986). It is listed with similar species in Tables 27 and 29. Of the four species with less than 10 branchial filaments where the branchiae are fully developed listed in Table 29, two, *E. microprion* and *E. philocorallia*, have peristomial cirri reaching the middle of the prostomium; the two remaining species have short peristomial cirri. The peristomial cirri are articulated in *E. tribranchiata* and lack articulations in *E. plicata*.

193. *Eunice tridentata* Ehlers, 1905

FIGURE 110f–l; TABLES 19, 21

Eunice tridentata Ehlers, 1905:288–290, pl. 9: figs. 3–10.—Fauchald, 1986:258–259, figs. 76–82.

MATERIAL EXAMINED.—Holotype, ZMH PE699, New Zealand.

DESCRIPTION.—Holotype complete with 185 setigers; total length 170 mm; maximal width 7 mm at setiger 10; length through setiger 10, 12 mm. Body circular in cross-section, abruptly tapering anteriorly and slowly tapering posteriorly.

Prostomium (Figure 110f) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in a straight line, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 8 cylindrical, distinct articulations in A-III. A-I to posterior margin of peristomium; A-II to setiger 2; A-III to setiger 3. Peristomium a thick, cylindrical collar around prostomium; lower lip distinctly scalloped, muscular. Separation between rings very distinct both dorsally and ventrally, appearing nearly as a separate segment, but indistinct laterally; anterior ring up 4/5 of total peristomial length. Peristomial cirri nearly to tip of prostomium, slender and tapering, without articulations.

Jaw apparatus missing.

Branchiae (Figure 110i) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 80. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and last 15 pairs single filaments; all other branchiae pectinate with maximum 14 filaments at setiger 30. Branchial stems soft, pliable. Filaments long and slender, very much longer than notopodial cirri where best developed.

Anterior neuropodial acicular lobes asymmetrically rounded with aciculae emerging above midline, near midline in posterior setigers (Figure 110j). Posterior neuropodial acicular lobes symmetrically conical. Anterior presetal lobes obliquely transverse, sloping from a high point at dorsal margins towards bases of acicular lobes at ventral margin. Anterior postsetal lobes transverse low folds. Posterior pre- and postsetal lobes follow outline of acicular lobes closely. First 4 ventral cirri thick and sharply tapering. Ventral cirri with inflated bases

from setiger 5 through setiger 25. Inflated bases nearly spherical; narrow tips tapering, broadly conical. Postbranchial ventral cirri increasingly digitiform, gradually loosing basal inflation. Prebranchial and early branchial notopodial cirri medially inflated, about half as long as peristomial cirri, becoming basally distinctly inflated, abruptly tapering with long, digitiform tips in most of branchial region. Postbranchial notopodial cirri medially inflated, similar in shape to prebranchial cirri but shorter. Notopodial cirri without articulations.

Limbate setae slender, nearly capillary. Pectinate setae (Figure 110k) flat, flaring, with thick shafts. One marginal tooth longer than other teeth; ~15 teeth present. Shafts of compound falcigers (Figure 110h) have thick, smoothly tapering, without marginal dentition. Appendages very small, slender, with indistinct head, bidentate. Proximal teeth triangular, directed laterally. Distal teeth much smaller than proximal teeth, nearly erect. Guards symmetrically bluntly pointed; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 110g) paired, yellow, distally bent ventrally, abruptly tapering; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 110l) yellow, bidentate. Hooks first present from setiger 51, irregular in occurrence, always single (except for replacements). Hooks distally abruptly tapered, with small head; both teeth directed obliquely distally; proximal and distal teeth similar in length; proximal teeth slender and tapering; distal teeth massive and blunt.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 13, 14.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice tridentata* is compared to similar species in Tables 19 and 21. Perhaps the most unusual feature of this species is that the branchiae first reach their maximum number of filaments at about setiger 30; in all other species in Table 21, the maximum number of filaments is reached at setiger 15, with the exception of *E. heterochaeta*, in which it is reached at setiger 25. The notopodial cirri are articulated in the anterior end in *E. heterochaeta* and wholly lack articulations in *E. tridentata*.

Eunice tristriata Grube, 1870

Eunice tristriata Grube, 1870b:55; 1878a:100.

REMARKS.—No specimens are available. The prostomial antennae are very indistinctly articulated; the median one reaches setiger 5. Branchiae are present from setiger 5 and are absent on the last 22 setigers; the maximum number of filaments is 10. The branchiae do not outreach the "remarkable thick" notopodial cirrus.

The species must be considered indeterminable.

194. *Eunice tubicola* (Treadwell, 1922)

FIGURE 111; TABLES 52, 53

Leodice tubicola Treadwell, 1922:139-142, figs. 17-23, pl. 3: figs. 1-6.
Eunice tubifex.—Hartman, 1956:282-283 [in part, not *Eunice tubifex* Crossland, 1904].

MATERIAL EXAMINED.—Holotype, AMNH 1540, Pago Pago, Samoa, 1920.

COMMENTS ON MATERIAL EXAMINED.—The anterior end had been dissected and the jaws are now missing. The lower lip had been sliced off, so the illustration is partly a reconstruction (below the dashed line indicated in the illustration). Remnants of a stiff horny tube was also present in sample, as were two fragments of another specimen, apparently of the same species.

DESCRIPTION.—Holotype complete, with 83 setigers; total length 26.5 mm; maximal width 1.2 mm at about setiger 10; length through setiger 10, 4.0 mm.

Prostomium (Figure 111a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally flattened; median groove shallow. Eyes not observed. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, without articulations. All antennae similar in length, none reaching beyond anterior peristomial ring. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring ~4/5 of total peristomial length. Peristomial cirri digitiform, without articulations, barely reaching middle of anterior peristomial ring.

Jaws missing.

Branchiae (Figure 111e) present; single filaments, about as long as notopodial cirri. Branchiae from setiger 22 on one side and 24 on other side to setiger 69. Branchiae terminating well before posterior end, present on more than 65% of total number of setigers. All branchiae digitiform filaments, about as long as notopodial cirri.

Anterior neuropodial acicular lobes (Figure 111b) obliquely truncate with small, rounded tabs above aciculae; aciculae emerging at midline. Median and posterior neuropodial acicular lobes nearly triangular with straight dorsal and distal edges. Pre- and postsetal lobes low, transverse folds. First 5 ventral cirri digitiform, thereafter basally strongly inflated, through rest of body. Inflated bases thick, transverse welts; narrow tips short and button-shaped. Anterior notopodial cirri medially inflated, becoming digitiform in posterior setigers, but retaining same length as in anterior setigers. Notopodial cirri without articulations.

Limbate setae marginally serrated. Pectinate setae small

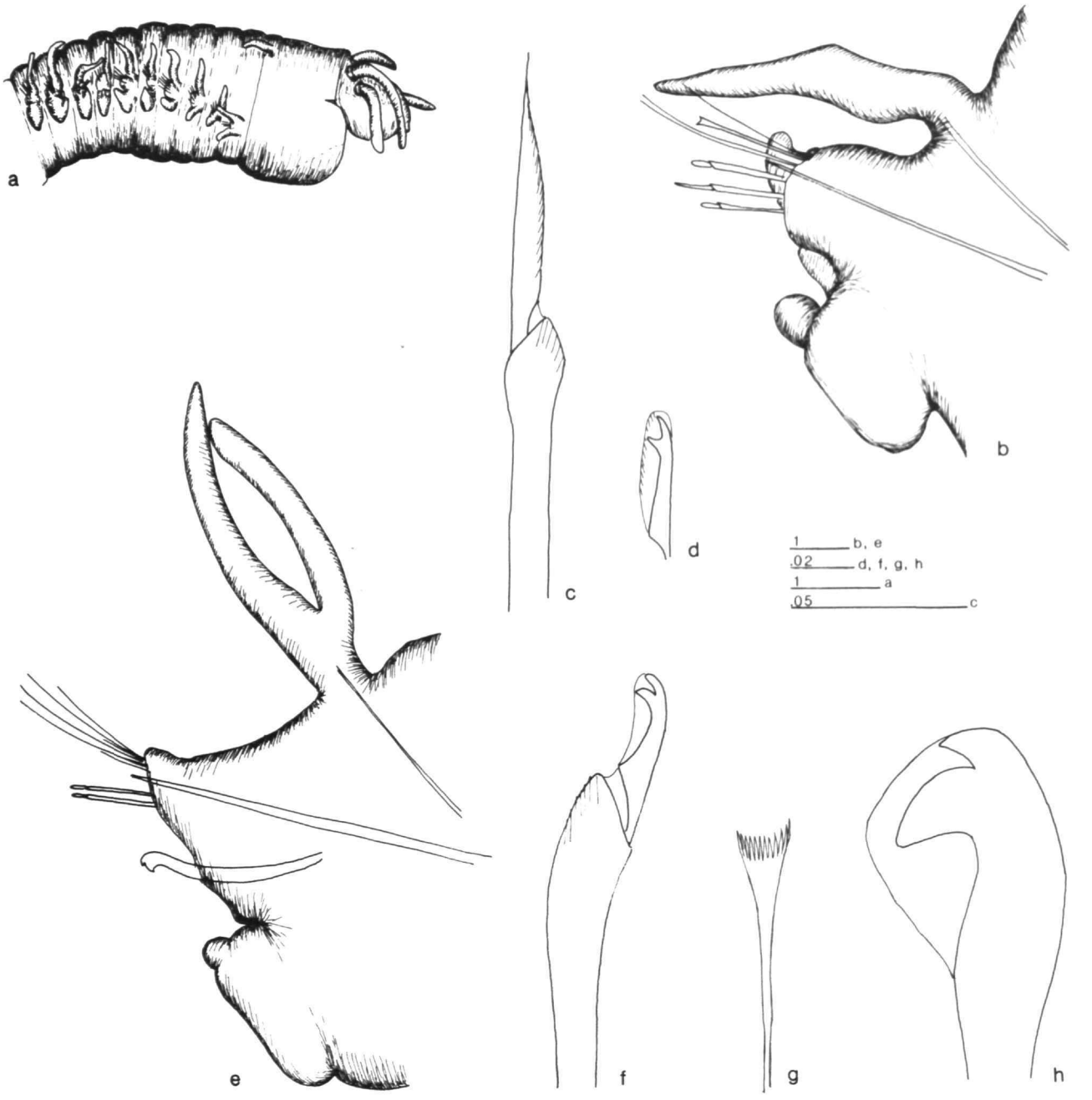

FIGURE 111.—*Eunice tubicola* (holotype, AMNH 1540): a, anterior end, lateral view; b, parapodium 8, anterior view; c, compound spiniger, parapodium 8; d, appendage of compound falciger, parapodium 8; e, parapodium 26, anterior view; f, compound falciger, parapodium 26; g, pectinate seta, parapodium 26; h, subacicular hook, parapodium 26. (Scale bars in mm.)

(Figure 111g), delicate, tapering, flat. About 12 teeth present. Shafts of compound falcigers (Figure 111f) strongly inflated. Appendages short and slender, bidentate. Proximal and distal teeth well developed, slender, tapering, curved and nearly parallel in median setigers, diverging in anterior setigers (Figure 111d). Guards blunt with marginal teeth; mucros absent. Pseudocompound falcigers absent. Compound spinigers (Figure 111c) in first 12 setigers. Shafts strongly inflated;

appendages long, knife-like and marginally serrated. Aciculae single, yellow, smoothly tapering, straight; cross-sections round. Subacicular hooks (Figure 111h) dark yellow (honey-colored) or amber, bidentate. Hooks first present from setiger 21, present in all setigers thereafter, always single (except for replacements). Hooks about as thick as aciculae, gently curved with distinct narrow necks and distinct heads. Proximal teeth very much larger than distal teeth, strongly curved. Distal teeth nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—Mx III long and straight, located behind left Mx II.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 33, 34, 39–42, 56, 60. *Unknown Characters:* 13, 14, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice tubicola* was considered a synonym of *E. tubifex* by Hartman (1956). It is listed in Tables 52 and 53 with similar species. The only three species in *Eunice* with compound spinigers are *E. impexa, E. tubicola,* and *E. tubifex.* The first has distinctly articulated ceratostyles; the other two have non-articulated ceratostyles. In *E. tubicola* the separation between the peristomial rings is distinct both dorsally and ventrally; in *E. tubifex* it is distinct dorsally only. *Eunice tubicola* has very short antennae, barely outreaching the prostomium; in *E. tubifex* the antennae are distinctly longer than the prostomium with the three median antennae similar in size.

195. *Eunice tubifex* Crossland, 1904

FIGURE 112; TABLES 52, 53

Eunice tubifex Crossland, 1904:303–310, figs. 52–55, pl. 21: figs. 1–8.

MATERIAL EXAMINED.—Lectotype and 2 paralectotypes, BM(NH) ZK 1924.3.1.90/91, Wasin Harbour, S Kenya coast, dredged, average depth 18 m, extensive *Telesto* cover. Crossland Zanzibar and British East Africa collections, 1901–1902.

COMMENTS ON MATERIAL EXAMINED.—The specimens examined are the three smaller specimens mentioned by Crossland (1904:308) as differing in structure from the adult specimens. The description is based on the two larger specimens; some comments are made on the third small specimen. Lectotype with jaws partially everted; paralectotype with jaws fully everted.

DESCRIPTION.—Lectotype incomplete with 51 setigers; length 37 mm; maximal width 3 mm at setiger 10; length through setiger 10, 7 mm. Large paralectotype incomplete with 52 setigers; length 36.5 mm; maximal width 2 mm; length through setiger 10, 7 mm. Anterior body inflated; median body dorsoventrally flattened.

Prostomium (Figure 112a,i) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium or deeper. Prostomial lobes frontally rounded, dorsally excavate with a flattened rim; median sulcus deep. Black eyes between bases of A-I and A-II. Antennae in a horseshoe; A-III separated from A-I and A-II by distinct gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform without articulations. A-I to middle of anterior peristomial ring; A-II to setiger 4; A-III incomplete in lectotype, to setiger 4 in paralectotype. Peristomium inflated anteriorly, massive, with muscular lower lip. Separation between rings distinct dorsally; 2 transverse furrows present ventrally, separating ventrum in 3 equal parts. Anterior ring 4/5 of total peristomial length. Peristomial cirri thick, to middle of anterior peristomial ring, basally inflated, without articulations.

Maxillary formula of paralectotype 1+1, 4+3, 7+0, 2+7, and 1+1; partial formula of lectotype 1+1, 4+4, 7?+0, 2+?, and 1+1. Mx VI absent; Mx III long, straight, located behind left Mx II. Distal arc absent.

Branchiae (Figure 112d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, flexible. Branchiae from setiger 17 as single filaments; maximum 4 filaments by setiger 30; maximum number retained to posterior end of fragments. Branchial stems shorter than notopodial cirri, tapering, flexible. Filaments longer than notopodial cirri, slender, filiform.

Neuropodial acicular lobes (Figure 112c,m) obliquely truncate with distinct superior tab; aciculae supporting superior tab. Presetal lobes low, transverse folds. Anterior postsetal lobes free, projecting as far as acicular lobes, rounded. Median postsetal lobes low, transverse folds. First 5 ventral cirri tapering. Ventral cirri basally inflated from about setiger 6 through rest of fragments. Inflated bases thick, transverse welts; narrow tips short and button-shaped. Prebranchial notopodial cirri medially inflated, increasing in length through setiger 10, thereafter retaining the same length through rest of prebranchial region. Notopodial cirri of branchial region increasingly shorter, becoming tapering. Notopodial cirri without articulations.

Limbate setae longer than all other setae, narrow, marginally smooth. Anterior and median pectinate setae (Figure 112f,l,r) similar, furled, tapering. Shafts slender, cylindrical. Both marginal teeth as long as other teeth, distinctly heavier. About 10 teeth present. Anterior parapodia with dense masses of compound spinigers. Shafts of spinigers (Figure 112b,j) slightly inflated, smooth, with distinct distal beaks. Appendages slender, tapering, marginally smooth. Spinigers replaced by compound falcigers from early branchial setigers. Shafts of falcigers (Figure 112e) inflated, marginally smooth, without distal beaks. Appendages longer than inflated end of shaft, tapering. Heads distinct, bidentate. Proximal teeth longer than distal teeth, narrowly tapering, directed laterally. Distal teeth slender, tapering, distinctly bent. Guards wide, distally rounded, amucronate; margins smooth. Pseudocompound falcigers absent. Aciculae paired, thick, inferior aciculae black;

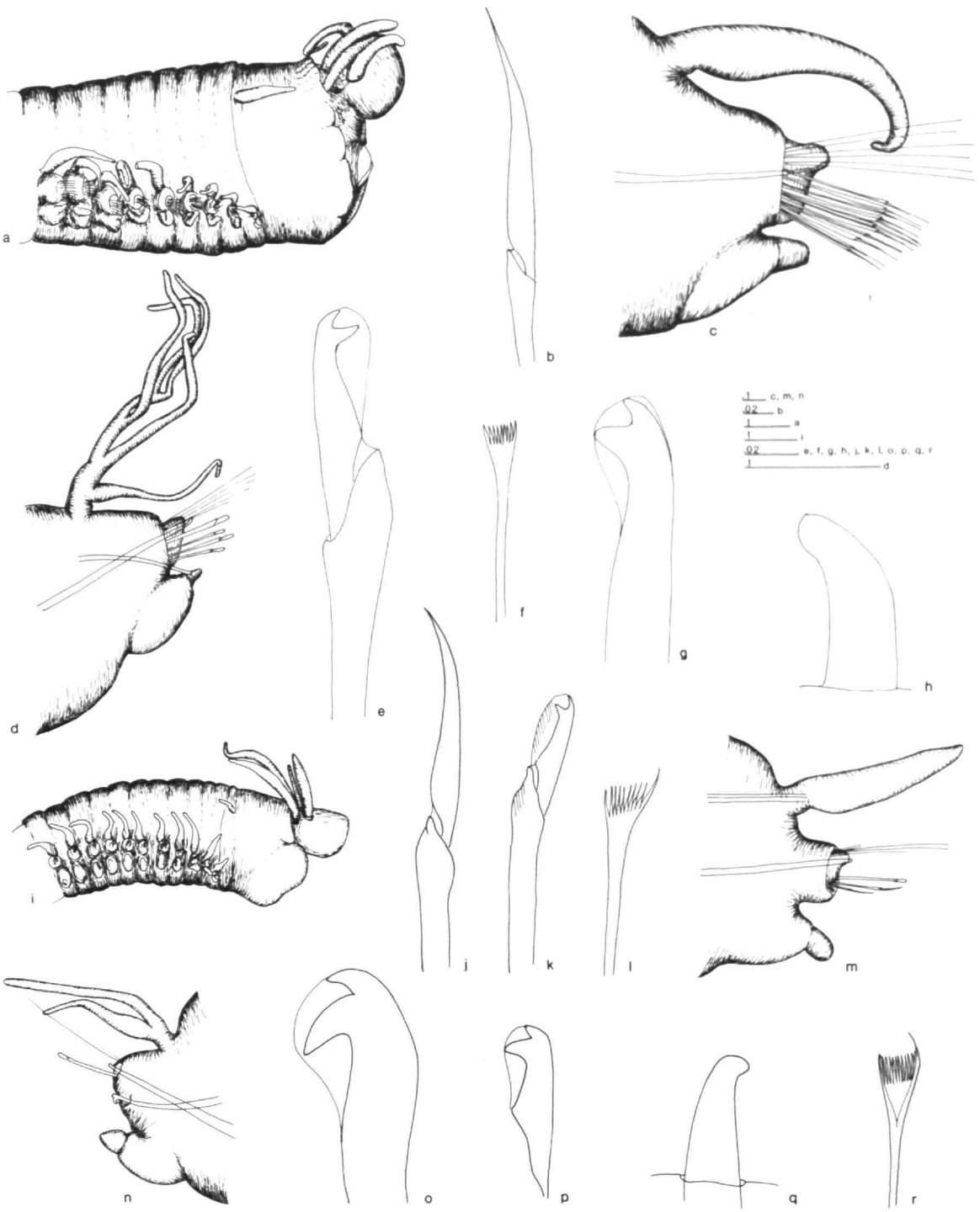

FIGURE 112.—*Eunice tubifex* (syntypes, BM(NH) ZK 1924.3.1.90/91): a, anterior end, lateral view; b, compound spiniger, parapodium 7; c, parapodium 7, anterior view; d, parapodium 42, anterior view; e, compound falciger, parapodium 42; f, pectinate seta, parapodium 42; g, subacicular hook, parapodium 42; h, acicula, parapodium 42. (i–r of smaller syntype): i, anterior end, lateral view; j, compound spiniger, parapodium 7; k, compound falciger, parapodium 7; l, pectinate seta, parapodium 7; m, parapodium 7, anterior view; n, parapodium 33, anterior view; o, subacicular hook, parapodium 33; p, appendage of compound falciger, parapodium 33; q, acicula, parapodium 33; r, pectinate seta, parapodium 33.

superior aciculae light brown; all aciculae distally geniculate (Figure 112h,o), expanded into small, flattened tabs; cross-sections of shafts round. Subacicular hooks (Figure 112g) slender, bidentate, with black cores and clear sheaths. Hooks first present from setiger 29 (32 in paralectotype), present in all setigers thereafter, always single (except for replacements). Hooks tapering, straight. Proximal teeth tapering, directed laterally; distal teeth smaller than proximal teeth, slender, tapering, directed obliquely laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF SELECTED MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 60. *Unknown Characters:* 1, 2, 4, 6, 36–40, 47, 50, 63, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,1; 38,1.

REMARKS.—The smaller specimen differs from the specimens described above in the following features:

Branchiae (Figure 112n) single filaments, rather than pectinate with up to 4 filaments.

Distal end of inflated ventral cirri relatively much larger than in larger specimens.

Pectinate setae (Figure 112o) with one marginal tooth longer than other in small specimen. Median pectinate setae distinctly furled in small specimen. Shafts of both compound spinigers and falcigers (Figure 112j,k) with very large distal beaks; shafts of falcigers (Figure 112k) serrated as is margin of guards. Falcigers present already from about setiger 5 in small specimens and not until about setiger 15 in larger specimens. Subacicular hooks (Figure 112o) distinctly beaked with large head and parrot-beaked teeth.

These differences, and the differences Crossland claimed for the specimens described above and the adult specimens he described in the first pages of the description, are the kind of differences that may be related to the size of the specimen, but may also be of specific value under certain circumstances. The species is clearly valid, but without access to large adults from the type areas, preferably from Zanzibar, it is going to be difficult to assess the relations among the three different forms Crossland included in his description.

The relationship between *E. tubifex* and the closely similar *E. tubicola* is explored above; the two described forms may in fact belong to a single widespread species, but without knowledge of variability with increasing size, this problem cannot be solved.

196. *Eunice unidentata* Rioja, 1962

TABLES 27, 28, 50

Eunice unidentata Rioja, 1962:175–178, figs. 77–83.

COMMENTS ON MATERIAL.—Rioja did not leave any material of this or any of the other species he described from Mexico (Maria Elena Caso and Vivianne Solis Weiss, in litt.). The following description summarizes what is known about this species based on his description and illustrations.

DESCRIPTION.—Specimens 80–100 mm long and 2–3 mm wide.

Prostomium distinctly shorter than peristomium, about as wide as peristomium. Prostomial lobes frontally rounded; median groove shallow. Small eyes hidden below peristomial fold. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores long in all antennae, with 4 to 5 distinct, short articulations. Ceratostyles slender and tapering, not articulated. All antennae short; not outreaching peristomium; A-III longest, A-II slightly shorter and A-I shortest. Peristomium cylindrical. Separation between rings distinct at least dorsally. Peristomial cirri tapering, short, without articulations.

Maxillary formula unknown.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 23 absent on last 1/3 or 1/4 of body. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Maximum 5 filaments reached at about setiger 35 and lasting through setiger 70. Filaments long, digitiform.

Parapodial features not described in detail by Rioja. Median parapodium (Rioja, 1962, fig. 78) with truncate, possibly slightly excavate neuropodial acicular lobes; aciculae emerging at midline. Presetal and possibly postsetal lobes low, transverse folds. Ventral cirri basally inflated with large, thick, tapering tips in median parapodia. Notopodial cirri tapering, without articulations.

Pectinate setae flat, flaring. One marginal tooth longer than other teeth; ~17 teeth present. Shafts of compound falcigers inflated, marginally smooth. Appendages short and triangular with very large heads, bidentate. Proximal teeth triangular and directed laterally. Distal teeth of about same size as proximal teeth, curved. Guards symmetrically rounded, mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae with dark (black) cores and clear sheaths, distally straight, bluntly pointed; cross-sections round. Subacicular hooks with dark cores and clear sheaths, distally tapering, unidentate. Hooks first present from setigers 20–25.

UNKNOWN MORPHOLOGICAL FEATURES.—Many prostomial and peristomial features; jaw structure; many parapodial features; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56. *Unknown Characters:* 1, 4–6, 8, 12, 14, 24–26, 36, 39, 40, 45, 47, 48, 50–52, 57–61, 63, 64, 81, 82.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice unidentata* was collected near Acapulco, Mexico. It is first and foremost characterized by the structure of the subacicular hooks and the very characteristic bases of the antennae. The basal articulations appear to be unique to the whole genus. The species is here considered valid and is listed with similar species in Tables 27 and 28. It is listed with other species with simple, spine-like subacicular hooks in Table 50.

197. *Eunice unifrons* (Verrill, 1900)

FIGURE 113a-j; TABLES 41, 42

Leodice unifrons Verrill, 1900:644.—Treadwell, 1921:17-20, figs. 21-30, pl. 1: figs. 5-9.

Eunice vittata.—Hartman, 1942:9 [in part, not *Nereis vittata* Chiaje, 1929].

MATERIAL EXAMINED.—Holotype, YPM 1241, Bermuda, 1898, A.E. Verrill and company coll.; YPM 1321, Platts Village, Bermuda, beach to 10 feet, A.E. Verrill and company, 1898, 4 specimens.

COMMENTS ON MATERIAL EXAMINED.—The holotype material now consists of an anterior fragment of 31 anterior setigers and a median fragment of about 60 setigers; the specimen has been completely dried out at one time (Treadwell, 1921:20 reported the type dry); the only information gained from the specimen concerns the structure of the subacicular hooks and other setae and some details of branchial distribution.

The four specimens from YPM 1321 were part of the original material, but were not designated as types; they are in better shape than the holotype even if they are rather soft and have lost most of the antennae.

DESCRIPTION.—All specimens from YPM 1321 incomplete with up to 90 setigers; specimen described and illustrated with 75 setigers; length 28 mm; maximal width 1 mm at setiger 10; length through setiger 10, 5 mm.

Prostomium (Figure 113a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of the peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus distinct ventrally and at frontal edge, but not dorsally. Eyes not seen. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles digitiform, with cylindrical articulations; innermost articulation (other than ceratophoral ring) ~ $^1/_2$ of total antennal length; maximum 4 articulations in A-II and A-III. A-I to posterior peristomial ring; A-II and A-III to setiger 2. Peristomium cylindrical. Separation between rings distinct on all sides; anterior ring less than $^2/_3$ of total peristomial length. Peristomial fold covering base of prostomium is unfolded on all 4 specimens. Peristomial cirri to middle of anterior peristomial ring, slender, digitiform, with 5 articulations.

Maxillary formula of 1 specimen 1+1, 8+8, 5+0, 8+10, and 1+1. Mx VI missing. Mx III behind left Mx II, but relatively short.

Branchiae (Figure 113d) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 through setigers 45-54 (of more than 70 setigers, no specimens complete). First 4 and last 10 pairs single filaments; maximum 5 filaments at about setiger 15-30. Branchial stems slender. Filaments slender.

Anterior neuropodial acicular lobes rounded with a distinct, short nipple-like projection near middle of lobe and posterior to emergence of aciculae. Median and posterior neuropodial acicular lobes conical; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 5 ventral cirri conical. Ventral cirri basally distinctly inflated from about setiger 6. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri increasingly tapering with inflated portion less noticeable. Anterior notopodial cirri basally inflated, becoming slender and digitiform in branchial region. All notopodial cirri with 2 or 3 cylindrical articulations.

Limbate setae slender, finely serrated. Pectinate setae (Figure 113c,f,i) tapering, flat. One marginal tooth very much longer and heavier than all other teeth; 7-10 teeth present. Shafts of compound falcigers (Figure 113b,g) slightly inflated and marginally serrated. Anterior and median appendages long and narrow with nearly parallel sides, bidentate. Teeth very similar in size, both sharply pointed. Proximal teeth directed laterally. Distal teeth distinctly bent. Posterior appendages (Figure 113j) very much shorter with slender teeth; proximal teeth shorter than distal teeth. Guards distally asymmetrically bluntly pointed and marginally serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single; clear yellow, distally tapering, straight; cross-sections round. Separation between cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 113e,h) yellow, tridentate in a crest. Hooks first present from setiger 25 in holotype and from setigers 26-31 in other specimens, present in all setigers thereafter, always single (except for replacements). Hooks with large curved main fangs and very small tertiary fangs; 2 distal fangs forming group separated from main fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 13, 14, 38, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—38,2.

REMARKS.—*Eunice unifrons* is listed with similar species in Tables 41 and 42. It is one of five species in Table 42 with blunt guards on the compound falcigers. The other species include *E. aucklandica*, *E. multicylindri*, *E. tentaculata*, and *E. vittata*. Of these species, only *E. multicylindri* and *E. unifrons* have single subacicular hooks throughout. The other species listed have at least paired subacicular hooks in most setigers. The peristomial cirri are articulated in *E. multicylindri* and lack articulations in *E. unifrons*.

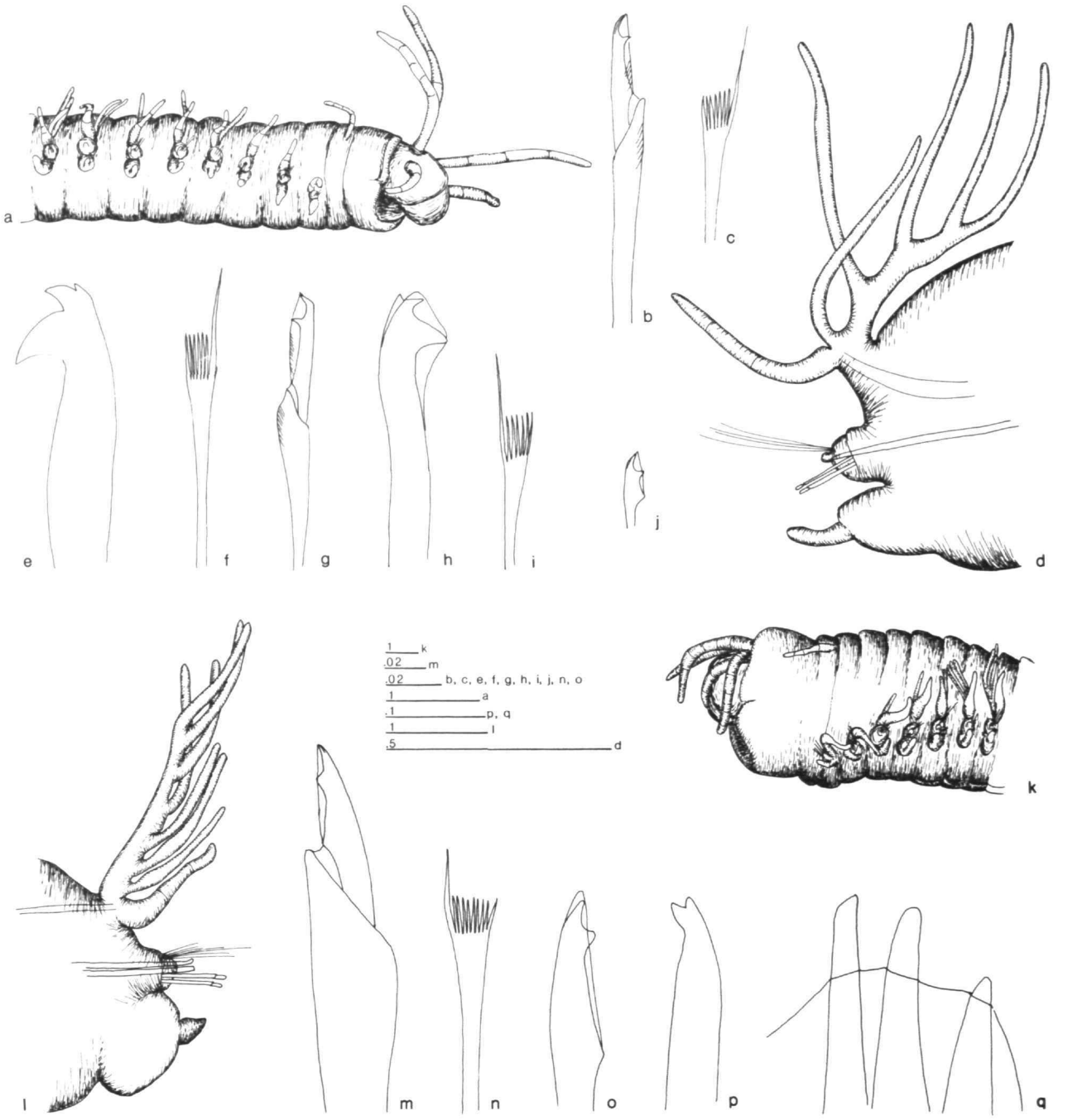

FIGURE 113.—*Eunice unifrons* (a–g of nontype, original material, YPM 1321; h–j of holotype, YPM 1241): a, anterior end, lateral view; b, compound falciger, parapodium 23; c, pectinate seta, parapodium 23; d, parapodium 23, anterior view; e, subacicular hook, parapodium 37; f, pectinate seta, parapodium 37; g, compound falciger, parapodium 37; h, subacicular hook, parapodium 50; i pectinate seta, parapodium 50; j, appendage of compound falciger, parapodium 50. *Eunice valens* (holotype, MCZ 120): k, anterior end, lateral view; l, parapodium 17, anterior view; m, compound falciger, parapodium 17; n, pectinate seta, parapodium 17; o, appendage of compound falciger, posterior parapodium; p, subacicular hook, posterior parapodium; q, aciculae, posterior parapodium. (Scale bars in mm.)

Eunice valenciennesii Grube, 1878

Eunice valenciennesii Grube, 1878a:99.—Hartman, 1948:76-77.
Eunice tentaculata Kinberg, 1865:562.

REMARKS.—As noted elsewhere (Fauchald, 1986:252) and above, this name was proposed as a replacement name for *Eunice tentaculata* Kinberg in the mistaken belief that the species name proposed by Kinberg was preoccupied. The name is here considered an objective junior synonym of *E. tentaculata* Kinberg, because that name is valid and the replacement name was proposed (by inference) for the material treated by Kinberg, and no additional material has ever been named as types or otherwise.

198. *Eunice valens* (Chamberlin, 1919)

FIGURE 113k–q; TABLES 19, 20

Leodice valens Chamberlin, 1919c:257-258, pl. 1: figs. 6-8.
Eunice valens.—Fauchald, 1969:10-12. fig. 5a-d.

MATERIAL EXAMINED.—Holotype, MCZ 120, Mendocino, California, coll. A. Agassiz.

DESCRIPTION.—Holotype complete with 179 setigers; total length 140 mm; maximal width 9 mm at setiger 15; length through setiger 10, 12.5 mm; width at setiger 10, 8.5 mm. Anterior part of body circular in cross-section, becoming ventrally flattened with convex dorsal side posteriorly. Anterior end truncate; body tapering slowly posteriorly to narrow pygidium. Anal cirri as long as the last 5 to 6 setigers, with 5 or 6 cylindrical articulations.

Prostomium (Figure 113k) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate, dorsally flattened; median groove shallow. Transverse grooves separating palpal region present. Dark purple eyes lateral to bases of A-II. Antennae in a horseshoe, with A-I and A-II emerging close together, separated from A-III by distinct gaps, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, with up to 11 cylindrical articulations in A-III. A-I to front of posterior peristomial ring; A-II to back of posterior peristomial ring; A-III to setiger 1. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally and indistinct only for short distance laterally; anterior ring 3/4 of total peristomial length. Peristomial cirri to middle of anterior ring, slender and tapering, with three indistinct rings.

Maxillary formula 1+1, 6+8, 9+0, 6+8 according to Chamberlin (1919c), presumably also 1+1. Mx III long and located behind left Mx II.

Branchiae (Figure 113l) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 76. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First 2 and last 10 pairs single filaments; all other branchiae with at least 2 filaments; maximum 11 filaments. Branchial stems tapering and erect. Filaments digitiform, relatively thick; filaments about as long as notopodial cirri.

Anterior neuropodial acicular lobes symmetrically rounded with aciculae emerging dorsal to midline. Posterior acicular lobes nearly conical. All presetal lobes low folds. Anterior postsetal lobes free, triangular lobes about as high as acicular lobes, becoming low folds following outline of acicular lobes closely from about setiger 20. First 9 ventral cirri thick and tapering. Ventral cirri basally inflated from about setiger 10 through about setiger 60. Inflated bases thick transverse welts; narrow tips tapering. Posterior ventral cirri thick, tapering and reflexed behind acicular lobes in far posterior setigers. Anterior notopodial cirri basally inflated, with 3 to 4 indistinct articulations. Articulations lost in middle branchial setigers; postbranchial notopodial cirri slender, tapering, without articulations.

All limbate setae outreaching compound hooks, slender and marginally finely serrated. All pectinate setae (Figure 113n) with cylindrical, slender shafts, distally tapering, flat. One marginal tooth longer than other teeth; ~10 teeth present. Shafts of all compound falcigers (Figure 113m) very coarse, nearly as thick as aciculae, tapering from wide proximal part of hinge. Beaks absent; shafts with distinct, dark-colored cores and dark-yellowish sheaths. Appendages short, narrow and tapering to small head, bidentate. Proximal teeth short, triangular and directed laterally, more prominent in posterior than in anterior setigers. Distal teeth nearly erect in all setigers, sharply pointed in anterior setigers, tapering and blunt in posterior setigers. All guards asymmetrical, sharply pointed, but not mucronate in anterior setigers, bluntly pointed in posterior setigers. Pseudocompound falcigers and compound spinigers absent. All aciculae and subacicular hooks with core and sheath structure. Aciculae (Figure 113q) paired in most setigers, but up to 4 aciculae in some setigers, yellow, tapering to blunt tips and gently curved; cross-section round. Subacicular hooks (Figure 113p) yellow, bidentate. Hooks first present from setiger 43, present in all setigers thereafter, single in most, paired in some setigers. Hooks about as thick as aciculae, tapering to distinct, bent necks and distinct heads. Both teeth directed distally; proximal teeth larger than distal teeth.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice valens* belongs to group A1 and is compared to similar taxa in Tables 19 and 20. The holotype was not dissected for the dentition; thus Chamberlin must have had available at least one paratype. When examined in 1967, the

paratype consisted of several unidentifiable fragments.

The relationship between this and similar species was discussed in detail by Fauchald (1969); no new information is available. It is discussed in relation to *E. segregata* above.

Eunice valida Gravier, 1900

Eunice valida Gravier, 1900:264-267, figs. 134-136, pl. 13: figs. 80-82.
Eunice siciliensis.—Crossland, 1904:323-326, pl. 22: figs. 8, 9.

REMARKS.—This species was described with branchiae starting at setiger 112 and continuing to the end, with maximum a single branchial filament and as lacking both subacicular hooks and pectinate setae. The species was considered a synonym of *Eunice siciliensis* by Crossland; it certainly belongs to the genus *Palola* as does *siciliensis*. It will be further considered in a review of *Palola*.

Eunice validissima Grube, 1866

Eunice validissima Grube, 1866a:67.

REMARKS.—Grube applied this name to Mediterranean and Adriatic specimens resembling *E. gigantea*. Specimens of *E. gigantea* from the Red Sea and Fiji had branchiae from setiger 6; *E. validissima* had branchiae from setigers 9-11. Grube must have had large specimens of a species in group B-2. His description is inadequate to identify the species; no material is available. The species is here considered indeterminable.

199. *Eunice validobranchiata* Monro, 1937

FIGURE 114a-g; TABLES 16, 19, 21

Eunice validobranchiata Monro, 1937:288-289, fig. 13a-f.

MATERIAL EXAMINED.—Three syntypes, BM(NH) ZK. 1937.9.2.312-6, Arabian Sea, South of Oman, 21°50′00″N, 59°52′00″E, 1046 meters, green mud, trawled, 3 Nov 1933, John Murray Expedition sta 54.

COMMENTS ON MATERIAL EXAMINED.—All three syntypes are incomplete; one with 103 setigers is deeply dissected and probably formed the base of Monro's description; another has 111 setigers and forms the base of the description and illustrations given here. The third type consists of 52 setigers.

DESCRIPTION.—All 3 syntypes incomplete. One syntype with 103 setigers; length 85 mm; maximal width 4 mm; length through setiger 10, 10 mm. Another syntype 111 setigers; length 43 mm; maximal width 3.5 mm at setiger 10; length through setiger 10, 7 mm. Third syntype with 52 setigers; length 24 mm; maximal width 2.5 mm; length through setiger 10, 6 mm.

Prostomium (Figure 114a) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally rounded, dorsally inflated; median sulcus deep. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles tapering, without articulations. A-I to setiger 1; A-II to setiger 4; A-III to setiger 7. Peristomium cylindrical. Separation between rings distinct dorsally, indistinct ventrally and indistinguishable laterally; anterior ring 3/4 of total peristomial length. Peristomial cirri outreaching prostomium, slender and tapering, without articulations.

Maxillary formula 1+1, 9+9, 11+0, 8+11, and 1+1 according to Monro. Mx III long. Left and right Mx IV apparently matching. Distal teeth on left Mx II illustrated as being very small.

Branchiae (Figure 114b) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 37–40. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. All branchiae except last 2 or 3 pairs pectinate; maximum filaments 33 in largest syntype, 17 and 13 in 2 other syntypes; maximum filaments reached at setigers 15-20. Branchial stems slender, erect. Filaments long and slender.

Anterior and median neuropodial acicular lobes truncate, becoming irregularly rounded in posterior setigers (Figure 114c); aciculae emerging at midline. Pre- and postsetal lobes low transverse folds. First 3 ventral cirri thick and tapering. Ventral cirri modestly basally inflated in median setigers. Inflated bases ovate; narrow tips digitiform. Posterior ventral cirri not basally inflated, digitiform. Notopodial cirri long, slender and tapering, with distinct internal aciculae, without articulations.

