

Scaled Polychaetes (Polynoidae)
Associated with Ophiuroids and Other
Invertebrates and Review of Species
Referred to *Malmgrenia* McIntosh and
Replaced by *Malmgreniella* Hartman,
with Descriptions of New Taxa

MARIAN H. PETTIBONE

SERIES PUBLICATIONS OF THE SMITHSONIAN INSTITUTION