Limbate setae slender. Shafts of pectinate setae (Figure 114e) slender, blade flaring, flat. One marginal tooth longer than other teeth; ~10 teeth present. Shafts of compound falcigers (Figure 114d) tapering, dentate along cutting margins. Appendages nearly triangular in outline, bidentate. Proximal teeth low, triangular and directed laterally. Distal teeth delicate, tapering, nearly erect. Guards symmetrically pointed, but not mucronate, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae single anteriorly, paired posteriorly, yellow, slender, tapering, straight; cross-section round. Separation of cores and sheaths indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 114f,g) yellow, bidentate. Hooks first present from setiger 37, 30, and 28 in 3 syntypes, present in all setigers thereafter, always single (except for replacements). Hooks slender; proximal teeth larger than distal teeth, directed distinctly laterally.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 56, 58, 59. *Unknown Characters:* 1, 2, 4, 6, 13, 14, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

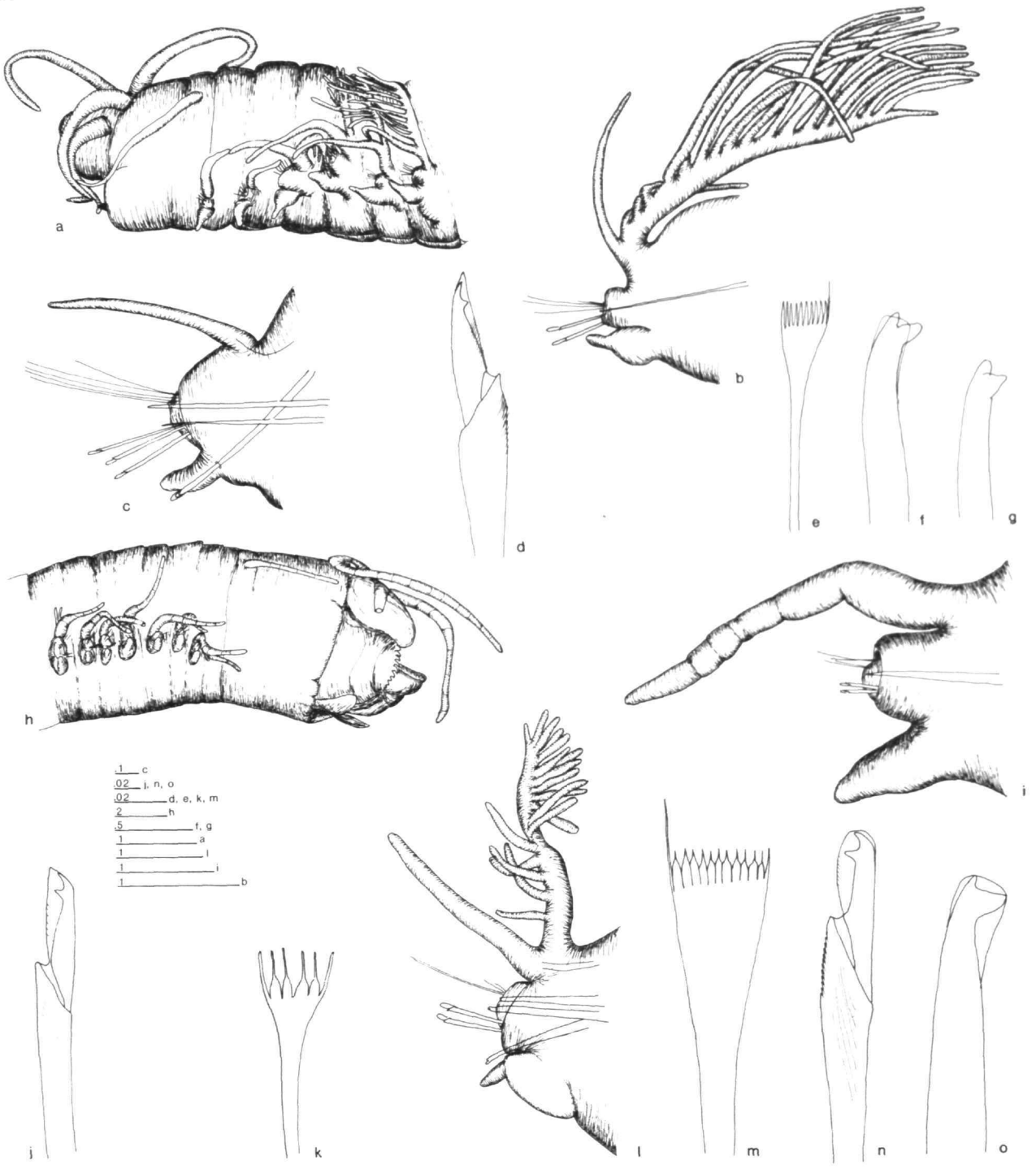

FIGURE 114.—*Eunice validobranchiata* (syntype, BM(NH) ZK 1937.9.2.312-6): a, anterior end, lateral view; b, parapodium 17, anterior view; c, parapodium 64, anterior view; d, compound falciger, parapodium 17; e, pectinate seta, parapodium 64; f, subacicular hook, parapodium 64; g, subacicular hook, parapodium 64. *Eunice violaceomaculata* (syntype, MCZ 163): h, anterior end, lateral view; i, parapodium 3, anterior view; j, compound falciger, parapodium 3; k, pectinate seta, parapodium 3; l, parapodium 45, anterior view; m, pectinate seta, parapodium 45; n, compound falciger, parapodium 45; o, subacicular hook, parapodium 45. (Scale bars in mm.)

TABLE 16.—Variable and invariable features in the type lot of *Eunice validobranchiata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
Maximal width	3	5	4	4.33	0.58
Length through 10	3	12	10	10.67	1.15
Last branchiae on setiger no.	3	52	41	47.67	5.86
Max. no. of branchial filaments	3	28	20	24.33	4.04
Ventral cirri inflated through setiger no.	3	45	40	43.33	2.89
No. of teeth of pectinates	3	9	8	8.33	0.58
Subacicular hooks first present from setiger no.	3	42	28	37.00	7.81

INVARIABLE FEATURES	N=3
Antennal articulations	absent
Separation of rings	visible on all sides
Peristomial cirri reach	middle of prostomium
Peristomial cirral articulations	absent
Branchiae first present from setiger no.	3
Articulations in notopodial cirri	absent
Pectinate setae	tapering; flat
Shafts of compound falcigers	inflated
Acicular color	yellow
Acicular shape	tapering; bent
Subacicular color	yellow
No. of subacicular teeth	2
Core-sheath construction	indistinct

REMARKS.—*Eunice validobranchiata* is a member of group A1 and resembles several of the other deep-water species from the same group closely. These species are listed in Tables 19 and 21. The detailed relation between this species, *E. hawaiensis* and *E. megabranchia*, is discussed in the "Remarks" section of *E. hawaiensis*.

Eunice violacea Grube, 1856

Eunice violacea Grube, 1856:55–56.

REMARKS.—This species was described from Puntarenas, Costa Rica; no specimens are currently available.

The information given in the original description indicates that A-III reaches setiger 7 and has 5 articulations; A-II and A-I are similar in length; each barely reaching beyond the peristomium and with two articulations. The peristomial cirri are two-thirds the length of the peristomium. Notopodial cirri lack articulations. Branchiae are present from setiger 6 and continued to the end of the incomplete specimen (68 setigers) and with maximally 28 filaments. Setal structures were poorly characterized by Grube; he did mention that the aciculae and subacicular hooks were dark.

The species is not sufficiently characterized to identify it even to group; it may be a member of group B-2 and related to a long series of rather similar species, but cannot be sufficiently identified to allow a safe assignment of synonymy. It is here considered indeterminable.

200. *Eunice violaceomaculata* Ehlers, 1887

FIGURE 114h–o; TABLES 17, 27, 30

Eunice violaceo-maculata Ehlers, 1887:86–87, pl. 24: figs. 11, 12, pl. 25: figs. 1–7.

MATERIAL EXAMINED.—4 syntypes, MCZ 163, Tortugas, Florida, shallow water.

COMMENTS ON MATERIAL EXAMINED.—The description is based on a complete syntype with 215 setigers. The material includes in addition a very large anterior fragment of 132 setigers, a rather small complete specimen with 114 setigers, and finally an incomplete specimen, consisting of 165 setigers. The three smaller specimens clearly belong to the same species and the concept of the species is here wholly based on these specimens.

DESCRIPTION.—One syntype complete with 215 setigers; total length 170 mm; maximal width 7 mm at setiger 10; length through setiger 10, 12 mm. Second specimen complete with 114 setigers; length 62 mm; maximal width 5 mm at setiger 10. Third specimen incomplete with 165 setigers; length 225 mm; maximal width 9 mm at setiger 10. Fourth specimen incomplete with 132 setigers; length 340 mm long; maximal width 22 mm at setiger 10.

Prostomium (Figure 114h) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes widely diverging and frontally obliquely truncate, dorsally somewhat flattened; median sulcus deep. Dark eyes between bases of A-I and A-II. Antennae in a horseshoe, evenly

TABLE 17.—Variable and invariable features in the type lot of *Eunice violaceomaculata* (N = number of individuals examined; SD = standard deviation; measurements in mm; * = SD not calculated).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	2	215	114	164.50	*
Total length	2	170	62	116.00	*
Maximum width	4	22	5	10.75	7.68
Length through 10	4	40	7	18.25	14.80
No. of antennal articulations	3	18	7	13.33	5.69
No. of peristomial cirral articulations	3	9	5	6.67	2.08
Branchiae first present from setiger no.	4	7	6	6.25	0.50
Max. no. of branchial filaments	4	30	12	20.25	7.41
Ventral cirri inflated through setiger no.	2	70	50	60.00	*
No. of pectinate teeth	3	10	9	9.67	0.58
Subacicular hooks first present from setiger no.	4	77	25	44.25	22.65

INVARIABLE FEATURES	N=4
Separation of rings	visible dorsally and ventrally
Peristomial cirri reach	middle of prostomium
No. of notopodial cirral articulations	6
Notopodial cirri articulated	throughout body
Pectinate setae	flat; tapering
Shaft of compound falcigers	tapering
Guards of compound falcigers	symmetrically rounded
Acicular color	dark brown
Acicular shape	tapering
Subacicular color	brown
No. of subacicular teeth	2
Core-sheath construction	distinct

spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering, with up to 10 cylindrical articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 4; A-III to setiger 7 (complete only in a single specimen). Peristomium flaring anteriorly, more strongly so when distorted by everted jaws, with distinct muscular lower lip. Separation between rings distinct dorsally and ventrally; anterior ring 5/6 of total peristomial length. Peristomial cirri to front margin of peristomium or to middle of prostomium, slender and tapering, with 6 articulations.

Maxillary formula (summarized for 2 specimens) 1+1, 5+5, 6–7+0, 4–6+9, and 1+1. Mx III short, forming part of distal arc with left Mx IV. Mx VI missing.

Branchiae (Figure 114l) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 6–7 to setiger 215. Branchiae present to near posterior end, present on more than 65% of total number of setigers. Maximum 20 filaments at about setigers 15–20. Branchial stems thick, relatively pliable, doubled over in several segments. Filaments digitiform, distinctly shorter than notopodial cirri.

Neuropodial acicular lobes obliquely truncate with aciculae emerging from elevated knobs near superior end of lobes. All presetal lobes low transverse folds. Anterior and median postsetal lobes following outline of acicular lobes closely, becoming free, inferiorly elevated folds in posterior setigers. First 4 ventral cirri thick and tapering, nearly triangular in outline. Ventral cirri basally inflated from about setiger 5 and retaining inflated base through first half of body. Inflated bases thick transverse welts, relatively low in setigers 25–35, thereafter becoming more distinctly rounded cushions in next 20 or so setigers. Far posterior ventral cirri triangular in outline and tapering to blunt tips, forming shallow scoops around lower edge of parapodia. All notopodial cirri tapering, with up to 6 long, cylindrical articulations in anteriormost setigers (Figure 114i). Notopodial cirri of larger specimens rather thick basally, retaining tapered tips in all setigers. Notopodial cirri shorter than branchiae except in anteriormost and posteriormost branchiated setigers.

Limbate setae marginally smooth. Pectinate setae (Figure 114k,m) flat, tapering, with rather wide, delicate teeth. Marginal teeth no longer than other teeth; ~7–8 teeth present. Shafts of compound falcigers (Figure 114j,n) marginally smooth, tapering. Appendages tapering and relatively short, bidentate. In 1 specimen proximal teeth directed laterally, in other specimens directed obliquely distally. Distal teeth slender and obliquely curved in all specimens. Guards marginally smooth, symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, dark brown to nearly black, tapering to slender tips, distally curved or straight; cross-sections round. Subacicular hooks (Figure 114o) dark brown, bidentate. Hooks first present from setiger 25, 36, and 39, present in all setigers thereafter,

always single (except for replacements). Hooks slender, tapering to relatively small head. Proximal teeth curved and directed laterally in 2 specimens and triangular and directed laterally in smallest specimen. Distal teeth smaller than proximal teeth, curved in all specimens.

UNKNOWN MORPHOLOGICAL FEATURES.—Pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 39, 40, 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—Part of the variability in the material may be due to the wide range of sizes of the type specimens. The very large specimen has very short antennae, not reaching beyond the prostomium and short peristomial cirri, and the subacicular hooks are not present before setiger 77; it may belong to the same species as the other three specimens, but without adequate intermediate specimens it is difficult to assign it to the same species. Similarly, there are some morphological differences between the two intermediate-sized specimens and the smallest one: the small specimen has nearly symmetrical neuropodial acicular lobes and laterally directed proximal teeth on the subacicular hooks. Furthermore, the ventral cirri are tapering and relatively narrow and do not form a scoop in posterior setigers. It is thus possible that the type lot of *E. violaceomaculata* consists of three different species, but this cannot be explored without access to sufficient and well-preserved material.

The species are listed with similar species in Tables 27 and 30. Of the species with more than 10 branchial filaments where the branchiae are best developed, two, *E. flavopicta* and *E. reducta*, have articulated peristomial cirri, the other five species lack articulations in the peristomial cirri. Of these five, *E. macrobranchia* has branchiae about as long as the notopodial cirri; the remaining species have the branchiae outreaching the notopodial cirri. In *E. coccinea*, the ventral cirri remain inflated through the posterior end, in the remaining three species, *E. laticeps*, *E. purpurea*, and *E. violaceomaculata*, posterior ventral cirri lack inflations; they are tapering in *E. laticeps* and *E. purpurea* and widely triangular, nearly scoop-shaped in *E. violaceomaculata*.

Eunice viridis auctores

Palola viridis Gray, 1847:18.

REMARKS.— This species is the type species of the genus *Palola*. It is often considered as a *Eunice* and is for that reason listed also in this context. It is being considered in a forthcoming review of *Palola*.

201. *Eunice vittata* (Chiaje, 1829)

FIGURE 115a–i; TABLES 18, 41, 42

Nereis vittata Chiaje, 1829:195.
Eunice vittata.—Grube, 1850:293.
Eunice minuta.—Grube, 1866b:68.

MATERIAL EXAMINED.—Gulf of Salerno, coll. A. Giangrande, 4 specimens.

COMMENTS ON MATERIAL EXAMINED.—The types are no longer in existence. The material examined was collected close to the type locality in the Gulf of Naples.

DESCRIPTION.—Specimen described and illustrated complete adult female with 73 setigers; total length 23.5 mm; maximal width 2 mm at setiger 10; length through setiger 10, 4 mm. Body circular in cross-section with relatively prominent parapodia throughout; posterior end tapering relatively abruptly towards pygidium. Longest anal cirri less than last 5 setigers combined.

Prostomium (Figure 115a) distinctly shorter and narrower than peristomium, as deep as $^1/_2$ of peristomium. Prostomial lobes frontally rounded, dorsally mildly inflated; median sulcus distinct ventrally, completely indistinct dorsally. Palpal region distinctly marked as paired, ovate anteroventrally directed fields on ventral surface of prostomium. Eyes hidden below translucent peristomial fold, black, behind bases of A-I. Antennae in a horseshoe with A-I well in front of other antennae, evenly spaced, similar in thickness. Peristomial fold covering bases of A-II and A-III. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, tapering abruptly to short, blunt tips, with up to 8 very poorly marked, cylindrical articulations in A-III. A-I to setiger 1; A-II to setiger 4; A-III to setiger 8. Peristomium cylindrical. Separation between rings very distinct on all sides; each ring slightly inflated. Peristomial cirri to middle or nearly the front edge of prostomium; slender and tapering, with 3 long, cylindrical articulations.

Summary maxillary formula for 2 specimens 1+1, 9–10+9–10, 8–9+0, 6+8–12, and 1+1. Jaws not calcified, with slender, tapering teeth. Mx III long, straight and located behind left Mx II. Mx VI missing.

Branchiae (Figure 115d) present, pectinate, about as long as notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 23. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. Last branchia with single filaments, maximum number of filaments 12 reached at about setiger 12. Branchial stems tapering, held erect over body in most setigers. Filaments slender, tapering to very fine tips, about as long as notopodial cirri in best-developed branchiae.

Anterior neuropodial acicular lobes symmetrically rounded; median and posterior neuropodial acicular lobes slightly more conical and slightly asymmetrical with aciculae emerging above midline (Figure 115e). All presetal lobes are low, transverse folds. Anterior postsetal lobes with high sections

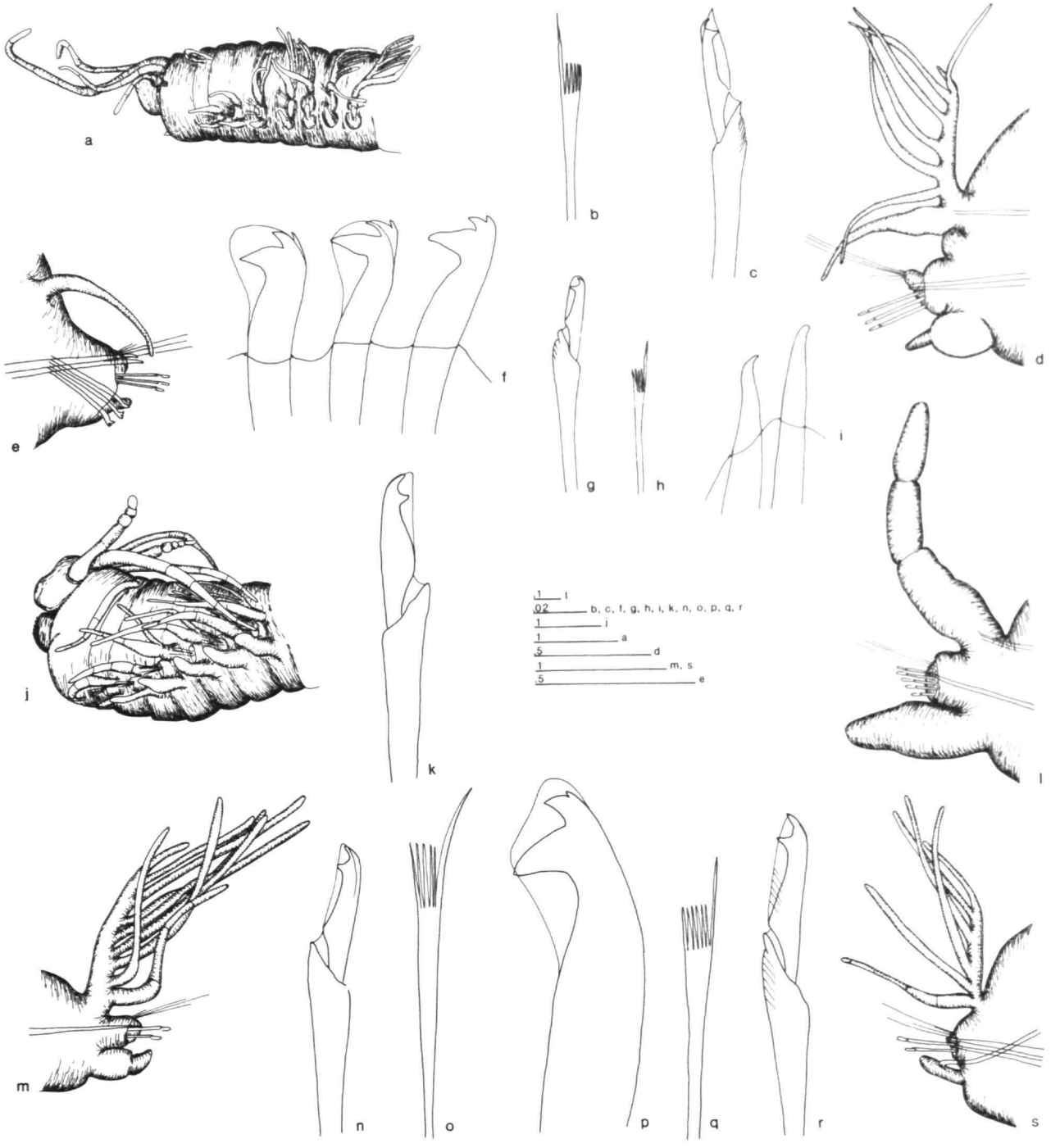

FIGURE 115.—*Eunice vittata* (Gulf of Salerno): a, anterior end, lateral view; b, pectinate seta, parapodium 8; c, compound falciger, parapodium 8; d, parapodium 8, anterior view; e, parapodium 49, anterior view; f, subacicular hooks, parapodium 49; g, compound falciger, parapodium 49; h, pectinate seta, parapodium 49; i, aciculae, parapodium 49. *Eunice vittatopsis* (holotype, AHF Poly 0337): j, anterior end, lateral view; k, compound falciger, parapodium 2; l, parapodium 2, anterior view; m, parapodium 25, anterior view; n, pectinate seta, parapodium 25; o, compound falciger, parapodium 25; p, subacicular hook, parapodium 81; q, pectinate seta, parapodium 81; r, compound falciger, parapodium 81; s, parapodium 81, anterior view. (Scale bars in mm.)

TABLE 18.—Variable and invariable features in the material examined of *Eunice vittata* (N = number of individuals examined; SD = standard deviation; measurements in mm).

VARIABLE FEATURES	N	Max.	Min.	Mean	SD
No. of setigers	4	78	62	69.75	7.14
Total length	4	24	9	19.13	6.98
Maximal width	4	2	0.75	1.69	0.63
Length through 10	4	4	1.75	3.44	1.13
No. of antennal articulations	4	8	4	7.00	2.00
Last branchiae on setiger no.	4	27	20	23.75	2.99
Max. no. of branchial filaments	4	12	6	9.00	2.45
Ventral cirri inflated through setiger no.	4	25	19	23.50	3.00
Subacicular hooks first present from setiger no.	4	22	20	20.75	0.96

INVARIABLE FEATURES	N=4
Separation of rings	visible on all sides
Peristomial cirri reach	middle of prostomium
No. of peristomial cirral articulations	3
Branchiae first present from setiger no.	3
Notopodial articulations	absent
Pectinate setae	tapering; flat
No. of pectinate teeth	5
Shaft of compound falcigers	inflated
Acicular color	yellow
Subacicular color	yellow
No. of subacicular teeth	3
Core-sheath construction	indistinct

superiorly; these sections wrapped around superior edge of acicular lobes and terminating on front of acicular lobes approximately at midline, covering emerging aciculae. Remainder of postsetal lobes following outline of acicular lobes closely. High sections located inside presetal lobes on anterior face of parapodia, reaching well beyond acicular lobes. First 4 ventral cirri tapering and blunt-tipped. Ventral cirri basally inflated from about setiger 5 through setiger 25. Inflated base ovate and very distinctly set off from large, tapering narrow tips. Bases of ventral cirri merge into body wall posterior to setiger 25, in posterior setigers only tapering, blunt tips of ventral cirri retained. Anterior notopodial cirri basally slightly inflated, tapering distally to slender, digitiform tips. Posterior notopodial cirri reduced in length to ~1/2 of length in anterior setigers, tapering from base. Notopodial cirri without articulations.

Limbate setae nearly capillary with very indistinct limbation, relatively thick with short, tapering tips, marginally very finely pilose. All pectinate setae (Figure 115c,h) very small, tapering, flat. One marginal tooth very thick and long; ~5 teeth present. Anterior pectinate setae slightly larger than posterior ones. Shafts of compound falcigers (Figure 115b,g) inflated with distinct distal beak, marginally coarsely serrated. Anterior appendages slightly longer than posterior ones, and slightly less tapering, bidentate. Proximal teeth narrowly triangular and directed slightly basally. Distal teeth distinctly shorter than proximal teeth, bent and directed laterally, thick and relatively blunt in posterior setigers, slender and tapering in anterior setigers. Anterior guards tapering to sharp, symmetrical tips, but not mucronate. Posterior guards symmetrically rounded, all guards marginally finely serrated; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 115i) paired, tapering, clear yellow; tips distinctly bent ventrally; cross-sections round. Dorsal aciculae in posterior setigers with short, pointed guards. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 115f) yellow, tridentate with teeth in a crest. Hooks first present from setiger 20–22, present in all setigers thereafter; multiple hooks in most setigers.

UNKNOWN MORPHOLOGICAL FEATURES.—None.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* None.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice vittata* is listed with similar species in Tables 41 and 42. The relationship between this species and other species with multiple subacicular hooks and articulated ceratostyles was indicated in the remarks to *E. indica*.

Eunice vittata has been reported from all over the world. Most of these reports probably are of related species, including the species listed in Table 42.

202. *Eunice vittatopsis* Fauchald, 1970

FIGURE 115j-s; TABLES 41, 43

Eunice vittatopsis Fauchald, 1970:50-52, pl. 7: figs. a-d.

MATERIAL EXAMINED.—Holotype, AHF Poly 0337, *Velero III* sta 739-37, Mexico, Gulf of California, Ensenada de San Francisco, 27°57′05″N, 111°03′20″W, 30 Mar 1937, intertidal, shingle, hand collected.

DESCRIPTION.—Holotype incomplete female with 85 setigers; length 38 mm; maximal width 2.5 mm at setiger 10; length through setiger 10, 6 mm. Body with ovate cross-section; each segment more than twice as wide as long, tapering slightly towards anterior end.

Prostomium (Figure 115j) distinctly shorter and narrower than peristomium, less than 1/2 as deep as peristomium. Prostomial lobes frontally obliquely truncate; dorsal surface pustulate; median sulcus shallow. Eyes between bases of A-I and A-II, dark purple. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and tapering; 3 medial antennae with cylindrical articulations; A-I with distally drop-shaped articulations; maximum number of articulations six in A-I and A-III. A-I to setiger 2; A-II and A-III to setiger 7. A-II slightly longer and distinctly heavier than A-III. Peristomium distorted by protruded jaws, apparently cylindrical. Separation between rings distinct on all sides; anterior ring 3/4 of total peristomial length. Peristomial cirri reaching well beyond tip of prostomium, slender, tapering, with 4 long articulations.

Maxillary formula 1+1, 8+9, 9+0, 6+13, and 1+1. Mx III long and located behind left Mx II. Mx VI absent.

Branchiae (Figure 115m,s) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to end of fragment. First 2 pairs single filaments; all other branchiae with 3 or more filaments; maximum 10 filaments present. Branchial stems slender, pliable, tapering. Filaments very long and slender, as long as notopodial cirri in all setigers.

Anterior neuropodial acicular lobes distally rounded (Figure 114l); median acicular lobes symmetrically rounded; aciculae emerging at midline. Posterior acicular lobes obliquely truncate with aciculae emerging from upper end. Pre- and postsetal lobes low folds. First 4 ventral cirri tapering and slightly inflated. Ventral cirri distinctly basally inflated by setiger 5 through about setiger 55-60. Inflated base ovate; narrow tips digitiform. In last setigers present ventral cirri slender, digitiform, longer than those in anterior setigers. Notopodial cirri with 3 to 4 long, cylindrical articulations. Anterior notopodial cirri medially, thick, increasing in length through first 5 setigers, with long, slender digitiform tips in anterior branchial setigers, tapering and slender from about setiger 20.

Limbate setae rather wide, marginally serrated. Pectinate setae (Figure 115n,q) very narrow, with cylindrical shafts; blades flat and tapering. One marginal tooth very large; 6-7 teeth present. Shafts of compound falcigers tapering in anterior and median setigers (Figure 115k,o), becoming slightly inflated in posterior setigers (Figure 115r). Anteriorly shafts marginally smooth, becoming marginally serrated in last setigers present. Appendages rather similar in all setigers, tapering, with rather large heads, bidentate. Proximal teeth narrowly triangular, directed laterally. Distal teeth about as large as proximal teeth, curved. Guards asymmetrically bluntly pointed; marginal serrations absent in anterior, present in posterior setigers; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae paired in most setigers, yellow, slender, tapering to sharp tips; most straight, but some sharply bent; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 115p) yellow, tridentate with teeth in a crest. Hooks first present from setiger 39, present in all setigers thereafter, always single (except for replacements). Main fangs large; secondary fang small and tertiary fang very small, appended to back of secondary fang.

UNKNOWN MORPHOLOGICAL FEATURES.—Posterior distribution of branchiae; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 1, 2, 36-38, 40, 42, 63.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—37,2; 38,2.

REMARKS.—*Eunice vittatopsis* belongs to group C-1; Fauchald (1970) reported non-type specimens with a limited numbers of pairs of branchiae. It is compared to similar species in Tables 41 and 43. It is the only species in Table 43 in which the peristomial cirri project clearly beyond the prostomium.

Eunice vivida Stimpson, 1854

Eunice vivida Stimpson, 1854:35, fig. 26.

REMARKS.—This species, of which no specimens are available, was described from Grand Manan in the Bay of Fundy. The description and illustration showed a species with long, slender, tapering peristomial cirri and branchiae present from setiger 3 through setiger 42, and branchiae pectinate with a maximum of nearly 20 filaments. Nothing is mentioned about the setal distribution or structure, nor are there any additional details that allow identification. Stimpson may have had a specimen of *E. pennata* (see above), but the information present in the original description is insufficient to allow identification. *Eunice vivida* is here considered indeterminable.

203. *Eunice wasinensis*, new name

FIGURE 116a-d; TABLES 33, 40

Nicidion gracilis Crossland, 1904:327-329, figs. 65, 66 pl. 22: figs. 10, 11.

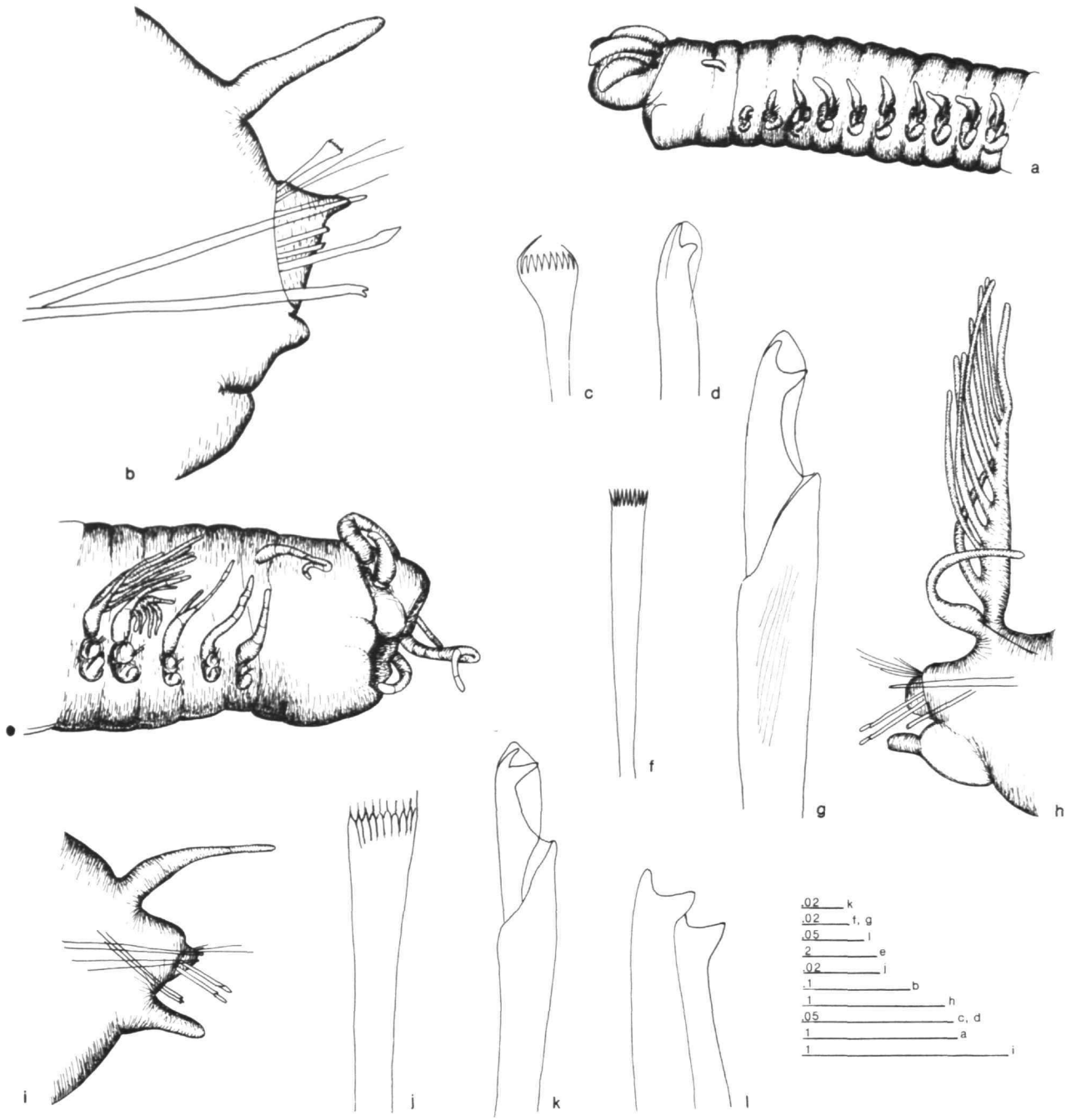

FIGURE 116.—*Eunice wasinensis* (syntype, BM(NH) ZK 1928.4.11.50): a, anterior end, lateral view; b, parapodium 60, anterior view; c, pectinate seta, parapodium 60; d, subacicular hook, parapodium 60. *Eunice websteri* (holotype of *Eunice loncicirrata* Webster, USNM 4792): e, anterior end, lateral view; f, pectinate seta, anteromedian parapodium; g, compound falciger, anteromedian parapodium; h, anteromedian parapodium, anterior view; i, posterior parapodium, anterior view; j, pectinate seta, posterior parapodium; k, compound falciger, posterior parapodium; l, subacicular hooks, posterior parapodium. (Scale bars in mm.)

MATERIAL EXAMINED.—Two syntypes, BM(NH) ZK 1928.4.11.50, Wasin Harbour, near border of Kenya and Tanganyika, dredged, Crossland Zanzibar and British East Africa collection, 1901-1902, average depth 10 fathoms, extensive cover of *Telesto*.

COMMENTS ON MATERIAL EXAMINED.—One of the two syntypes is complete; the other is an anterior fragment.

DESCRIPTION.—Complete syntype of unknown sex; with 84 setigers; posterior regenerate including last 15 setigers; total length 17 mm; maximal width 2.5 mm at setiger 10; length through setiger 10, 6 mm. Anterior fragment with 77 setigers; length 14 mm; width 2.0 mm.

Prostomium (Figure 116a) about as long and as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes large, frontally rounded, dorsally inflated; median sulcus deep. Eyes between bases of A-I and A-II; black. Antennae in a shallow horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles sausage-shaped, without articulations; none projecting clearly beyond tip of prostomium or beyond posterior peristomial rings. Peristomium cylindrical, slightly flaring ventrally. Separation between rings distinct dorsally and ventrally, less distinct, but visible laterally; anterior ring ~2/3 of total peristomial length. Peristomial cirri barely to front edge of posterior ring, tapering, without articulations.

Maxillary formula 1+1, 5+5, ?4+0, ?3+8, and 1+1 according to Crossland (1904, fig. 65). Mx III part of distal arc with left Mx IV.

Branchiae absent.

Anterior neuropodial acicular lobes rounded; acicular lobes conical in median and sharply pointed in far posterior setigers (Figure 116b); aciculae emerging at midline. Presetal lobes low, transverse folds. First 20 postsetal lobes distinct, rounded, shorter than acicular lobes, following outline of acicular lobes in median and posterior setigers. First 4 ventral cirri thick, tapering. Ventral cirri basally indistinctly inflated in median setigers. Inflated bases transverse welts; narrow tips absent. Posterior ventral cirri without inflated bases, short, nearly tubercular. Notopodial cirri short, without articulations; median and posterior notopodial cirri increasingly filiform, retaining same length as in anterior setigers. Notopodial cirri without articulations.

Limbate setae not observed. Pectinate setae (Figure 116c) short, flaring, furled. Both marginal teeth longer than other teeth; ~10 coarse teeth present. Shafts of compound falcigers inflated, marginally smooth. Appendages bidentate. Guards symmetrically rounded; mucros absent. Pseudocompound falcigers and compound spinigers absent. Aciculae single, black, pointed, straight; cross-sections round. Subacicular hooks (Figure 116d) black, bidentate. Hooks first present from setiger 31 in 1 syntype and from setiger 27 in other syntype, present in all setigers thereafter, always single (except for replacements). Hooks tapering, with small head. Proximal teeth smaller than distal teeth, directed laterally, triangular. Distal teeth tapering, erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Relationship between Mx III and left Mx IV; pygidium and anal cirri.

EXPECTED STATES OF SELECTED UNKNOWN FEATURES.—Mx III short, forming part of distal arc with left Mx IV.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 22, 31-42, 56, 58, 59. *Unknown Characters:* 74, 78.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—A new name is needed because the name *E. gracilis* is preoccupied in the combination *E. gracilis* Grube, 1867.

The species is listed with similar species in Tables 33 and 40. Three species in Table 40 combine a lack of articulations in the ceratostyles with inflated bases of the ventral cirri limited to median setigers. In addition to *E. wasinensis*, the two other species are *E. cariboea* and *E. goodei*. In *E. cariboea* the inflated bases are transverse ridges; in the two other species, they are ovate and more or less free from the ventral edge of the neuropodia. In *E. wasinensis* the inflated ventral cirri lack a free tip; such tips are present in *E. goodei*.

204. *Eunice websteri* Fauchald, 1969

FIGURE 116e-l; TABLES 19, 20

Eunice websteri Fauchald, 1969:12-14, fig. 6.
Eunice longicirrata Webster, 1884:318-319, pl. 12: figs. 75-80.
Leodice margaritacea Verrill, 1900:644-645.
Leodice longicirrata.—Treadwell, 1921:11-14, figs. 3-12, pl.1: figs. 1-4 [not *Eunice longicirrata* Kinberg, 1865].
Eunice longicirrata.—Hartman, 1942:9 [not *Eunice longicirrata* Kinberg, 1865].

MATERIAL EXAMINED.—Holotype, 1 specimen and 8 mounted slides, USNM 4792, Bermuda, coll. G. Brown Goode.

DESCRIPTION.—Holotype complete with 150 setigers; total length 120 mm; maximal width 4 mm at setiger 10; length through setiger 10, 8 mm. Body slightly dorsoventrally flattened, but basically convex dorsally and more flattened ventrally. Anal cirri as long as last 15 setigers, slender, with 15 cylindrical articulations.

Prostomium (Figure 116e) distinctly shorter and narrower than peristomium, as deep as 1/2 of peristomium. Prostomial lobes frontally truncate, dorsally flattened; median sulcus very shallow. Eyes lateral to bases of A-II, dark. Antennae in a horseshoe, evenly spaced, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with mostly long, cylindrical articulations. Distal articulations in A-I short, very well set off from each other and nearly moniliform; maximum number of articulations 8 in A-III. A-I to posterior peristomial ring; A-II to setiger 6; A-III to setiger 8. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring

3/4 of total peristomial length. Peristomial cirri to middle of prostomium, very slender, with 6 long, cylindrical articulations.

Jaws not examined.

Branchiae (Figure 116h) present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 53. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. First and last 10 pairs single filaments; maximum 15 filaments. Branchial stems slender, tapering. Filaments slender, longer than notopodial cirri in median branchial setigers Anterior neuropodial acicular lobes broadly and nearly symmetrically rounded, becoming conical in posterior setigers (Figure 116i); aciculae emerging at midline. All presetal lobes low, transverse folds. Anterior postsetal lobes low, rounded, free folds, becoming low, transverse folds by end of branchial region. Postsetal lobes shorter than acicular lobes in all setigers. First 6 ventral cirri thick, nearly triangular and tapering. Ventral cirri basally inflated from about setiger 7 through about setiger 55. Inflated bases modest, ovate inflated; narrow tips digitiform. Postbranchial ventral cirri digitiform. All notopodial cirri with 2 or more long, cylindrical articulations. Anterior notopodial cirri tapering, long and distally truncate; median and posterior notopodial cirri digitiform.

All limbate setae slender and marginally smooth. Pectinate setae (Figure 116f,j) narrow, tapering, flat. One marginal tooth longer than other teeth; 10 teeth present. Shafts of compound falcigers (Figure 116g,k) tapering and internally striated, but without marginal teeth. Appendages short, tapering with distinct heads, bidentate. Proximal teeth triangular, directed laterally or slightly basally. Distal teeth obliquely curved. Guards distally round, marginally smooth; mucros absent. Pseudocompound falcigers and compound spinigers absent. Two or 3 aciculae in a parapodium, yellow. Anterior aciculae bluntly tapering or nearly truncate; median aciculae distally expanded to distinct rounded tabs; posterior aciculae becoming slender, tapering to fine tips, sometimes distinctly bent dorsally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 116l) yellow, bidentate. Hooks first present from setiger 31, present in all setigers thereafter, paired in most setigers. Hooks tapering, with large, laterally directed proximal teeth. Distal teeth smaller than proximal teeth, nearly erect.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown Characters:* 42.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—As noted by Fauchald (1969), the name originally applied by Webster to this taxon was preoccupied and had to be replaced. *Eunice websteri* is a member of group A-1 and is compared to similar taxa in Tables 19 and 20. Median aciculae are distally expanded into rounded tabs, a feature present only in one additional species listed in Table 20, *E. antillensis*. *Eunice websteri* has about twice the number of branchial filaments as *E. antillensis;* furthermore, in *E. websteri*, the articulations of the ceratostyles are distally drop-shaped; in *E. antillensis*, they are cylindrical along the whole length of the antennae.

205. *Eunice woodwardi* Baird, 1869

FIGURE 117; TABLES 41, 42

Eunice woodwardi Baird, 1869:347–348.

MATERIAL EXAMINED.—Holotype, BM(NH) ZH 1863.8.19.13, La Coruña, Spain. H. Woodward, Esq. coll.

COMMENTS ON MATERIAL EXAMINED.—The holotype is poorly fixed and is now very soft. The illustration of the anterior end is somewhat idealized to avoid showing wrinkles caused by collapse of internal structure.

DESCRIPTION.—Holotype incomplete female with 59 setigers; length 49 mm; maximal width 5 mm at setiger 10; length through setiger 10, 7 mm. Body shape indeterminable.

Prostomium (Figure 117a) distinctly shorter than peristomium, about as wide as peristomium, as deep as 1/2 of the peristomium. Prostomial lobes frontally rounded, dorsally flattened; median sulcus deep. Eyes not observed. Antennae in a horseshoe, with A-I isolated by a gap, similar in thickness. Ceratophores ring-shaped in all antennae, without articulations. Ceratostyles slender and digitiform, with up to 4 or 5 long, rather indistinct articulations in A-III. A-I to posterior peristomial ring; A-II to setiger 3; A-III to setiger 9 or 10. Peristomium cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring about 2/3 of total peristomial length. Peristomial cirri to frontal edge of peristomium, slender and digitiform, without articulations.

Jaws not examined.

Branchiae present, pectinate, distinctly longer than notopodial cirri, not reduced in mid-body region, erect. Branchiae from setiger 3 to setiger 39. Branchiae terminating well before posterior end, present on less than 55% of total number of setigers. All branchiae, except last 4 or 5 with 2 or more filaments maximum number of filaments 12 at about setiger 15. Branchial stems slender. Filaments longer than notopodial cirri in median branchiferous setigers.

Neuropodial acicular lobes truncate; aciculae emerging at midline. Pre- and postsetal lobes low, transverse folds. First 3 ventral cirri tapering and digitiform. Ventral cirri basally inflated from about setiger 4 through setiger 40, Inflated bases ovate; narrow tips tapering. Postbranchial ventral cirri slender and tapering. Prebranchial notopodial cirri medially inflated, becoming increasingly slender posteriorly and digitiform in

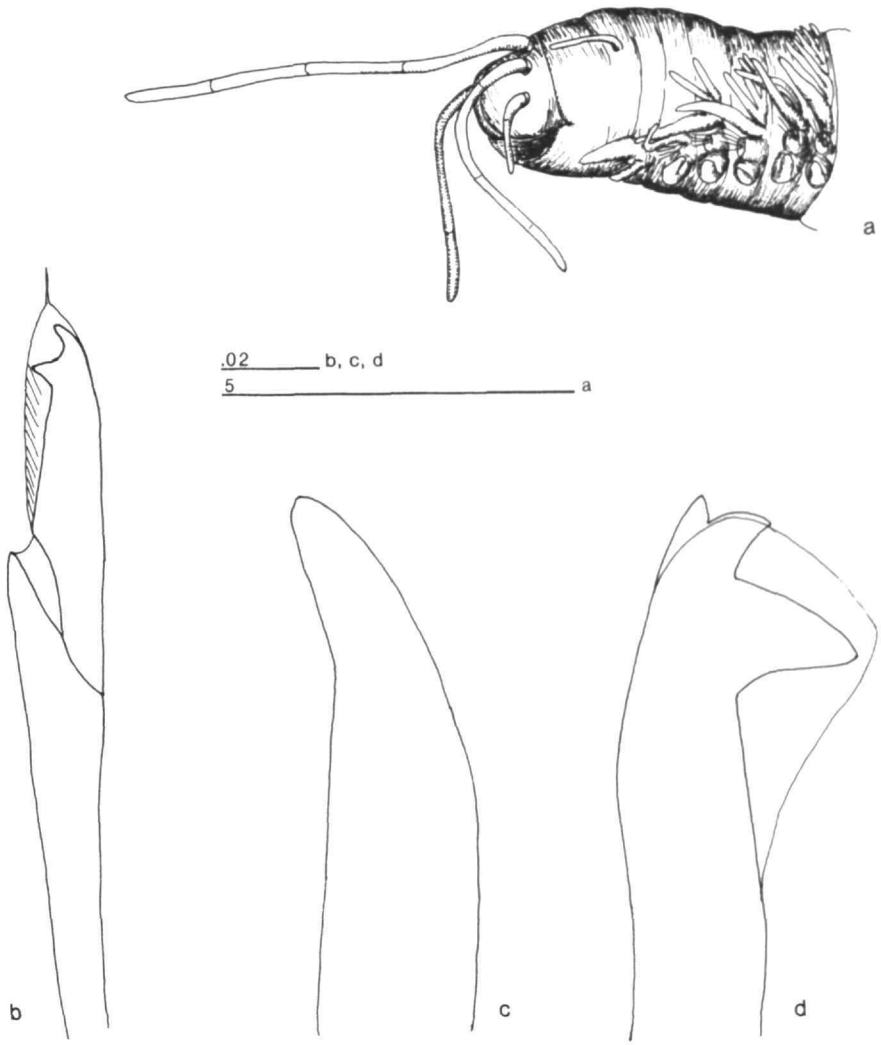

FIGURE 117.—*Eunice woodwardi* (holotype, BM(NH) ZH 1863.8.19.13): a, anterior end, lateral view; b, compound falciger, parapodium 45; c, acicula, parapodium 45; d, subacicular hook, parapodium 45. (Scale bars in mm.)

postbranchial region. Notopodial cirri without articulations.

Limbate setae rather wide and marginally finely serrated.

Pectinate setae not observed. Shafts of compound falcigers (Figure 117b) tapering, marginally smooth. Appendages large with distinct heads, bidentate. Proximal teeth larger than distal teeth, triangular, directed slightly basally. Distal teeth curved. Guards symmetrically rounded with a distinct mucro, marginally serrated. Pseudocompound falcigers and compound spinigers absent. Aciculae (Figure 117c) paired, yellow, tapering and bent dorsally; cross-sections round. Separation between core and sheath indistinct in both aciculae and subacicular hooks. Subacicular hooks (Figure 117d) yellow, tridentate with teeth in a crest. Hooks first present from setiger 31, present in all setigers thereafter, most postbranchial setigers with 4 to 5 hooks in each segment. Hooks with large main fangs; distal pair of fangs in a crest.

UNKNOWN MORPHOLOGICAL FEATURES.—Jaw structure; pygidium and anal cirri.

EXPECTED STATES OF UNKNOWN MORPHOLOGICAL FEATURES.—None.

CHARACTERS USED IN PREPARATION OF KEY NOT SCORED.—*Inappropriate Characters:* 56, 58, 59. *Unknown*

Characters: 1, 2, 13, 14, 63, 65-68.

ASSUMED STATES FOR PURPOSE OF PREPARING KEY.—None.

REMARKS.—*Eunice woodwardi* was considered indeterminable by Hartman (1959); it is listed with similar species in Tables 41 and 42. It is the only species in Table 42 to combine the presence of multiple subacicular hooks with incomplete separation between the anterior and posterior peristomial rings.

Eunice zonata Chiaje, 1841

Eunice zonata Chiaje, 1841:94.—Quatrefages, 1866:330.—Ehlers, 1868:312.—Fauvel, 1923:451.

REMARKS.—Quatrefages (1866:330) listed this species without any comments; Ehlers and Fauvel both considered it incertae sedis. As far as known, no material exists and it is here considered indeterminable.

TABLE 19.—Comparison of species in group A-1. Column numbers are the same as character numbers used to prepare the key (see explanation below; for a complete listing of characters and character states, see Appendix A).

Species	1	2	3	5	35	36	80
11 *E. antarctica*	122	102	3.5	11	3	39-44	31-44
13 *E. antillensis*	U	U	3	7	4	36	33
15 *E. arcturi*	110	80	U	U	6	42	36
19 *E. articulata*	U	U	3	U	4	55	40
25 *E. benedicti*	105	38	2.5	5	3	39	21
26 *E. biannulata*	139	105	3	12	3	50	38
36 *E. caeca*	90	103	6	14	3	48	42
55 *E. edwardsi*	118	70	3.5	8	3	34	28
85 *E. hawaiensis*	U	U	7	13	3	54	30
86 *E. heterochaeta*	105	27	3.5	4	3	85	22
94 *E. japonica*	110	50	2.5	7	4	46	34
98 *E. kobiensis*	U	U	3.5	6.5	3	41	30
114 *E. manihine*	127	75	4	9	8	43	29
120 *E. megabranchia*	U	U	7	12	3	54	35
121 *E. mexicana*	106	87	3.5	10.5	3	40	32
132 *E. narconi*	U	U	2	6	8	33-35	35-38
146 *E. parasegregata*	U	U	3	8	3	U	U
150 *E. pectinata*	U	U	2	6	5	U	41
153 *E. pennata*	114	73	3	7.5	3	39-41	35-43
173 *E. rubrocincta*	100	68	3	U	3	80	U
176 *E. savignyi*	U	U	U	U	4	45	U
179 *E. segregata*	U	U	4	5	3	39	36
180 *E. semisegregata*	U	U	6	9	3	65/69	51/55
193 *E. tridentata*	185	170	7	12	3	80	51
198 *E. valens*	179	140	9	12.5	3	76	43
199 *E. validobranchiata*	U	U	4	4	3	37-40	28-37
204 *E. websteri*	150	120	4	8	3	53	31

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column heads:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 20.—Comparison of *Eunice* species in group A-1 with articulated peristomial cirri. Stub (C) gives character numbers; column heads are species numbers. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	13	15	19	26	36	94	98	121	150	153	176	179	198	204
	SOFT BODY CHARACTER STATES													
7	1	U	1	1	3	3	3	2	3	2	U	1	2	1
8	2	U	2	2	2	2	2	1	1	1	U	2	2	2
9	2	U	3	3	3	2	3	2	3	2	U	2	2	2
11	2	U	2	1	2	2	2	2	2	2	U	2	2	2
12	2	U	1	2	1	1	1	2	1	1	U	1	1	2
14	1	U	1	2	1	3	U	2	2	1	U	3	1	2
15	1	U	3	1	1	1	1	1	1	1	U	3	1	1
16	3	U	1	1	2	1	1	1	1	3	U	2	3	1
17	1	U	6	1	1	1	1	1	1	4	U	1	1	1
20	1	U	1	1	3	1	1	1	1	1	U	3	1	3
22	1	U	2	2	1	2	1	2	2	2	1	1	1	2
24	2	U	2	1	1	2	2	1	1	2	U	1	2	2
25	3	U	1	4	4	4	4	3	4	4	U	4	3	3
26	4	U	3	3	3	3	2	3	3	2	U	3	3	3
27	3	U	3	1	2	2	1	2	1	1	2	1	1	2
28	2	U	2	4	2	1	1	1	2	2	U	1	1	2
32	3	U	1	1	1	1	1	1	1	1	U	1	1	1
34	1	U	1	1	1	1	1	1	2	1	U	1	1	1
39	2	U	1	1	1	2	3	0	2	5	U	2	2	1
40	2	U	2-3	2-3	0	2-3	2	0-3	U	2	U	0	10	10
41	6	10	6	8	24	11	8	18	10	12	12	15	11	15
42	U	U	15	10	15	U	U	15	U	15	U	25	U	U
43	1	U	U	1-2	2	3	3	2	1-2	1	U	3	2-3	2
44	3	U	U	3	3	2	2	3	2	3	U	2	3	2
45	2	U	U	2	2	2	2	2	1	2	U	2	2	2
48	2	U	U	2	3	2	2	2	1	3	U	3	3	3
51	3	U	U	5	3	3	3	9	3	5-6	U	7	9	6
54	1	U	U	1	1	1	1	1	1	1	U	1	2	1
55	2	U	U	3	2	2	2	3	3	2	U	3	2	3
60	1	U	2	2	1	2	1	2	U	1	U	2	1	2
61	4	U	4	2	4	1	2	3	2	4	U	3	1	3
64	1	U	2	2	2	2	2	2	1	2	U	2	2	1
	SETAL CHARACTER STATES													
65	2	U	2	1	2	U	2	1	2	2	U	1	2	2
66	1	U	1	1	1	U	1	1	2	1	U	1	1	1
74	2	2	2	2	2	2	2	1	2	2	U	1/2	2	2
76	2	1	1	1	1	1	1	1	1	1	U	1	1	1/3
78	2	2	2	2	2	2	2	1	2	2	U	2	2	2
82	2	U	1	2	1	2	1	5	1	2	U	1	2	3

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 10,1; 13,1; 18,3; 19,2; 21,1; 23,2; 29,1; 30,1; 31,1; 33,2; 37,2; 38,2; 52,1; 53,1; 56,–; 57,2; 58,–; 59,–; 69,1; 70,2; 71,2; 72,2; 73,1; 75,1; 77,1; 79,1; 81,1.

Species included: 13 *E. antillensis;* 15 *E. arcturi;* 19 *E. articulata;* 26 *E. biannulata;* 36 *E. caeca;* 94 *E. japonica;* 98 *E. kobiensis;* 121 *E. mexicana;* 150 *E. pectinata;* 153 *E. pennata;* 176 *E. savignyi;* 179 *E. segregata;* 198 *E. valens;* 204 *E. websteri.*

TABLE 21.—Comparison of *Eunice* species in group A-1 without articulated peristomial cirri. Stub (C) gives character numbers; column heads are species numbers. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	11	15	25	55	85	86	114	120	132	146	173	180	193	199
	SOFT BODY CHARACTER STATES													
7	3	U	3	3	3	1	2	3	3	3	U	3	3	3
8	1	U	2	2	1	2	2	1	1	1	U	1	1	1
9	2	U	2	2	3	2	3	2	2	2	U	3	3	3
11	1	U	2	2	2	2	2	2	2	2	U	2	2	2
12	1	U	1	1	2	1	1	2	U	2	U	1	2	1
13	U	U	1	1	1	2	2	1	U	1	U	1	U	U
14	U	U	2	2	3	-	-	2	U	2	U	2	U	U
15	1	U	1	3	1	1	1	1	U	1	U	1	3	1
16	1	U	1	3	1	1	1	1	U	1	U	1	1	2
17	1	U	1	1	1	2	U	1	U	1	U	1	1	1
20	3	U	1	3	1	1	1	1	U	1	3	1	3	1
21	1	U	2	1	2	1	2	2	U	1	2	1	1	2
22	1	U	-	1	-	1	-	-	U	2	-	1	2	-
23	2	U	2	2	2	2	U	2	U	2	4	2	2	2
24	2	U	2	2	U	1	1	2	2	2	U	2	1	2
25	3	U	4	4	U	3	3	4	U	4	4	4	3	3
26	4	U	2	2	2	2	2	3	3	2	U	2	4	3
27	2	U	2	2	1	1	2	3	1	2	2	1	2	3
28	2	U	2	2	1	1	2	1	5	2	2	2	1	1
31	1	U	1	1	1	1	2	1	2	1	1	1	1	1
32	3	U	1	2	1	1	1	1	U	1	1	1	1	1
34	1	U	2	1	1	1	-	1	U	1	1	1	1	1
38	2	2	2	2	2	1	2	2	2	2	1	2	2	2
39	6-7	U	3	5	0	3	-	0	U	0	U	0	1	0
40	2	U	0	2	4	15	-	7	U	U	11	0	15	2-3
41	5	10	12	6	30	7	3	47	3	18	8	38	14	33
42	15	U	15	10	U	25	U	15	15	10	U	15	30	15
43	1	U	3-4	2-3	2	1-2	1	1	U	1	U	2	2-3	1
44	2	U	3	2	2	2	2	3	U	3	U	2	2-3	2
45	1	U	2	2	2	2	2	2	U	2	U	2	2	2
48	1	U	2	2	2	2	2	2	U	2	U	2	2	2
51	3	U	4	5	3	4	4	3	U	5	U	4	4	3
52	3	U	1	1	1	3	1	1	U	1	1	1	1	1
53	1	U	1	2	1	1	1	1	1	1	1	1	1	1
54	1	U	2	1	1	2	2	1	U	1	U	1	1	1
55	3	U	3	2	2	2	1	2	U	3	U	2	2	3
57	2	U	1	2	2	2	2	2	U	2	2	2	2	2
58	-	U	2	-	-	-	-	-	U	-	-	-	-	-
59	-	U	2	-	-	-	-	-	U	-	-	-	-	-
60	2	U	-	1	1	2	1	1	U	2	U	1	2	2
61	2	U	2	1	1	1	1	3	U	1	2	3	2	3
64	1	U	3	3	3	2	3	2	U	2	3	3	3	3
	SETAL CHARACTER STATES													
65	2	U	2	U	2	2	2	1	2	2	1	U	2	2
66	1	U	1	U	1	1	2	2	1	1	2	U	2	2
70	2	U	1	2	1	2	2	1	2	2	2	2	2	2
74	2	2	2	2	2	2	2	U	2	2	2	4	1	2
77	1	1	1	1	1	1	1	2	1	1	1	1	1	1
81	1	U	1	U	1	1	1	1	U	1	U	1	2	1
82	1	U	2	U	1	1	5	1	U	1	U	1	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparison: 10,1; 18,3; 19,2; 29,2; 30,1; 33,2; 37,2; 56,-; 69,1; 71,2; 72,2; 73,1; 75,1; 76,1; 78,2; 79,2.

Species included: 11 *E. antarctica;* 15 *E. arcturi;* 25 *E. benedicti;* 55 *E. edwardsi;* 85 *E. hawaiensis;* 86 *E. heterochaeta;* 114 *E. manihine;* 120 *E. megabranchia;* 132 *E. narconi;* 146 *E. parasegregata;* 173 *E. rubrocincta;* 180 *E. semisegregata;* 193 *E. tridentata;* 199 *E. validobranchiata.*

TABLE 22.—Comparison of *Eunice* species in groups A-2 and A-4. Column heads are the same as character numbers used to prepare the key (see explanation below; for a complete listing of characters and character states, see Appendix A).

	Species	1	2	3	5	35	36	80
18	*E. armillata*	114	46	2	6	6	109	34
76	*E. gracilicirrata*	323	214	2.5	9	3	181	63
95	*E. johnsoni*	160	75	3	7	24	130	31
102	*E. leptocirris*	U	U	3	9	3	U	51
146	*E. parasegregata*	U	U	3	8	3	U	U
177	*E. schizobranchia*	731	655	5	10	67	730	60
184	*E. stigmatura*	U	U	2	4	3	110-126	27-35

U = feature is unknown. Numbers separated by a dash indicate a range.

Explanation of column heads numbers:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 23.—Comparison of *Eunice* species in group A-2. Stub (C) gives character numbers; column heads give species numbers. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	18	76	95	102	146	177	184
	SOFT BODY CHARACTER STATES						
7	3	3	3	2	3	2	3
8	1	1	1	2	1	2	1
9	3	3	3	3	2	2	2
12	1	2	1	2	2	1	1
13	U	U	1	U	1	U	1
14	U	U	3	U	2	U	2
15	3	1	1	1	1	1	1
16	1	3	1	3	1	3	1
17	1	3	1	1	1	1	1
18	1	3	3	1	3	3	3
20	1	1	4	3	1	1	3
21	1	1	1	2	1	2	1
22	3	1	1	-	2	-	1
23	2	2	2	2	2	4	1
24	2	2	2	2	2	1	2
25	4	4	4	4	4	3	4
26	4	4	3	2	2	5	2
27	1	2	1	3	2	1	2
28	2	2	2	1	2	2	2
29	2	1	2	2	2	2	1
32	1	1	1	3	1	1	2
37	1	2	2	1	2	1	1
38	1	2	1	1	2	1	1
39	1	2	3	U	0	100	4
40	U	36	20	U	U	0	40
41	3	7	10	6	18	7	4
42	U	20	U	15	10	U	15
43	1	1	2	2-3	1	3	1
44	3	2	2	3	3	2	3
46	2	2	2	2	1	2	2
47	2	2	2	2	1	2	2
48	3	3	2	2	2	3	2
49	2	2	2	2	1	1	2

TABLE 23.—*Continued.*

C	18	76	95	102	146	177	184
	SOFT BODY CHARACTER STATES—*Continued.*						
51	5	10	-	4	5	9	6
52	3	3	1	1	1	1	1
53	1	1	2	1	1	1	1
54	1	1	-	1	1	1	1
55	2	3	-	2	3	2	2
56	-	-	1	-	-	-	-
57	2	2	2	2	2	1	2
58	-	-	-	-	-	2	-
59	-	-	-	-	-	1	-
60	2	2	1	2	2	-	2
61	4	3	1	1	1	1	3
64	2	2	3	2	2	3	2
	SETAL CHARACTER STATES						
65	2	2	1	2	2	1	2
66	2	1	1	1	1	1	1
73	1	1	1	1	1	2	1
78	2	2	2	2	2	U	2
79	2	2	2	2	2	2	2-3
81	1	1	1	1	1	2	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 11,2; 19,2; 30,1; 31,1; 33,2; 69,1; 70,2; 71,2; 72,2; 74,2; 75,1; 76,1; 77,1; 78,2; 82,1.

Species included: 18 *E. armillata;* 76 *E. gracilicirrata;* 95 *E. johnsoni;* 102 *E. leptocirris;* 146 *E. parasegregata;* 177 *E. schizobranchia;* 184 *E. stigmatura.*

TABLE 24.—Comparison of *Eunice* species in group B-1. The column heads are the same as the character numbers used to prepare the key (see explanation below; for a complete listing of characters and character states see Appendix A).

	Species	1	2	3	5	35	36	80
7	*E. amoureuxi*	U	13	U	U	9	24	17
23	*E. barvicensis*	U	U	3.5	6	6	65	19
41	*E. coccinea*	U	U	5	10	6	U	38-39
42	*E. coccinoides*	U	U	5	8	7-8	78	28/30
54	*E. dubitata*	U	U	7	16	3-5	38-48	35-38
58	*E. elegans*	133	75	3	8	3	33	30
78	*E. gravieri*	U	28	2	U	5	20/26	25
99	*E. langi*	71	42	2	5.5	3	39	30
120	*E. megabranchia*	U	U	7	12	3	54	35
131	*E. mutilatoides*	110	32	1	5	8	48	19
134	*E. nicidioformis*	97	45	2	6	6-8	40-50	19-26
143	*E. palauensis*	U	U	U	U	6-8	U	19-22
168	*E. rosaurae*	142	152	4	18	3	48-55	32-38
175	*E. samoae*	U	U	4	5	6	51	26
183	*E. stanleyi*	130	58	4	7	4	33	29
188	*E. thomasiana*	99	45	3	6	4	79	22/24

U = feature is unknown. Numbers separated by a dash indicates a range; numbers separated by a slash indicated paired alternative observations. Explanation of column heads:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 25.—Comparison of *Eunice* species in group B-1 with antennal articulations. Stub (C) gives character numbers; column heads are species numbers. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	41	54	58	78	134	143	168	175	183	188
	SOFT BODY CHARACTER STATES									
7	3	3	2	3	3	3	2	2	3	2
8	1	2	2	U	3	2	2	2	1	2
9	3	2	2	U	3	1	3	3	3	2
11	2	2	2	U	2	1	2	2	2	2
12	2	2	2	U	1	U	2	2	2	1
14	U	2	2	3	4	U	3	U	2	3
15	3	1	1	U	1	1	1	1	1	1
16	1	1	1	U	2	1	1	1	2	2
17	1	4	U	U	1	1	1	1	1	1
18	3	3	1	3	3	3	3	3	3	3
20	3	1	3	3	1	1	2	2	3	1
22	1	2	1	1	2	-	2	1	2	2
23	2	2	U	1	1	2	1	4	2	2
24	1	2	2	U	1	U	2	2	2	2
25	3	3	4	5	3	4	1	4	3	1
26	5	5	3	-	5	3	3	3	3	4
27	1	2	2	3	2	1	1	1	1	1
28	2	2	1	2	1	1	3	3	1	2
29	1	1	1	1	1	2	2	2	1	1
31	1	2	1	3	3	2	3	1	2	2
32	1	3	1	3	3	1	3	1	1	3
33	2	2	2	–	–	U	2	2	2	2
34	1	–	1	–	–	–	–	1	–	–
38	2	2	2	2	2	U	2	2	2	1
39	0	5	1	–	–	5-9	–	2	8	U
40	U	10-15	1	–	–	U	–	10	8	U
41	10	3	10	–	1	3	–	6	2	3
42	30	10	10	–	–	U	–	15	12	15
43	1	1-2	2	U	3	2	1-2	2	1-2	2
44	3	2	3	U	2	2	1-2	3	2	2
45	2	2	2	U	2	1-2	1	2	2	2
48	2	2	2	U	2	1-2	1	3	2	2
51	4-5	10	4	U	9	U	5	5	3	4
52	1	3	1	1	1	U	3	1	1	1
54	1	1	1	U	1	1	1	2	1	2
55	4	2	2	U	3	U	2	2	2	2
57	1	2	1	2	2	2	1	2	2	2
58	4	-	4	–	–	–	2	–	–	–
59	2	-	2	–	–	–	3	–	–	–
60	-	2	–	1	1	U	–	1	1	1
61	3	1	1	4	4	1	1	1	1	4
64	2	2	2	2	2	3	3	3	1	1
	SETAL CHARACTER STATES									
65	2	2	2	U	2	2	2	1	2	1
66	2	1	1	1	1	2	1	2	2	2
74	U	1	2	U	U	U	1	2	U	U
75	1	1	1	1	1	1	1	1	1	2
76	1	1	1/3	1	1	1	1	1	1	1
78	U	1	2	U	U	U	1	1	U	U
79	2	2	2	2	2	2	2/4	2	2	2
82	1	1	5	U	1	U	1	1	1	2

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 10,1; 13,1; 19,2; 21,1; 30,1; 37,2; 53,1; 56,-; 69,1; 70,2; 71,2; 72,2; 73,2; 77,2; 81,1.

Species included: 41 *E. coccinea;* 54 *E. dubitata;* 58 *E. elegans;* 78 *E. gravieri;* 134 *E. nicidioformis;* 143 *E. palauensis;* 168 *E. rosaurae* 175 *E.*

TABLE 26.—Comparison of *Eunice* species in group B-1 without antennal articulations. Stub (C) gives character numbers; column heads are species numbers. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	7	23	42	99	120	131	143
	SOFT BODY CHARACTER STATES						
7	3	3	3	2	3	U	3
8	U	2	1	2	1	U	2
9	U	3	3	2	2	2	1
11	U	1	1	U	2	2	1
12	U	1	1	U	2	2	U
14	U	3	5	U	2	2	U
15	U	1	1	U	1	3	1
18	3	1	2	3	3	3	3
20	3	1	3	U	1	3	1
23	1	2	2	U	2	4	2
25	U	3	3	3	4	3	4
27	1	1	1	3	3	1	1
28	U	1	3	2	1	5	1
29	2	2	2	1	2	2	2
31	3	1	1	1	1	2	2
32	1	2	1	1	1	3	1
34	U	1	1	1	1	-	-
39	U	3	U	U	0	U	5-9
40	U	10	U	U	7	U	U
41	U	4	9	8	47	2	3
42	U	25	U	15	15	U	U
43	U	2-3	2	1	1	1-2	2
44	U	2	3	2	3	U	2
45	U	2	2	2	2	U	1-2
48	U	2	3	2	2	U	1-2
51	U	4	4	4	3	7	U
52	U	3	1	3	1	1	U
54	U	1	2	1	1	2	1
55	U	3	2	2	2	2	U
60	U	2	1	3	1	1	U
61	U	4	1	4	3	2	1
64	U	3	3	3	2	3	3
	SETAL CHARACTER STATES						
65	U	2	2	2	1	1	2
66	U	2	2	2	2	1	2
70	1	2	2	2	1	2	2
73	2	2	2	2	1	2	2
82	U	2	1	1	1	1	U

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 13,1; 16,1; 17,1; 19,2; 21,2; 22,-; 24,2; 26,3; 30,1; 33,2; 37,2; 38,2; 53,1; 56,-; 57,2; 58,-; 59,-; 69,1; 71,2; 72,2; 74,1; 75,1; 76,1; 77,2; 78,1; 79,2; 81,1.

Species included: 7 *E. amoureuxi;* 23 *E. barvicensis;* 42 *E. coccinoides;* 99 *E. langi;* 120 *E. megabranchia;* 131 *E. mutilatoides;* 143 *E. palauensis.*

TABLE 27.—Comparison of *Eunice* species in group B-2. The column numbers are the same as the character numbers used to prepare the key (see explanation below; for a complete listing of all characters and character states see Appendix A).

	Species	1	2	3	5	35	36	80
8	*E. amphiheliae*	40-150	180-200	7-10	U	4	140-150	U
10	*E. annulicornis*	145	135	4	12.5	3	134	35
14	*E. aphroditois*	U	U	22	55	6	U	200
17	*E. argentinensis*	U	U	5	12	3	U	19-22
28	*E. biformicirrata*	137	217	7	17	3	132	27
29	*E. bilobata*	U	U	6	7	7	U	25
30	*E. bipapillata*	U	U	U	U	4	U	U
31	*E. borneensis*	120	42	6	7	6	120	30-35
33	*E. bowerbanki*	142	95	7	11	5	136	31
41	*E. coccinea*	U	U	5	10	6	U	38-39
48	*E. contingens*	U	U	U	U	6	U	30
53	*E. djiboutiensis*	U	U	10	20	5	U	81
57	*E. eimeorum*	U	U	3.5	7.5	5	U	38
64	*E. fimbriata*	362	230	7	11	9	122	26
68	*E. flavopicta*	166	215	6	U	5	166	U
69	*E. floridana*	111	80	6	10.5	8-10	111	29-40
70	*E. franklini*	U	U	7	15	6	U	34
71	*E. frauenfeldi*	U	U	5	7	6	U	27
72	*E. fucata*	250	195	5	10	5	170-180	U
79	*E. grubei*	U	U	6	12	3	U	24
81	*E. guildingi*	258	138	6	7	5	236	24
82	*E. guttata*	115	52	3	8	6	105	32
83	*E. harassii*	U	U	2.5	5	4	U	28
92	*E. investigatoris*	U	110	7	U	6	U	44-45
97	*E. kinbergi*	380	398	15	16	8-9	365	123
100	*E. laticeps*	U	U	10	21	4	U	38
101	*E. laurillardi*	189	150	5	9	3	184	32-33
107	*E. longicirris*	U	U	5	16	3	U	30
108	*E. longisetis*	108	40	3.5	6.4	6	104	18
110	*E. macrobranchia*	150	200	U	U	7-8	U	U
111	*E. magellanica*	130	140	7	17	7-8	120	26/30
122	*E. microprion*	127	82	5	10	7-8	127	38/41
123	*E. mindanavensis*	63	40	4	7	6	63	21
127	*E. multipectinata*	196	172	7	16	7-8	196	37-45
130	*E. mutilata*	U	U	3.5	10	7	U	27
133	*E. nesiotes*	U	U	6	10	6	U	31
135	*E. nigricans*	180	100	7	10	6-7	180	30
136	*E. northioidea*	U	U	2.5	7	3	U	25
137	*E. norvegica*	157	200	9	13	7	155	42
141	*E. ovalifera*	U	U	5	U	5	U	35
143	*E. palauensis*	U	U	U	U	6-8	U	19-22
149	*E. pauroneurata*	U	U	5.5	6	8	U	27
158	*E. philocorallia*	136	115	6	6	6	135	34
159	*E. plicata*	126	80	4	8	7	115	25
160	*E. polybranchia*	U	U	3	8	7-8	U	24-36
162	*E. prognatha*	122	80	7.5	16	10/13	110	35
163	*E. pulvinopalpata*	U	U	11	23	3	U	62-72
164	*E. purpurea*	106	53	4	9.5	5	100	19
165	*E. pycnobranchiata*	U	U	8	12	5-6	U	28/29
166	*E. quinquefida*	U	U	2.5	8	7	U	30
167	*E. reducta*	298	318	6	15	4	131	45
169	*E. roussaei*	U	U	U	U	6-8	U	U
170	*E. rubella*	U	U	2	8	5	U	28
174	*E. rullieri*	72	24	3	5	5	70	19
208	*E. scombrinis*	130	47	4	7	7	125	29
178	*E. sebastiani*	706	1455	23	35	7-14	686	56/56
185	*E. suviensis*	U	370	9	U	9	160	U
189	*E. tibiana*	165	73	3	5	6	135	26

TABLE 27.—*Continued.*

	Species	1	2	3	5	35	36	80
190	*E. torquata*	U	U	U	U	3	U	32
192	*E. tribranchiata*	U	U	7	13	4-5	U	30
196	*E. unidentata*	U	80-100	2-3	U	23	U	20-25
200	*E. violaceomaculata*	215	170	7	12	6-7	215	25-39

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of heads:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 28.—Comparison of the *Eunice* species from group B-2 without antennal articulations. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	14	48	53	72	82	84	143	160	169	174	178	185	196	208
	SOFT BODY CHARACTER STATES													
7	3	U	3	U	2	U	3	3	U	3	2	U	3	3
8	1	U	2	U	1	U	2	3	U	1	1	U	U	1
9	2	U	3	U	3	U	1	2	U	3	2	U	2	3
11	2	U	2	U	2	U	1	1	U	2	2	U	1	1
12	1	U	2	U	2	U	U	2	U	2	2	U	U	1
14	U	U	1	U	U	U	U	3	U	4	U	6	U	U
15	1	U	3	U	1	U	1	1	U	1	1	1	1	1
16	1	U	1	U	1	U	1	2	U	1	3	U	1	1
18	3	3	3	U	3	3	3	3	U	3	2	3	1	2
19	2	U	2	U	2	2	2	2	U	2	2	2	1	2
20	3	U	3	U	1	1	1	1	U	3	1	U	1	1
23	4	U	4	1	2	2	2	2	1	1	4	4	4	2
24	2	2	2	U	2	U	U	1	U	1	1	U	U	1
25	3	U	3	U	1	U	4	3	U	1	3	U	U	3
26	4	U	8	3	4	U	3	4	U	5	5	U	U	9
27	1	2	1	2	1	U	1	2	1	1	1	1	1	1
28	4	U	4	1	1	U	1	2	U	5	4	U	1	1
31	1	1	1	1	1	1	2	1	1	1	1	1	1	1
32	1	3	1	1	1	1	1	1	1	1	1	1	1	1
33	2	2	2	2	2	1	U	2	U	2	2	2	2	2
34	1	1	1	1	1	1	-	1	1	2	1	1	1	2
37	1	1	1	2	1	1	2	1	1	1	1	1	2	1
38	1	1	1	1	1	1	U	1	1	1	1	1	2	1
39	0	1	0	U	U	U	5-9	1	U	0	0	U	U	5
40	U	U	U	30	U	U	U	U	U	4-5	3	U	U	5
41	30	18-19	25	12	10	18-20	3	5	47	5	40	9	5	17
42	30	15	U	U	U	14	U	15	U	10	35	U	35	U
43	1-2	1-2	1-2	1	3	U	2	3	5	2	15	U	1	1
44	2	2	3	3	2	U	2	2	2	3	2	U	2	3
45	2	2	2	2	2	U	1-2	2	2	2	2	U	3	2
48	1	2	2	2	3	U	1-2	2	3	3	1	U	U	3
51	250	U	5	U	19	U	U	4	U	4	6-13	U	U	5
52	2	2	1	U	1	1	U	1	U	1	1	U	U	1
54	3	U	1	U	1	U	1	1	2	1	2	U	1	2
55	2	2	3	U	1	2	U	1	1	2	4	U	2	1
57	1	2	2	2	1	2	2	2	U	2	1	2	U	1
58	2	-	-	-	1	-	-	-	U	-	2	-	U	2
59	2	-	-	-	1	-	-	-	U	-	4	-	U	1
60	-	2	4	2	-	2	U	1	U	4	-	U	U	-
61	1	1	1	1	1	4	1	4	1	2	1	3	U	1
	SETAL CHARACTER STATES													
65	1	U	2	U	2	U	2	1	2	2	1	U	2	-
66	1	U	2	U	1	U	2	2	1	1	1	2	2	-
70	2	2	2	2	1	2	2	2	2	2	2	2	2	2
74	1	U	1	1	U	U	U	1	1	1	2	U	1	1
79	2	2	2	1	2	2	2	2	2	2	1	2	1	2
81	3	U	3	U	1	1	U	1	U	1	1	U	U	1
82	1	U	1	U	2	1	U	1	3	3	5	U	U	5

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not include in the comparisons: 10,1; 12,1; 13,1; 17,1; 21,2; 22,- 29,2; 30,1; 53,1; 56,-; 64,3; 69,1; 71,2; 72,2; 73,2; 75,1; 76,1; 77,2; 78,1.

Species included: 14 *E. aphroditois;* 48 *E. contingens;* 53 *E. djiboutiensis;* 72 *E. fucata;* 82 *E. guttata;* 84 *E. investigatoris;* 143 *E. palauensis;* 160 *E. polybranchia;* 169 *E. roussaei;* 174 *E. rullieri;* 178 *E. sebastiani;* 185 *E. suviensis;* 196 *E. unidentata;* 208 *E. scombrinis.*

TABLE 29.—Comparison of the *Eunice* species from Group B-2 with cylindrical antennal articulations and the notopodial cirri articulated throughout. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	17	29	68	97	110	111	122	135	158	159	192
	SOFT BODY CHARACTER STATES										
7	3	2	U	3	U	3	2	2	3	3	3
8	2	2	U	1	U	1	3	3	1	3	1
9	3	3	U	3	U	3	3	3	2	3	3
12	2	2	U	2	U	1	1	2	2	1	1
13	2	2	1	1	U	1	1	1	1	U	U
14	-	-	1	3	U	2	4	3	3	U	U
15	3	U	U	3	U	U	1	1	3	1	1
16	1	U	U	1	U	1	3	1	1	1	2
17	1	U	U	1	U	1	1	6	1	1	1
20	3	3	U	1	U	3	1	1	3	3	1
23	2	U	2	1-2	U	2	1	2	2	1	1
24	2	1	U	1	U	1	2	2	2	1	1
25	3	3	U	3	U	3	3	1	3	3	3
26	3	9	U	5	U	5	5	4	3	9	4
27	1	2	1	1	1	1	2	2	2	1	1
28	2	2	U	1	U	5	1	4	1	4	4
29	1	2	2	1	U	2	1	1	1	2	1
31	1	1	1	1	1	1	1	1	1	2	1
32	1	3	1	2	2	1	3	1	3	1	1
33	2	2	2	2	2	2	1	2	2	2	2
34	1	2	1	1	1	1	2	1	2	2	2
35	3	7	5	8-9	7-8	7-8	7-8	6-7	6	7	4-5
36	U	U	166	365	U	120	127	180	135	115	U
39	0	0	0	2	5	0	0	0	1	1	0
40	U	U	0	0	U	0	0	0	0	30	U
41	10	18	18-19	22	15-17	20	8	18	4	5	8
42	10	U	14	25	U	85	15	U	U	U	U
43	1	2	U	3	U	1-2	2-3	1	3	3	3
44	3	3	U	3	U	2	2	3	3	2	2
45	2	2	U	2	U	2	2	2	2	2	2
48	2	2	U	1	U	2	2	2	1	3	2
51	3	3	U	4	U	5	9	4	3	U	5
52	3	1	U	1	U	3	1	1	2	1	1
54	1	1	U	2	U	1	2	1	1	2	3
55	2	2	U	2	U	2	2	2	2	1	2
57	U	U	U	1	U	2	2	2	2	1	U
58	U	U	U	4	U	-	-	-	-	2	U
59	U	U	U	2	U	-	-	-	-	4	U
60	U	U	U	-	U	2	4	4	1	-	U
61	2	1	U	1	U	4	4	1	2	1	1
	SETAL CHARACTER STATES										
65	2	2	2	1	U	2	2	2	2	2	2
66	1	1	1	1	1	1	1	1	1	2	2
70	2	2	2	2	2	2	2	1	2	2	2
75	2	1	1	1	U	1	1	1	1	1	1
76	1	3	U	1	U	1	1	1	1	1	1
81	1	1	U	3	U	1	1	1	1	1	1
82	1	1	U	2	U	1	4	1	4	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparison: 10,1; 11,2; 18,3; 19,2; 21,1; 22,1; 30,1; 37,1; 38,1; 53,1; 56,-; 64,1; 69,1; 71,2; 72,2; 73,2; 74,1; 77,2; 78,1; 79,2.

Species listed: 17 *E. argentinensis;* 29 *E. bilobata;* 68 *E. flavopicta;* 97 *E. kinbergi;* 110 *E. macrobranchia;* 111 *E. magellanica;* 122 *E. microprion;* 135 *E. nigricans;* 158 *E. philocorallia;* 159 *E. plicata;* 192 *E. tribranchiata.*

TABLE 30.—Comparison of *Eunice* species from group B-2 with cylindrical antennal articulations and notopodial articulations limited to anterior setigers. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	41	64	68	100	108	110	123	137	164	167	200
	SOFT BODY CHARACTER STATES										
7	3	2	U	3	3	U	3	1	3	2	2
8	1	3	U	1	2	U	2	3	1	3	2
9	3	2	U	3	2	U	3	3	3	2	3
12	2	2	U	1	2	U	1	2	2	2	2
14	U	U	1	U	3	U	U	4	3	2	3
15	3	3	U	3	1	U	U	1	1	1	1
17	1	1	U	1	4	U	1	1	1	1	1
20	3	3	U	1	3	U	1	3	1	3	1
23	2	4	2	1	U	U	2	2	1	1	1
24	1	1	U	2	2	U	2	2	1	1	1
25	3	4	U	3	3	U	3	3	3	3	3
26	5	4	U	3	5	U	6	4	4	4	5
27	1	1	1	1	1	1	2	2	1	1	1-2
28	2	2	U	2	2	U	1	1	2	1	1
29	1	1	2	1	1	U	1	1	1	2	1
32	1	1	1	1	1	2	3	3	1	1	1
34	1	2	1	1	1	1	1	1	1	1	1
35	6	9	5	4	6	7-8	6	7	5	4	6-7
36	U	122	166	U	104	U	63	155	100	131	215
37	2	2	1	1	1	1	1	1	1	2	1
38	2	2	1	1	1	1	1	1	1	2	1
39	0	0	0	0	1	5	0	1	2	0	U
40	U	10-12	0	U	15	U	5	3	0	6	U
41	10	5	18-19	18	8	15-17	3	7	14	21	20
42	30	15	14	20	U	U	15	U	20	U	15
43	1	2	U	1	3	U	1-2	1-2	2	1	1
44	3	3	U	3	3	U	3	2	2	2	3
45	2	2	U	2	2	U	2	2	1	2	2
48	2	3	U	2	3	U	1	2	1	2	1
51	4-5	4-5	U	3	9	U	5	6	4	4	4
54	1	2	U	1	2	U	3	1	2	1	2
55	4	1	U	2	3	U	2	3	1	4	2
57	1	2	U	2	2	U	1	2	2	2	2
58	4	-	U	-	-	U	4	-	-	-	-
59	2	-	U	-	-	U	2	-	-	-	-
60	-	3	U	1	2	U	-	2	1	2	4
61	3	4	U	4	4	U	2	3	1	2	3
	SETAL CHARACTER STATES										
66	2	2	1	1	1	1	2	1	2	2	1
78	U	2	U	U	1	1	1	U	1	U	U
82	1	1	U	2	1	U	1	2	1	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparison: 10,1; 11,2; 13,1; 16,1; 18,3; 19,2; 21,1; 22,1; 30,1; 31,1; 33,2; 52,1; 53,1; 56,-; 64,2; 65,2; 69,1; 70,2; 71,2; 72,2; 73,2; 74,1; 75,1; 76,1; 77,2; 79,2; 81,1.

Species included: 41 *E. coccinea;* 64 *E. fimbriata;* 68 *E. flavopicta;* 100 *E. laticeps;* 108 *E. longisetis;* 110 *E. macrobranchia;* 123 *E. mindanavensis;* 137 *E. norvegica;* 164 *E. purpurea;* 167 *E. reducta;* 200 *E. violaceomaculata.*

TABLE 31.—Comparison of *Eunice* species in group B-2 with cylindrical antennal articulations, but without notopodial articulations. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	8	30	31	57	70	81	83	110	130	133	141	149	162	163	189
	SOFT BODY CHARACTER STATES														
7	1	U	1	3	3	3	2	U	3	2	U	3	3	3	2
8	2	U	2	2	1	1	2	U	1	2	U	1	1	3	2
9	3	U	3	3	3	3	3	U	3	2	U	3	2	3	2
12	U	U	1	1	1	1	1	U	2	1	U	1	1	2	1
13	2	U	U	1	U	U	1	U	1	U	U	U	U	U	1
14	-	U	U	2	U	U	1	U	3	U	U	U	U	U	2
15	3	U	1	1	3	1	1	U	3	1	U	1	1	1	5
16	U	U	1	1	1	1	1	U	1	2	U	1	2	1	1
17	1	U	1	1	1	1	1	U	1	1	U	6	1	1	1
18	3	U	3	3	3	3	3	U	3	3	U	3	3	3	3
20	1	3	1	1	3	3	1	U	1	1	4	1	3	1	1
23	4	4	1	4	2	2	2	U	2	2	U	U	1	1	2
24	2	U	2	2	2	1	2	U	2	2	U	2	2	1	2
25	4	U	3	3	3	4	4	U	4	3	U	3	3	3	3
26	5	U	6	5	5	3	4	U	3	4	U	3	5	3	4
27	1	U	1	1	2	2	1	1	1	2	U	1	U	2	3
28	1	U	1	3	1	2	1	U	2	1	U	2	U	1	1
29	2	U	1	2	1	2	2	U	2	1	U	2	U	1	1
31	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
32	1	3	1	1	3	1	1	2	1	1	U	3	3	3	3
34	1	U	2	1	1	1	1	1	1	1	U	2	-	2	1
37	1	1	1	1	1	2	1	1	1	1	U	1	1	1	1
38	1	1	1	1	1	1	1	1	1	1	U	1	2	1	1
39	U	U	0	U	0	0	3	5	3	2	U	1	U	1	1
40	U	U	10	U	U	20	U	U	U	U	U	U	U	0	10-15
41	7	4	8	5	25	11	10	15-17	4	14	5-6	5	3	25	5
42	U	8	15	20	U	15	15	U	25	U	U	15	U	15	U
43	2-3	1	1	1-3	3	2	1/3	U	3	1-2	U	1-2	2-3	2	2-3
44	2	3	3	2	2	3	2	U	2	3	U	2	3	3	2-3
45	2	2	2	2	3	2	2	U	2	2	U	2	2	2	2
48	2	2	3	2	3	1	2	U	3	2	U	2	2	2	3
51	U	U	4	U	U	4	5	U	9	5	U	4	9	5	4
52	1	U	1	1	1	1	1	U	1	1	U	1	1	3	1/3
54	U	1	2	1	1	1	1	U	2	2	U	1	1	1	2
55	U	3	1	3	2	2	2	U	3	3	U	3	2	2	2
57	U	2	1	1	U	1	2	U	2	U	1	2	2	2	2
58	U	-	2	U	U	1	-	U	-	U	U	-	-	-	-
59	U	-	1	U	U	2	-	U	-	U	U	-	-	-	-
60	U	2	-	-	U	-	4	U	2	U	-	2	2	1	1
61	3	1	1	2	4	3	1	U	4	1	5	1	1	3	1
	SETAL CHARACTER STATES														
65	U	2	2	2	2	2	2	U	1	2	U	2	2	2	1
66	U	2	2	1	2	2	1	1	1	1	1	1	2	1	2
70	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2
74	U	U	U	U	U	U	2	U	U	U	U	U	U	2	U
75	U	1	1	1	1	1	1	U	1	1	U	1	2	1	1
78	U	U	U	U	U	U	2	1	U	U	2	U	U	2	U
81	U	U	1	U	1	1	1	U	1	1	U	1	1	1	1
82	U	U	4	U	1	1	1	U	1	1	U	1	1	1	5

U = feature is unknown; dash (–) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparison: 10,1; 11,2; 19,2; 21,1; 22,1; 30,1; 33,2; 53,1; 56,–; 76,3; 69,1; 71,2; 72,2; 73,2; 76,1; 77,2; 79,2.

Species listed: 8 *E. amphiheliae;* 30 *E. bipapillata;* 31 *E. borneensis;* 57 *E. eimeorum;* 70 *E. franklini;* 81 *E. guildingi;* 83 *E. harassii;* 110 *E. macrobranchia;* 130 *E. mutilata;* 133 *E. nesiotes;* 141 *E. ovalifera;* 149 *E. pauroneurata;* 162 *E. prognatha;* 163 *E. pulvinopalpata;* 189 *E. tibiana.*

TABLE 32.—Comparison of the *Eunice* species from group B-2 with distally drop-shaped or moniliform articulations of the ceratostyles. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	28	33	69	71	79	101	107	127	136	165	166	170
	SOFT BODY CHARACTER STATES											
7	3	3	2	2	3	3	3	3	3	3	3	1
8	1	1	2	3	1	2	1	3	1	1	1	3
9	3	3	2	2	2	3	2	2	3	3	3	2
12	1	1	1	2	2	1	2	1	1	1	1	2
13	U	U	1	U	U	1	1	1	1	U	1	1
14	U	U	3	U	U	3	2	3	4	U	3	3
15	1	3	1	1	1	3	1	U	1	1	1	1
16	1	1	2	1	1	1	3	1	2	3	2	1
17	1	1	1	1	1	1	3	1	1	2	1	1
18	3	3	3	3	3	3	2	3	3	3	3	3
20	1	1	3	1	1	1	1	1	1	1	1	3
23	1	1	2	2	1	2	U	U	2	1	U	4
24	2	1	1	1	1	2	2	1	1	1	1	2
25	3	3	3	3	3	3	3	3	3	3	3	1
26	3	6	4	3	5	5	3	5	3	5	5	3
27	1	1	2	1	1	2	3	1	1	1	1	1
28	1	2	1	1	2	1	1	2	3	2	1	1
29	1	1	1	1	1	1	1	1	2	1	1	1
31	1	1	1	2	1	1	1	1	1	1	1	2
32	1	1	1	1	1	3	3	1	1	2	1	1
33	2	2	1	2	2	2	2	2	2	2	2	2
34	1	2	1	-	1	1	1	1	1	U	1	-
39	1	0	1	1	1	1	U	8-10	3	U	0	2
40	5	60	0	U	U	0	U	0	U	U	U	U
41	7	15	8	3	8	10	7	12	4	4	5	2
42	10	12	U	15	20	15	15	U	10	U	15	7
43	1-2	3	2-3	2	1	2	3	2	3	2	3	1
44	3	2	3	2	2	3	3	3	2	3	2	2
48	2	3	3	2	1	2	2	2	2	3	2	2
51	3	-	7-9	4	5	9	4	4	4	U	5-6	7
52	3	3	1	1	2	1	1	3	1	3	1	1
53	1	2	1	1	1	1	1	1	1	1	1	1
54	1	-	2	2	1	1	1	2	1	1	1	1
55	2	-	2	2	2	2	2	2	3	3	2	2
56	-	2	-	-	-	-	-	-	-	-	-	-
60	2	2	4	1	4	4	1	2	1	U	1	4
61	3	1	4	3	1	3	4	3	4	4	3	2
64	1	2	2	2	2	1	1	2	2	2	3	3
	SETAL CHARACTER STATES											
65	2	2	1	2	1	2	2	1	2	2	2	2
66	2	1	2	2	1	1	1	1	1	2	1	1
74	U	U	U	1	U	U	2	1	1	U	1	U
75	1	1	12	1	1	1	1	1	1	1	1	1
76	1	1	1	1	1	1	1	1	1	1	1	1
77	2	2	2	2	2	2	2	2	2	2	2	2
78	U	U	U	1	U	U	1	1	1	1	1	U
82	1	2	2	2	2	1	1	1	1	1	3	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 11,2; 19,2; 21,1; 22,2; 30,1; 37,1; 38,1; 45,2; 57,2; 58,-; 59,-; 69,1; 70,2; 71,2; 72,2; 73,2; 79,2; 81,1.

Species included: 28 *E. biformicirrata;* 33 *E. bowerbanki;* 69 *E. floridana;* 71 *E. frauenfeldi;* 79 *E. grubei;* 101 *E. laurillardi;* 107 *E. longicirris;* 127 *E. multipectinata;* 136 *E. northioidea;* 165 *E. pycnobranchiata;* 166 *E. quinquefida;* 170 *E. rubella.*

TABLE 33.—Comparison of *Eunice* species in groups B-3 and B-4. Column heads are the same as the character numbers used to prepare the key (see explanation below; for a complete listing of all characters and character states see Appendix A).

	Species	1	2	3	5	35	36	80
1	*E. aciculata*	202	129	4.5	11	18	190	22
4	*E. afra*	U	U	6	10	16	U	22
34	*E. brevis*	130	18	1.5	2.5	-	-	27
35	*E. bucciensis*	U	U	3.5	7.5	18	U	34
37	*E. cariboea*	127	24	1.2	2.5	-	-	24-31
39	*E. cincta*	U	U	1.1	3	-	-	21
40	*E. cirrobranchiata*	U	U	3	6	22	U	17/24
43	*E. collaris*	U	U	6	12	17-18	U	27/33
44	*E. collini*	U	U	4	7	16	85	26-27
45	*E. complanata*	100	72	U	U	19	U	28
47	*E. conglomerans*	166	163	3.5	6.5	23-29	166	22
49	*E. crassitentaculata*	U	U	3.5	9.5	28	U	32
50	*E. curticirris*	55	12	1	2.25	-	-	16
51	*E. denticulata*	U	U	3	7	27	U	18-19
52	*E. dilatata*	U	U	10	16	19	U	28
56	*E. ehlersi*	U	U	4	6	14	U	27
61	*E. excariboea*	U	U	2	3.7	78-79	U	78/87
62	*E. fauveli*	216	302	8	18	18	216	41
63	*E. filamentosa*	119	25	1.5	3	23-27	119	17/22
66	*E. flavapunctata*	U	U	2	7	13	U	25
73	*E. fuscafasciata*	U	U	1.3	3	-	-	23
74	*E. gagzoi*	160	32.5	1.5	2.75	85-120	160	27-38
75	*E. goodei*	U	U	0.75	4	-	-	23
80	*E. guanica*	224	100	4	7	19	224	36
88	*E. imogena*	U	U	2	3.5	-	-	50
93	*E. jagori*	U	U	6	6	17	U	23
103	*E. leucosticta*	131	130	U	U	14-15	113	U
104	*E. levibranchia*	105	94	8	9	69	85-95	28
106	*E. lita*	240	78	4	4	15	120	23
112	*E. magnifica*	U	U	U	U	22	U	U
115	*E. marenzelleri*	U	U	5	11	28	U	38
124	*E. modesta*	80	28	1	3	17-18	70	U
129	*E. mutabilis*	196	95	6	8	17-18	196	22-23
138	*E. notata*	95	40	1	U	14	70	U
142	*E. pacifica*	102	33	3	6	17-21	102	23-28
147	*E. parvibranchis*	U	U	4	10	19-20	U	17-19
148	*E. paupera*	127	U	U	U	23	U	23
154	*E. perimensis*	U	U	5	10	17	U	28
155	*E. perrieri*	185	135	5	12	18	170	25
157	*E. petersi*	302	130	5	7	13	200	26
162	*E. prognatha*	122	80	7.5	16	10/13	110	35
9	*E. pruvoti*	115	34	3	5	15	115	19
181	*E. sonorae*	586	345	6	14	41	530	54
182	*E. spongicola*	152	68	1.75	6	24	150	26
187	*E. tenuis*	695	460	2	4.5	81	695	124
203	*E. wasinensis*	84	17	2.5	6	-	-	27-31

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column heads:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 34.—Comparison of *Eunice* species in groups B-3 and B-4 with articulated ceratostyles. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	4	40	43	47	56	61	62	80	93	124	142	157	162	181
	SOFT BODY CHARACTER STATES													
7	3	3	3	2	2	3	3	3	3	3	3	3	3	2
8	1	3	2	2	2	2	2	1	2	3	3	1	1	2
9	3	2	3	3	3	2	3	2	3	3	2	3	2	3
11	1	2	2	1	2	1	2	2	1	2	2	1	2	2
12	2	2	2	2	1	1	1	2	1	1	1	2	1	2
14	2	2	2	2	2	2	5	U	6	3	2	2	U	2
15	1	1	U	3	1	1	1	2	1	1	1	3	1	1
16	1	1	1	1	1	3	1	1	2	1	3	1	2	1
17	3	1	1	1	1	1	1	1	1	1	3	1	1	1
18	3	3	3	3	3	3	3	3	3	1	1	1	3	1
20	3	3	3	3	3	3	1	3	1	3	1	3	3	1
22	1	1	2	1	1	1	1	1	1	1	1	1	1	1
23	1	4	2	4	1	1	2	4	2	4	2	4	1	2
24	1	1	1	1	2	2	2	2	2	1	2	1	2	1
25	3	1	2	1	4	3	3	3	3	3	3	4	3	4
26	3	9	3	4	2-3	3	4	2	5	3	4	3	5	2
27	1	1	1	1	1	1	1	1	2	1	1	1	U	1
28	2	1	2	1	2	2	2	1	2	5	3	2	U	1
29	2	2	2	2	2	2	2	2	1	2	2	1	U	2
31	1	2	1	2	1	2	1	2	1	3	1	1	2	1
32	1	1	1	1	1	2	1	1	1	1	1	1	3	1
33	2	2	2	2	2	2	2	2	2	-	2	2	2	2
34	1	-	1	-	2	-	1	-	1	-	2	1	-	2
37	1	1	1	1	1	1	1	1	1	2	1	1	2	2
38	1	1	1	1	1	1	1	1	1	1	1	1	1	2
39	0	U	0	U	1	U	1	10	U	-	U	U	U	0
40	U	U	U	U	U	U	0	U	U	-	U	130	U	55
41	6	2	12	4	6	3	14	2	8	1	5	4	3	6
42	30	U	50	130	U	U	35	30	25	-	40	U	U	65
43	2	14	2	3	2	24	2-3	2-3	2	U	2	2	2-3	1-2
44	2	2	2	2	2	2	2	2	3	U	2	2	3	2
48	2	2	3	2	2	1	3	3	3	U	2	3	2	3
51	5	4	3-4	4	4	4	9	6-7	-	4	9	4	9	4
52	2	3	1	1	1	1	1	3	1	U	1	1	1	1
53	1	1	1	1	2	1	1	1	2	1	1	1	1	1
54	3	2	1	2	2	2	1	1	-	1	2	2	1	2
55	2	1	2	2	1	2	2	1	-	U	3	1	2	2
56	-	-	-	-	-	-	-	-	1	-	-	-	-	-
57	2	1	2	2	U	1	2	1	U	2	2	2	2	1
58	-	2	-	-	U	2	-	1	U	-	-	-	-	2
59	-	1	-	-	U	1	-	1	U	-	-	-	-	2
60	1	-	1	2	U	-	1	-	U	1	2	1	2	-
61	1	2	1	1	1	3	1	3	1	1	2	1	1	2
64	3	3	3	3	3	1	2	3	1	3	3	2	3	3
	SETAL CHARACTER STATES													
65	1-2	1	1	1	1	1	1	2	1	2	2	2	2	-
66	2	2	2	2	2	2	1	2	2	2	1	1	2	-
70	2	2	2	2	2	2	1	2	2	2	2	2	2	2
75	1	1	1	1	1	1	1	1	1	1	1	1	2	2
76	1	4	1	4-5	1	1	1	1	1	1	1	1	1	1
79	2	4	2	2	2	2	2	2	2	2	2	2	2	1
81	1	1	1	1	U	3	1	1	1	1	1	1	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 13,1; 19,2; 21,1; 30,1; 45,2; 69,1; 71,2; 73,2; 74,1; 77,2; 78,1, 82,1.

Species listed: 4 *E. afra;* 40 *E. cirrobranchiata;* 43 *E. collaris;* 47 *E. conglomerans;* 56 *E. ehlersi;* 61 *E. excariboea;* 62 *E. fauveli;* 80 *E. guanica;* 93 *E. jagori;* 124 *E. modesta;* 142 *E. pacifica;* 157 *E. petersi;* 162 *E. prognatha;* 181 *E. sonorae.*

TABLE 35.—Comparison of *Eunice* species in groups B-3 and B-4 with articulated ceratostyles; branchiae pectinate. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	4	43	56	62	93	142	157	181
	SOFT BODY CHARACTER STATES							
7	3	3	2	3	3	3	3	2
8	1	2	2	2	2	3	1	2
9	3	3	3	3	3	2	3	3
11	1	2	2	2	1	2	1	2
12	2	2	1	1	1	1	2	2
14	2	2	2	5	6	2	2	2
15	1	U	1	1	1	1	3	1
16	1	1	1	1	2	3	1	1
17	3	1	1	1	1	3	1	1
18	3	3	3	3	3	1	1	1
20	3	3	3	1	1	1	3	1
22	1	2	1	1	1	1	1	1
23	1	2	1	2	2	2	4	2
24	1	1	2	2	2	2	1	1
25	3	2	4	3	3	3	4	4
26	3	3	2-3	4	5	4	3	2
27	1	1	1	1	2	1	1	1
28	2	2	2	2	2	3	2	1
29	2	2	2	2	1	2	1	2
34	1	1	2	1	1	2	1	2
37	1	1	1	1	1	1	1	2
38	1	1	1	1	1	1	1	2
39	0	0	1	1	U	U	U	0
40	U	U	U	0	U	U	130	55
41	6	12	6	14	8	5	4	6
42	30	50	U	35	25	40	U	65
43	2	2	2	2-3	2	2	2	1-2
44	2	2	2	2	3	2	2	2
48	2	3	2	3	3	2	3	3
51	5	3-4	4	9	-	9	4	4
52	2	1	1	1	1	1	1	1
53	1	1	2	1	2	1	1	1
54	3	1	2	1	-	2	2	2
55	2	2	1	2	-	3	1	2
56	-	-	-	-	1	-	-	-
57	2	2	U	2	U	2	2	1
58	-	-	U	-	U	-	-	2
59	-	-	U	-	U	-	-	2
60	1	1	U	1	U	2	1	-
61	1	1	1	1	1	2	1	2
64	3	3	3	2	1	3	2	3
	SETAL CHARACTER STATES							
65	1-2	1	1	1	1	2	2	-
66	2	2	2	1	2	1	1	-
70	2	2	2	1	2	2	2	2
75	1	1	1	1	1	1	1	2
79	2	2	2	2	2	2	2	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 13,1; 19,2 21,1; 30,1; 31,1; 32,1; 33,2; 45,2; 69,1; 71,2; 72,2; 73,2; 74,1; 76,1; 78,1; 81,1; 82,1.

Species listed: 4 *E. afra;* 43 *E. collaris;* 56 *E. ehlersi;* 62 *E. fauveli;* 93 *E. jagori;* 142 *E. pacifica;* 181 *E. sonorae.*

TABLE 36.—Comparison of *Eunice* species in groups B-3 and B-4 with articulated ceratostyles; branchiae palmate or single filaments. Stub (C) gives character number; column heads givespecies number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	9	40	47	61	80	124	162
	SOFT BODY CHARACTER STATES						
7	1	3	2	3	3	3	3
8	2	3	2	2	1	3	1
9	3	2	3	2	2	3	2
11	2	2	1	1	2	2	2
12	1	2	2	1	2	1	1
14	3	2	2	2	U	3	U
15	1	1	3	1	2	1	1
16	1	1	1	3	1	1	2
18	3	3	3	3	3	1	3
23	4	4	4	1	4	4	1
24	1	1	1	2	2	1	2
25	3	1	1	3	3	3	3
26	4	9	4	3	2	3	5
28	1	1	1	2	1	5	U
31	3	2	2	2	2	3	2
32	U	1	1	2	1	1	3
33	U	2	2	2	2	-	2
37	1	1	1	1	1	2	2
39	-	U	U	U	10	-	U
40	-	U	U	U	U	-	U
41	-	2	4	3	2	1	3
42	-	U	130	U	30	-	U
43	2	14	3	24	2-3	U	2-3
44	2	2	2	2	2	U	3
48	2	2	2	1	3	U	2
51	9	4	4	4	6-7	4	9
52	1	3	1	1	3	U	1
54	1	2	2	2	1	1	1
55	2	1	2	2	1	U	2
57	2	1	2	1	1	2	2
58	-	2	-	2	1	-	-
59	-	1	-	1	1	-	-
60	1	-	2	-	-	1	2
61	1	2	1	3	3	1	1
64	3	3	3	1	3	3	3
	SETAL CHARACTER STATES						
65	2	1	1	1	2	2	2
74	2	1	U	U	U	U	U
75	1	1	1	1	1	1	2
76	1	4	4-5	1	1	1	1
78	2	1	U	U	U	U	U
79	2	4	2	2	2	2	2
81	1	1	1	3	1	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 10,1; 13,1; 19,2 21,1; 29,2; 30,1; 32,1; 33,2; 34,-; 45,2; 66,2; 69,1; 71,2; 72,2; 73,2; 74,1; 76,1; 78,1; 81,1; 82,1.

Species listed: 9 *E. pruvoti;* 40 *E. cirrobranchiata;* 47 *E. conglomerans;* 61 *E. excariboea;* 80 *E. guanica;* 124 *E. modesta;* 162 *E. prognatha.*

TABLE 37.—Comparison of *Eunice* species in groups B-3 and B-4 with branchiae present, without antennal articulations, and with the three median antennae of similar length. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	1	44	45	63	74	103	104	112	115	138	155
	SOFT BODY CHARACTER STATES										
7	2	3	U	2	3	U	3	U	3	U	3
8	2	1	U	2	2	U	1	U	2	U	3
9	3	3	U	3	1	U	2	U	2	U	3
11	2	2	U	2	1	U	2	U	2	U	2
12	2	2	U	1	2	U	1	U	1	U	2
13	1	2	1	1	1	U	1	U	1	U	1
14	2	-	3	2	3	U	3	U	2	U	6
16	1	1	U	3	1	U	1	U	3	U	1
17	1	1	U	1	1	U	1	U	4	U	1
18	1	3	U	3	3	U	3	U	3	U	1
20	3	1	U	3	3	U	3	U	3	4	1
24	2	2	U	2	1	U	2	U	2	U	1
25	3	3	3	3	4	U	3	U	3	U	3
26	3	3	5	7	2	U	2	U	4	U	3
27	1	1	3	1	1	U	1	U	1	1	1
28	5	2	U	2	1	U	1	U	5	U	2
31	1	2	1	2	3	U	2	1	3	2-3	1
32	1	3	1	1	1	U	3	1	1	U	1
33	2	2	2	2	-	U	2	U	-	2	2
34	1	1	U	-	-	U	-	1	-	-	1
37	1	2	U	1	1	2	1-2	U	1	2	1
38	1	2	U	1	2	U	2	U	1	1	1
39	10	U	2	U	-	U	0	U	-	-	2-3
40	10	U	U	U	-	U	0	U	-	-	4-5
41	5	2	6	2	-	4	3	8	1	1-3	10
42	32	U	U	U	-	U	U	U	-	U	30
43	2	1-2	U	2-3	2	2	1	1	2	U	2
44	3	2	U	3	2	3	2	2	2	U	2
45	2	2	U	2	2	U	2	1	2	U	2
48	3	2	U	2	3	U	2	3	3	U	3
51	15-20	4	U	4	9	U	1-2	U	11	9	9
52	2	1	U	1	1	U	1	2	1	U	2
54	1	1	U	2	2	U	2	U	2	U	2
55	3	2	2	1	2	U	1	U	2	U	2
57	2	2	U	2	2	1	2	2	2	U	2
58	-	-	U	-	-	1	-	-	-	U	-
59	-	-	U	-	-	1	-	-	-	U	-
60	2	2	U	2	2	U	1	1	1	U	2
61	4	1	U	1	1	U	3	3	2	3	1
64	3	3	U	3	3	2/3	2	3	3	3	3
	SETAL CHARACTER STATES										
65	2	2	U	1	2	U	1	2	2	1	1
66	2	2	U	1	1	U	2	1	2	1	2
70	2	2	2	1	2	2	2	2	2	2	2
74	2	U	U	U	U	1	U	1	U	1	1
76	1	1/2	1	4	1	1	1	1	1	1	1
78	2	U	U	U	U	1	U	1	U	1	1
79	2	2	2	2	2	2	2	2	1	2	2

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 10,1; 15,1; 19,2; 21,2; 22,-; 23,1; 29,2; 30,1; 53,1; 56,-; 69,1; 71,2; 72,2; 75,1; 77,2; 81,1; 82,1.

Species listed: 1 *E. aciculata;* 44 *E. collini;* 45 *E. complanata;* 63 *E. filamentosa;* 74 *E. gagzoi;* 103 *E. leucosticta;* 104 *E. levibranchia;* 112 *E. magnifica;* 115 *E. marenzelleri;* 138 *E. notata;* 155 *E. perrieri.*

TABLE 38.—Comparison of *Eunice* species from group B-4 with branchiae, with the median antenna distinctly longer than the other antennae, without antennal articulations. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	1	44	45	49	52	106	112	129	138	187
	SOFT BODY CHARACTER STATES									
7	2	3	U	3	2	2	U	3	U	U
8	2	1	U	1	2	3	U	2	U	U
9	3	3	U	3	3	3	U	3	U	3
12	2	2	U	1	1	1	U	1	U	U
13	1	2	1	1	1	1	U	1	U	U
14	2	-	3	3	2	3	U	4	U	U
16	1	1	U	1	3	2	U	1	U	U
17	1	1	U	1	3	4	U	4	U	U
18	1	3	U	1	3	3	U	3	U	3
20	3	1	U	1	3	1	U	1	4	3
24	2	2	U	2	2	2	U	1	U	U
25	3	3	3	3	1	4	U	3	U	4
26	3	3	5	1	3	5	U	4	U	U
27	1	1	3	1	1	2	U	1-2	1	1
28	5	2	U	1	2	3	U	4	U	5
31	1	2	1	2	1	2	1	1	2-3	2
32	1	3	1	1	1	1	1	1	U	1
33	2	2	2	U	1	2	U	2	2	2
34	1	1	U	U	2	-	1	2	-	-
37	1	2	U	1	1	2	U	1	2	1
38	1	2	U	1	1	2	U	1	1	1
39	10	U	2	U	5	20	U	2-3	-	10
40	10	U	U	U	U	50	U	0	-	U
41	5	2	6	2	6	2	8	12	1-3	4
42	32	U	U	U	U	35	U	25	U	400
43	2	1-2	U	2-3	2	3	1	1-2	U	2
44	3	2	U	2	2	2	2	3	U	2
45	2	2	U	2	2	2	1	2	U	2
48	3	2	U	3	3	2	3	3	U	2
51	15-20	4	U	4	U	4	U	9	9	200
52	2	1	U	13	2	1	2	1	U	3
54	1	1	U	1	1	2	U	2	U	1
55	3	2	2	2	2	1	U	2	U	2
56	-	-	-	2	-	-	U	-	U	-
57	2	2	U	U	U	2	2	1	U	2
58	-	-	U	U	U	-	-	2	U	-
59	-	-	U	U	U	-	-	2	U	-
60	2	2	U	U	U	3	1	-	U	3
61	4	1	U	1	2	4	3	1	3	4
	SETAL CHARACTER STATES									
65	2	2	U	2	1	2	2	1	1	2
66	2	2	U	2	1	2	1	2	1	1
74	2	U	U	1	U	U	1	1	1	U
76	1	1/2	1	1	1	1	1	1	1	1
78	2	U	U	1	U	U	1	1	1	U
82	1	1	U	1	1	1	U	1	U	3

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 10,1; 11,2; 15,1; 19,2; 21,2; 22,-; 23,2; 29,2; 30,1; 53,1; 64,3; 69,1; 70,2; 71,2; 72,2; 73,2; 75,1; 77,2; 79,2; 81,1.

Species listed: 1 *E. aciculata;* 44 *E. collini;* 45 *E. complanata;* 49 *E. crassitentaculata;* 52 *E. dilatata;* 106 *E. lita;* 112 *E. magnifica;* 129 *E. mutabilis;* 138 *E. notata;* 187 *E. tenuis.*

TABLE 39.—Comparison of *Eunice* species in group B-4 with branchiae; with all antennae similar in length (short) and without antennal articulations. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	35	44	45	51	66	112	138	147	148	154	182
	SOFT BODY CHARACTER STATES										
7	3	3	U	3	3	U	U	3	U	1	1
8	3	1	U	2	1	U	U	1	U	2	2
9	3	3	U	3	3	U	U	2	U	3	3
10	1	1	U	1	2	U	U	1	U	1	1
11	2	2	U	2	1	U	U	2	U	2	2
12	1	2	U	1	2	U	U	1	U	1	1
13	U	2	1	1	U	U	U	1	U	1	1
14	U	-	3	2	U	U	U	2	U	3	2
15	1	1	U	3	3	U	U	2	U	1	1
16	1	1	U	1	2	U	U	1	U	1	1
17	3	1	U	1	1	U	U	1	U	1	1
18	1	3	U	1	3	U	U	3	U	3	3
19	2	2	U	2	2	U	U	2	U	2	2
20	3	1	U	1	3	U	4	3	3	1	1
23	4	U	U	4	4	U	U	4	4	4	4
24	1	2	U	1	2	U	U	2	U	2	2
25	4	3	3	3	4	U	U	4	4	3	2
26	2	3	5	3	2	U	U	4	1	2	5
27	1	1	3	1	1	U	1	1	U	1	1
28	1	2	U	1	2	U	U	1	U	2	2
29	2	2	2	2	2	U	2	2	U	2	2
31	2	2	1	2	1	1	2-3	2	2	1	2
32	1	3	1	1	1	1	U	1	U	1	1
34	1	1	U	-	1	1	-	-	U	2	-
37	1	2	U	1	2	U	2	1	U	1	1
38	1	2	U	1	1	U	1	1	U	1	1
39	3	U	2	10-12	U	U	-	U	U	1	5
40	U	U	U	U	U	U	-	U	U	U	3
41	3	2	6	3	6	8	1-3	3	3	8	3
42	U	U	U	U	50	U	U	40	U	30	U
43	1-2	1-2	U	1	1	1	U	1-2	U	1-2	1-3
44	3	2	U	3	3	2	U	U	U	2	2
45	2	2	U	2	2	1	U	2	U	2	2
48	3	2	U	2	2	3	U	1	U	2	3
51	20	4	U	9	4	U	9	4-5	3	9	3
52	1	1	U	1	1	2	U	1	U	1	3
54	1	1	U	2	2	U	U	1	U	1	1
55	3	2	2	2	2	U	U	2	5	2	3
60	2	2	U	2	U	1	U	U	U	U	2
61	1	1	U	4	4	3	3	2	4	4	4
64	3	3	U	3	3	3	3	3	3	3	3
	SETAL CHARACTER STATES										
65	2	2	U	1	2	2	1	1	U	1	2
66	2	2	U	1	1	1	1	2	U	2	2
74	1	U	U	U	U	1	1	U	U	2	U
76	1	12	1	4	1	1	1	1	U	1	4
78	1	U	U	U	U	1	1	U	U	2	U

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 21,2; 22,–; 30,1; 33,2; 53,1; 56,–; 57,2; 58,–; 59,–; 69,1; 70,2; 71,2; 72,2; 73,2; 75,1; 77,2; 79,2; 81,1; 82,1.

Species listed: 35 *E. bucciensis;* 44 *E. collini;* 45 *E. complanata;* 51 *E. denticulata;* 66 *E. flavapunctata;* 112 *E. magnifica;* 138 *E. notata;* 147 *E. parvibranchis;* 148 *E. paupera;* 154 *E. perimensis;* 182 *E. spongicola.*

TABLE 40.—Comparison of abranchiate *Eunice* species. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	34	37	50	73	75	88	203
	SOFT BODY CHARACTER STATES						
7	1	2	3	3	3	3	3
8	2	2	2	1	1	2	1
9	2	2	1	3	2	3	3
10	1	1	2	1	1	1	2
11	2	2	1	2	2	2	1
12	2	2	1	2	U	2	2
14	U	2	3	U	2	2	3
15	3	1	3	3	1	1	1
16	1	3	3	1	3	1	1
20	3	3	3	2	3	2	3
21	1	2	1	1	2	2	2
22	1	-	3	1	-	-	-
24	1	2	2	1	U	2	2
25	1	3	3	1	4	4	3
26	2	3	3	4	2	2	2
28	2	5	2	2	5	2	1
43	2-3	2-3	14	1	13	2	3
48	2	2	2	2	3	2	3
51	7	4-5	11	9	9	9	4
54	2	2	1	1	1	1	2
55	2	3	2	2	1	1	4
57	2	2	2	2	2	1	2
58	-	-	-	-	-	1	-
59	-	-	-	-	-	2	-
60	1	3	1	1	2	-	3
61	2	3	4	3	1	3	3
64	3	3	3	3	3	3	3
	SETAL CHARACTER STATES						
65	2	2	2	2	2	2	1
66	2	1	1	2	1	1	2

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Species listed: 34 *E. brevis;* 37 *E. cariboea;* 50 *E. curticirris;* 73 *E. fuscafasciata;* 75 *E. goodei;* 88 *E. imogena;* 203 *E. wasinensis.*

TABLE 41.—Comparison of *Eunice* species in group C-1. Column heads are the same as character numbers used to prepare the key (see explanation below; for a complete listing of all characters and character states see Appendix A).

Species	1	2	3	5	35	36	80
6 *E. americana*	123	86	2	9	3	35	25
16 *E. arenosa*	79	16	0.75	2.5	3	25/26	16
20 *E. atlantica*	U	U	2	U	3	U	U
21 *E. aucklandica*	79	18	1	3.2	8	21	18
22 *E. australis*	109	70	4	9	7	33	31
27 *E. bicirrata*	U	U	1	U	3	48	45
38 *E. cedroensis*	U	U	2	3	3	27	17
46 *E. congesta*	U	U	4	6	7	47	33
60 *E. eugeniae*	U	U	1	4	4	44	18
65 *E. flaccida*	U	U	2.5	8.5	7	U	27
67 *E. flavocuprea*	U	17	1	2	4	34	17
90 *E. indica*	U	U	2	4	3	21	18
91 *E. interrupta*	U	U	2	9	5-7	24-26	24-27
96 *E. kerguelensis*	U	U	0.3	1.2	3	U	19
105 *E. limosa*	81-106	32-65	2	U	3	36	U
117 *E. marovoi*	65	14.5	1	2.5	3	17-22	17-19
119 *E. medicina*	79	29	1.3	5	3	26	17
125 *E. mucronata*	116	58	4	8	3	34	18-22
126 *E. multicylindri*	115	45	1	3.5	3	40	27
128 *E. murrayi*	101	37	4	7	5	28	17
145 *E. papeetensis*	U	U	2	2.5	6	30/33	21
206 *E. parva*	59	17	0.75	4	5	20	24
152 *E. pellucida*	U	U	2	3.5	5	28	21/23
161 *E. prayensis*	U	U	2	4.5	5	33	18
172 *E. rubrivittata*	U	U	1.2	5.1	3	56	31
186 *E. tentaculata*	U	U	U	U	6	28	23
197 *E. unifrons*	U	U	1	5	3	45-54	25-31
201 *E. vittata*	73	23.5	2	4	3	23	20-22
202 *E. vittatopsis*	U	U	2.5	6	3	U	39
205 *E. woodwardi*	U	U	5	7	3	39	31

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column heads:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 42.—Comparison of *Eunice* species of group C-1 with cylindrical articulations in the ceratostyles. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	6	16	20	21	38	67	90	119	126	161	172	186	197	201	205
	SOFT BODY CHARACTER STATES														
7	1	3	3	3	1	2	3	2	3	3	3	3	3	3	3
8	1	2	2	2	1	2	2	2	3	3	2	U	1	1	2
9	2	2	2	3	2	2	2	2	3	2	2	2	1	1	3
10	1	2	1	1	2	1	1	1	1	1	2	U	1	1	1
11	2	1	U	2	1	2	1	2	2	1	2	U	2	2	1
12	2	2	U	2	2	2	1	1	2	2	1	U	2	2	2
14	2	U	U	2	2	U	2	2	4	3	U	U	U	2	U
15	3	1	U	1	1	1	1	1	1	1	1	U	1	1	1
16	1	1	U	1	1	1	2	1	3	1	1	U	2	1	2
18	3	3	3	3	3	3	3	3	3	1	3	3	3	3	3
20	1	3	1	3	1	3	1	3	3	U	3	U	3	3	3
23	1	2	2	2	1	2	2	U	1	U	1	2	1	2	2
25	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3
26	2	1	2	3	2	2	2	2	2	1	1	3	2	2	2
27	2	2	2	1	2	1	2	2	1-2	U	U	2	1	2	1
28	3	1	1	1	1	5	1	2	1	U	U	1	2	1	2
29	2	1	1	2	2	2	1	1	1	U	U	1	2	1	2
31	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
32	1	1	U	1	1	1	1	U	1	1	3	U	1	2	1
34	1	1	U	-	1	1	1	1	1	1	2	1	1	1	1
39	0	5	1	U	2	5	1	5	2	1	6	1	4	0	0
40	2	2-3	U	U	3	10	0	0	10-15	0	11	1	10	1	4-5
41	20	5	5	2	10	4	8	7	4	9	5	9	5	12	12
42	10	15	U	U	10	15	U	U	U	12	25	U	15	12	15
43	1	1	U	2-3	1	U	2	1-2	1-2	1	2/4	U	3	3	1
44	2	2	U	2	3	U	2	3	2	2	2	U	2	3	2
45	2	2	U	2	2	U	2	2	2	2	1	U	2	2	2
48	2	2	U	2	2	U	2	1	2	2	1	U	2	3	2
51	5	4	U	5	5	4	2	2	5-6	2	5-6	U	5	4	3
52	3	1	U	1	1	U	1	3	1	1	3	U	1	1	1
55	3	2	U	2	2	1	2	3	2	2	3	U	3	2	2
60	2	2	1	1	U	U	1	2	1	1	1	U	1	1	1
61	2	3	U	1	3	2	2	4	1	1	3	U	1	1	2
64	1	3	U	3	1	3	3	2	3	3	2	U	1	3	3
	SETAL CHARACTER STATES														
65	2	U	U	2	2	U	U	2	1	2	U	2	2	2	U
66	2	U	U	1	1	U	U	2	1	1	U	2	1	1	U
69	1	1	1	1-2	1	1	1	1	1	1	1	1/2	1	1	1
70	1	1	1	2	1	1	1	1	2	1	1	2	2	2	1
74	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
78	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
82	1	1	U	3	1	2	5	1	1	2	1	5	1	5	5

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparison: 13,1; 17,1; 19,2; 21,1; 22,1; 24,2; 30,1; 33,2; 37,2; 38,2; 53,1; 54,1; 56,–; 57,2; 58,–; 59,–; 71,2; 72,2; 73,1; 75,1; 76,1; 77,1; 79,1; 81,1.

Species listed: 6 *E. americana;* 16 *E. arenosa;* 20 *E. atlantica;* 21 *E. aucklandica;* 38 *E. cedroensis;* 67 *E. flavocuprea;* 90 *E. indica;* 119 *E. medicina;* 126 *E. multicylindri;* 161 *E. prayensis;* 172 *E. rubrivittata;* 186 *E. tentaculata;* 197 *E. unifrons;* 201 *E. vittata;* 205 *E. woodwardi.*

TABLE 43.—Comparison of *Eunice* species in group C-1 with distally drop-shaped or moniliform articulations in the ceratostyles. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	22	27	96	105	161	202
	SOFT BODY CHARACTER STATES					
7	3	U	3	3	3	2
8	2	U	1	U	3	1
9	3	U	2	2	2	2
10	1	U	2	U	1	1
11	1	U	1	U	1	2
12	2	U	2	U	2	1
18	3	U	3	3	1	3
20	1	3	3	3	U	1
23	2	2	1	2	U	1
24	2	U	1	U	2	2
25	3	U	4	4	4	4
26	3	U	2	2	1	3
27	1	2	1	1	U	3
28	2	U	2	2	U	1
29	1	U	2	2	U	1
31	1	2	1	1	1	1
32	1	U	2	1	1	1
34	1	U	-	1	1	1
39	0	U	U	U	1	2
40	2	U	U	U	0	U
41	8	U	2	12	9	10
42	10	U	U	U	12	U
43	1-2	U	2	U	1	2
51	6	U	3	U	2	4
52	3	U	1	U	1	1
55	2	U	2	U	2	3
60	2	U	U	U	1	2
61	4	U	1	4	1	2
64	2	U	3	3	3	1
	SETAL CHARACTER STATES					
66	2	U	1	U	1	1
70	2	2	2	1	1	2
82	1	U	1	U	2	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 13,1; 14,3; 15,1; 16,1; 17,1; 19,2; 21,1; 22,2; 30,1; 33,2; 37,2; 38,2; 45,2; 48,2; 53,1; 54,1; 56,-; 57,2; 58,-; 59,-; 65,2; 69,1; 71,2; 72,2; 73,1; 74,2; 75,1; 76,1; 77,1; 78,2; 79,3; 81,1.

Species listed: 22 *E. australis;* 27 *E. bicirrata;* 96 *E. kerguelensis;* 105 *E. limosa;* 161 *E. prayensis;* 202 *E. vittatopsis.*

TABLE 44.—Comparison of *Eunice* species of group C-1 with moniliform articulations in the ceratostyles. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	65	91	128	145	152	161	206
	SOFT BODY CHARACTER STATES						
8	1	2	1	3	1	3	1
9	2	3	2	2	2	2	2
11	2	2	2	2	2	1	2
12	2	2	2	1	2	2	2
13	U	1	U	1	2	1	1
14	U	1	U	2	-	3	4
16	1	1	1	3	1	1	1
18	3	1	3	3	3	1	3
20	1	1	1	1	3	U	1
23	2	1	U	2	2	U	2
24	1	1	2	2	2	2	2
25	2	2	3	3	3	4	3
26	5	5	3	5	4	1	2
27	1	1	1	1	1	U	1
28	2	1	2	1	1	U	1
31	1	2	1	2	1	1	1
32	3	3	1	U	U	1	1
33	U	1-2	2	2	2	2	1
34	1	-	1	-	1	1	1
37	U	1-2	1	2	2	2	2
38	U	1	2	2	2	2	2
39	0	U	2	2	U	1	2
40	U	U	5	5	U	0	2
41	9	3	9	3	8	9	4
42	12	U	10	U	U	12	10
43	2	2	1	2	2	1	2
44	3	2	2	2	2	2	3
51	-	6	4	3	4	2	4
52	1	1	3	1	1	1	1
53	2	1	1	1	1	1	1
54	-	1	1	1	1	1	1
55	-	2	3	2	3	2	2
56	2	-	-	-	-	-	-
60	U	2	2	U	2	1	2
61	2	4	2	1	2	1	3
64	3	1	2	2	3	3	2
	SETAL CHARACTER STATES						
66	1	U	U	2	1	1	U
70	2	2	2	2	2	1	2
74	2	2	1	2	2	2	2
76	1	1	1	3	4	1	1
79	4	3	3	3	3	3	3
82	1	1	U	U	1	2	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 7,3; 10,1; 15,1; 17,1; 19,2; 21,1; 22,3; 29,1; 30,1; 45,2; 48,2; 57,2; 58,-; 59,-; 65,2; 69,1; 71,2; 72,2; 73,1; 75,1; 77,1; 78,2; 81,1.

Species listed: 65 *E. flaccida;* 91 *E. interrupta;* 128 *E. murrayi;* 145 *E. papeetensis;* 152 *E. pellucida;* 161 *E. prayensis;* 206 *E. parva.*

TABLE 45.—Comparison of *Eunice* species in group C-1 without antennal articulations. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	46	60	117	125	161
	SOFT BODY CHARACTER STATES				
8	2	1	1	1	3
9	2	2	1	2	2
10	1	2	1	1	1
11	2	1	2	2	1
12	2	2	2	1	2
13	1	2	1	1	1
14	3	-	3	2	3
16	U	1	1	2	1
17	U	4	1	1	U
18	3	3	3	3	1
20	3	1	1	1	U
26	2	1	2	2	1
27	U	1	1	3	U
28	U	2	2	1	U
29	U	2	1	2	U
32	1	2	1	1	1
39	1	4	0	2	1
40	0	2-3	1	0	0
41	18	5	6	15	9
42	U	U	U	U	12
43	3	1-2	2	1-2	1
44	3	2	3	3	2
48	1	2	2	2	2
51	7-8	3	2	3	2
55	1	2	3	2	2
57	2	2	1	2	2
58	-	-	1	-	-
59	-	-	3	-	-
60	1	2	-	1	1
61	3	1	1	3	1
	SETAL CHARACTER STATES				
66	2	2	U	2	1
82	1	1	5	1	2

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparisons: 7,3; 15,1; 19,2; 21,2; 22,-; 23,2; 24,2; 25,4; 30,1; 31,1; 33,2; 34,1; 37,2; 38,2; 45,2; 52,1; 53,1; 54,1; 56,-; 64,3; 65,2; 69,1; 70,1; 71,2; 72,2; 73,1; 74,2; 75,1; 76,1; 77,1; 78,2; 79,3; 81,1.

Species listed: 46 *E. congesta;* 60 *E. eugeniae;* 117 *E. marovoi;* 125 *E. mucronata;* 161 *E. prayensis.*

TABLE 46.—Comparison of of *Eunice* species in group C-2. The column numbers are the same as the character numbers used to prepare the key (see explanation below; for a complete listing of all characters and character states see Appendix A).

	Species	1	2	3	5	35	36	80
2	*aedificatrix*	270	128	4	7	4	250	35
3	*aequabilis*	158	175	7	16	6	151	26/32
12	*antennata*	98	54	3	7	7	92	25
24	*bassensis*	U	U	U	U	U	U	U
27	*bicirrata*	U	U	1	U	3	48	45
32	*bottae*	U	U	2	7	6	U	25
59	*elseyi*	120	64	7	13	6	104	30
65	*flaccida*	U	U	2.5	8.5	7	U	27
77	*gracilis*	81	66	2	6	4-5	81	28
84	*havaica*	78	25	1	4	6	78	19-23
87	*hirschi*	112	55	3	7	4	102	22/25
91	*interrupta*	U	U	3	9	5-7	U	24-27
96	*kerguelensis*	U	U	0.3	1.2	3	U	19
109	*lucei*	U	U	3	5.5	5	168	24-34
113	*makemoana*	92	20	1	3.5	7	86	28
116	*margaritacea*	95	14	U	U	6	95	U
118	*martensi*	168	220	6	14	6	163	28
139	*oliga*	82	16.5	2	U	5	82	U
140	*ornata*	110	45	2	6	5	110	22-25
144	*panamena*	U	U	3.5	6	5	U	27
171	*rubra*	U	U	3	7.5	4	U	27
184	*stigmatura*	U	U	2	4	3	110-126	7-35
191	*torresiensis*	72	47	3	6.5	5	70	24

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column numbers:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 47.—Comparison of *Eunice* species of group C-2 with all notopodial cirri articulated. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	12	24	27	32	59	91	109	113	116	118	139	171	191
	SOFT BODY CHARACTER STATES												
7	3	U	U	3	3	3	3	3	U	U	3	2	3
8	2	U	U	2	1	2	1	1	U	U	3	2	1
9	3	U	U	2	3	3	3	U	U	2	3	2	3
10	1	U	U	1	1	1	1	1	U	1	U	2	1
12	2	U	U	2	1	2	1	U	U	U	U	2	2
14	2	U	U	U	U	1	2	2	U	3	U	3	3
15	1	U	U	1	1	1	1	U	U	U	U	1	3
16	1	U	U	U	1	1	2	U	U	U	U	1	2
18	3	U	U	3	2	1	3	3	U	3	3	3	1
20	1	U	3	3	1	1	1	U	U	3	1	3	1
22	3	U	2	3	3	3	2	3	3	1	3	3	3
23	2	U	2	U	2	1	1	2	U	U	2	U	2
24	1	U	U	1	2	1	1	U	2	2	U	2	2
25	3	U	U	4	3	2	4	U	U	3	3	3	3
26	3	U	U	5	4	5	4	U	U	3	U	3	3
27	1	U	2	1	1	1	2	U	2	2	2	1	1
28	1	U	U	1	1	1	4	U	U	2	1	1	1
31	1	1	2	1	1	2	1	3	1	1	2	1	1
32	1	1	U	1	1	3	1	1	U	1	U	1	1
33	1	1	U	U	2	1-2	2	-	1	2	1	2	1
34	1	1	U	1	1	-	1	-	1	1	-	1	2
37	1	1	U	1	1	1-2	1	1	1	1	1	1	1
39	0	U	U	0	0	U	1	-	U	0	1	0	1
40	3	U	U	U	0	U	U	-	U	0	1	U	0
41	7	9	U	8	18	3	8	-	5	16	3	21	7
42	U	U	U	15	U	U	U	-	10	15	12	15	15
43	1	1	U	1-2	1	2	2	2	U	1-2	1	2	1
44	2	2	U	3	2	2	3	U	U	2	U	2	2
51	4	U	U	U	5	6	4	U	U	U	U	3	4
52	1	U	U	1	1	1	1	1	1	1	U	1	3
54	1	U	U	1	1	1	2	U	1	1	U	1	1
55	3	U	U	3	3	2	1	U	U	2	U	2	3
57	2	2	U	2	1	2	2	2	1	2	2	2	2
60	2	2	U	2	2	2	1	1	-	1	U	4	2
61	1	U	U	1	1	4	1	2	U	1	3	1	4
	SETAL CHARACTER STATES												
66	2	U	U	U	2	U	1	1	2	2	1	1	U
69	1	1	1	2	2	1	1	1	2	2	1	1	1
70	2	2	2	2	2	2	1-2	2	2	2	2	2	2
76	1	1	1	1	5	1	4-5	1/4	1	1	1	15	1
78	2	2	U	2	2	2	2	2	2	1	2	2	2
79	3	3	3	3	4	3	3	3	3	3	3	3	3
82	1	U	U	1	1	1	1	U	U	1	U	2	1

U = feature is unknown; dash (–) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 11,2; 13,1; 17,1; 19,2; 21,1; 29,1; 30,1; 38,1; 45,2; 48,2; 53,1; 56,–; 58,–; 59,–; 64,1; 65,2; 81,1.

Species listed: 12 *E. antennata;* 24 *E. bassensis;* 27 *E. bicirrata;* 32 *E. bottae;* 59 *E. elseyi;* 91 *E. interrupta;* 109 *E. lucei;* 113 *E. makemoana;* 116 *E. margariticacea;* 118 *E. martensi;* 139 *E. oliga;* 171 *E. rubra;* 191 *E. torresiensis.*

TABLE 48.—Comparison of *Eunice* species in group C-2 with articulations of the notopodia limited to the anterior end. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	27	84	87	140	144	184
	SOFT BODY CHARACTER STATES					
7	U	2	1	3	3	3
8	U	2	2	1	2	1
9	U	2	3	3	3	2
11	U	1	2	2	2	2
12	U	1	2	1	2	1
14	U	2	U	3	2	2
16	U	1	1	1	3	1
17	U	1	3	1	3	1
20	3	1	1	1	2	3
22	2	3	3	3	3	1
23	2	2	2	2	1	1
24	U	2	1	1	2	2
25	U	4	3	3	3	4
26	U	3	3	3	4	2
27	2	1	2	1-2	1	2
28	U	1	1	1	1	2
31	2	1	1	1	1	1
32	U	2	3	1	3	2
33	U	1	2	1-2	2	2
39	U	U	1	1	1	4
40	U	U	7	0	U	11
41	U	5	7	20	8	4
42	U	20	10	U	15	15
43	U	1	2	2	1	1
44	U	2	2	2	2	3
48	U	2	2	3	2	2
51	U	4	4	9	3	6
52	U	3	1	1	1	1
55	U	2	2	3	1/3	2
60	U	1	1	2	U	2
61	U	3	1	3	1	3
64	U	2	1	2	2	2
	SETAL CHARACTER STATES					
65	U	2	2	1	2	2
66	U	1	2	1	1	1
69	1	1/2	1	1	1	1
76	1	1	1	1/5	4	1
79	3	3	3	3	3	2-3

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states for characters not included in the comparisons: 10,1; 13,1; 15,1; 18,3; 19,2; 21,1; 29,1; 30,1; 34,1; 37,1; 38,1; 45,2; 53,1; 54,1; 56,–; 57,2; 58,–; 59,–; 70,2; 71,2; 72,2; 73,1; 74,2; 75,1; 77,1; 78,2; 81,1; 82,1.

Species listed: 27 *E. bicirrata;* 77 *E. gracilis;* 84 *E. havaica;* 128 *E. murrayi;* 140 *E. ornata;* 144 *E. panamena;* 184 *E. stigmatura.*

TABLE 49.—*Eunice* species of group C-2 without articulated notopodial cirri. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	2	3	27	65	96
	SOFT BODY CHARACTER STATES				
7	3	2	U	3	3
8	1	2	U	1	1
9	3	2	U	2	2
10	1	1	U	1	2
11	2	2	U	2	1
12	1	2	U	2	2
13	1	2	U	U	1
14	2	-	U	U	3
16	1	2	U	1	1
20	1	1	3	1	3
22	3	1	2	3	2
23	2	2	2	2	1
24	1	2	U	1	1
25	4	3	U	2	4
26	2	5	U	5	2
27	2	1	2	1	1
28	4	1	U	2	2
29	1	1	U	1	2
31	1	1	2	1	1
32	1	1	U	3	2
34	1	1	U	1	-
37	1	1	U	U	2
38	1	1	U	U	2
39	10	0	U	0	U
40	10	0	U	U	U
41	11	17	U	9	2
42	15	20	U	12	U
43	1-2	1	U	2	2
44	2	3	U	3	2
53	1	1	U	2	1
54	1	1	U	-	1
55	2	2	U	-	2
56	-	-	U	2	-
61	1	1	U	2	1
64	3	3	U	3	3
	SETAL CHARACTER STATES				
65	1	2	U	2	U
69	1	2	1	1	1
76	1/4	3/5	1	1	1
79	3	3	3	4	3

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 15,1; 17,1; 18,3; 19,2; 21,1; 30,1; 33,2; 45,2; 48,2; 51,3; 52,1; 57,2; 58,–; 59,–; 60,1; 64,3; 66,1; 70,2; 71,2; 72,2; 73,1; 74,2; 75,1; 77,1; 78,2; 81,1; 82,1.

Species listed: 2 *E. aedificatrix;* 3 *E. aequabilis;* 27 *E. bicirrata;* 65 *E. flaccida;* 96 *E. kerguelensis.*

TABLE 50.—Comparison of *Eunice* species in group D. Column heads are the same as the character numbers used to prepare the key (see explanation below; for a complete listing of all characters and character states see Appendix A).

Species		1	2	3	5	35	36	80
72	*E. fucata*	250	195	5	10	5	170–180	U
110	*E. macrobranchia*	150	200	U	U	7–8	U	U
115	*E. marenzelleri*	U	U	5	11	28	U	38
178	*E. sebastiani*	706	1455	23	35	7–14	686	51/56
181	*E. sonorae*	586	345	6	14	41	530	54
196	*E. unidentata*	U	80–100	2–3	U	23	U	20–25

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column numbers:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 51.—Comparison of *Eunice* species in group D. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	72	110	115	178	181	196
	SOFT BODY CHARACTER STATES					
7	U	U	3	2	2	3
8	U	U	2	1	2	U
9	U	U	2	2	3	2
11	U	U	2	2	2	1
12	U	U	1	2	2	U
16	U	U	3	3	1	1
17	U	U	4	1	1	1
18	U	U	3	2	1	1
19	U	U	2	2	2	1
20	U	U	3	1	1	1
21	2	1	2	2	1	2
22	-	1	-	-	1	-
23	1	U	1	4	2	4
24	U	U	2	1	1	U
25	U	U	3	3	4	U
26	3	U	4	5	2	U
27	2	1	1	1	1	1
28	1	U	5	4	1	1
31	1	1	3	1	1	1
32	1	2	1	1	1	1
33	2	2	-	2	2	2
34	1	1	-	1	2	1
37	2	1	1	1	2	2
38	1	1	1	1	2	2
39	U	5	-	0	0	U
40	30	U	-	3	55	U
41	12	15–17	1	40	6	5
42	U	U	-	35	65	35
43	1	U	2	15	1–2	1
44	3	U	2	2	2	2
48	2	U	3	1	3	U
51	U	U	11	6–13	4	U
54	U	U	2	2	2	1

TABLE 51.—*Continued.*

C	72	110	115	178	181	196
	SOFT BODY CHARACTER STATES—*Continued.*					
55	U	U	2	4	2	2
57	2	U	2	1	1	U
58	-	U	-	2	2	U
59	-	U	-	4	2	U
60	2	U	1	-	-	U
61	1	U	2	1	2	U
	SETAL CHARACTER STATES					
65	U	U	2	1	-	2
66	U	1	2	1	-	2
67	1	U	2	2	2	2
68	2	1	2	1	2	2
74	1	U	U	2	1	1
75	1	U	1	1	2	1
79	1	1–2	1	1	1	1
82	U	U	1	5	1	U

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range.

Character states of characters not included in the comparison: 10,1; 13,1; 14,2; 15,1; 29,2; 30,1; 45,2; 52,1 53,1; 56,-; 64,3; 69;1; 70,2; 71,2; 72,2; 73,2; 76,1; 77,2; 78,1; 81,1.

Species listed: 72 *E. fucata;* 110 *E. macrobranchia;* 115 *E. marenzelleri;* 178 *E. sebastiani;* 181 *E. sonorae;* 196 *E. unidentata.*

TABLE 52.—Comparison of *Eunice* species with various unusual kinds of setae present. Comparisons should be made only between members of the same section of the table. The column numbers are the same as the character numbers used to prepare the key (for a full listing see Appendix A).

	Species	1	2	3	5	35	36	80
		PSEUDOCOMPOUND HOOKS PRESENT						
5	*E. afuerensis*	687	720	12	19	3	686	100
151	*E. pelamidis*	113	100	12	20	3	220	63
		COMPOUND SPINIGERS PRESENT						
89	*E. impexa*	U	U	5.5	11	22	U	60
194	*E. tubicola*	83	26.5	1.2	4	22/24	69	21
195	*E. tubifex*	U	U	2	7	17	U	29/32
		SUBACICULAR HOOKS WITH TEETH IN TANDEM PRESENT						
40	*E. cirrobranchiata*	U	U	3	6	22	U	17/24
59	*E. elseyi*	120	64	7	13	6	104	30
65	*E. flaccida*	U	U	2.5	8.5	7	U	27
168	*E. rosaurae*	142	152	4	18	3	48-55	32-38

U = feature is unknown. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations. Explanation of column numbers:

1 = Total number of setigers (complete specimens only).
2 = Total length in mm (complete specimens only).
3 = Maximum width in mm.
5 = Length through setiger 10 in mm.
35 = Branchiae first present from setiger number.
36 = Branchiae present through setiger number.
80 = Subacicular hooks first present from setiger number.

TABLE 53.—Comparison of *Eunice* species with various unusual setae. Comparisons should be made only between members of the same section of the table. Stub (C) gives character number; column heads give species number. Characters and character states are listed in Appendix A. Species are in order by number; corresponding species names are listed at the end of the table.

C	Pseudocompounds		Spinigers			Tandems			
	5	151	89	194	195	40	59	65	168
	SOFT BODY CHARACTER STATES								
7	3	2	3	3	3	3	3	3	2
8	1	2	2	2	3	3	1	1	2
9	3	2	2	2	3	2	3	2	3
11	2	U	2	2	1	2	2	2	2
12	1	U	1	1	2	2	1	2	2
14	U	2	2	U	2	2	U	U	3
15	3	U	1	1	1	1	1	1	1
16	1	U	1	1	3	1	1	1	1
18	3	3	3	3	3	3	2	3	3
20	1	1	1	3	3	3	1	1	2
21	1	1	1	2	2	1	1	1	1
22	2	3	1	-	-	1	3	3	2
23	4	1	2	4	1	4	2	2	1
24	1	U	1	2	1	1	2	1	2
25	3	3	3	3	1	1	3	2	1
26	3	3	3	4	4	9	4	5	3
28	3	1	2	2	4	1	1	2	3
29	2	1	2	2	2	2	1	1	2
31	1	1	2	3	1	2	1	1	3
32	1	1	1	2	1	1	1	3	3
33	2	2	2	-	2	2	2	U	2
34	1	1	2	-	2	-	1	1	-
35	3	3	22	22/24	17	22	6	7	3
36	686	220	U	69	U	U	104	U	48-55

TABLE 53.—*Continued.*

C	Pseudocompounds		Spinigers			Tandems			
	5	151	89	194	195	40	59	65	168
	SOFT BODY CHARACTER STATES—*Continued.*								
37	1	1	1	2	1	1	1	U	2
38	1	1	1	1	1	1	1	U	2
39	0	0	10	-	U	U	0	0	-
40	0	0	U	-	U	U	0	U	-
41	25	24	7	-	4	2	18	9	-
42	U	20	U	-	30	U	U	12	-
43	2	3	2	3	1	14	1	2	1-2
44	2	2	3	2	3	2	2	3	1-2
45	2	2	3	2	2	2	2	2	1
48	2	2	2	2	3	2	2	2	1
51	3	9	4	5	5	4	5	-	5
52	1	1	1	1	1	3	1	1	3
53	1	1	1	1	1	1	1	2	1
54	2	1	2	2	2	2	1	-	1
55	2	2	1	1	1	1	3	-	2
56	-	-	-	-	-	-	-	2	-
57	1	2	1	1	1	1	1	U	1
58	2	-	2	2	2	2	-	U	2
59	2	-	2	1	1	1	-	U	3
60	-	1	-	-	-	-	2	U	-
61	2	1	1	2	2	2	1	2	1
64	2	1	3	3	3	3	1	3	3
	SETAL CHARACTER STATES								
65	1	1	1	2	1	1	2	2	2
66	1	1	1	1	1	2	2	1	1
69	1	1	1	1	1	1	2	1	1
71	1	1	2	2	2	2	2	2	2
72	2	2	1	1	1	2	2	2	2
73	1	2	2	1	2	2	1	1	2
74	2	U	1	U	U	1	2	2	1
76	1	1	1	1	2	4	5	1	1
77	1	2	2	2	2	2	1	1	2
78	2	U	1	U	1	1	2	2	1
79	2	3	2-3	2	2	4	4	4	2/4
80	100	63	60	21	29/32	17/24	30	27	32-38
81	1	2	1	1	1	1	1	1	1
82	1	1	5	1	1	1	1	1	1

U = feature is unknown; dash (-) = character inappropriate. Numbers separated by a dash indicate a range; numbers separated by a slash indicate paired alternative observations.

Character states of characters not included in the comparisons: 10,1; 13,1; 17,1; 19,2; 27,1; 30,1; 56,-; 70,2; 75,1.

Species listed:

Pseudocompound hooks present: 5 *E. afuerensis;* 151 *E. pelamidis.*

Compound spinigers present: 89 *E. impexa;* 194 *E. tubicola;* 195 *E. tubifex.*

Subacicular hooks with teeth in tandem present: 40 *E. cirrobranchiata;* 59 *E. elseyi;* 65 *E. flaccida;* 168 *E. rosaurae.*

Appendix A

Character List for *Eunice*

1. number of setigers
2. total length (mm)
3. maximum width (mm)
4. first reached at at setiger
5. length through setiger 10 (mm)
6. width at setiger 10 (mm)
7. prostomial lobes
   1. frontally truncate
   2. frontally obliquely truncate
   3. frontally rounded
8. prostomial lobes
   1. dorsally inflated
   2. dorsally flattened
   3. dorsally excavate with thickened rim
9. median sulcus
   1. median sulcus invisible dorsally
   2. median sulcus shallow
   3. median sulcus deep
10. prostomium
    1. distinctly shorter than peristomium
    2. about as long as peristomium
11. prostomium
    1. about as wide as peristomium
    2. distinctly narrower than peristomium
12. prostomium
    1. less than $^1/_2$ as deep as peristomium
    2. at least as deep as $^1/_2$ of peristomium
13. eyes
    1. present
    2. absent
14. eyes
    1. lateral to the bases of A-I
    2. behind bases of A-I
    3. between bases of A-I and A-II
    4. behind bases of A-II
    5. on ceratophores of A-I
    6. on ceratophores of A-II
15. antennae in a
    1. horseshoe
    2. semicircle
    3. transverse row
16. antennae
    1. evenly spaced
    2. with A-I isolated by a gap
    3. with A-III isolated by a gap
17. antennae
    1. similar in thickness
    2. with A-I slimmer than other 3
    3. with A-III slimmer than other 4
    4. with A-I thicker than other 3
    5. with A-II thicker than other 3
    6. with A-III thicker than other 4
18. ceratophores
    1. long in all antennae
    2. long in A-I and ring-shaped in other 3
    3. ring-shaped in all antennae
19. ceratophores
    1. articulated
    2. without articulations
20. ceratostyles
    1. tapering
    2. medially inflated
    3. digitiform
    4. club-shaped
21. ceratostyles
    1. articulated
    2. without articulations
22. ceratostyle articulations
    1. long or short cylinders
    2. moniliform or drop-shaped distally
    3. moniliform
23. length of
    1. A-II and III similar and A-I shorter
    2. antennae increasing from A-I to A-III
    3. A-II greater than A-I and A-III
    4. all antennae similar (short)
24. peristomium
    1. with distinct, muscular lower lip
    2. cylindrical
25. separation between peristomial rings
    1. visible dorsally only
    2. visible ventrally only
    3. visible both dorsally and ventrally
    4. present on all sides
    5. absent
26. anterior ring makes up
    1. $^1/_2$ of total peristomial length
    2. $^2/_3$ of total peristomial length
    3. $^3/_4$ of total peristomial length
    4. $^4/_5$ of total peristomial length
    5. $^5/_6$ of total peristomial length
    6. $^6/_7$ of total peristomial length
    7. $^7/_8$ of total peristomial length
    8. $^8/_9$ of total peristomial length
    9. $^9/_{10}$ of total peristomial length
27. peristomial cirri reach
    1. middle or anterior end of peristomium
    2. middle or front of prostomium
    3. beyond prostomium
28. peristomial cirri
    1. tapering
    2. digitiform
    3. medially inflated
    4. basally inflated

5. ovate
29. peristomial cirri
1. articulated
2. without articulations
30. branchiae
1. present
2. absent
31. branchiae
1. pectinate
2. palmate
3. single filaments
32. branchiae
1. distinctly longer than notopodial cirri
2. about as long as notopodial cirri
3. distinctly shorter than notopodial cirri
33. branchiae
1. reduced in mid-body region
2. not reduced in mid-body region
34. branchial stems
1. erect
2. flexible
35. branchiae from setiger
to setiger
36. to setiger
37. branchiae
1. present to near posterior end
2. terminating well before posterior end
38. branchiae present on
1. more than 65% of total number of setigers
2. less than 55% of total number of setigers
39. number of anterior setigers with single branchial filaments
40. number of posterior setigers with single branchial filaments
41. maximum number of filaments
42. maximum number of filaments first reached in setiger number
43. median acicular lobes
1. distally truncate
2. distally rounded
3. triangular or conical
4. withdrawn into body wall
5. bilobed
44. median acicular lobes with
1. acicula emerging ventral to midline
2. acicula emerging at midline
3. acicula emerging dorsal to midline
45. anterior presetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
46. median presetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
47. posterior presetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
48. anterior postsetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
49. median postsetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
50. posterior postsetal lobes
1. follow outline of acicular lobes closely
2. form low transverse folds
3. project as free lobes
51. number of anterior setigers with ventral cirri without inflatior
52. anterior ventral cirri
1. tapering from narrow bases
2. tapering from wide, triangular bases
3. digitiform
53. median ventral cirri
1. basally inflated
2. without basal inflations
54. bases of median inflated ventral cirri
1. inflated bases ovate or spherical
2. inflated bases thick, transverse welts
3. inflated bases scoop-shaped
55. median inflated ventral cirri
1. narrow tips short and button-shaped
2. narrow tips tapering
3. narrow tips digitiform
4. narrow tips absent
56. median ventral cirri
1. tapering
2. digitiform
57. posterior ventral cirri
1. basally inflated
2. without basal inflation
58. bases of posterior inflated ventral cirri
1. inflated bases ovate or spherical
2. inflated bases thick, transverse welts
3. inflated bases triangular welts
4. inflated bases scoop-shaped
59. posterior inflated ventral cirri
1. narrow tips short and button-shaped
2. narrow tips tapering
3. narrow tips digitiform
4. narrow tips absent
60. posterior ventral cirri
1. tapering
2. digitiform
3. short, nearly tubercular
4. broadly triangular, nearly scoop-shaped
61. anterior notopodial cirri
1. basally inflated
2. medially inflated
3. tapering
4. digitiform
5. clavate
62. median notopodial cirri
1. basally inflated
2. medially inflated
3. tapering
4. digitiform
5. clavate
63. posterior notopodial cirri
1. basally inflated
2. medially inflated
3. tapering

4. digitiform
5. clavate

64. notopodial cirri
1. articulated throughout body
2. articulated in anterior setigers
3. without articulations

65. anterior pectinate setae
1. distally furled
2. distally flat

66. anterior pectinate setae
1. tapering
2. flaring

67. median and posterior pectinate setae
1. distally furled
2. distally flat

68. median and posterior pectinate setae
1. tapering
2. flaring

69. appendages of compound falcigers distally
1. bidentate
2. tridentate

70. hoods of compound falcigers distally
1. mucronate
2. without mucros

71. pseudocompound falcigers
1. present
2. absent

72. compound spinigers
1. present
2. absent

73. aciculae
1. light yellow or translucent
2. dark honey-colored to black

74. separation of acicular cores and sheaths
1. distinct
2. indistinct

75. cross-section of aciculae
1. round
2. flattened or knife-edged

76. aciculae distally
1. pointed (sharp or blunt)
2. flattened with rounded tabs
3. expanded, knurled and knobbed
4. hammer-headed
5. bifid (bidentate)

77. subacicular hooks
1. light yellow or translucent
2. dark honey-colored to black

78. separation of cores and sheaths
1. distinct
2. indistinct

79. hooks
1. tapering to simple falcate tips
2. bidentate
3. tridentate with teeth in a crest
4. tridentate with teeth in tandem

80. hooks first present from setiger in

81. hooks
1. present in all setigers posteriad
2. missing in a some setigers
3. missing in many setigers

82. hooks
1. always single (except for replacements)
2. paired in some setigers
3. paired in most setigers
4. 3 or more in some setigers
5. 3 or more in most setigers

Appendix B

Characters and character states for each species of *Eunice* as set up for use with the DELTA program. (Numbers in column 1 (1.01, 1.02, etc.) are line-numbers for each character—the digit(s) preceding the decimal is also the species number used in centerheads and comparison tables; paired numbers = character, state for all 82 characters using the character list in Appendix A (dash = character inappropriate, U = feature unknown); numbers separated by a dash indicate a range, by a slash, paired alternate observations.)

1.01 *aciculata*
1.02 1,202 2,129 3,4.5 4,15 5,11 6,4 7,2 8,2 9,3 10,1 11,2
1.03 12,2 13,1 14,2 15,1 16,1 17,1 18,1 19,2 20,3 21,2 22,–
1.04 23,U 24,2 25,3 26,3 27,1 28,5 29,2 30,1 31,1 32,1 33,2
1.05 34,1 35,18 36,190 37,1 38,1 39,10 40,10 41,5 42,32 43,2
1.06 44,3 45,2 46,2 47,2 48,3 49,1 50,1 51,15–20 52,2 53,1
1.07 54,1 55,3 56,– 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3
1.08 65,2 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,2 75,1
1.09 76,1 77,2 78,2 79,2 80,22 81,1 82,1

2.01 *aedificatrix*
2.02 1,270 2,128 3,4 4,10 5,7 6,4 7,3 8,1 9,3 10,1 11,2 12,1
2.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
2.04 24,1 25,4 26,2 27,2 28,4 29,1 30,1 31,1 32,1 33,2 34,1
2.05 35,4 36,250 37,1 38,1 39,10 40,10 41,11 42,15 43,1–2 44,2
2.06 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2
2.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,4 64,3 65,1 66,1
2.08 67,1 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1/4 77,1
2.09 78,2 79,3 80,35 81,1 82,1

3.01 *aequabilis*
3.02 1,158 2,175 3,7 4,15 5,16 6,6 7,2 8,2 9,2 10,1 11,2 12,2
3.03 13,2 14,– 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,1 23,2
3.04 24,2 25,3 26,5 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
3.05 35,6 36,151 37,1 38,1 39,0 40,0 41,17 42,20 43,1 44,3 45,2
3.06 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,–
3.07 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,3 65,2 66,1 67,2
3.08 68,1 69,2 70,2 71,2 72,2 73,1 74,2 75,1 76,3/5 77,1 78,2
3.09 79,3 80,26/32 81,1 82,1

4.01 *afra*
4.02 1,U 2,U 3,6 4,U 5,10 6,U 7,3 8,1 9,3 10,1 11,1 12,2 13,1
4.03 14,2 15,1 16,1 17,3 18,3 19,2 20,3 21,1 22,1 23,1 24,1
4.04 25,3 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,16
4.05 36,U 37,1 38,1 39,0 40,U 41,6 42,30 43,2 44,2 45,2 46,2
4.06 47,2 48,2 49,2 50,2 51,5 52,2 53,1 54,3 55,2 56,– 57,2
4.07 58,– 59,– 60,1 61,1 62,2 63,4 64,3 65,1–2 66,2 67,2 68,2
4.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
4.09 80,22 81,1 82,1

5.01 *afuerensis*
5.02 1,687 2,720 3,12 4,15 5,19 6,10 7,3 8,1 9,3 10,1 11,2 12,1

5.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,4
5.04 24,1 25,3 26,3 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,1
5.05 35,3 36,686 37,1 38,1 39,0 40,0 41,25 42,U 43,2 44,2 45,2
5.06 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,2 55,2 56,–
5.07 57,1 58,2 59,2 60,– 61,2 62,2 63,2 64,2 65,1 66,1 67,1
5.08 68,2 69,1 70,2 71,1 72,2 73,1 74,2 75,1 76,1 77,1 78,2
5.09 79,2 80,100 81,1 82,1

6.01 *americana*
6.02 1,123 2,86 3,2 4,10 5,9 6,2 7,1 8,1 9,2 10,1 11,2 12,2
6.03 13,1 14,2 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1
6.04 24,2 25,3 26,2 27,2 28,3 29,2 30,1 31,1 32,1 33,2 34,1
6.05 35,3 36,35 37,2 38,2 39,0 40,2 41,20 42,10 43,1 44,2 45,2
6.06 46,2 47,2 48,2 49,2 50,2 51,5 52,3 53,1 54,1 55,3 56,–
6.07 57,2 58,– 59,– 60,2 61,2 62,2 63,4 64,1 65,2 66,2 67,2
6.08 68,2 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
6.09 79,3 80,25 81,1 82,1

7.01 *amoureuxi*
7.02 1,U 2,13 3,U 4,U 5,U 6,U 7,3 13,1 14,U 15,U 16,1 17,1 18,3
7.03 19,2 20,3 21,2 22,– 23,1 24,U 25,U 26,U 27,1 28,U 29,2
7.04 30,1 31,3 32,1 33,2 34,U 35,9 36,24 37,2 38,U 39,U 40,U
7.05 41,U 42,U 43,U 44,U 45,U 46,U 47,U 48,U 49,U 50,U 51,U
7.06 52,U 53,U 54,U 55,U 56,U 57,U 58,U 59,U 60,U 61,U 62,U
7.07 63,U 64,U 65,U 66,U 67,U 68,U 69,1 70,1 71,2 72,2 73,2
7.08 74,U 75,U 76,1 77,2 78,U 79,2 80,17 81,U 82,U

8.01 *amphiheliae*
8.02 1,140–150 2,180–200 3,7–10 4,U 5,U 6,U 7,1 8,2 9,3 10,1
8.03 11,2 12,U 13,2 14,– 15,3 16,U 17,1 18,3 19,2 20,1 21,1
8.04 22,1 23,4 24,2 25,4 26,5 27,1 28,1 29,2 30,1 31,1 32,1
8.05 33,2 34,1 35,4 36,140–150 37,1 38,1 39,U 40,U 41,7 42,U
8.06 43,2–3 44,2 45,2 46,2 47,2 48,2 49,2 50,2 52,1 53,U 54,U
8.07 55,U 56,U 57,U 58,U 59,U 60,U 61,3 62,3 63,3 64,3 65,U
8.08 66,U 67,U 68,U 69,1 70,1 71,2 72,2 73,2 74,U 75,U 76,1
8.09 77,2 78,U 79,2 80,U 81,U 82,U

9.01 *pruvoti*
9.02 1,115 2,34 3,3 4,U 5,5 6,U 7,1 8,2 9,3 10,1 11,2 12,1 13,1
9.03 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,4 24,1
9.04 25,3 26,4 27,1 28,1 29,2 30,1 31,3 32,U 33,U 34,– 35,15
9.05 36,115 37,1 38,1 39,– 40,– 41,– 42,– 43,2 44,2 45,2 46,2
9.06 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,2 56,– 57,2
9.07 58,– 59,– 60,1 61,1 62,4 63,4 64,3 65,2 66,2 67,2 68,2
9.08 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2 78,2 79,2
9.09 80,19 81,1 82,1

10.01 *annulicornis*
10.02 1,145 2,135 3,4 4,U 5,12.5 6,U 7,3 8,1 9,3 10,1 11,2 12,2
10.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
10.04 24,2 25,1 26,3 27,2 28,2 29,1 30,1 31,1 32,1 33,2 34,1
10.05 35,3 36,134 37,1 38,1 39,0 40,2–3 41,9 42,15 43,1 44,3
10.06 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1 55,3
10.07 56,– 57,2 58,– 59,– 60,2 61,1 62,1 63,1 64,1 65,2 66,2
10.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
10.09 78,U 79,2 80,35 81,1 82,1

11.01 *antarctica*
11.02 1,122 2,102 3,3.5 4,U 5,11 6,U 7,3 8,1 9,2 10,1 11,1 12,1
11.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
11.04 24,2 25,3 26,4 27,2 28,2 29,2 30,1 31,1 32,3 33,2 34,1
11.05 35,3 36,39–44 37,2 38,2 39,6–7 40,2 41,5 42,15 43,1 44,2
11.06 45,1 46,1 47,1 48,1 49,1 50,1 51,3 52,3 53,1 54,1 55,3
11.07 56,– 57,2 58,– 59,– 60,2 61,2 62,3 63,4 64,1 65,2 66,1
11.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
11.09 78,2 79,2 80,31–44 81,1 82,1

12.01 *antennata*
12.02 1,98 2,54 3,3 4,U 5,7 6,U 7,3 8,2 9,3 10,1 11,2 12,2 13,1
12.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2 24,1
12.04 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,1 34,1 35,7
12.05 36,92 37,1 38,1 39,0 40,3 41,7 42,U 43,1 44,2 45,2 46,2
12.06 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,3 56,– 57,2
12.07 58,– 59,– 60,2 61,1 62,1 63,1 64,1 65,2 66,2 67,2 68,2
12.08 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
12.09 80,25 81,1 82,1

13.01 *antillensis*
13.02 1,U 2,U 3,3 4,U 5,7 6,U 7,1 8,2 9,2 10,1 11,2 12,2 13,1
13.03 14,1 15,1 16,3 17,1 18,3 19,2 20,1 21,1 22,1 23,2 24,2
13.04 25,3 26,4 27,3 28,2 29,1 30,1 31,1 32,3 33,2 34,1 35,4
13.05 36,36 37,2 38,2 39,2 40,2 41,6 42,U 43,1 44,3 45,2 46,2
13.06 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,– 57,2
13.07 58,– 59,– 60,1 61,4 62,4 63,4 64,1 65,2 66,1 67,U 68,U
13.08 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,2 77,1 78,2
13.09 79,2 80,33 81,1 82,2

14.01 *aphroditois*
14.02 1,U 2,U 3,22 4,25 5,55 6,U 7,3 8,1 9,2 10,1 11,2 12,1
14.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,4
14.04 24,2 25,3 26,4 27,1 28,4 29,2 30,1 31,1 32,1 33,2 34,1
14.05 35,6 36,U 37,1 38,1 39,0 40,U 41,30 42,30 43,1–2 44,2
14.06 45,2 46,2 47,2 48,1 49,1 50,3 51,250 52,2 53,1 54,3 55,2
14.07 56,– 57,1 58,2 59,2 60,– 61,1 62,1 63,1 64,3 65,1 66,1
14.08 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
14.09 78,1 79,2 80,200 81,3 82,1

15.01 *arcturi*
15.02 1,110 2,80 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
15.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,U 22,U 23,U
15.04 24,U 25,U 26,U 27,U 28,U 29,U 30,1 31,U 32,U 33,U 34,U
15.05 35,6 36,42 37,2 38,2 39,U 40,U 41,10 42,U 43,U 44,U 45,U
15.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,U 54,U 55,U 56,U
15.07 57,U 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,U 66,U 67,U
15.08 68,U 69,U 70,U 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
15.09 79,2 80,36 81,U 82,U

16.01 *arenosa*
16.02 1,79 2,16 3,.75 4,10 5,2.5 6,.75 7,3 8,2 9,2 10,2 11,1
16.03 12,2 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1
16.04 23,2 24,2 25,4 26,1 27,2 28,1 29,1 30,1 31,1 32,1 33,2
16.05 34,1 35,3 36,25/26 37,2 38,2 39,5 40,2–3 41,5 42,15 43,1
16.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1

16.07 55,2 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,4 64,3 65,U
16.08 66,U 67,U 68,U 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1
16.09 77,1 78,1 79,3 80,16 81,1 82,1

17.01 *argentinensis*
17.02 1,U 2,U 3,5 4,10 5,12 6,5 7,3 8,2 9,3 10,1 11,2 12,2 13,2
17.03 14,– 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2 24,2
17.04 25,3 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1 35,3
17.05 36,U 37,1 38,1 39,0 40,U 41,10 42,10 43,1 44,3 45,2 46,2
17.06 47,2 48,2 49,2 50,2 51,3 52,3 53,1 54,1 55,2 56,– 57,U
17.07 58,U 59,U 60,U 61,2 62,2 63,U 64,1 65,2 66,1 67,2 68,1
17.08 69,1 70,2 71,2 72,2 73,2 74,U 75,2 76,1 77,2 78,U 79,2
17.09 80,19–22 81,1 82,1

18.01 *armillata*
18.02 1,114 2,46 3,2 4,15 5,6 6,1.75 7,3 8,1 9,3 10,1 11,2 12,1
18.03 13,U 14,U 15,3 16,1 17,1 18,1 19,2 20,1 21,1 22,3 23,2
18.04 24,2 25,4 26,4 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
18.05 35,6 36,109 37,1 38,1 39,1 40,U 41,3 42,U 43,1 44,3 45,2
18.06 46,2 47,2 48,3 49,2 50,2 51,5 52,3 53,1 54,1 55,2 56,–
18.07 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,2 65,2 66,2 67,2
18.08 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
18.09 79,2 80,34 81,1 82,1

19.01 *articulata*
19.02 1,U 2,U 3,3 4,U 5,U 6,U 7,1 8,2 9,3 10,1 11,2 12,1 13,1
19.03 14,1 15,3 16,1 17,6 18,3 19,2 20,1 21,1 22,2 23,2 24,2
19.04 25,1 26,3 27,3 28,2 29,1 30,1 31,1 32,1 33,2 34,1 35,4
19.05 36,55 37,2 38,2 39,1 40,2–3 41,6 42,15 43,U 44,U 45,U
19.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,–
19.07 57,2 58,– 59,– 60,2 61,4 62,3 63,3 64,2 65,2 66,1 67,2
19.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
19.09 79,2 80,40 81,1 82,1

20.01 *atlantica*
20.02 1,U 2,U 3,2 4,U 5,U 6,U 7,3 8,2 9,2 10,1 11,U 12,U 13,U
20.03 14,U 15,U 16,U 17,U 18,3 19,2 20,1 21,1 22,1 23,2 24,2
20.04 25,4 26,2 27,2 28,1 29,1 30,1 31,1 32,U 33,2 34,U 35,3
20.05 36,U 37,2 38,2 39,1 40,U 41,5 42,U 43,U 44,U 45,U 46,U
20.06 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,U 57,2
20.07 58,U 59,U 60,1 61,U 62,U 63,U 64,U 65,U 66,U 67,U 68,U
20.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
20.09 80,U 81,U 82,U

21.01 *aucklandica*
21.02 1,79 2,18 3,1 4,10 5,3.2 6,1 7,3 8,2 9,3 10,1 11,2 12,2
21.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1
21.04 23,2 24,2 25,4 26,3 27,1 28,1 29,2 30,1 31,2 32,1 33,2
21.05 34,– 35,8 36,21 37,2 38,2 39,U 40,U 41,2 42,U 43,2–3 44,2
21.06 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1 55,2
21.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,3 65,2 66,1
21.08 67,2 68,1 69,1–2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
21.09 78,2 79,3 80,18 81,1 82,3

22.01 *australis*
22.02 1,109 2,70 3,4 4,15 5,9 6,8.5 7,3 8,2 9,3 10,1 11,1 12,2
22.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2

22.04 24,2 25,3 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
22.05 35,7 36,33 37,2 38,2 39,0 40,2 41,8 42,10 43,1–2 44,2
22.06 45,2 46,2 47,2 48,2 49,2 50,2 51,6 52,3 53,1 54,1 55,2
22.07 56,– 57,2 58,– 59,– 60,2 61,4 62,1 63,3 64,2 65,2 66,2
22.08 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
22.09 78,2 79,3 80,31 81,1 82,1

23.01 *barvicensis*
23.02 1,U 2,U 3,3.5 4,10 5,6 6,3.5 7,3 8,2 9,3 10,1 11,1 12,1
23.03 13,1 14,3 15,1 16,1 17,1 18,1 19,2 20,1 21,2 22,– 23,2
23.04 24,2 25,3 26,3 27,1 28,1 29,2 30,1 31,1 32,2 33,2 34,1
23.05 35,6 36,65 37,2 38,2 39,3 40,10 41,4 42,25 43,2–3 44,2
23.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,1 55,3
23.07 56,– 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3 65,2 66,2
23.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
23.09 78,1 79,2 80,19 81,1 82,2

24.01 *bassensis*
24.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
24.03 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,U 22,U 23,U
24.04 24,U 25,U 26,U 27,U 28,U 29,U 30,1 31,1 32,1 33,1 34,1
24.05 35,U 36,U 37,1 39,U 40,0 41,9 42,U 43,1 44,2 45,U 46,U
24.06 47,2 48,U 49,U 50,2 51,U 52,U 53,U 54,U 55,U 56,U 57,2
24.07 58,– 59,– 60,2 61,U 62,U 63,3 64,1 65,U 66,U 67,U 68,U
24.08 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
24.09 80,U 81,U 82,U

25.01 *benedicti*
25.02 1,105 2,38 3,2.5 4,15 5,5 6,2 7,3 8,2 9,2 10,1 11,2 12,1
25.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2
25.04 24,2 25,4 26,2 27,2 28,2 29,2 30,1 31,1 32,1 33,2 34,2
25.05 35,3 36,39 37,2 38,2 39,3 40,0 41,12 42,15 43,3–4 44,3
25.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2 55,3
25.07 56,– 57,1 58,2 59,2 60,– 61,2 62,2 63,4 64,3 65,2 66,1
25.08 67,2 68,1 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
25.09 78,2 79,2 80,21 81,1 82,2

26.01 *biannulata*
26.02 1,139 2,105 3,3 4,15 5,12 6,2.75 7,1 8,2 9,3 10,1 11,1
26.03 12,2 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2
26.04 23,2 24,1 25,4 26,3 27,1 28,4 29,1 30,1 31,1 32,1 33,2
26.05 34,1 35,3 36,50 37,2 38,2 39,1 40,2–3 41,8 42,10 43,1–2
26.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1
26.07 55,3 56,– 57,2 58,– 59,– 60,2 61,2 62,2 63,2 64,2 65,1
26.08 66,1 67,1 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1
26.09 77,1 78,2 79,2 80,38 81,1 82,2

27.01 *bicirrata*
27.02 1,U 2,U 3,1 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
27.03 14,U 15,U 16,U 17,U 18,U 19,U 20,3 21,1 22,2 23,2 24,U
27.04 25,U 26,U 27,2 28,U 29,U 30,1 31,2 32,U 33,U 34,U 35,3
27.05 36,48 37,U 38,U 39,U 40,U 41,U 42,U 43,U 44,U 45,U 46,U
27.06 47,U 48,U 49,U 50,U 51,U 52,U 53,U 54,U 55,U 56,U 57,U
27.07 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,U 66,U 67,U 68,U
27.08 69,1 70,2 71,2 72,2 73,1 74,U 75,U 76,1 77,1 78,U 79,3
27.09 80,45 81,U 82,U

28.01 *biformicirrata*
28.02 1,137 2,217 3,7 4,15 5,17 6,6.5 7,3 8,1 9,3 10,1 11,2
28.03 12,1 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2
28.04 23,1 24,2 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,2
28.05 34,1 35,3 36,132 37,1 38,1 39,1 40,5 41,7 42,10 43,1–2
28.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,3 53,1 54,1
28.07 55,2 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,1 65,2
28.08 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1
28.09 77,2 78,U 79,2 80,27 81,1 82,1

29.01 *bilobata*
29.02 1,U 2,U 3,6 4,U 5,7 6,U 7,2 8,2 9,3 10,1 11,2 12,2 13,2
29.03 14,– 15,U 16,U U 18,3 19,2 20,3 21,1 22,1 23,U 24,1
29.04 25,3 26,9 27,2 28,2 29,2 30,1 31,1 32,3 33,2 34,2 35,7
29.05 36,U 37,1 38,1 39,0 40,U 41,18 42,U 43,2 44,3 45,2 46,2
29.06 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,– 57,U
29.07 58,U 59,U 60,U 61,1 62,3 63,3 64,1 65,2 66,1 67,2 68,1
29.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,3 77,2 78,U 79,2
29.09 80,25 81,1 82,1

30.01 *bipapillata*
30.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
30.03 14,U 15,U 16,U 17,U 18,U 19,U 20,3 21,1 22,1 23,4 24,U
30.04 25,U 26,U 27,U 28,U 29,U 30,1 31,1 32,3 33,2 34,U 35,4
30.05 36,U 37,1 38,1 39,U 40,U 41,4 42,8 43,1 44,3 45,2 46,2
30.06 47,2 48,2 49,2 50,2 51,U 52,U 53,1 54,1 55,3 56,– 57,2
30.07 58,– 59,– 60,2 61,1 62,1 63,1 64,3 65,2 66,2 67,2 68,2
30.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
30.09 80,U 81,U 82,U

31.01 *borneensis*
31.02 1,120 2,42 3,6 4,50 5,7 6,4.5 7,1 8,2 9,3 10,1 11,2 12,1
31.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1
31.04 24,2 25,3 26,6 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,2
31.05 35,6 36,120 37,1 38,1 39,0 40,10 41,8 42,15 43,1 44,3
31.06 45,2 46,2 47,2 48,3 49,3 50,3 51,4 52,1 53,1 54,2 55,1
31.07 56,– 57,1 58,2 59,1 60,– 61,1 62,1 63,1 64,3 65,2 66,2
31.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
31.09 78,U 79,2 80,30–35 81,1 82,4

32.01 *bottae*
32.02 1,U 2,U 3,2 4,40 5,7 6,1.75 7,3 8,2 9,2 10,1 11,2 12,2
32.03 13,U 14,U 15,1 16,U 17,1 18,3 19,2 20,3 21,1 22,3 23,U
32.04 24,1 25,4 26,5 27,1 28,1 29,1 30,1 31,1 32,1 33,U 34,1
32.05 35,6 36,U 37,1 38,1 39,0 40,U 41,8 42,15 43,1–2 44,3 45,2
32.06 46,2 47,U 48,2 49,2 50,U 51,U 52,1 53,1 54,1 55,3 56,–
32.07 57,2 58,– 59,– 60,2 61,1 62,3 63,U 64,1 65,U 66,U 67,U
32.08 68,U 69,2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
32.09 79,3 80,25 81,1 82,1

33.01 *bowerbanki*
33.02 1,142 2,95 3,7 4,20 5,11 6,6.5 7,3 8,1 9,3 10,1 11,2 12,1
33.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,1
33.04 24,1 25,3 26,6 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,2
33.05 35,5 36,136 37,1 38,1 39,0 40,60 41,15 42,12 43,3 44,2
33.06 45,2 46,2 47,2 48,3 49,2 50,2 51,– 52,3 53,2 54,– 55,–

33.07 56,2 57,2 58,– 59,– 60,2 61,1 62,3 63,4 64,2 65,2 66,1
33.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
33.09 78,U 79,2 80,31 81,1 82,2

34.01 *brevis*
34.02 1,130 2,18 3,1.5 4,10 5,2.5 6,1.5 7,1 8,2 9,2 10,1 11,2
34.03 12,2 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1
34.04 23,4 24,1 25,1 26,2 27,1 28,2 29,2 30,2 31,– 32,– 33,–
34.05 34,– 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,2–3 44,2
34.06 45,2 46,2 47,2 48,2 49,2 50,2 51,7 52,1 53,1 54,2 55,2
34.07 56,– 57,2 58,– 59,– 60,1 61,2 62,2 63,2 64,3 65,2 66,2
34.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
34.09 78,U 79,2 80,27 81,1 82,1

35.01 *bucciensis*
35.02 1,U 2,U 3,3.5 4,15 5,7.5 6,3.25 7,3 8,3 9,3 10,1 11,2
35.03 12,1 13,U 14,U 15,1 16,1 17,3 18,1 19,2 20,3 21,2 22,–
35.04 23,4 24,1 25,4 26,2 27,1 28,1 29,2 30,1 31,2 32,1 33,2
35.05 34,1 35,18 36,U 37,1 38,1 39,3 40,U 41,3 42,U 43,1–2 44,3
35.06 45,2 46,2 47,2 48,3 49,3 50,3 51,20 52,1 53,1 54,1 55,3
35.07 56,– 57,2 58,– 59,– 60,2 61,1 62,1 63,1 64,3 65,2 66,2
35.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
35.09 78,1 79,2 80,34 81,1 82,1

36.01 *caeca*
36.02 1,90 2,103 3,6 4,10 5,14 6,6 7,3 8,2 9,3 10,1 11,2 12,1
36.03 13,1 14,1 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,1 23,U
36.04 24,1 25,4 26,3 27,2 28,2 29,1 30,1 31,1 32,1 33,2 34,1
36.05 35,3 36,48 37,2 38,2 39,1 40,0 41,24 42,15 43,2 44,3 45,2
36.06 46,2 47,2 48,3 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,–
36.07 57,2 58,– 59,1 60,1 61,4 62,4 63,4 64,2 65,2 66,1 67,2
36.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
36.09 79,2 80,42 81,1 82,1

37.01 *cariboea*
37.02 1,127 2,24 3,1.2 4,10 5,2.5 6,1.2 7,2 8,2 9,2 10,1 11,2
37.03 12,2 13,1 14,2 15,1 16,3 17,1 18,3 19,2 20,3 21,2 22,–
37.04 23,4 24,2 25,3 26,3 27,1 28,5 29,2 30,2 31,– 32,– 33,–
37.05 34,– 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,2–3 44,2
37.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4–5 52,1 53,1 54,2 55,3
37.07 56,– 57,2 58,– 59,– 60,3 61,3 62,3 63,3 64,3 65,2 66,1
37.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
37.09 78,U 79,2 80,24–31 81,1 82,1

38.01 *cedroensis*
38.02 1,U 2,U 3,2 4,10 5,3 6,2 7,1 8,1 9,2 10,2 11,1 12,2 13,1
38.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1 24,2
38.04 25,4 26,2 27,2 28,1 29,2 30,1 31,1 32,1 33,2 34,1 35,3
38.05 36,27 37,2 38,2 39,2 40,3 41,10 42,10 43,1 44,3 45,2 46,2
38.06 47,U 48,2 49,2 50,U 51,5 52,1 53,1 54,1 55,2 56,– 57,U
38.07 58,U 59,U 60,U 61,3 62,3 63,U 64,1 65,2 66,1 67,2 68,1
38.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
38.09 80,17 81,1 82,1

39.01 *cincta*
39.02 1,U 2,U 3,1.1 4,U 5,3 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U

39.03 14,U 15,U 16,U 17,U 18,3 19,2 20,3 21,2 22,– 23,4 24,U
39.04 25,4 26,1 27,1 28,5 29,2 30,2 31,– 32,– 33,– 34,– 35,–
39.05 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,2 44,1 45,2 46,2
39.06 47,U 48,3 49,1 50,U 51,U 52,1 53,2 54,– 55,– 56,1 57,U
39.07 58,U 59,U 60,U 61,2 62,4 63,U 64,3 65,2 66,2 67,2 68,2
39.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
39.09 80,21 81,1 82,1
40.01 *cirrobranchiata*
40.02 1,U 2,U 3,3 4,U 5,6 6,U 7,3 8,3 9,2 10,1 11,2 12,2 13,1
40.03 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,4 24,1
40.04 25,1 26,9 27,1 28,1 29,2 30,1 31,2 32,1 33,2 34,– 35,22
40.05 36,U 37,1 38,1 39,U 40,U 41,2 42,U 43,1/4 44,2 45,2 46,2
40.06 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,2 55,1 56,– 57,1
40.07 58,2 59,1 60,– 61,2 62,2 63,U 64,3 65,1 66,2 67,1 68,1
40.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,4 77,2 78,1 79,4
40.09 80,17/24 81,1 82,1

41.01 *coccinea*
41.02 1,U 2,U 3,5 4,U 5,10 6,U 7,3 8,1 9,3 10,1 11,2 12,2 13,U
41.03 14,U 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2 24,1
41.04 25,3 26,5 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1 35,6
41.05 36,U 37,2 38,2 39,0 40,U 41,10 42,30 43,1 44,3 45,2 46,2
41.06 47,2 48,2 49,2 50,2 51,4–5 52,1 53,1 54,1 55,4 56,– 57,1
41.07 58,4 59,2 60,– 61,3 62,3 63,3 64,2 65,2 66,2 67,2 68,2
41.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
41.09 79,2 80,38–39 81,1 82,1

42.01 *coccinoides*
42.02 1,U 2,U 3,5 4,20 5,8 6,U 7,3 8,1 9,3 10,1 11,1 12,1 13,1
42.03 14,5 15,1 16,1 17,1 18,2 19,2 20,3 21,2 22,– 23,2 24,2
42.04 25,3 26,3 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,1 35,7–8
42.05 36,78 37,2 38,2 39,U 40,U 41,9 42,U 43,2 44,3 45,2 46,2
42.06 47,2 48,3 49,2 50,2 51,4 52,1 53,1 54,2 55,2 56,– 57,2
42.07 58,– 59,– 60,1 61,1 62,3 63,3 64,3 65,2 66,2 67,2 68,2
42.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
42.09 80,28/30 81,1 82,1

43.01 *collaris*
43.02 1,U 2,U 3,6 4,10 5,12 6,6 7,3 8,2 9,3 10,1 11,2 12,2 13,1
43.03 14,2 15,U 16,1 17,1 18,3 19,2 20,3 21,1 22,2 23,2 24,1
43.04 25,2 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
43.05 35,17–18 36,U 37,1 38,1 39,0 40,U 41,12 42,50 43,2 44,2
43.06 45,2 46,2 47,U 48,3 49,2 50,U 51,3–4 52,1 53,1 54,1 55,2
43.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,U 64,3 65,1 66,2
43.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
43.09 78,U 79,2 80,27/33 81,1 82,1

44.01 *collini*
44.02 1,U 2,U 3,4 4,15 5,7 6,U 7,3 8,1 9,3 10,1 11,2 12,2 13,2
44.03 14,– 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,U 24,2
44.04 25,3 26,3 27,1 28,2 29,2 30,1 31,2 32,3 33,2 34,1 35,16
44.05 36,85 37,2 38,2 39,U 40,U 41,2 42,U 43,1–2 44,2 45,2 46,2
44.06 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2 56,– 57,2
44.07 58,– 59,– 60,2 61,1 62,1 63,1 64,3 65,2 66,2 67,2 68,2
44.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1/2 77,2 78,U
44.09 79,2 80,26–27 81,1 82,1

45.01 *complanata*
45.02 1,100 2,72 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
45.03 13,1 14,3 15,U 16,U 17,U 18,U 19,U 20,U 21,2 22,– 23,U
45.04 24,U 25,3 26,5 27,3 28,U 29,2 30,1 31,1 32,1 33,2 34,U
45.05 35,19 36,U 37,U 38,U 39,2 40,U 41,6 42,U 43,U 44,U 45,U
45.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,2 56,–
45.07 57,U 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,U 66,U 67,U
45.08 68,U 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
45.09 79,2 80,28 81,U 82,U

46.01 *congesta*
46.02 1,U 2,U 3,4 4,10 5,6 6,4 7,3 8,2 9,2 10,1 11,2 12,2 13,1
46.03 14,3 15,1 16,U 17,U 18,3 19,2 20,3 21,2 22,– 23,U 24,2
46.04 25,4 26,2 27,U 28,U 29,U 30,1 31,1 32,1 33,2 34,1 35,7
46.05 36,47 37,2 38,2 39,1 40,0 41,18 42,U 43,3 44,3 45,2 46,2
46.06 47,2 48,1 49,2 50,1 51,7–8 52,1 53,1 54,1 55,1 56,– 57,2
46.07 58,– 59,– 60,1 61,3 62,3 63,3 64,3 65,2 66,2 67,2 68,2
46.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
46.09 80,33 81,1 82,1

47.01 *conglomerans*
47.02 1,166 2,163 3,3.5 4,10 5,6.5 6,3.5 7,2 8,2 9,3 10,1 11,1
47.03 12,2 13,1 14,2 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1
47.04 23,4 24,1 25,1 26,4 27,1 28,1 29,2 30,1 31,2 32,1 33,2
47.05 34,– 35,23–29 36,166 37,1 38,1 39,U 40,U 41,4 42,130 43,3
47.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2
47.07 55,2 56,– 57,2 58,– 59,– 60,2 61,1 62,4 63,4 64,3 65,1
47.08 66,2 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,4–5
47.09 77,2 78,U 79,2 80,22 81,1 82,1

48.01 *contingens*
48.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
48.03 14,U 15,U 16,U 17,U 18,3 19,U 20,U 21,2 22,– 23,U
48.04 24,2 25,U 26,U 27,2 28,U 29,2 30,1 31,1 33,2 34,1 35,6
48.05 36,U 37,1 38,1 39,1 40,U 41,18–19 42,15 43,1–2 44,2 45,2
48.06 46,2 47,2 48,2 49,2 50,2 51,U 52,2 53,1 54,U 55,2 56,–
48.07 57,1 58,– 59,– 60,2 61,1 62,1 63,4 64,3 65,U 66,U 67,U
48.08 68,U 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
48.09 79,2 80,30 81,U 82,U

49.01 *crassitentaculata*
49.02 1,U 2,U 3,3.5 4,80 5,9.5 6,U 7,3 8,1 9,3 10,1 11,2 12,1
49.03 13,1 14,3 15,1 16,1 17,1 18,1 19,2 20,1 21,2 22,– 23,2
49.04 24,2 25,3 26,1 27,1 28,1 29,2 30,1 31,2 32,1 33,U 34,U
49.05 35,28 36,U 37,1 38,1 39,U 40,U 41,2 42,U 43,2–3 44,2 45,2
49.06 46,2 47,2 48,3 49,1 50,2 51,4 52,1/3 53,1 54,1 55,2 56,2
49.07 57,U 58,U 59,U 60,U 61,1 62,1 63,U 64,3 65,2 66,2 67,2
49.08 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
49.09 79,2 80,32 81,1 82,1

50.01 *curticirris*
50.02 1,55 2,12 3,1 4,10 5,2.25 6,1 7,3 8,2 9,1 10,2 11,1 12,1
50.03 13,1 14,3 15,3 16,3 17,1 18,3 19,2 20,3 21,1 22,3 23,4
50.04 24,2 25,3 26,3 27,1 28,2 29,2 30,2 31,– 32,– 33,– 34,–
50.05 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,1/4 44,2 45,2
50.06 46,2 47,2 48,2 49,2 50,2 51,11 52,1 53,1 54,1 55,2 56,–

50.07 57,2 58,– 59,– 60,1 61,4 62,4 63,4 64,3 65,2 66,1 67,2
50.08 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
50.09 79,2 80,16 81,1 82,1

51.01 *denticulata*
51.02 1,U 2,U 3,3 4,10 5,7 6,3 7,3 8,2 9,3 10,1 11,2 12,1 13,1
51.03 14,2 15,3 16,1 17,1 18,1 19,2 20,1 21,2 22,– 23,4 24,1
51.04 25,3 26,3 27,1 28,1 29,2 30,1 31,2 32,1 33,2 34,– 35,27
51.05 36,U 37,1 38,1 39,10–12 40,U 41,3 42,U 43,1 44,3 45,2
51.06 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,2 55,2 56,–
51.07 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3 65,1 66,1 67,1
51.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,4 77,2 78,U
51.09 79,2 80,18–19 81,1 82,1

52.01 *dilatata*
52.02 1,U 2,U 3,10 4,85 5,16 6,5 7,2 8,2 9,3 10,1 11,2 12,1
52.03 13,1 14,2 15,1 16,3 17,3 18,3 19,2 20,3 21,2 22,– 23,2
52.04 24,2 25,1 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,1 34,2
52.05 35,19 36,U 37,1 38,1 39,5 40,U 41,6 42,U 43,2 44,2 45,2
52.06 46,2 47,U 48,3 49,2 50,U 51,U 52,2 53,1 54,1 55,2 56,–
52.07 57,U 58,U 59,U 60,U 61,2 62,1 63,U 64,3 65,1 66,1 67,1
52.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
52.09 79,2 80,28 81,1 82,1

53.01 *djiboutiensis*
53.02 1,U 2,U 3,10 4,10 5,20 6,10 7,3 8,2 9,3 10,1 11,2 12,2
53.03 13,1 14,1 15,3 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,4
53.04 24,2 25,3 26,8 27,1 28,4 29,2 30,1 31,1 32,1 33,2 34,1
53.05 35,5 36,U 37,1 38,1 39,0 40,U 41,25 42,U 43,1–2 44,3 45,2
53.06 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1 55,3 56,–
53.07 57,2 58,– 59,– 60,4 61,1 62,1 63,1 64,3 65,2 66,2 67,2
53.08 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
53.09 79,2 80,81 81,3 82,1

54.01 *dubitata*
54.02 1,U 2,U 3,7 4,10 5,16 6,7 7,3 8,2 9,2 10,1 11,2 12,2 13,1
54.03 14,2 15,1 16,1 17,4 18,3 19,2 20,1 21,1 22,2 23,2 24,2
54.04 25,3 26,5 27,2 28,2 29,1 30,1 31,2 32,3 33,2 34,– 35,3–5
54.05 36,38–48 37,2 38,2 39,5 40,10–15 41,3 42,10 43,1–2 44,2
54.06 45,2 46,2 47,2 48,2 49,2 50,2 51,10 52,3 53,1 54,1 55,2
54.07 56,– 57,2 58,– 59,– 60,2 61,1 62,3 63,3 64,2 65,2 66,1
54.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
54.09 78,1 79,2 80,35–38 81,1 82,1

55.01 *edwardsi*
55.02 1,118 2,70 3,3.5 4,10 5,8 6,3.5 7,3 8,2 9,2 10,1 11,2
55.03 12,1 13,1 14,2 15,3 16,3 17,1 18,3 19,2 20,3 21,1 22,1
55.04 23,2 24,2 25,4 26,2 27,2 28,2 29,2 30,1 31,1 32,2 33,2
55.05 34,1 35,3 36,34 37,2 38,2 39,5 40,2 41,6 42,10 43,2–3
55.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,2 54,1
55.07 55,2 56,– 57,2 58,– 59,– 60,1 61,1 62,4 63,4 64,3 65,U
55.08 66,U 67,U 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1
55.09 77,1 78,2 79,2 80,28 81,U 82,U

56.01 *ehlersi*
56.02 1,U 2,U 3,4 4,10 5,6 6,4 7,2 8,2 9,3 10,1 11,2 12,1 13,1
56.03 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,1 24,2

56.04 25,4 26,2–3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,2 35,14
56.05 36,U 37,1 38,1 39,1 40,U 41,6 42,U 43,2 44,2 45,2 46,2
56.06 47,2 48,2 49,2 50,2 51,4 52,1 53,2 54,2 55,1 56,– 57,U
56.07 58,U 59,U 60,U 61,1 62,4 63,4 64,3 65,1 66,2 67,1 68,2
56.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
56.09 80,27 81,U 82,U

57.01 *eimeorum*
57.02 1,U 2,U 3,3.5 4,U 5,7.5 6,U 7,3 8,2 9,3 10,1 11,2 12,1
57.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,4
57.04 24,2 25,3 26,5 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,1
57.05 35,5 36,U 37,1 38,1 39,U 40,U 41,5 42,20 43,1–3 44,2 45,2
57.06 46,2 47,2 48,2 49,2 50,2 51,U 52,1 53,1 54,1 55,3 56,–
57.07 57,1 58,U 59,U 60,– 61,2 62,2 63,2 64,3 65,2 66,1 67,2
57.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
57.09 79,2 80,38 81,U 82,U

58.01 *elegans*
58.02 1,133 2,75 3,3 4,10 5,8 6,3 7,2 8,2 9,2 10,1 11,2 12,2
58.03 13,1 14,2 15,1 16,1 17,U 18,1 19,2 20,3 21,1 22,1 23,U
58.04 24,2 25,4 26,3 27,2 28,1 29,1 30,1 31,1 32,1 33,2 34,1
58.05 35,3 36,33 37,2 38,2 39,1 40,1 41,10 42,10 43,2 44,3 45,2
58.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2 56,–
58.07 57,1 58,4 59,2 60,– 61,1 62,1 63,3 64,2 65,2 66,1 67,2
58.08 68,1 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1/3 77,2 78,2
58.09 79,2 80,30 81,1 82,5

59.01 *elseyi*
59.02 1,120 2,64 3,7 4,U 5,13 6,U 7,3 8,1 9,3 10,1 11,2 12,1
59.03 13,U 14,U 15,1 16,1 17,1 18,2 19,2 20,1 21,1 22,3 23,2
59.04 24,2 25,3 26,4 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
59.05 35,6 36,104 37,1 38,1 39,0 40,0 41,18 42,U 43,1 44,2 45,2
59.06 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1 55,3 56,–
59.07 57,1 58,– 59,– 60,2 61,1 62,1 63,1 64,1 65,2 66,2 67,2
59.08 68,2 69,2 70,2 71,2 72,2 73,1 74,2 75,1 76,5 77,1 78,2
59.09 79,4 80,30 81,1 82,1

60.01 *eugeniae*
60.02 1,U 2,U 3,1 4,10 5,4 6,1 7,3 8,1 9,2 10,2 11,1 12,2 13,2
60.03 14,– 15,1 16,1 17,4 18,3 19,2 20,1 21,2 22,– 23,2 24,2
60.04 25,4 26,1 27,1 28,2 29,2 30,1 31,1 32,2 33,2 34,1 35,4
60.05 36,44 37,2 38,2 39,4 40,2–3 41,5 42,U 43,1–2 44,2 45,2
60.06 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,–
60.07 57,2 58,– 59,– 60,2 61,1 62,4 63,U 64,3 65,2 66,2 67,2
60.08 68,2 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
60.09 79,3 80,18 81,1 82,1

61.01 *excariboea*
61.02 1,U 2,U 3,2 4,10 5,3.7 6,2 7,3 8,2 9,2 10,1 11,1 12,1
61.03 13,1 14,2 15,1 16,3 17,1 18,3 19,2 20,3 21,1 22,1 23,1
61.04 24,2 25,3 26,3 27,1 28,2 29,2 30,1 31,2 32,2 33,2 34,–
61.05 35,78–79 36,U 37,1 38,1 39,U 40,U 41,3 42,U 43,2/4 44,2
61.06 45,2 46,1 47,1 48,1 49,1 50,1 51,4 52,1 53,1 54,2 55,2
61.07 56,– 57,1 58,2 59,1 60,– 61,3 62,3 63,4 64,1 65,1 66,2
61.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
61.09 78,U 79,2 80,78/87 81,3 82,1

62.01 *fauveli*
62.02 1,216 2,302 3,8 4,20 5,18 6,7.5 7,3 8,2 9,3 10,1 11,2
62.03 12,1 13,1 14,5 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1
62.04 23,2 24,2 25,3 26,4 27,1 28,2 29,2 30,1 31,1 32,1 33,2
62.05 34,1 35,18 36,216 37,1 38,1 39,1 40,0 41,14 42,35 43,2–3
62.06 44,2 45,2 46,2 47,2 48,3 49,2 50,2 51,9 52,1 53,1 54,1
62.07 55,2 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,2 65,1
62.08 66,1 67,1 68,1 69,1 70,1 71,2 72,2 73,2 74,U 75,1 76,1
62.09 77,2 78,U 79,2 80,41 81,1 82,1

63.01 *filamentosa*
63.02 1,119 2,25 3,1.5 4,10 5,3 6,1.5 7,2 8,2 9,3 10,1 11,2
63.03 12,1 13,1 14,2 15,1 16,3 17,1 18,3 19,2 20,3 21,2 22,–
63.04 23,1 24,2 25,3 26,7 27,1 28,2 29,2 30,1 31,2 32,1 33,2
63.05 34,– 35,23–27 36,119 37,1 38,1 39,U 40,U 41,2 42,U 43,2–3
63.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2
63.07 55,1 56,– 57,2 58,– 59,– 60,2 61,1 62,3 63,3 64,3 65,1
63.08 66,1 67,1 68,1 69,1 70,1 71,2 72,2 73,2 74,U 75,1 76,4
63.09 77,2 78,U 79,2 80,17/22 81,1 82,1

64.01 *fimbriata*
64.02 1,362 2,230 3,7 4,30 5,11 6,6 7,2 8,3 9,2 10,1 11,2 12,2
64.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,4
64.04 24,1 25,4 26,4 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,2
64.05 35,9 36,122 37,2 38,2 39,0 40,10–12 41,5 42,15 43,2 44,3
64.06 45,2 46,2 47,2 48,3 49,3 50,3 51,4–5 52,1 53,1 54,2 55,1
64.07 56,– 57,2 58,– 59,– 60,3 61,4 62,4 63,4 64,2 65,2 66,2
64.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
64.09 78,2 79,2 80,26 81,1 82,1

65.01 *flaccida*
65.02 1,U 2,U 3,2.5 4,10 5,8.5 6,2.5 7,3 8,1 9,2 10,1 11,2 12,2
65.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
65.04 24,1 25,2 26,5 27,1 28,2 29,1 30,1 31,1 32,3 33,U 34,1
65.05 35,7 36,U 37,U 38,U 39,0 40,U 41,9 42,12 43,2 44,3 45,2
65.06 46,2 47,U 48,2 49,2 50,U 51,– 52,1 53,2 54,– 55,– 56,2
65.07 57,U 58,U 59,U 60,U 61,2 62,2 63,U 64,3 65,2 66,1 67,2
65.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
65.09 78,2 79,4 80,27 81,1 82,1

66.01 *flavapunctata*
66.02 1,U 2,U 3,2 4,10 5,7 6,2 7,3 8,1 9,3 10,2 11,1 12,2 13,U
66.03 14,U 15,3 16,2 17,1 18,3 19,2 20,3 21,2 22,– 23,4 24,2
66.04 25,4 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,13
66.05 36,U 37,2 38,1 39,U 40,U 41,6 42,50 43,1 44,3 45,2 46,2
66.06 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,2 55,2 56,– 57,U
66.07 58,U 59,U 60,U 61,4 62,4 63,U 64,3 65,2 66,1 67,2 68,1
66.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
66.09 80,25 81,1 82,1

67.01 *flavocuprea*
67.02 1,U 2,17 3,1 4,U 5,2 6,U 7,2 8,2 9,2 10,1 11,2 12,2 13,U
67.03 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2 24,2
67.04 25,4 26,2 27,1 28,5 29,2 30,1 31,1 32,1 33,2 34,1 35,4
67.05 36,34 37,2 38,2 39,5 40,10 41,4 42,15 43,U 44,U 45,U 46,U
67.06 47,U 48,U 49,U 50,U 51,4 52,U 53,1 54,1 55,1 56,– 57,U

67.07 58,U 59,U 60,U 61,2 62,4 63,4 64,3 65,U 66,U 67,U 68,U
67.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
67.09 80,17 81,1 82,2

68.01 *flavopicta*
68.02 1,166 2,215 3,6 4,10 5,U 6,6 7,U 8,U 9,U 10,U 11,U 12,U
68.03 13,1 14,1 15,U 16,U 17,U 18,3 19,2 20,U 21,1 22,U 23,2
68.04 24,U 25,U 26,U 27,1 28,U 29,2 30,1 31,1 32,1 33,2 34,1
68.05 35,5 36,166 37,1 38,1 39,0 40,0 41,18–19 42,14 43,U 44,U
68.06 45,U 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U
68.07 56,U 57,U 58,U 59,U 60,U 61,U 62,1 63,U 64,1/2 65,2
68.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,U
68.09 77,2 78,U 79,2 80,U 81,U 82,U

69.01 *floridana*
69.02 1,111 2,80 3,6 4,10 5,10.5 6,6 7,2 8,2 9,2 10,1 11,2 12,1
69.03 13,1 14,3 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,2 23,2
69.04 24,1 25,3 26,4 27,2 28,1 29,1 30,1 31,1 32,1 33,1 34,1
69.05 35,8–10 36,111 37,1 38,1 39,1 40,0 41,8 42,U 43,2–3 44,3
69.06 45,2 46,2 47,2 48,3 49,3 50,2 51,7–9 52,1 53,1 54,2 55,2
69.07 56,– 57,2 58,– 59,– 60,4 61,4 62,1 63,1 64,2 65,1 66,2
69.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1/2 76,1 77,2
69.09 78,U 79,2 80,29–40 81,1 82,2

70.01 *franklini*
70.02 1,U 2,U 3,7 4,10 5,15 6,7 7,3 8,1 9,3 10,1 11,2 12,1 13,U
70.03 14,U 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2 24,2
70.04 25,3 26,5 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,1 35,6
70.05 36,U 37,1 38,1 39,0 40,U 41,25 42,U 43,3 44,2 45,3 46,2
70.06 47,U 48,3 49,2 50,U 51,U 52,1 53,1 54,1 55,2 56,– 57,U
70.07 58,U 59,U 60,U 61,4 62,4 63,U 64,3 65,2 66,2 67,2 68,2
70.08 69,1 70,1 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
70.09 80,34 81,1 82,1

71.01 *frauenfeldi*
71.02 1,U 2,U 3,5 4,10 5,7 6,5 7,2 8,3 9,2 10,1 11,2 12,2 13,U
71.03 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2 24,1
71.04 25,3 26,3 27,1 28,1 29,1 30,1 31,2 32,1 33,2 34,– 35,6
71.05 36,U 37,1 38,1 39,1 40,U 41,3 42,15 43,2 44,2 45,2 46,2
71.06 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,2 55,2 56,– 57,2
71.07 58,– 59,– 60,1 61,3 62,3 63,U 64,2 65,2 66,2 67,2 68,2
71.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
71.09 80,27 81,1 82,2

72.01 *fucata*
72.02 1,250 2,195 3,5 4,U 5,10 6,U 7,U 8,U 9,U 10,U 11,U 12,U
72.03 13,1 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,2 22,– 23,1
72.04 24,U 25,U 26,3 27,2 28,1 29,2 30,1 31,1 32,1 33,2 34,1
72.05 35,5 36,170–180 37,2 38,1 39,U 40,30 41,12 42,U 43,1 44,3
72.06 45,2 46,2 47,2 48,2 49,2 50,2 51,U 52,U 53,1 54,U 55,U
72.07 56,U 57,2 58,– 59,– 60,2 61,1 62,1 63,4 64,3 65,U 66,U
72.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
72.09 78,1 79,1 80,U 81,U 82,U

73.01 *fuscafasciata*
73.02 1,U 2,U 3,1.3 4,10 5,3 6,1.3 7,3 8,1 9,3 10,1 11,2 12,2
73.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,2 21,1 22,1 23,4

73.04 24,1 25,1 26,4 27,1 28,2 29,2 30,2 31,– 32,– 33,– 34,–
73.05 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,1 44,2 45,2
73.06 46,2 47,U 48,2 49,2 50,U 51,9 52,1 53,1 54,1 55,2 56,–
73.07 57,2 58,– 59,– 60,1 61,3 62,2 63,U 64,3 65,2 66,2 67,2
73.08 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
73.09 79,2 80,23 81,1 82,1

74.01 *gagzoi*
74.02 1,160 2,32.5 3,1.5 4,10 5,2.75 6,1.5 7,3 8,2 9,1 10,1
74.03 11,1 12,2 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,2
74.04 22,– 23,1 24,1 25,4 26,2 27,1 28,1 29,2 30,1 31,3 32,1
74.05 33,– 34,– 35,85–120 36,160 37,1 38,2 39,– 40,– 41,– 42,–
74.06 43,2 44,2 45,2 46,1 47,1 48,3 49,1 50,1 51,9 52,1 53,1
74.07 54,2 55,2 56,– 57,2 58,– 59,– 60,2 61,1 62,3 63,4 64,3
74.08 65,2 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1
74.09 76,1 77,2 78,U 79,2 80,27–38 81,1 82,1

75.01 *goodei*
75.02 1,U 2,U 3,.75 4,U 5,4 6,U 7,3 8,1 9,2 10,1 11,2 12,U 13,1
75.03 14,2 15,1 16,3 17,1 18,3 19,2 20,3 21,2 22,– 23,4 24,U
75.04 25,4 26,2 27,1 28,5 29,2 30,2 31,– 32,– 33,– 34,– 35,–
75.05 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,1/3 44,2 45,2 46,2
75.06 47,U 48,3 49,2 50,U 51,9 52,1 53,1 54,1 55,1 56,– 57,2
75.07 58,– 59,– 60,2 61,1 62,3 63,U 64,3 65,2 66,1 67,2 68,1
75.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
75.09 80,23 81,1 82,1

76.01 *gracilicirrata*
76.02 1,323 2,214 3,2.5 4,10 5,9 6,2.5 7,3 8,1 9,3 10,1 11,2
76.03 12,2 13,U 14,U 15,1 16,3 17,3 18,3 19,2 20,1 21,1 22,1
76.04 23,2 24,2 25,4 26,4 27,2 28,2 29,1 30,1 31,1 32,1 33,2
76.05 34,1 35,3 36,181 37,2 38,2 39,2 40,36 41,7 42,20 43,1
76.06 44,2 45,2 46,2 47,2 48,3 49,2 50,2 51,10 52,3 53,1 54,1
76.07 55,3 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,2 65,2
76.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1
76.09 77,1 78,2 79,2 80,63 81,1 82,1

77.01 *gracilis*
77.02 1,81 2,66 3,2 4,10 5,6 6,2 7,2 8,2 9,2 10,1 11,2 12,2
77.03 13,1 14,3 15,1 16,1 17,4 18,3 19,2 20,3 21,1 22,3 23,U
77.04 24,2 25,1 26,4 27,1 28,2 29,1 30,1 31,1 32,1 33,1 34,1
77.05 35,4–5 36,81 37,1 38,1 39,0 40,0 41,6 42,U 43,2–3 44,2
77.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,2
77.07 56,– 57,2 58,– 59,– 60,1 61,3–4 62,4 63,4 64,2 65,U 66,U
77.08 67,U 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
77.09 78,2 79,3 80,28 81,1 82,1

78.01 *gravieri*
78.02 1,U 2,28 3,2 4,U 5,U 6,U 7,3 8,U 9,U 10,U 11,U 12,U 13,1
78.03 14,3 15,U 16,U 17,U 18,3 19,2 20,3 21,1 22,1 23,1 24,U
78.04 25,5 26,– 27,3 28,2 29,1 30,1 31,3 32,3 33,– 34,– 35,5
78.05 36,20/26 37,2 38,2 39,– 40,– 41,1 42,– 43,U 44,U 45,U
78.06 46,U 47,U 48,U 49,U 50,U 51,U 52,1 53,1 54,U 55,U 56,–
78.07 57,2 58,– 59,– 60,1 61,4 62,4 63,4 64,2 65,U 66,1 67,U
78.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
78.09 79,2 80,25 81,U 82,U

79.01 *grubei*
79.02 1,U 2,U 3,6 4,10 5,12 6,6 7,3 8,1 9,2 10,1 11,2 12,2
79.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,1
79.04 24,1 25,3 26,5 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
79.05 35,3 36,U 37,1 38,1 39,1 40,U 41,8 42,20 43,1 44,2 45,2
79.06 46,2 47,U 48,1 49,1 50,U 51,5 52,2 53,1 54,1 55,2 56,–
79.07 57,2 58,– 59,– 60,4 61,1 62,1 63,U 64,2 65,1 66,1 67,1
79.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1. 77,2 78,U
79.09 79,2 80,24 81,1 82,2

80.01 *guanica*
80.02 1,224 2,100 3,4 4,10 5,7 6,4 7,3 8,1 9,2 10,1 11,2 12,2
80.03 13,U 14,U 15,2 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,4
80.04 24,2 25,3 26,2 27,1 28,1 29,2 30,1 31,2 32,1 33,2 34,–
80.05 35,19 36,224 37,1 38,1 39,10 40,U 41,2 42,30 43,2–3 44,2
80.06 45,2 46,2 47,2 48,3 49,2 50,2 51,6–7 52,3 53,1 54,1 55,1
80.07 56,– 57,1 58,1 59,1 60,– 61,3 62,3 63,3 64,3 65,2 66,2
80.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
80.09 78,U 79,2 80,36 81,1 82,1

81.01 *guildingi*
81.02 1,258 2,138 3,6 4,10 5,7 6,6 7,3 8,1 9,3 10,1 11,2 12,1
81.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
81.04 24,1 25,4 26,3 27,2 28,2 29,2 30,1 31,1 32,1 33,2 34,1
81.05 35,5 36,236 37,2 38,1 39,0 40,20 41,11 42,15 43,2 44,3
81.06 45,2 46,2 47,2 48,1 49,2 50,2 51,4 52,1 53,1 54,1 55,2
81.07 56,– 57,1 58,1 59,2 60,– 61,3 62,2 63,4 64,3 65,2 66,2
81.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
81.09 78,U 79,2 80,24 81,1 82,1

82.01 *guttata*
82.02 1,115 2,52 3,3 4,10 5,8 6,3 7,2 8,1 9,3 10,1 11,2 12,2
82.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2
82.04 24,2 25,1 26,4 27,1 28,1 29,2 30,1 31,1 32,1 33,2 34,1
82.05 35,6 36,105 37,1 38,1 39,U 40,U 41,10 42,U 43,3 44,2 45,2
82.06 46,2 47,2 48,3 49,2 50,2 51,19 52,1 53,1 54,1 55,1 56,–
82.07 57,1 58,1 59,1 60,– 61,1 62,1 63,1 64,3 65,2 66,1 67,2
82.08 68,1 69,1 70,1 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
82.09 79,2 80,32 81,1 82,2

83.01 *harassii*
83.02 1,U 2,U 3,2.5 4,10 5,5 6,2.5 7,2 8,2 9,3 10,1 11,2 12,1
83.03 13,1 14,1 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2
83.04 24,2 25,4 26,4 27,1 28,1 29,2 30,1 31,1 32,1 33,2
83.05 34,1 35,4 36,U 37,1 38,1 39,3 40,U 41,10 42,15 43,1/3
83.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1
83.07 55,2 56,– 57,2 58,– 59,– 60,4 61,1 62,3 63,3 64,3 65,2
83.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1
83.09 77,2 78,2 79,2 80,28 81,1 82,1

84.01 *havaica*
84.02 1,78 2,25 3,1 4,10 5,4 6,1 7,2 8,2 9,2 10,1 11,1 12,1
84.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
84.04 24,2 25,4 26,3 27,1 28,1 29,1 30,1 31,1 32,2 33,1 34,1
84.05 35,6 36,78 37,1 38,1 39,U 40,U 41,5 42,20 43,1 44,2 45,2
84.06 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,1 55,2 56,–

84.07 57,2 58,– 59,– 60,1 61,3 62,3 63,3 64,2 65,2 66,1 67,2
84.08 68,1 69,1/2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
84.09 79,3 80,19–23 81,1 82,1

85.01 *hawaiensis*
85.02 1,U 2,U 3,7 4,10 5,13 6,7 7,3 8,1 9,3 10,1 11,2 12,2 13,1
85.03 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2 24,U
85.04 25,U 26,2 27,1 28,1 29,2 30,1 31,1 32,1 33,2 34,1 35,3
85.05 36,54 37,2 38,2 39,0 40,4 41,30 42,U 43,2 44,2 45,2 46,2
85.06 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2 56,– 57,2
85.07 58,– 59,– 60,1 61,1 62,1 63,U 64,3 65,2 66,1 67,2 68,1
85.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,2
85.09 80,30 81,1 82,1

86.01 *heterochaeta*
86.02 1,105 2,27 3,3.5 4,10 5,4 6,3.5 7,1 8,2 9,2 10,1 11,2
86.03 12,1 13,2 14,– 15,1 16,1 17,2 18,3 19,2 20,1 21,1 22,1
86.04 23,2 24,1 25,3 26,2 27,1 28,1 29,2 30,1 31,1 32,1 33,2
86.05 34,1 35,3 36,85 37,2 38,1 39,3 40,15 41,7 42,25 43,1–2
86.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,2
86.07 55,2 56,– 57,2 58,– 59,– 60,2 61,1 62,1 63,1 64,2 65,2
86.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1
86.09 77,1 78,2 79,2 80,22 81,1 82,1

87.01 *hirschi*
87.02 1,112 2,55 3,3 4,10 5,7 6,3 7,1 8,2 9,3 10,1 11,2 12,2
87.03 13,U 14,U 15,1 16,1 17,3 18,3 19,2 20,1 21,1 22,3 23,2
87.04 24,1 25,3 26,3 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,1
87.05 35,4 36,102 37,1 38,1 39,1 40,7 41,7 42,10 43,2 44,2 45,2
87.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2 56,–
87.07 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,2 66,2 67,2
87.08 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
87.09 79,3 80,22/25 81,1 82,1

88.01 *imogena*
88.02 1,U 2,U 3,2 4,10 5,3.5 6,2 7,3 8,2 9,3 10,1 11,2 12,2
88.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,2 21,2 22,– 23,4
88.04 24,2 25,4 26,2 27,1 28,2 29,2 30,2 31,– 32,– 33,– 34,–
88.05 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,2 44,3 45,2
88.06 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,1 56,–
88.07 57,1 58,1 59,2 60,– 61,3 62,4 63,4 64,3 65,2 66,1 67,2
88.08 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
88.09 79,2 80,50 81,1 82,1

89.01 *impexa*
89.02 1,U 2,U 3,5.5 4,10 5,11 6,5.5 7,3 8,2 9,2 10,1 11,2 12,1
89.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2
89.04 24,1 25,3 26,3 27,1 28,2 29,2 30,1 31,2 32,1 33,2 34,2
89.05 35,22 36,U 37,1 38,1 39,10 40,U 41,7 42,U 43,2 44,3 45,3
89.06 46,3 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,2 55,1 56,–
89.07 57,1 58,2 59,2 60,– 61,1 62,1 63,U 64,3 65,1 66,1 67,1
89.08 68,1 69,1 70,2 71,2 72,1 73,2 74,1 75,1 76,1 77,2 78,1
89.09 79,2–3 80,60 81,1 82,5

90.01 *indica*
90.02 1,U 2,U 3,2 4,U 5,4 6,U 7,3 8,2 9,2 10,1 11,1 12,1 13,1
90.03 14,2 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,1 23,2 24,2

90.04 25,4 26,2 27,2 28,1 29,1 30,1 31,1 32,1 33,2 34,1 35,3
90.05 36,21 37,2 38,2 39,1 40,0 41,8 42,U 43,2 44,2 45,2 46,2
90.06 47,U 48,2 49,2 50,U 51,2 52,1 53,1 54,1 55,2 56,– 57,2
90.07 58,– 59,– 60,1 61,2 62,4 63,U 64,3 65,U 66,U 67,U 68,U
90.08 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
90.09 80,18 81,1 82,5

91.01 *interrupta*
91.02 1,U 2,U 3,2 4,U 5,9 6,U 7,3 8,2 9,3 10,1 11,2 12,2 13,1
91.03 14,1 15,1 16,1 17,1 18,1 19,2 20,1 21,1 22,3 23,1 24,1
91.04 25,2 26,5 27,1 28,1 29,1 30,1 31,2 32,3 33,1–2 34,–
91.05 35,5–7 36,24–26 37,1–2 38,1 39,U 40,U 41,3 42,U 43,2 44,2
91.06 45,2 46,2 47,U 48,2 49,2 50,U 51,6 52,1 53,1 54,1 55,2
91.07 56,– 57,2 58,– 59,– 60,2 61,4 62,4 63,U 64,1 65,U 66,U
91.08 67,U 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
91.09 78,2 79,3 80,24–27 81,1 82,1

92.01 *investigatoris*
92.02 1,U 2,110 3,7 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
92.03 14,U 15,U 16,U 17,1 18,3 19,2 20,1 21,2 22,– 23,1 24,U
92.04 25,U 26,U 27,U 28,U 29,U 30,1 31,1 32,1 33,1 34,1 35,6
92.05 36,U 37,1 38,1 39,U 40,U 41,18–20 42,14 43,U 44,U 45,U
92.06 46,U 47,U 48,U 49,U 50,U 51,U 52,1 53,1 54,U 55,2 56,–
92.07 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3 65,U 66,U 67,U
92.08 68,U 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
92.09 79,2 80,44–45 81,1 82,1

93.01 *jagori*
93.02 1,U 2,U 3,6 4,15 5,6 6,U 7,3 8,2 9,3 10,1 11,1 12,1 13,1
93.03 14,6 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,1 23,2 24,2
93.04 25,3 26,5 27,2 28,2 29,1 30,1 31,1 32,1 33,2 34,1 35,17
93.05 36,U 37,1 38,1 39,U 40,U 41,8 42,25 43,2 44,3 45,2 46,2
93.06 47,U 48,3 49,1 50,U 51,– 52,1 53,2 54,– 55,– 56,1 57,U
93.07 58,U 59,U 60,U 61,1 62,1 63,U 64,1 65,1 66,2 67,1 68,2
93.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
93.09 80,23 81,1 82,1

94.01 *japonica*
94.02 1,110 2,50 3,2.5 4,U 5,7 6,U 7,3 8,2 9,2 10,1 11,2 12,1
94.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2
94.04 24,2 25,4 26,3 27,2 28,1 29,1 30,1 31,1 32,1 33,2 34,1
94.05 35,4 36,46 37,2 38,2 39,2 40,2–3 41,11 42,U 43,3 44,2
94.06 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2
94.07 56,– 57,2 58,– 59,– 60,2 61,1 62,3 63,4 64,2 65,U 66,U
94.08 67,U 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
94.09 78,2 79,2 80,34 81,1 82,2

95.01 *johnsoni*
95.02 1,160 2,75 3,3 4,U 5,7 6,U 7,3 8,1 9,3 10,1 11,2 12,1
95.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,4 21,1 22,1 23,2
95.04 24,2 25,4 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
95.05 35,24 36,130 37,2 38,1 39,3 40,20 41,10 42,U 43,2 44,2
95.06 45,2 46,2 47,2 48,2 49,2 50,2 51,– 52,1 53,2 54,– 55,–
95.07 56,1 57,2 58,– 59,– 60,1 61,1 62,1 63,4 64,3 65,1 66,1
95.08 67,1 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
95.09 78,2 79,2 80,31 81,1 82,1

96.01 *kerguelensis*
96.02 1,U 2,U 3,0.3 4,U 5,1.2 6,U 7,3 8,1 9,2 10,2 11,1 12,2
96.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,2 23,1
96.04 24,1 25,4 26,2 27,1 28,2 29,2 30,1 31,1 32,2 33,2 34,–
96.05 35,3 36,U 37,2 38,2 39,U 40,U 41,2 42,U 43,2 44,2 45,2
96.06 46,2 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2 56,–
96.07 57,U 58,U 59,U 60,U 61,1 62,1 63,U 64,3 65,U 66,1 67,U
96.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
96.09 79,3 80,19 81,1 82,1

97.01 *kinbergi*
97.02 1,380 2,398 3,15 4,U 5,16 6,U 7,3 8,1 9,3 10,1 11,2 12,2
97.03 13,1 14,3 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1–2
97.04 24,1 25,3 26,5 27,1 28,1 29,1 30,1 31,1 32,2 33,2 34,1
97.05 35,8–9 36,365 37,1 38,1 39,2 40,0 41,22 42,25 43,3 44,3
97.06 45,2 46,2 47,2 48,1 49,1 50,2 51,4 52,1 53,1 54,2 55,2
97.07 56,– 57,1 58,4 59,2 60,– 61,1 62,1 63,1 64,1 65,1 66,1
97.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
97.09 78,1 79,2 80,123 81,3 82,2

98.01 *kobiensis*
98.02 1,U 2,U 3,3.5 4,U 5,6.5 6,U 7,3 8,2 9,3 10,1 11,2 12,1
98.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2
98.04 24,2 25,4 26,2 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
98.05 35,3 36,41 37,2 38,2 39,3 40,2 41,8 42,U 43,3 44,2 45,2
98.06 46,2 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2 56,–
98.07 57,2 58,– 59,– 60,1 61,2 62,3 63,U 64,2 65,2 66,1 67,2
98.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
98.09 79,2 80,30 81,1 82,1

99.01 *langi*
99.02 1,71 2,42 3,2 4,U 5,5.5 6,U 7,2 8,2 9,2 10,U 11,U 12,U
99.03 13,U 14,U 15,U 16,U 17,U 18,3 19,U 20,U 21,2 22,U 23,U
99.04 24,U 25,3 26,3 27,3 28,2 29,1 30,1 31,1 32,1 33,2 34,1
99.05 35,3 36,39 37,2 38,2 39,U 40,U 41,8 42,15 43,1 44,2 45,2
99.06 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,1 55,2 56,–
99.07 57,2 58,– 59,– 60,3 61,4 62,3 63,3 64,3 65,2 66,2 67,2
99.08 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
99.09 79,2 80,30 81,1 82,1

100.01 *laticeps*
100.02 1,U 2,U 3,10 4,U 5,21 6,U 7,3 8,1 9,3 10,1 11,2 12,1
100.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,1
100.04 23,1 24,2 25,3 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2
100.05 34,1 35,4 36,U 37,1 38,1 39,0 40,U 41,18 42,20 43,1 44,3
100.06 45,2 46,2 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2
100.07 56,– 57,2 58,– 59,– 60,1 61,4 62,4 63,U 64,2 65,2 66,1
100.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
100.09 78,U 79,2 80,38 81,1 82,2

101.01 *laurillardi*
101.02 1,189 2,150 3,5 4,U 5,9 6,U 7,3 8,2 9,3 10,1 11,2 12,1
101.03 13,1 14,3 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2
101.04 24,2 25,3 26,5 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,1
101.05 35,3 36,184 37,1 38,1 39,1 40,0 41,10 42,15 43,2 44,3
101.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,2

101.07 56,– 57,2 58,– 59,– 60,4 61,3 62,3 63,3 64,1 65,2 66,1
101.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
101.09 78,U 79,2 80,32–33 81,1 82,1

102.01 *leptocirris*
102.02 1,U 2,U 3,3 4,U 5,9 6,U 7,2 8,2 9,3 10,1 11,2 12,2 13,U
102.03 14,U 15,1 16,3 17,1 18,1 19,2 20,3 21,2 22,– 23,2 24,2
102.04 25,4 26,2 27,3 28,1 29,2 30,1 31,1 32,3 33,2 34,1 35,3
102.05 36,U 37,1 38,1 39,U 40,U 41,6 42,15 43,2–3 44,3 45,2
102.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2 56,–
102.07 57,2 58,– 59,– 60,2 61,1 62,3 63,3 64,2 65,2 66,1 67,2
102.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
102.09 79,2 80,51 81,1 82,1

103.01 *leucosticta*
103.02 1,131 2,130 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
103.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,U 22,U 23,1
103.04 24,U 25,U 26,U 27,U 28,U 29,U 30,1 31,U 32,U 33,U 34,U
103.05 35,14–15 36,113 37,2 38,U 39,U 40,U 41,4 42,U 43,2 44,3
103.06 45,U 46,U 47,2 48,U 49,U 50,2 51,U 52,U 53,U 54,U 55,U
103.07 56,U 57,1 58,1 59,1 60,U 61,U 62,U 63,1 64,2/3 65,U 66,U
103.08 67,U 68,U 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
103.09 78,1 79,2 80,U 81,U 82,U

104.01 *levibranchia*
104.02 1,105 2,94 3,8 4,U 5,9 6,U 7,3 8,1 9,2 10,1 11,2 12,1
104.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,1
104.04 24,2 25,3 26,2 27,1 28,1 29,2 30,1 31,2 32,3 33,2 34,–
104.05 35,69 36,85–95 37,1–2 38,2 39,0 40,0 41,3 42,U 43,1 44,2
104.06 45,2 46,2 47,2 48,2 49,2 50,2 51,1–2 52,1 53,1 54,2 55,1
104.07 56,– 57,2 58,– 59,– 60,1 61,3 62,3 63,3 64,2 65,1 66,2
104.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
104.09 78,U 79,2 80,28 81,1 82,1

105.01 *limosa*
105.02 1,81–106 2,32–65 3,2 4,U 5,U 6,U 7,3 8,U 9,2 10,U 11,U
105.03 12,U 13,U 14,U 15,U 16,U 17,U 18,3 19,2 20,3 21,1 22,2
105.04 23,2 24,U 25,4 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2
105.05 34,1 35,3 36,36 37,2 38,2 39,U 40,U 41,12 42,U 43,U 44,U
105.06 45,U 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U
105.07 56,U 57,2 58,– 59,– 60,U 61,4 62,4 63,4 64,3 65,U 66,U
105.08 67,U 68,U 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
105.09 78,2 79,3 80,U 81,U 82,U

106.01 *lita*
106.02 1,240 2,78 3,4 4,U 5,4 6,U 7,2 8,3 9,3 10,1 11,2 12,1
106.03 13,1 14,3 15,1 16,2 17,4 18,3 19,2 20,1 21,2 22,– 23,2
106.04 24,2 25,4 26,5 27,2 28,3 29,2 30,1 31,2 32,1 33,2 34,–
106.05 35,15 36,120 37,2 38,2 39,20 40,50 41,2 42,35 43,3 44,2
106.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2 55,1
106.07 56,– 57,2 58,– 59,– 60,3 61,4 62,4 63,4 64,3 65,2 66,2
106.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
106.09 78,U 79,2 80,23 81,1 82,1

107.01 *longicirris*
107.02 1,U 2,U 3,5 4,U 5,16 6,U 7,3 8,1 9,2 10,1 11,2 12,2 13,1
107.03 14,2 15,1 16,3 17,3 18,2 19,2 20,1 21,1 22,2 23,U 24,2

107.04 25,3 26,3 27,3 28,1 29,1 30,1 31,1 32,3 33,2 34,1 35,3
107.05 36,U 37,1 38,1 39,U 40,U 41,7 42,15 43,3 44,3 45,2 46,2
107.06 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,1 55,2 56,– 57,2
107.07 58,– 59,– 60,1 61,4 62,4 63,U 64,1 65,2 66,1 67,2 68,1
107.08 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2 78,1 79,2
107.09 80,30 81,1 82,1

108.01 *longisetis*
108.02 1,108 2,40 3,3.5 4,U 5,6.4 6,U 7,3 8,2 9,2 10,1 11,2
108.03 12,2 13,1 14,3 15,1 16,1 17,4 18,3 19,2 20,3 21,1 22,1
108.04 23,U 24,2 25,3 26,5 27,1 28,2 29,1 30,1 31,1 32,1 33,2
108.05 34,1 35,6 36,104 37,1 38,1 39,1 40,15 41,8 42,U 43,3
108.06 44,3 45,2 46,2 47,2 48,3 49,3 50,3 51,9 52,1 53,1 54,2
108.07 55,3 56,– 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,2 65,2
108.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
108.09 77,2 78,1 79,2 80,18 81,1 82,1

109.01 *lucei*
109.02 1,U 2,U 3,3 4,40 5,5.5 6,U 7,3 8,1 9,3 10,1 11,2 12,1
109.03 13,1 14,2 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,2 23,1
109.04 24,1 25,4 26,4 27,2 28,4 29,1 30,1 31,1 32,1 33,2 34,1
109.05 35,5 36,168 37,1 38,1 39,1 40,U 41,8 42,U 43,2 44,3 45,2
109.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2 55,1 56,–
109.07 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,2 66,1 67,2
109.08 68,1 69,1 70,1–2 71,2 72,2 73,1 74,2 75,1 76,4–5 77,1
109.09 78,2 79,3 80,24–34 81,1 82,1

110.01 *macrobranchia*
110.02 1,150 2,200 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
110.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,1 22,1 23,U
110.04 24,U 25,U 26,U 27,1 28,U 29,U 30,1 31,1 32,2 33,2 34,1
110.05 35,7–8 36,U 37,1 38,1 39,5 40,U 41,15–17 42,U 43,U 44,U
110.06 45,U 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,U 54,U 55,U
110.07 56,U 57,U 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,U 66,1
110.08 67,U 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,U 76,U 77,2
110.09 78,U 79,1–2 80,U 81,U

111.01 *magellanica*
111.02 1,130 2,140 3,7 4,U 5,17 6,U 7,3 8,1 9,3 10,1 11,2 12,1
111.03 13,1 14,2 15,U 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
111.04 24,1 25,3 26,5 27,1 28,5 29,2 30,1 31,1 32,1 33,2 34,1
111.05 35,7–8 36,120 37,1 38,1 39,0 40,0 41,20 42,85 43,1–2
111.06 44,2 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,3 53,1 54,1
111.07 55,2 56,– 57,2 58,– 59,– 60,2 61,4 62,3 63,3 64,1 65,2
111.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
111.09 77,2 78,1 79,2 80,26/30 81,1 82,1

112.01 *magnifica*
112.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
112.03 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,U 22,U 23,U 24,U
112.04 25,U 26,U 27,U 28,U 29,U 30,1 31,1 32,1 33,U 34,1 35,22
112.05 36,U 37,U 38,U 39,U 40,U 41,8 42,U 43,1 44,2 45,1 46,U
112.06 47,U 48,3 49,U 50,U 51,U 52,2 53,U 54,U 55,U 56,U 57,2
112.07 58,– 59,– 60,1 61,3 62,U 63,3 64,3 65,2 66,1 67,2 68,1
112.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,U
112.09 80,U 81,U 82,U

113.01 *makemoana*
113.02 1,92 2,20 3,1 4,U 5,3.5 6,U 7,3 8,1 9,U 10,1 11,U 12,U
113.03 13,1 14,2 15,U 16,U 17,U 18,3 19,2 20,U 21,1 22,3 23,2
113.04 24,U 25,U 26,U 27,U 28,U 29,U 30,1 31,3 32,1 33,– 34,–
113.05 35,7 36,86 37,1 38,1 39,– 40,– 41,1 42,– 43,2 44,U 45,2
113.06 46,2 47,2 48,2 49,2 50,2 51,U 52,1 53,1 54,U 55,U 56,U
113.07 57,2 58,– 59,– 60,1 61,2 62,2 63,2 64,1 65,U 66,1 67,U
113.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1/4 77,1 78,2
113.09 79,3 80,28 81,U 82,U

114.01 *manihine*
114.02 1,127 2,75 3,4 4,U 5,9 6,U 7,2 8,2 9,3 10,1 11,2 12,1
114.03 13,2 14,– 15,1 16,1 17,U 18,3 19,2 20,1 21,2 22,– 23,U
114.04 24,1 25,3 26,2 27,2 28,2 29,2 30,1 31,2 32,1 33,2 34,–
114.05 35,8 36,43 37,2 38,2 39,– 40,– 41,3 42,U 43,1 44,2 45,2
114.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2 55,1 56,–
114.07 57,2 58,– 59,– 60,1 61,1 62,3 63,4 64,3 65,2 66,2 67,2
114.08 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
114.09 79,2 80,29 81,1 82,5

115.01 *marenzelleri*
115.02 1,U 2,U 3,5 4,U 5,11 6,U 7,3 8,2 9,2 10,1 11,2 12,1 13,1
115.03 14,2 15,1 16,3 17,4 18,3 19,2 20,3 21,2 22,– 23,1 24,2
115.04 25,3 26,4 27,1 28,5 29,2 30,1 31,3 32,1 33,– 34,– 35,28
115.05 36,U 37,1 38,1 39,– 40,– 41,1 42,– 43,2 44,2 45,2 46,2
115.06 47,2 48,3 49,1 50,2 51,11 52,1 53,1 54,2 55,2 56,– 57,2
115.07 58,– 59,– 60,1 61,2 62,3 63,3 64,3 65,2 66,2 67,2 68,2
115.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,1
115.09 80,38 81,1 82,1

116.01 *margaritacea*
116.02 1,95 2,14 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
116.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,1 22,3 23,U
116.04 24,2 25,U 26,U 27,2 28,U 29,1 30,1 31,1 32,U 33,1 34,1
116.05 35,6 36,95 37,1 38,1 39,U 40,U 41,5 42,10 43,U 44,U 45,U
116.06 46,U 47,U 48,U 49,U 50,U 51,U 52,1 53,1 54,1 55,U 56,U
116.07 57,1 58,U 59,U 60,U 61,U 62,U 63,U 64,1 65,2 66,2 67,2
116.08 68,2 69,2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
116.09 79,3 80,U 81,U 82,U

117.01 *marovoi*
117.02 1,65 2,14.5 3,1 4,U 5,2.5 6,U 7,3 8,1 9,1 10,1 11,2 12,2
117.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2
117.04 24,2 25,4 26,2 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
117.05 35,3 36,17–22 37,2 38,2 39,0 40,1 41,6 42,U 43,2 44,3
117.06 45,2 46,2 47,2 48,2 49,2 50,2 51,2 52,1 53,1 54,1 55,3
117.07 56,– 57,1 58,1 59,3 60,– 61,1 62,1 63,4 64,3 65,U 66,U
117.08 67,U 68,U 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
117.09 78,2 79,3 80,17–19 81,1 82,5

118.01 *martensi*
118.02 1,168 2,220 3,6 4,U 5,14 6,U 7,U 8,U 9,2 10,1 11,U 12,U
118.03 13,1 14,3 15,U 16,U 17,U 18,3 19,2 20,3 21,1 22,1 23,U
118.04 24,2 25,3 26,3 27,2 28,2 29,1 30,1 31,1 32,1 33,2 34,1
118.05 35,6 36,163 37,1 38,1 39,0 40,0 41,16 42,15 43,1–2 44,2
118.06 45,2 46,2 47,2 48,2 49,2 50,2 51,U 52,1 53,1 54,1 55,2

118.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,2 66,2
118.08 67,2 68,2 69,2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
118.09 78,1 79,3 80,28 81,1 82,1

119.01 *medicina*
119.02 1,79 2,29 3,1.3 4,U 5,5 6,U 7,2 8,2 9,2 10,1 11,2 12,1
119.03 13,1 14,2 15,1 16,1 17,U 18,3 19,2 20,3 21,1 22,1 23,U
119.04 24,2 25,4 26,2 27,2 28,2 29,1 30,1 31,1 32,U 33,2 34,1
119.05 35,3 36,26 37,2 38,2 39,5 40,0 41,7 42,U 43,1–2 44,3
119.06 45,2 46,2 47,2 48,1 49,2 50,2 51,2 52,3 53,1 54,1 55,3
119.07 56,– 57,1 58,– 59,– 60,2 61,4 62,4 63,4 64,2 65,2 66,2
119.08 67,2 68,2 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
119.09 78,2 79,3 80,17 81,1 82,1

120.01 *megabranchia*
120.02 1,U 2,U 3,7 4,U 5,12 6,U 7,3 8,1 9,2 10,1 11,2 12,2 13,1
120.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2 24,2
120.04 25,4 26,3 27,3 28,1 29,2 30,1 31,1 32,1 33,2 34,1 35,3
120.05 36,54 37,2 38,2 39,0 40,7 41,47 42,15 43,1 44,3 45,2
120.06 46,2 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2 56,–
120.07 57,2 58,– 59,– 60,1 61,3 62,2 63,U 64,2 65,1 66,2 67,2
120.08 68,2 69,1 70,1 71,2 72,2 73,1 74,U 75,1 76,1 77,1 78,U
120.09 79,2 80,35 81,1 82,1

121.01 *mexicana*
121.02 1,106 2,87 3,3.5 4,15 5,10.5 6,3.2 7,2 8,1 9,2 10,1 11,2
121.03 12,2 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2
121.04 23,2 24,1 25,3 26,3 27,2 28,1 29,1 30,1 31,1 32,1 33,2
121.05 34,1 35,3 36,40 37,2 38,2 39,0 40,0–3 41,18 42,15 43,2
121.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1
121.07 55,3 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,4 64,2 65,1
121.08 66,1 67,1 68,1 69,1 70,2 71,2 72,2 73,1 74,1 75,1 76,1
121.09 77,1 78,1 79,2 80,32 81,1 82,5

121.01 *microprion*
122.02 1,127 2,82 3,5 4,U 5,10 6,U 7,2 8,3 9,3 10,1 11,2 12,1
122.03 13,1 14,4 15,1 16,3 17,1 18,3 19,2 20,1 21,1 22,1 23,1
122.04 24,2 25,3 26,5 27,2 28,1 29,1 30,1 31,1 32,3 33,1 34,2
122.05 35,7–8 36,127 37,1 38,1 39,0 40,0 41,8 42,15 43,2–3 44,2
122.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,2 55,2
122.07 56,– 57,2 58,– 59,– 60,4 61,4 62,4 63,4 64,1 65,2 66,1
122.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
122.09 78,1 79,2 80,38/41 81,1 82,4

123.01 *mindanavensis*
123.02 1,63 2,40 3,4 4,U 5,7 6,U 7,3 8,2 9,3 10,1 11,2 12,1
123.03 13,U 14,U 15,U 16,U 17,1 18,3 19,2 20,1 21,1 22,1 23,2
123.04 24,2 25,3 26,6 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,1
123.05 35,6 36,63 37,1 38,1 39,0 40,5 41,3 42,15 43,1–2 44,3
123.06 45,2 46,2 47,2 48,1 49,2 50,2 51,5 52,1 53,1 54,3 55,2
123.07 56,– 57,1 58,4 59,2 60,– 61,2 62,2 63,2 64,2 65,2 66,2
123.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
123.09 78,1 79,2 80,21 81,1 82,1

124.01 *modesta*
124.02 1,80 2,28 3,1 4,U 5,3 6,U 7,3 8,3 9,3 10,1 11,2 12,1
124.03 13,1 14,3 15,1 16,1 17,1 18,1 19,2 20,3 21,1 22,1 23,4

124.04 24,1 25,3 26,3 27,1 28,5 29,2 30,1 31,3 32,1 33,– 34,–
124.05 35,17–18 36,70 37,2 38,1 39,– 40,– 41,1 42,– 43,U 44,U
124.06 45,U 46,U 47,U 48,U 49,U 50,U 51,4 52,U 53,1 54,1 55,U
124.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,3 65,2 66,2
124.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
124.09 78,U 79,2 80,U 81,1 82,1

125.01 *mucronata*
125.02 1,116 2,58 3,4 4,25 5,8 6,U 7,3 8,1 9,2 10,1 11,2 12,1
125.03 13,1 14,2 15,1 16,2 17,1 18,3 19,2 20,1 21,2 22,– 23,2
125.04 24,2 25,4 26,2 27,3 28,1 29,2 30,1 31,1 32,1 33,2 34,1
125.05 35,3 36,34 37,2 38,2 39,2 40,0 41,15 42,U 43,1–2 44,3
125.06 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2
125.07 56,– 57,2 58,– 59,– 60,1 61,3 62,3 63,3 64,3 65,2 66,2
125.08 67,2 68,2 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
125.09 78,2 79,3 80,18–22 81,1 82,1

126.01 *multicylindri*
126.02 1,115 2,45 3,1 4,U 5,3.5 6,U 7,3 8,3 9,3 10,1 11,2 12,2
126.03 13,1 14,4 15,1 16,3 17,1 18,3 19,2 20,3 21,1 22,1 23,1
126.04 24,2 25,4 26,2 27,1–2 28,1 29,1 30,1 31,1 32,1 33,2 34,1
126.05 35,3 36,40 37,2 38,2 39,2 40,10–15 41,4 42,U 43,1–2 44,2
126.06 45,2 46,2 47,2 48,2 49,2 50,2 51,5–6 52,1 53,1 54,1 55,2
126.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,3 65,1 66,1
126.08 67,1 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
126.09 78,2 79,3 80,27 81,1 82,1

127.01 *multipectinata*
127.02 1,196 2,172 3,7 4,U 5,16 6,U 7,3 8,3 9,2 10,1 11,2 12,1
127.03 13,1 14,3 15,U 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,U
127.04 24,1 25,3 26,5 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
127.05 35,7–8 36,196 37,1 38,1 39,8–10 40,0 41,12 42,U 43,2
127.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,2
127.07 55,2 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,2 65,1
127.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
127.09 77,2 78,1 79,2 80,37–45 81,1 82,1

128.01 *murrayi*
128.02 1,101 2,37 3,4 4,U 5,7 6,U 7,3 8,1 9,2 10,1 11,2 12,2
128.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,U
128.04 24,2 25,3 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
128.05 35,5 36,28 37,1 38,2 39,2 40,5 41,9 42,10 43,1 44,2 45,2
128.06 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,1 55,3 56,–
128.07 57,2 58,– 59,– 60,2 61,2 62,2 63,2 64,2 65,U 66,U 67,U
128.08 68,U 69,1 70,2 71,2 72,2 73,1 74,1 75,1 76,1 77,1 78,2
128.09 79,3 80,17 81,U 82,U

129.01 *mutabilis*
129.02 1,196 2,95 3,6 4,U 5,8 6,U 7,3 8,2 9,3 10,1 11,2 12,1
129.03 13,1 14,4 15,1 16,1 17,4 18,3 19,2 20,1 21,2 22,– 23,2
129.04 24,1 25,3 26,4 27,1–2 28,4 29,2 30,1 31,1 32,1 33,2 34,2
129.05 35,17–18 36,196 37,1 38,1 39,2–3 40,0 41,12 42,25 43,1–2
129.06 44,3 45,2 46,2 47,2 48,3 49,2 50,2 51,9 52,1 53,1 54,2
129.07 55,2 56,– 57,1 58,2 59,2 60,– 61,1 62,1 63,1 64,3 65,1
129.08 66,2 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
129.09 77,2 78,1 79,2 80,22–23 81,1 82,1

130.01 *mutilata*
130.02 1,U 2,U 3,3.5 4,U 5,10 6,U 7,3 8,1 9,3 10,1 11,2 12,2
130.03 13,1 14,3 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2
130.04 24,2 25,4 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
130.05 35,7 36,U 37,1 38,1 39,3 40,U 41,4 42,25 43,3 44,2 45,2
130.06 46,2 47,2 48,3 49,3 50,2 51,9 52,1 53,1 54,2 55,3 56,–
130.07 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3 65,1 66,1 67,1
130.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U
130.09 79,2 80,27 81,1 82,1

131.01 *mutilatoides*
131.02 1,110 2,32 3,1 4,U 5,5 6,U 7,U 8,U 9,2 10,1 11,2 12,2
131.03 13,1 14,2 15,3 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,4
131.04 24,2 25,3 26,3 27,1 28,5 29,2 30,1 31,2 32,3 33,2 34,–
131.05 35,8 36,48 37,2 38,2 39,U 40,U 41,2 42,U 43,1–2 44,U
131.06 45,U 46,U 47,U 48,U 49,U 50,U 51,7 52,1 53,1 54,2 55,2
131.07 56,– 57,2 58,– 59,– 60,1 61,2 62,2 63,2 64,3 65,1 66,1
131.08 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
131.09 78,U 79,2 80,19 81,1 82,1

132.01 *narconi*
132.02 1,U 2,U 3,2 4,U 5,6 6,U 7,3 8,1 9,2 10,1 11,2 12,U 13,U
132.03 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,U 22,U 23,U 24,2
132.04 25,U 26,3 27,1 28,5 29,2 30,1 31,2 32,U 33,U 34,U 35,8
132.05 36,33–35 37,2 38,2 39,U 40,U 41,3 42,15 43,U 44,U 45,U
132.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,–
132.07 57,U 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,2 66,1 67,2
132.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
132.09 79,2 80,35–38 81,U 82,U

133.01 *nesiotes*
133.02 1,U 2,U 3,6 4,U 5,10 6,U 7,2 8,2 9,2 10,1 11,2 12,1
133.03 13,U 14,U 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,1 23,2
133.04 24,2 25,3 26,4 27,2 28,1 29,1 30,1 31,1 32,1 33,2 34,1
133.05 35,6 36,U 37,1 38,1 39,2 40,U 41,14 42,U 43,1–2 44,3
133.06 45,2 46,2 47,U 48,2 49,2 50,U 51,5 52,1 53,1 54,2 55,3
133.07 56,– 57,U 58,U 59,U 60,U 61,1 62,1 63,U 64,3 65,2 66,1
133.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
133.09 78,U 79,2 80,31 81,1 82,1

134.01 *nicidioformis*
134.02 1,97 2,45 3,2 4,U 5,6 6,U 7,3 8,3 9,3 10,1 11,2 12,1
134.03 13,1 14,4 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,2 23,1
134.04 24,1 25,3 26,5 27,2 28,1 29,1 30,1 31,3 32,3 33,– 34,–
134.05 35,6–8 36,40–50 37,2 38,2 39,– 40,– 41,1 42,– 43,3 44,2
134.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,3
134.07 56,– 57,2 58,– 59,– 60,1 61,4 62,4 63,4 64,2 65,2 66,1
134.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
134.09 78,U 79,2 80,19–26 81,1 82,1

135.01 *nigricans*
135.02 1,180 2,100 3,7 4,25–30 5,10 6,6 7,2 8,3 9,3 10,1 11,2
135.03 12,2 13,1 14,3 15,1 16,1 17,6 18,3 19,2 20,1 21,1 22,1
135.04 23,2 24,2 25,1 26,4 27,2 28,4 29,1 30,1 31,1 32,1 33,2
135.05 34,1 35,6–7 36,180 37,1 38,1 39,0 40,0 41,18 42,U 43,1
135.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1

135.07 55,2 56,– 57,2 58,– 59,– 60,4 61,1 62,1 63,1 64,1 65,2
135.08 66,1 67,2 68,1 69,1 70,1 71,2 72,2 73,2 74,1 75,1 76,1
135.09 77,2 78,1 79,2 80,30 81,1 82,1

136.01 *northioidea*
136.02 1,U 2,U 3,2.5 4,U 5,7 6,U 7,3 8,1 9,3 10,1 11,2 12,1
136.03 13,1 14,4 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,2 23,2
136.04 24,1 25,3 26,3 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,1
136.05 35,3 36,U 37,1 38,1 39,3 40,U 41,4 42,10 43,3 44,2 45,2
136.06 46,2 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,1 55,3 56,–
136.07 57,2 58,– 59,– 60,1 61,4 62,4 63,U 64,2 65,2 66,1 67,2
136.08 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
136.09 79,2 80,25 81,1 82,1

137.01 *norvegica*
137.02 1,157 2,200 3,9 4,U 5,13 6,U 7,1 8,3 9,3 10,1 11,2 12,2
137.03 13,1 14,4 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
137.04 24,2 25,3 26,4 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,1
137.05 35,7 36,155 37,1 38,1 39,1 40,3 41,7 42,U 43,1–2 44,2
137.06 45,2 46,2 47,2 48,2 49,2 50,2 51,6 52,1 53,1 54,1 55,3
137.07 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,2 65,2 66,1
137.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
137.09 78,U 79,2 80,42 81,1 82,2

138.01 *notata*
138.02 1,95 2,40 3,1 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
138.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,4 21,2 22,– 23,U
138.04 24,U 25,U 26,U 27,1 28,U 29,2 30,1 3 32,U 33,2 34,–
138.05 35,14 36,70 37,2 38,1 39,– 40,– 41,1–3 42,U 43,U 44,U
138.06 45,U 46,U 47,U 48,U 49,U 50,U 51,9 52,U 53,1 54,U 55,U
138.07 56,U 57,U 58,U 59,U 60,U 61,3 62,3 63,3 64,3 65,1 66,1
138.08 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
138.09 78,1 79,2 80,U 81,U 82,U

139.01 *oliga*
139.02 1,82 2,16.5 3,2 4,U 5,U 6,U 7,3 8,3 9,3 10,U 11,U 12,U
139.03 13,U 14,U 15,U 16,U 17,U 18,3 19,2 20,1 21,1 22,3 23,2
139.04 24,U 25,3 26,U 27,2 28,1 29,1 30,1 31,2 32,U 33,1 34,–
139.05 35,5 36,82 37,1 38,1 39,1 40,1 41,3 42,12 43,1 44,U 45,U
139.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,U
139.07 57,2 58,– 59,– 60,U 61,3 62,3 63,3 64,1 65,2 66,1 67,2
139.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
139.09 79,3 80,U 81,U 82,U

140.01 *ornata*
140.02 1,110 2,45 3,2 4,U 5,6 6,U 7,3 8,1 9,3 10,1 11,2 12,1
140.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
140.04 24,1 25,3 26,3 27,1–2 28,1 29,1 30,1 31,1 32,1 33,1–2
140.05 34,1 35,5 36,110 37,1 38,1 39,1 40,0 41,20 42,U 43,2
140.06 44,2 45,2 46,2 47,2 48,3 49,2 50,2 51,9 52,1 53,1 54,1
140.07 55,3 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,2 65,1
140.08 66,1 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1/5
140.09 77,1 78,2 79,3 80,22–25 81,1 82,1

141.01 *ovalifera*
141.02 1,U 2,U 3,5 4,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U 14,U

141.03 15,U 16,U 17,U 18,U 19,U 20,4 21,1 22,1 23,U 24,U 25,U
141.04 26,U 27,U 28,U 29,U 30,1 31,1 32,U 33,U 34,U 35,5 36,U
141.05 37,U 38,U 39,U 40,U 41,5–6 42,U 43,U 44,U 45,U 46,U 47,U
141.06 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,U 57,1 58,U
141.07 59,U 60,– 61,5 62,5 63,5 64,3 65,U 66,1 67,U 68,1 69,1
141.08 70,2 71,2 72,2 73,2 74,U 75,U 76,U 77,2 78,2 79,2 80,35
141.09 81,U 82,U

142.01 *pacifica*
142.02 1,102 2,33 3,3 4,U 5,6 6,U 7,3 8,3 9,2 10,1 11,2 12,1
142.03 13,1 14,2 15,1 16,3 17,3 18,1 19,2 20,1 21,1 22,1 23,2
142.04 24,2 25,3 26,4 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,2
142.05 35,17–21 36,102 37,1 38,1 39,U 40,U 41,5 42,40 43,2 44,2
142.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,2 55,3
142.07 56,– 57,2 58,– 59,– 60,2 61,2 62,4 63,4 64,3 65,2 66,1
142.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
142.09 78,U 79,2 80,23–28 81,1 82,1

143.01 *palauensis*
143.02 1,U 2,U 3,U 4,U 5,U 6,U 7,3 8,1 9,2 10,1 11,1 12,U 13,U
143.03 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1–2 22,– 23,2 24,U
143.04 25,4 26,3 27,1 28,1 29,2 30,1 31,2 32,1 33,U 34,– 35,6–8
143.05 36,U 37,2 38,U 39,5–9 40,U 41,3 42,U 43,2 44,2 45,1–2
143.06 46,1–2 47,1–2 48,1–2 49,1–2 50,1–2 51,U 52,U 53,1 54,1
143.07 55,U 56,– 57,2 58,– 59,U 60,U 61,1 62,1 63,U 64,3 65,2
143.08 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1
143.09 77,2 78,U 79,2 80,19–22 81,U 82,U

144.01 *panamena*
144.02 1,U 2,U 3,3.5 4,U 5,6 6,U 7,3 8,2 9,3 10,1 11,2 12,2
144.03 13,1 14,2 15,1 16,3 17,3 18,3 19,2 20,2 21,1 22,3 23,1
144.04 24,2 25,3 26,4 27,1 28,1 29,1 30,1 31,1 32,3 33,2 34,1
144.05 35,5 36,U 37,1 38,1 39,1 40,U 41,8 42,15 43,1 44,2 45,2
144.06 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,1/3 56,–
144.07 57,U 58,U 59,U 60,U 61,1 62,1 63,U 64,2 65,2 66,1 67,2
144.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,4 77,1 78,2
144.09 79,3 80,27 81,1 82,1

145.01 *papeetensis*
145.02 1,U 2,U 3,2 4,U 5,2.5 6,U 7,3 8,3 9,2 10,1 11,2 12,1
145.03 13,1 14,2 15,1 16,3 17,1 18,3 19,2 20,1 21,1 22,3 23,2
145.04 24,2 25,3 26,5 27,1 28,1 29,1 30,1 31,2 32,U 33,2 34,–
145.05 35,6 36,30/33 37,2 38,2 39,2 40,5 41,3 42,U 43,2 44,2
145.06 45,2 46,2 47,U 48,2 49,2 50,U 51,3 52,1 53,1 54,1 55,2
145.07 56,– 57,U 58,U 59,U 60,U 61,1 62,1 63,U 64,2 65,2 66,2
145.08 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,3 77,1
145.09 78,2 79,3 80,21 81,U 82,U

146.01 *parasegregata*
146.02 1,U 2,U 3,3 4,U 5,8 6,U 7,3 8,1 9,2 10,1 11,2 12,2 13,1
146.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2 24,2
146.04 25,4 26,2 27,2 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,3
146.05 36,U 37,2 38,2 39,0 40,U 41,18 42,10 43,1 44,3 45,2
146.06 46,1 47,1 48,2 49,1 50,1 51,5 52,1 53,1 54,1 55,3 56,–
146.07 57,2 58,– 59,– 60,2 61,1 62,1 63,1 64,2 65,2 66,1 67,2

146.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
146.09 79,2 80,U 81,1 82,1

147.01 *parvibranchis*
147.02 1,U 2,U 3,4 4,U 5,10 6,U 7,3 8,1 9,2 10,1 11,2 12,1 13,1
147.03 14,2 15,2 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,4 24,2
147.04 25,4 26,4 27,1 28,1 29,1 30,1 31,2 32,1 33,2 34,–
147.05 35,19–20 36,U 37,1 38,1 39,U 40,U 41,3 42,40 43,1–2 44,U
147.06 45,2 46,2 47,U 48,1 49,2 50,U 51,4–5 52,1 53,1 54,1 55,2
147.07 56,– 57,U 58,U 59,U 60,U 61,2 62,2 63,U 64,3 65,1 66,2
147.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
147.09 78,U 79,2 80,17–19 81,1 82,1

148.01 *paupera*
148.02 1,127 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
148.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,3 21,2 22,– 23,4
148.04 25,U 26,4 27,1 28,U 29,U 30,1 31,2 32,U 33,U 34,U 35,23
148.05 36,U 37,U 38,U 39,U 40,U 41,3 42,U 43,U 44,U 45,U 46,U
148.06 47,U 48,U 49,U 50,U 51,3 52,U 53,1 54,U 55,U 56,U 57,2
148.07 58,U 59,U 60,U 61,4 62,4 63,4 64,3 65,U 66,U 67,U 68,U
148.08 69,1 70,U 71,2 72,2 73,2 74,U 75,U 76,U 77,2 78,U 79,2
148.09 80,23 81,U 82,U

149.01 *pauroneurata*
149.02 1,U 2,U 3,5.5 4,U 5,6 6,U 7,3 8,1 9,3 10,1 11,2 12,1
149.03 13,U 14,U 15,1 16,1 17,6 18,3 19,2 20,1 21,1 22,1 23,U
149.04 24,2 25,3 26,3 27,1 28,2 29,2 30,1 31,1 32,3 33,2 34,2
149.05 35,8 36,U 37,1 38,1 39,1 40,U 41,5 42,15 43,1–2 44,2
149.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,3
149.07 56,– 57,2 58,– 59,– 60,2 61,1 62,1 63,1 64,3 65,2 66,1
149.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
149.09 78,U 79,2 80,27 81,1 82,1

150.01 *pectinata*
150.02 1,U 2,U 3,2 4,U 5,6 6,U 7,3 8,1 9,3 10,1 11,2 12,1 13,1
150.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,2 24,1
150.04 25,4 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,2 35,5
150.05 36,U 37,2 38,2 39,2 40,U 41,10 42,U 43,1–2 44,2 45,1
150.06 46,1 47,U 48,1 49,1 50,U 51,3 52,1 53,1 54,1 55,3 56,–
150.07 57,U 58,U 59,U 60,U 61,2 62,2 63,U 64,1 65,2 66,2 67,2
150.08 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
150.09 79,2 80,41 81,1 82,1

151.01 *pelamidis*
151.02 1,113 2,100 3,12 4,U 5,20 6,U 7,2 8,2 9,2 10,U 11,U 12,U
151.03 13,1 14,2 15,U 16,U 17,U 18,3 19,2 20,1 21,1 22,3 23,1
151.04 24,U 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
151.05 35,3 36,220 37,1 38,1 39,0 40,0 41,24 42,20 43,3 44,2
151.06 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1 55,2
151.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,1 66,1
151.08 67,2 68,2 69,1 70,U 71,1 72,2 73,2 74,U 75,1 76,1 77,2
151.09 78,U 79,3 80,63 81,2 82,1

152.01 *pellucida*
152.02 1,U 2,U 3,2 4,U 5,3.5 6,U 7,3 8,1 9,2 10,1 11,2 12,2
152.03 13,2 14,– 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,3 23,2
152.04 24,2 25,3 26,4 27,1 28,1 29,1 30,1 31,1 32,U 33,2 34,1

152.05 35,5 36,28 37,2 38,2 39,U 40,U 41,8 42,U 43,2 44,2 45,2
152.06 46,2 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,1 55,3 56,–
152.07 57,2 58,– 59,– 60,2 61,2 62,2 63,U 64,3 65,2 66,1 67,2
152.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,4 77,1 78,2
152.09 79,3 80,21/23 81,1 82,1

153.01 *pennata*
153.02 1,114 2,73 3,3 4,U 5,7.5 6,U 7,2 8,1 9,2 10,1 11,2 12,1
153.03 13,1 14,1 15,1 16,3 17,4 18,3 19,2 20,1 21,1 22,2 23,U
153.04 24,2 25,4 26,2 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
153.05 35,3 36,39–41 37,2 38,2 39,5 40,2 41,12 42,15 43,1 44,3
153.06 45,2 46,2 47,2 48,3 49,1 50,1 51,5–6 52,1 53,1 54,1 55,2
153.07 56,– 57,2 58,– 59,– 60,1 61,4 62,3 63,3 64,2 65,2 66,1
153.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
153.09 78,2 79,2 80,35–43 81,1 82,2

154.01 *perimensis*
154.02 1,U 2,U 3,5 4,70 5,10 6,U 7,1 8,2 9,3 10,1 11,2 12,1
154.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,4
154.04 24,2 25,3 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,2
154.05 35,17 36,U 37,1 38,1 39,1 40,U 41,8 42,30 43,1–2 44,2
154.06 45,2 46,2 47,U 48,2 49,2 50,U 51,9 52,1 53,1 54,1 55,2
154.07 56,– 57,U 58,U 59,U 60,U 61,4 62,4 63,U 64,3 65,1 66,2
154.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2
154.09 78,2 79,2 80,28 81,1 82,1

155.01 *perrieri*
155.02 1,185 2,135 3,5 4,U 5,12 6,U 7,3 8,3 9,3 10,1 11,2 12,2
155.03 13,1 14,6 15,1 16,1 17,1 18,1 19,2 20,1 21,2 22,– 23,1
155.04 24,1 25,3 26,3 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
155.05 35,18 36,170 37,1 38,1 39,2–3 40,4–5 41,10 42,30 43,2
155.06 44,2 45,2 46,2 47,2 48,3 49,1 50,2 51,9 52,2 53,1 54,2
155.07 55,2 56,– 57,2 58,– 59,– 60,2 61,1 62,1 63,4 64,3 65,1
155.08 66,2 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
155.09 77,2 78,1 79,2 80,25 81,1 82,1

157.01 *petersi*
157.02 1,302 2,130 3,5 4,U 5,7 6,U 7,3 8,1 9,3 10,1 11,1 12,2
157.03 13,1 14,2 15,3 16,1 17,1 18,1 19,2 20,3 21,1 22,1 23,4
157.04 24,1 25,4 26,3 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
157.05 35,13 36,200 37,1 38,1 39,U 40,130 41,4 42,U 43,2 44,2
157.06 45,2 46,2 47,2 48,3 49,3 50,1 51,4 52,1 53,1 54,2 55,1
157.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,2 65,2 66,1
157.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
157.09 78,1 79,2 80,26 81,1 82,1

158.01 *philocorallia*
158.02 1,136 2,115 3,6 4,U 5,6 6,U 7,3 8,1 9,2 10,1 11,2 12,2
158.03 13,1 14,3 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
158.04 24,2 25,3 26,3 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,2
158.05 35,6 36,135 37,1 38,1 39,1 40,0 41,4 42,U 43,3 44,3 45,2
158.06 46,2 47,2 48,1 49,1 50,1 51,3 52,2 53,1 54,1 55,2 56,–
158.07 57,2 58,– 59,– 60,1 61,2 62,3 63,3 64,1 65,2 66,1 67,2
158.08 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
158.09 79,2 80,34 81,1 82,4

159.01 *plicata*
159.02 1,126 2,80 3,4 4,U 5,8 6,U 7,3 8,3 9,3 10,1 11,2 12,1
159.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,1
159.04 24,1 25,3 26,9 27,1 28,4 29,2 30,1 31,2 32,1 33,2 34,2
159.05 35,7 36,115 37,1 38,1 39,1 40,30 41,5 42,U 43,3 44,2
159.06 45,2 46,2 47,2 48,3 49,1 50,2 51,U 52,1 53,1 54,2 55,1
159.07 56,– 57,1 58,2 59,4 60,– 61,1 62,1 63,1 64,1 65,2 66,2
159.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
159.09 78,U 79,2 80,25 81,1 82,1

160.01 *polybranchia*
160.02 1,U 2,U 3,3 4,U 5,8 6,U 7,3 8,3 9,2 10,1 11,1 12,2 13,1
160.03 14,3 15,1 16,2 17,1 18,3 19,2 20,1 21,2 22,– 23,2 24,1
160.04 25,3 26,4 27,2 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,7–8
160.05 36,U 37,1 38,1 39,1 40,U 41,5 42,15 43,3 44,2 45,2 46,2
160.06 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,1 55,1 56,– 57,2
160.07 58,– 59,– 60,1 61,4 62,4 63,U 64,3 65,1 66,2 67,1 68,2
160.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
160.09 80,24–36 81,1 82,1

161.01 *prayensis*
161.02 1,U 2,U 3,2 4,U 5,4.5 6,U 7,3 8,3 9,2 10,1 11,1 12,2
161.03 13,1 14,3 15,1 16,1 17,U 18,1 19,2 20,U 21,U 22,U 23,U
161.04 24,2 25,4 26,1 27,U 28,U 29,U 30,1 31,1 32,1 33,2 34,1
161.05 35,5 36,33 37,2 38,2 39,1 40,0 41,9 42,12 43,1 44,2 45,2
161.06 46,2 47,U 48,2 49,2 50,U 51,2 52,1 53,1 54,1 55,2 56,–
161.07 57,2 58,– 59,– 60,1 61,1 62,1 63,U 64,3 65,2 66,1 67,2
161.08 68,1 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
161.09 79,3 80,18 81,1 82,2

162.01 *prognatha*
162.02 1,122 2,80 3,7.5 4,U 5,16 6,U 7,3 8,1 9,2 10,1 11,2 12,1
162.03 13,U 14,U 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,1 23,1
162.04 24,2 25,3 26,5 27,U 28,U 29,U 30,1 31,2 32,3 33,2 34,–
162.05 35,10/13 36,110 37,1 38,1 39,U 40,U 41,3 42,U 43,2–3
162.06 44,3 45,2 46,2 47,2 48,2 49,2 50,2 51,9 52,1 53,1 54,1
162.07 55,2 56,– 57,2 58,– 59,– 60,2 61,1 62,4 63,4 64,3 65,2
162.08 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,2 76,1
162.09 77,2 78,U 79,2 80,35 81,1 82,1

163.01 *pulvinopalpata*
163.02 1,U 2,U 3,11 4,U 5,23 6,U 7,3 8,3 9,3 10,1 11,2 12,2
163.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1
163.04 24,1 25,3 26,3 27,2 28,1 29,1 30,1 31,1 32,3 33,2 34,2
163.05 35,3 36,U 37,1 38,1 39,1 40,0 41,25 42,15 43,2 44,3 45,2
163.06 46,2 47,2 48,2 49,2 50,2 51,5–6 52,3 53,1 54,1 55,2 56,–
163.07 57,2 58,– 59,– 60,1 61,3 62,3 63,3 64,3 65,2 66,1 67,2
163.08 68,1 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2 78,2
163.09 79,2 80,62–72 81,1 82,1

164.01 *purpurea*
164.02 1,106 2,53 3,4 4,U 5,9.5 6,U 7,3 8,1 9,3 10,1 11,2 12,2
164.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1
164.04 24,1 25,3 26,4 27,1 28,2 29,1 30,1 31,1 32,1 33,2 34,1
164.05 35,5 36,100 37,1 38,1 39,2 40,0 41,14 42,20 43,2 44,2
164.06 45,1 46,1 47,1 48,1 49,1 50,1 51,4 52,1 53,1 54,2 55,1

164.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,4 64,2 65,2 66,2
164.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
164.09 78,1 79,2 80,19 81,1 82,1

165.01 *pycnobranchiata*
165.02 1,U 2,U 3,8 4,U 5,12 6,U 7,3 8,1 9,3 10,1 11,2 12,1 13,U
165.03 14,U 15,1 16,3 17,2 18,3 19,2 20,1 21,1 22,2 23,1 24,1
165.04 25,3 26,5 27,1 28,2 29,1 30,1 31,1 32,2 33,2 34,U 35,5–6
165.05 36,U 37,1 38,1 39,U 40,U 41,4 42,U 43,2 44,3 45,2 46,2
165.06 47,U 48,3 49,1 50,U 51,U 52,3 53,1 54,1 55,3 56,– 57,2
165.07 58,– 59,– 60,U 61,4 62,4 63,U 64,2 65,2 66,2 67,2 68,2
165.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,1 79,2
165.09 80,28/29 81,1 82,1

166.01 *quinquefida*
166.02 1,U 2,U 3,2.5 4,U 5,8 6,U 7,3 8,1 9,3 10,1 11,2 12,1
166.03 13,1 14,3 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,2 23,U
166.04 24,1 25,3 26,5 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
166.05 35,7 36,U 37,1 38,1 39,0 40,U 41,5 42,15 43,3 44,2 45,2
166.06 46,2 47,U 48,2 49,2 50,U 51,5–6 52,1 53,1 54,1 55,2 56,–
166.07 57,2 58,– 59,– 60,1 61,3 62,3 63,U 64,3 65,2 66,1 67,1
166.08 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
166.09 79,2 80,30 81,1 82,3

167.01 *reducta*
167.02 1,298 2,318 3,6 4,U 5,15 6,U 7,2 8,3 9,2 10,1 11,2 12,2
167.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,1
167.04 24,1 25,3 26,4 27,1 28,1 29,2 30,1 31,1 32,1 33,2 34,1
167.05 35,4 36,131 37,2 38,2 39,0 40,6 41,21 42,U 43,1 44,2
167.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,4
167.07 56,– 57,2 58,– 59,– 60,2 61,2 62,3 63,4 64,2 65,2 66,2
167.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
167.09 78,U 79,2 80,45 81,1 82,1

168.01 *rosaurae*
168.02 1,142 2,152 3,4 4,U 5,18 6,U 7,2 8,2 9,3 10,1 11,2 12,2
168.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,2 21,1 22,2 23,1
168.04 24,2 25,1 26,3 27,1 28,3 29,2 30,1 31,3 32,3 33,2 34,–
168.05 35,3 36,48–55 37,2 38,2 39,– 40,– 41,– 42,– 43,1–2
168.06 44,1–2 45,1 46,2 47,2 48,1 49,2 50,2 51,5 52,3 53,1 54,1
168.07 55,2 56,– 57,1 58,2 59,3 60,– 61,1 62,1 63,4 64,3 65,2
168.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
168.09 77,2 78,1 79,2/4 80,32–38 81,1 82,1

169.01 *roussaei*
169.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
169.03 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,1–2 22,1 23,1 24,U
169.04 25,U 26,U 27,1 28,U 29,U 30,1 31,1 32,1 33,U 34,1 35,6–8
169.05 36,U 37,1 38,1 39,U 40,U 41,47 42,U 43,5 44,2 45,2 46,2
169.06 47,U 48,3 49,1 50,U 51,U 52,U 53,1 54,2 55,1 56,– 57,U
169.07 58,U 59,U 60,U 61,1 62,1 63,U 64,3 65,2 66,1 67,2 68,2
169.08 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1 79,2
169.09 80,U 81,U 82,3

170.01 *rubella*
170.02 1,U 2,U 3,2 4,U 5,8 6,U 7,1 8,3 9,2 10,1 11,2 12,2 13,1
170.03 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,2 23,4 24,2

170.04 25,1 26,3 27,1 28,1 29,1 30,1 31,2 32,1 33,2 34,– 35,5
170.05 36,U 37,1 38,1 39,2 40,U 41,2 42,7 43,1 44,2 45,2 46,2
170.06 47,2 48,2 49,2 50,2 51,7 52,1 53,1 54,1 55,2 56,– 57,2
170.07 58,– 59,– 60,4 61,2 62,2 63,4 64,3 65,2 66,1 67,2 68,1
170.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
170.09 80,28 81,1 82,1

171.01 *rubra*
171.02 1,U 2,U 3,3 4,U 5,7.5 6,U 7,2 8,2 9,2 10,2 11,2 12,2
171.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,3 23,U
171.04 24,2 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
171.05 35,4 36,U 37,1 38,1 39,0 40,U 41,21 42,15 43,2 44,2 45,2
171.06 46,1 47,1 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,–
171.07 57,2 58,– 59,– 60,4 61,1 62,1 63,1 64,1 65,2 66,1 67,2
171.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1/5 77,1 78,2
171.09 79,3 80,27 81,1 82,2

172.01 *rubrivittata*
172.02 1,U 2,U 3,1.2 4,U 5,5.1 6,U 7,3 8,2 9,2 10,2 11,2 12,1
172.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,1
172.04 24,2 25,4 26,1 27,U 28,U 29,U 30,1 31,1 32,3 33,2 34,2
172.05 35,3 36,56 37,2 38,2 39,6 40,11 41,5 42,25 43,2/4 44,2
172.06 45,1 46,1 47,1 48,1 49,1 50,1 51,5–6 52,3 53,1 54,1 55,3
172.07 56,– 57,2 58,– 59,– 60,1 61,3 62,3 63,4 64,2 65,U 66,U
172.08 67,U 68,U 69,1 70,1 71,2 72,2 73,1 74,2 75,1 76,1 77,1
172.09 78,2 79,3 80,31 81,1 82,1

173.01 *rubrocincta*
173.02 1,100 2,68 3,3 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
173.03 13,U 14,U 15,U 16,U 17,U 18,U 19,U 20,3 21,2 22,– 23,4
173.04 24,U 25,4 26,U 27,2 28,2 29,2 30,1 31,1 32,1 33,U 34,1
173.05 35,3 36,80 37,2 38,1 39,U 40,11 41,8 42,U 43,U 44,U 45,U
173.06 46,U 47,U 48,U 49,U 50,U 51,U 52,1 53,1 54,U 55,U 56,U
173.07 57,2 58,– 59,– 60,U 61,2 62,2 63,2 64,3 65,1 66,2 67,1
173.08 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
173.09 79,2 80,U 81,U 82,U

174.01 *rullieri*
174.02 1,72 2,24 3,3 4,U 5,5 6,U 7,3 8,1 9,3 10,1 11,2 12,2
174.03 13,1 14,4 15,1 16,1 17,1 18,3 19,2 20,3 21,2 22,– 23,1
174.04 24,1 25,1 26,5 27,1 28,5 29,2 30,1 31,1 32,1 33,2 34,2
174.05 35,5 36,70 37,1 38,1 39,0 40,4–5 41,5 42,10 43,2 44,3
174.06 45,2 46,2 47,2 48,3 49,2 50,2 51,4 52,1 53,1 54,1 55,2
174.07 56,– 57,2 58,– 59,– 60,4 61,2 62,2 63,2 64,3 65,2 66,1
174.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
174.09 78,1 79,2 80,19 81,1 82,3

175.01 *samoae*
175.02 1,U 2,U 3,4 4,15 5,5 6,U 7,2 8,2 9,3 10,1 11,2 12,2 13,U
175.03 14,U 15,1 16,1 17,1 18,3 19,2 20,2 21,1 22,1 23,4 24,2
175.04 25,4 26,3 27,1 28,3 29,2 30,1 31,1 32,1 33,2 34,1 35,6
175.05 36,51 37,2 38,2 39,2 40,10 41,6 42,15 43,2 44,3 45,2
175.06 46,2 47,2 48,3 49,1 50,2 51,5 52,1 53,1 54,2 55,2 56,–
175.07 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,3 65,1 66,2 67,1
175.08 68,2 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2 78,1
175.09 79,2 80,26 81,1 82,1

176.01 *savignyi*
176.02 1,U 2,U 3,U 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U 13,U
176.03 14,U 15,U 16,U 17,U 18,U 19,U 20,U 21,1 22,1 23,U 24,U
176.04 25,U 26,U 27,2 28,U 29,1 30,1 31,1 32,U 33,U 34,U 35,4
176.05 36,45 37,2 38,2 39,U 40,U 41,12 42,U 43,U 44,U 45,U 46,U
176.06 47,U 48,U 49,U 50,U 51,U 52,U 53,U 54,U 55,U 56,U 57,U
176.07 58,U 59,U 60,U 61,U 62,U 63,U 64,U 65,U 66,U 67,U 68,U
176.08 69,1 70,U 71,2 72,2 73,1 74,U 75,U 76,U 77,1 78,U 79,2
176.09 80,U 81,U 82,U

177.01 *schizobranchia*
177.02 1,731 2,655 3,5 4,10 5,10 6,5 7,2 8,2 9,2 10,1 11,2 12,1
177.03 13,U 14,U 15,1 16,3 17,1 18,3 19,2 20,1 21,2 22,– 23,4
177.04 24,1 25,3 26,5 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
177.05 35,67 36,730 37,1 38,1 39,100 40,0 41,7 42,U 43,3 44,2
177.06 45,2 46,2 47,2 48,3 49,1 50,1 51,9 52,1 53,1 54,1 55,2
177.07 56,– 57,1 58,2 59,1 60,– 61,1 62,1 63,1 64,3 65,1 66,1
177.08 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1
177.09 76,1 77,1 78,U 79,2 80,60 81,2 82,1

178.01 *sebastiani*
178.02 1,706 2,1455 3,23 4,25 5,35 6,21 7,2 8,1 9,2 10,1 11,2
178.03 12,2 13,U 14,U 15,1 16,3 17,1 18,2 19,2 20,1 21,2 22,–
178.04 23,4 24,1 25,3 26,5 27,1 28,4 29,2 30,1 31,1 32,1 33,2
178.05 34,1 35,7–14 36,686 37,1 38,1 39,0 40,3 41,40 42,35
178.06 43,1/5 44,2 45,2 46,2 47,2 48,1 49,1 50,1 51,6–13 52,1
178.07 53,1 54,2 55,4 56,– 57,1 58,2 59,4 60,– 61,1 62,1 63,3
178.08 64,3 65,1 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,2
178.09 75,1 76,1 77,2 78,1 79,1 80,51/56 81,1 82,5

179.01 *segregata*
179.02 1,U 2,U 3,4 4,15 5,5 6,3.5 7,1 8,2 9,2 10,1 11,2 12,1
179.03 13,1 14,3 15,3 16,2 17,1 18,3 19,2 20,3 21,1 22,1 23,2
179.04 24,1 25,4 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
179.05 35,3 36,39 37,2 38,2 39,2 40,0 41,15 42,25 43,3 44,2
179.06 45,2 46,2 47,U 48,3 49,1 50,U 51,7 52,1 53,1 54,1 55,3
179.07 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,U 64,2 65,1 66,1
179.08 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,1/2 75,1 76,1 77,1
179.09 78,2 79,2 80,36 81,1 82,1

180.01 *semisegregata*
180.02 1,U 2,U 3,6 4,U 5,9 6,U 7,3 8,1 9,3 10,1 11,2 12,1 13,1
180.03 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2 24,2
180.04 25,4 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,3
180.05 36,65/69 37,2 38,2 39,0 40,0 41,38 42,15 43,2 44,2 45,2
180.06 46,2 47,U 48,2 49,2 50,U 51,4 52,1 53,1 54,1 55,2 56,–
180.07 57,2 58,– 59,– 60,1 61,3 62,3 63,U 64,3 65,U 66,U 67,U
180.08 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
180.09 79,2 80,51/55 81,1 82,1

181.01 *sonorae*
181.02 1,586 2,345 3,6 4,U 5,14 6,U 7,2 8,2 9,3 10,1 11,2 12,2
181.03 13,1 14,2 15,1 16,1 17,1 18,1 19,2 20,1 21,1 22,1 23,2
181.04 24,1 25,4 26,2 27,1 28,1 29,2 30,1 31,1 32,1 33,2 34,2
181.05 35,41 36,530 37,2 38,1 39,0 40,55 41,6 42,65 43,1–2
181.06 44,2 45,2 46,2 47,2 48,3 49,3 50,3 51,4 52,1 53,1 54,2

181.07 55,2 56,– 57,1 58,2 59,2 60,– 61,2 62,3 63,3 64,3 65,–
181.08 66,– 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1
181.09 77,2 78,1 79,1 80,54 81,1 82,1

182.01 *spongicola*
182.02 1,152 2,68 3,1.75 4,10 5,6 6,1.75 7,1 8,2 9,3 10,1 11,2
182.03 12,1 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,–
182.04 23,4 24,2 25,2 26,5 27,1 28,2 29,2 30,1 31,2 32,1 33,2
182.05 34,– 35,24 36,150 37,1 38,1 39,5 40,3 41,3 42,U 43,1–3
182.06 44,2 45,2 46,2 47,2 48,3 49,1 50,2 51,3 52,3 53,1 54,1
182.07 55,3 56,– 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,3 65,2
182.08 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,4
182.09 77,2 78,U 79,2 80,26 81,1 82,1

183.01 *stanleyi*
183.02 1,130 2,58 3,4 4,U 5,7 6,U 7,3 8,1 9,3 10,1 11,2 12,2
183.03 13,1 14,2 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,2 23,2
183.04 24,2 25,3 26,3 27,1 28,1 29,1 30,1 31,2 32,1 33,2 34,–
183.05 35,4 36,33 37,2 38,2 39,8 40,8 41,2 42,12 43,1–2 44,2
183.06 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2
183.07 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,2 66,2
183.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
183.09 78,U 79,2 80,29 81,1 82,1

184.01 *stigmatura*
184.02 1,U 2,U 3,2 4,U 5,4 6,U 7,3 8,1 9,2 10,1 11,2 12,1 13,1
184.03 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,1 24,2
184.04 25,4 26,2 27,2 28,2 29,1 30,1 31,1 32,2 33,2 34,1 35,3
184.05 36,110–126 37,1 38,1 39,4 40,40 41,5 42,15 43,1 44,3
184.06 45,2 46,2 47,2 48,2 49,2 50,2 51,6 52,1 53,1 54,1 55,2
184.07 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,3 64,2 65,2 66,1
184.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
184.09 78,2 79,2–3 80,27–35 81,1 82,1

185.01 *suviensis*
185.02 1,U 2,370 3,9 4,U 5,U 6,U 7,U 8,U 9,U 10,U 11,U 12,U
185.03 13,1 14,6 15,1 16,U 17,U 18,3 19,2 20,U 21,2 22,– 23,4
185.04 24,U 25,U 26,U 27,1 28,U 29,U 30,1 31,1 32,1 33,2 34,1
185.05 35,9 36,160 37,1 38,1 39,U 40,U 41,9 42,U 43,U 44,U 45,U
185.06 46,U 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,U
185.07 57,2 58,– 59,– 60,U 61,3 62,3 63,3 64,3 65,U 66,2 67,U
185.08 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,U 76,1 77,2 78,U
185.09 79,2 80,U 81,U 82,U

186.01 *tentaculata*
186.02 1,U 2,U 3,U 4,U 5,U 6,U 7,3 8,U 9,2 10,U 11,U 12,U 13,1
186.03 14,U 15,U 16,U 17,U 18,3 19,2 20,U 21,1 22,1 23,2 24,2
186.04 25,4 26,3 27,2 28,1 29,1 30,1 31,1 32,U 33,2 34,1 35,6
186.05 36,28 37,2 38,2 39,1 40,1 41,9 42,U 43,U 44,U 45,U 46,U
186.06 47,U 48,U 49,U 50,U 51,U 52,U 53,1 54,U 55,U 56,U 57,2
186.07 58,– 59,– 60,U 61,U 62,2 63,U 64,U 65,2 66,2 67,2 68,2
186.08 69,1/2 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2 79,3
186.09 80,23 81,1 82,5

187.01 *tenuis*
187.02 1,695 2,460 3,2 4,U 5,4.5 6,U 7,U 8,U 9,3 10,U 11,U 12,U
187.03 13,U 14,U 15,U 16,U 17,U 18,3 19,2 20,3 21,2 22,– 23,2

187.04 24,U 25,4 26,U 27,1 28,5 29,2 30,1 31,2 32,1 33,2 34,–
187.05 35,81 36,695 37,1 38,1 39,10 40,U 41,4 42,400 43,2 44,2
187.06 45,2 46,2 47,2 48,2 49,2 50,2 51,200 52,3 53,1 54,1 55,2
187.07 56,– 57,2 58,– 59,– 60,3 61,4 62,4 63,4 64,3 65,2 66,1
187.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
187.09 78,U 79,2 80,124 81,1 82,3

188.01 *thomasiana*
188.02 1,99 2,45 3,3 4,U 5,6 6,U 7,2 8,2 9,2 10,1 11,2 12,1
188.03 13,1 14,3 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,2 23,2
188.04 24,2 25,1 26,4 27,1 28,2 29,1 30,1 31,2 32,3 33,2 34,–
188.05 35,4 36,79 37,2 38,2 39,U 40,U 41,3 42,15 43,2 44,2 45,2
188.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,2 55,2 56,–
188.07 57,2 58,– 59,– 60,1 61,4 62,5 63,4 64,1 65,1 66,2 67,1
188.08 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,2 76,1 77,2 78,U
188.09 79,2 80,22/24 81,1 82,2

189.01 *tibiana*
189.02 1,165 2,73 3,3 4,U 5,5.5 6,U 7,2 8,2 9,2 10,1 11,2 12,1
189.03 13,1 14,2 15,3 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,2
189.04 24,2 25,3 26,4 27,3 28,1 29,1 30,1 31,1 32,3 33,2 34,1
189.05 35,6 36,135 37,2 38,1 39,1 40,10–15 41,5 42,U 43,2–3
189.06 44,2–3 45,2 46,2 47,2 48,3 49,1 50,2 51,4 52,1/3 53,1
189.07 54,2 55,2 56,– 57,2 58,– 59,– 60,1 61,1 62,1 63,1
189.08 64,3 65,1 66,2 67,1 68,1 69,1 70,2 71,2 72,2 73,2 74,U
189.09 75,1 76,1 77,2 78,U 79,2 80,26 81,1 82,5

190.01 *torquata*
190.02 1,U 2,U 3,4 4,U 5,10.5 6,U 7,3 8,1 9,3 10,1 11,2 12,2
190.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3 23,2
190.04 24,2 25,3 26,5 27,1 28,1 29,1 30,1 31,1 32,1 33,2 34,1
190.05 35,3 36,U 37,1 38,1 39,0 40,U 41,7 42,15 43,2 44,2 45,2
190.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2 56,–
190.07 57,2 58,– 59,– 60,1 61,1 62,1 63,1 64,1 65,2 66,1 67,2
190.08 68,1 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,2 78,1
190.09 79,2 80,32 81,1 82,2

191.01 *torresiensis*
191.02 1,72 2,47 3,3 4,10 5,6.5 6,3 7,3 8,1 9,3 10,1 11,2 12,2
191.03 13,1 14,3 15,3 16,2 17,1 18,1 19,2 20,1 21,1 22,3 23,2
191.04 24,2 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,1 34,2
191.05 35,5 36,70 37,1 38,1 39,1 40,0 41,7 42,15 43,1 44,2 45,2
191.06 46,2 47,2 48,2 49,2 50,2 51,4 52,3 53,1 54,1 55,3 56,–
191.07 57,2 58,– 59,– 60,2 61,4 62,4 63,4 64,1 65,U 66,U 67,U
191.08 68,U 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
191.09 79,3 80,24 81,1 82,1

192.01 *tribranchiata*
192.02 1,U 2,U 3,7 4,U 5,13 6,U 7,3 8,1 9,3 10,1 11,2 12,1 13,U
192.03 14,U 15,1 16,2 17,1 18,3 19,2 20,1 21,1 22,1 23,1 24,1
192.04 25,3 26,4 27,1 28,4 29,1 30,1 31,1 32,1 33,2 34,2 35,4–5
192.05 36,U 37,1 38,1 39,0 40,U 41,8 42,U 43,3 44,2 45,2 46,2
192.06 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,3 55,2 56,– 57,U
192.07 58,U 59,U 60,U 61,1 62,1 63,U 64,1 65,2 66,2 67,2 68,2
192.08 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2 78,U 79,2
192.09 80,30 81,1 82,1

193.01 *tridentata*
193.02 1,185 2,170 3,7 4,10 5,12 6,7 7,3 8,1 9,3 10,1 11,2 12,2
193.03 13,U 14,U 15,3 16,1 17,1 18,3 19,2 20,3 21,1 22,2 23,2
193.04 24,1 25,3 26,4 27,2 28,1 29,2 30,1 31,1 32,1 33,2 34,1
193.05 35,3 36,80 37,2 38,2 39,1 40,15 41,14 42,30 43,2–3
193.06 44,2–3 45,2 46,1 47,1 48,2 49,1 50,1 51,4 52,1 53,1 54,1
193.07 55,2 56,– 57,2 58,– 59,– 60,2 61,2 62,1 63,2 64,3 65,2
193.08 66,2 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,1 75,1 76,1
193.09 77,1 78,2 79,2 80,51 81,2 82,1

194.01 *tubicola*
194.02 1,83 2,26.5 3,1.2 4,10 5,4 6,1.2 7,3 8,2 9,2 10,1 11,2
194.03 12,1 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,3 21,2 22,–
194.04 23,4 24,2 25,3 26,4 27,1 28,2 29,2 30,1 31,3 32,2 33,–
194.05 34,– 35,22/24 36,69 37,2 38,1 39,– 40,– 41,– 42,– 43,3
194.06 44,2 45,2 46,1 47,1 48,2 49,1 50,1 51,5 52,1 53,1 54,2
194.07 55,1 56,– 57,1 58,2 59,1 60,– 61,2 62,4 63,4 64,3 65,2
194.08 66,1 67,2 68,1 69,1 70,2 71,2 72,1 73,1 74,U 75,1 76,1
194.09 77,2 78,U 79,2 80,21 81,1 82,1

195.01 *tubifex*
195.02 1,U 2,U 3,2 4,U 5,7 6,U 7,3 8,3 9,3 10,1 11,1 12,2 13,1
195.03 14,2 15,1 16,3 17,1 18,3 19,2 20,3 21,2 22,– 23,1 24,1
195.04 25,1 26,4 27,1 28,4 29,2 30,1 31,1 32,1 33,2 34,2 35,17
195.05 36,U 37,1 38,1 39,U 40,U 41,4 42,30 43,1 44,3 45,2 46,2
195.06 47,U 48,3 49,2 50,U 51,5 52,1 53,1 54,2 55,1 56,– 57,1
195.07 58,2 59,1 60,– 61,2 62,1 63,U 64,3 65,1 66,1 67,1 68,1
195.08 69,1 70,2 71,2 72,1 73,2 74,U 75,1 76,2 77,2 78,1 79,2
195.09 80,29/32 81,1 82,1

196.01 *unidentata*
196.02 1,U 2,80–100 3,2–3 4,U 5,U 6,U 7,3 8,U 9,2 10,1 11,1
196.03 12,U 13,1 14,U 15,1 16,1 17,1 18,1 19,1 20,1 21,2 22,–
196.04 23,4 24,U 25,U 26,U 27,1 28,1 29,2 30,1 31,1 32,1 33,2
196.05 34,1 35,23 36,U 37,2 38,2 39,U 40,U 41,5 42,35 43,1 44,2
196.06 45,U 46,2 47,U 48,U 49,2 50,U 51,U 52,U 53,1 54,1 55,2
196.07 56,– 57,U 58,U 59,U 60,U 61,U 62,3 63,U 64,U 65,2 66,2
196.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
196.09 78,1 79,1 80,20–25 81,U 82,U

197.01 *unifrons*
197.02 1,U 2,U 3,1 4,10 5,5 6,1 7,3 8,1 9,1 10,1 11,2 12,2
197.03 13,U 14,U 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,1 23,1
197.04 24,2 25,4 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1
197.05 35,3 36,45–54 37,2 38,2 39,4 40,10 41,5 42,15 43,3 44,2
197.06 45,2 46,2 47,2 48,2 49,2 50,2 51,5 52,1 53,1 54,1 55,3
197.07 56,– 57,2 58,– 59,– 60,1 61,1 62,4 63,U 64,1 65,2 66,1
197.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
197.09 78,2 79,3 80,25–31 81,1 82,1

198.01 *valens*
198.02 1,179 2,140 3,9 4,15 5,12.5 6,8.5 7,2 8,2 9,2 10,1 11,2
198.03 12,1 13,1 14,1 15,1 16,3 17,1 18,3 19,2 20,1 21,1 22,1
198.04 23,2 24,2 25,3 26,3 27,1 28,1 29,1 30,1 31,1 32,1 33,2
198.05 34,1 35,3 36,76 37,2 38,2 39,2 40,10 41,11 42,U 43,2–3
198.06 44,3 45,2 46,2 47,2 48,3 49,1 50,1 51,9 52,1 53,1 54,2

198.07 55,2 56,– 58,– 59,– 60,1 61,1 62,1 63,3 64,2 65,2
198.08 66,1 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1
198.09 77,1 78,2 79,2 80,43 81,1 82,2

199.01 *validobranchiata*
199.02 1,U 2,U 3,4 4,U 5,4 6,U 7,3 8,1 9,3 10,1 11,2 12,1 13,U
199.03 14,U 15,1 16,2 17,1 18,3 19,2 20,1 21,2 22,– 23,2 24,2
199.04 25,3 26,3 27,3 28,1 29,2 30,1 31,1 32,1 33,2 34,1 35,3
199.05 36,37–40 37,2 38,2 39,0 40,2–3 41,33 42,15 43,1 44,2
199.06 45,2 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,3
199.07 56,– 57,2 58,– 59,– 60,2 61,3 62,3 63,U 64,3 65,2 66,2
199.08 67,2 68,2 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
199.09 78,2 79,2 80,28–37 81,1 82,1

200.01 *violaceomaculata*
200.02 1,215 2,170 3,7 4,10 5,12 6,7 7,2 8,2 9,3 10,1 11,2 12,2
200.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,1 23,1
200.04 24,1 25,3 26,5 27,1–2 28,1 29,1 30,1 31,1 32,1 33,2 34,1
200.05 35,6–7 36,215 37,1 38,1 39,U 40,U 41,20 42,15 43,1 44,3
200.06 45,2 46,2 47,2 48,1 49,1 50,3 51,4 52,1 53,1 54,2 55,2
200.07 56,– 57,2 58,– 59,– 60,4 61,3 62,3 63,3 64,2 65,2 66,1
200.08 67,2 68,1 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
200.09 78,U 79,2 80,25–39 81,1 82,1

201.01 *vittata*
201.02 1,73 2,23.5 3,2 4,10 5,4 6,2 7,3 8,1 9,1 10,1 11,2 12,2
201.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,1 23,2
201.04 24,2 25,4 26,2 27,2 28,1 29,1 30,1 31,1 32,2 33,2 34,1
201.05 35,3 36,23 37,2 38,2 39,0 40,1 41,12 42,12 43,3 44,3
201.06 45,2 46,2 47,2 48,3 49,1 50,1 51,4 52,1 53,1 54,1 55,2
201.07 56,– 57,2 58,– 59,– 60,1 61,1 62,3 63,3 64,3 65,2 66,1
201.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1
201.09 78,2 79,3 80,20–22 81,1 82,5

202.01 *vittatopsis*
202.02 1,U 2,U 3,2.5 4,10 5,6 6,2.5 7,2 8,1 9,2 10,1 11,2 12,1
202.03 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,2 23,1
202.04 24,2 25,4 26,3 27,3 28,1 29,1 30,1 31,1 32,1 33,2 34,1
202.05 35,3 36,U 37,2 38,2 39,2 40,U 41,10 42,U 43,2 44,2 45,2
202.06 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,3 56,–
202.07 57,2 58,– 59,– 60,2 61,2 62,3 63,U 64,1 65,2 66,1 67,2
202.08 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1 77,1 78,2
202.09 79,3 80,39 81,1 82,1

203.01 *wasinensis*
203.02 1,84 2,17 3,2.5 4,10 5,6 6,2.5 7,3 8,1 9,3 10,2 11,1
203.03 12,2 13,1 14,3 15,1 16,1 17,1 18,3 19,2 20,3 21,2 22,–
203.04 23,4 24,2 25,3 26,2 27,1 28,1 29,2 30,2 31,– 32,– 33,–
203.05 34,– 35,– 36,– 37,– 38,– 39,– 40,– 41,– 42,– 43,3 44,2
203.06 45,2 46,2 47,2 48,3 49,1 50,1 51,4 52,1 53,1 54,2 55,4
203.07 56,– 57,2 58,– 59,– 60,3 61,3 62,4 63,4 64,3 65,1 66,2
203.08 67,1 68,2 69,1 70,2 71,2 72,2 73,2 74,U 75,1 76,1 77,2
203.09 78,U 79,2 80,27–31 81,1 82,1

204.01 *websteri*
204.02 1,150 2,120 3,4 4,10 5,8 6,4 7,1 8,2 9,2 10,1 11,2 12,2
204.03 13,1 14,2 15,1 16,1 17,1 18,3 19,2 20,3 21,1 22,2 23,2

204.04 24,2 25,3 26,3 27,2 28,2 29,1 30,1 31,1 32,1 33,2 34,1
204.05 35,3 36,53 37,2 38,2 39,1 40,10 41,15 42,U 43,2 44,2
204.06 45,2 46,2 47,2 48,3 49,2 50,2 51,6 52,1 53,1 54,1 55,3
204.07 56,– 57,2 58,– 59,– 60,2 61,3 62,4 63,4 64,1 65,2 66,1
204.08 67,2 68,1 69,1 70,2 71,2 72,2 73,1 74,2 75,1 76,1/3 77,1
204.09 78,2 79,2 80,31 81,1 82,3

205.01 *woodwardi*
205.02 1,U 2,U 3,5 4,10 5,7 6,5 7,3 8,2 9,3 10,1 11,1 12,2 13,U
205.03 14,U 15,1 16,2 17,1 18,3 19,2 20,3 21,1 22,1 23,2 24,2
205.04 25,3 26,2 27,1 28,2 29,2 30,1 31,1 32,1 33,2 34,1 35,3
205.05 36,39 37,2 38,2 39,0 40,4–5 41,12 42,15 43,1 44,2 45,2
205.06 46,2 47,2 48,2 49,2 50,2 51,3 52,1 53,1 54,1 55,2 56,–
205.07 57,2 58,– 59,– 60,1 61,2 62,4 63,U 64,3 65,U 66,U 67,U
205.08 68,U 69,1 70,1 71,2 72,2 73,1 74,1 75,1 76,1 77,1 78,2
205.09 79,3 80,31 81,1 82,5

206.01 *parva*
206.02 1,59 2,17 3,.75 4,10 5,4 6,.75 7,3 8,1 9,2 10,1 11,2
206.03 12,2 13,1 14,4 15,1 16,1 17,1 18,3 19,2 20,1 21,1 22,3
206.04 23,2 24,2 25,3 26,2 27,2 28,1 29,1 30,1 31,1 32,1 33,1
206.05 34,1 35,5 36,20 37,2 38,2 39,2 40,2 41,4 42,10 43,2 44,3
206.06 45,2 46,2 47,2 48,2 49,2 50,2 51,4 52,1 53,1 54,1 55,2
206.07 56,– 57,2 58,– 59,– 60,2 61,3 62,4 63,4 64,2 65,U 66,U
206.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,2 75,1 76,1 77,1
206.09 78,2 79,3 80,24 81,1 82,1

207.01 *goodsiri*
207.02 1,N 2,N 3,2.5 4,N 5,N 6,N 7,N 8,N 9,3 10,N 11,N 12,N
207.03 13,1 14,N 15,N 16,N 17,1 18,N 19,N 20,1 21,1 22,2 23,1
207.04 24,N, 25,N 26,N 27,1 28,N 29,N 30,1 31,2 32,1 33,2 34,–
207.05 35,25 36,N 37,N 38,N 39,11 40,N 41,2 42,2 43,3 44,2 45,N
207.06 46,N 47,N 48,N 49,N 50,N 51,N 52,N 53,1 54,1 55,2 56,–
207.06 57,N 58,N 59,N 60,N 61,3 62,3 63,N 64,3 65,N 66,N 67,N
207.07 68,N 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2 78,1
207.08 79,2 80,N 81,1 82,1

208.01 *scombrinis*
208.02 1,130 2,47 3,4 4,10 5,7 6,10 7,3 8,1 9,3 10,1 11,1 12,1
208.03 13,U 14,U 15,1 16,1 17,1 18,3 19,2 20,1 21,2 22,– 23,2
208.04 24,1 25,3 26,9 27,1 28,1 29,2 30,1 31,1 32,1 33,2 34,2
208.05 35,7 36,125 37,1 38,1 39,5 40,5 41,17 42,U 43,1 44,3
208.06 45,2 46,2 47,2 48,3 49,1 50,1 51,5 52,1 53,1 54,2 55,1
208.07 56,– 57,1 58,2 59,1 60,– 61,1 62,1 63,1 64,3 65,– 66,–
208.08 67,2 68,2 69,1 70,2 71,2 72,2 73,2 74,1 75,1 76,1 77,2
208.09 78,1 79,2 80,29 81,1 82,5

Appendix C

Important publications on *Eunice* issued since 1985 and new taxa described.

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1989. Some Observations on the Possible Synonymy of *Eunice vittata* (Delle Chiaje, 1825) and *E. indica* Kinberg, 1865 (Annelida, Polychaeta). *Cahiers de Biologie Marine*, 30(2):227–234.

Hanley, J. Russell

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New species: *Eunice metatropos*.

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New species: *Eunice riojai*.

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New species: *Eunice masudai, E. yamamotoi, E. annulicirrata, E. fauchaldi*, and *E. tanseiae*.

New subspecies: *E. northioidea brevibranchiata*.

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1833. Classification des Annélides, et description de celles qui habitent les côtes de la France. *Annales des Sciences Naturelles* (Paris), series 1, 28:187-247, plates 9, 10.

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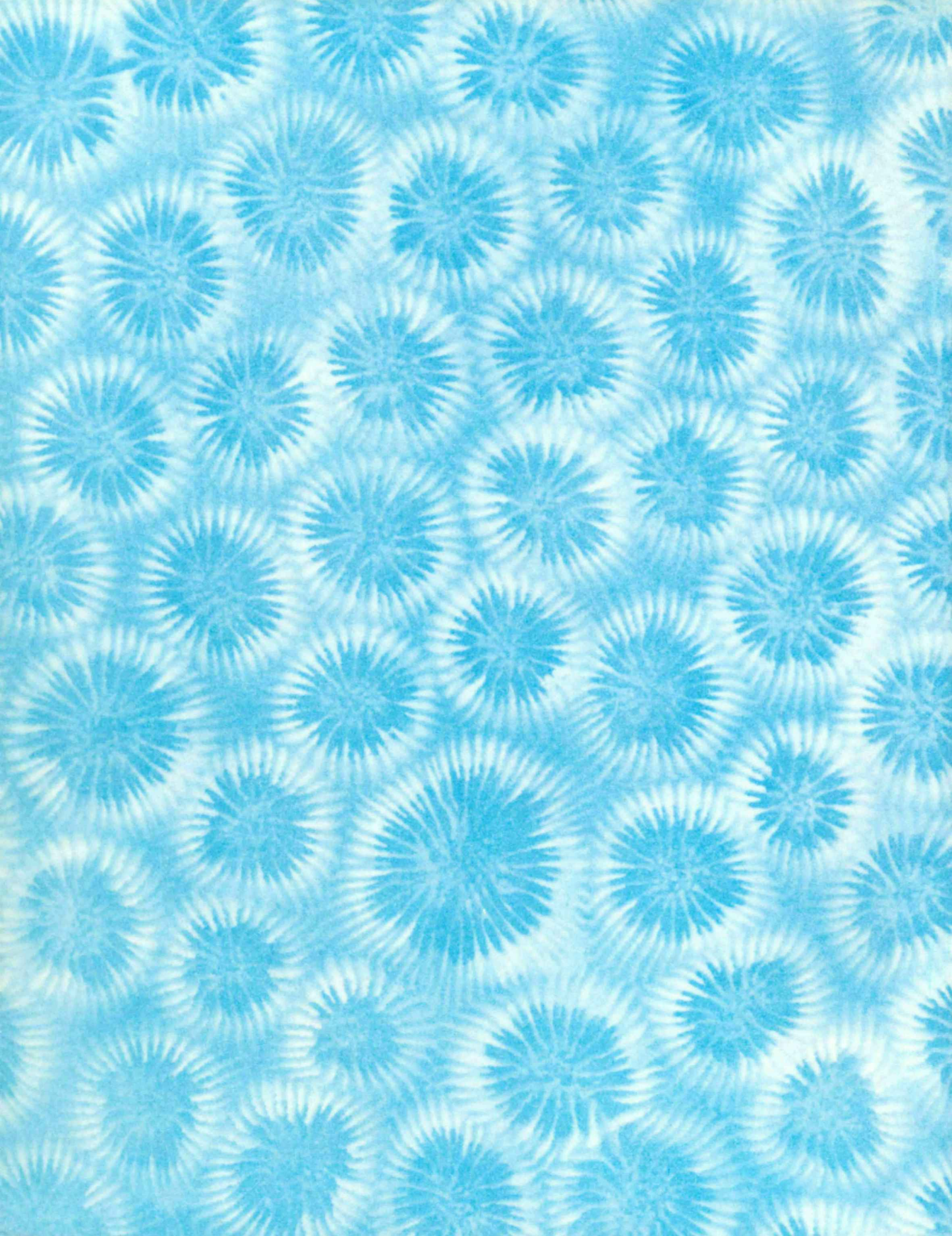
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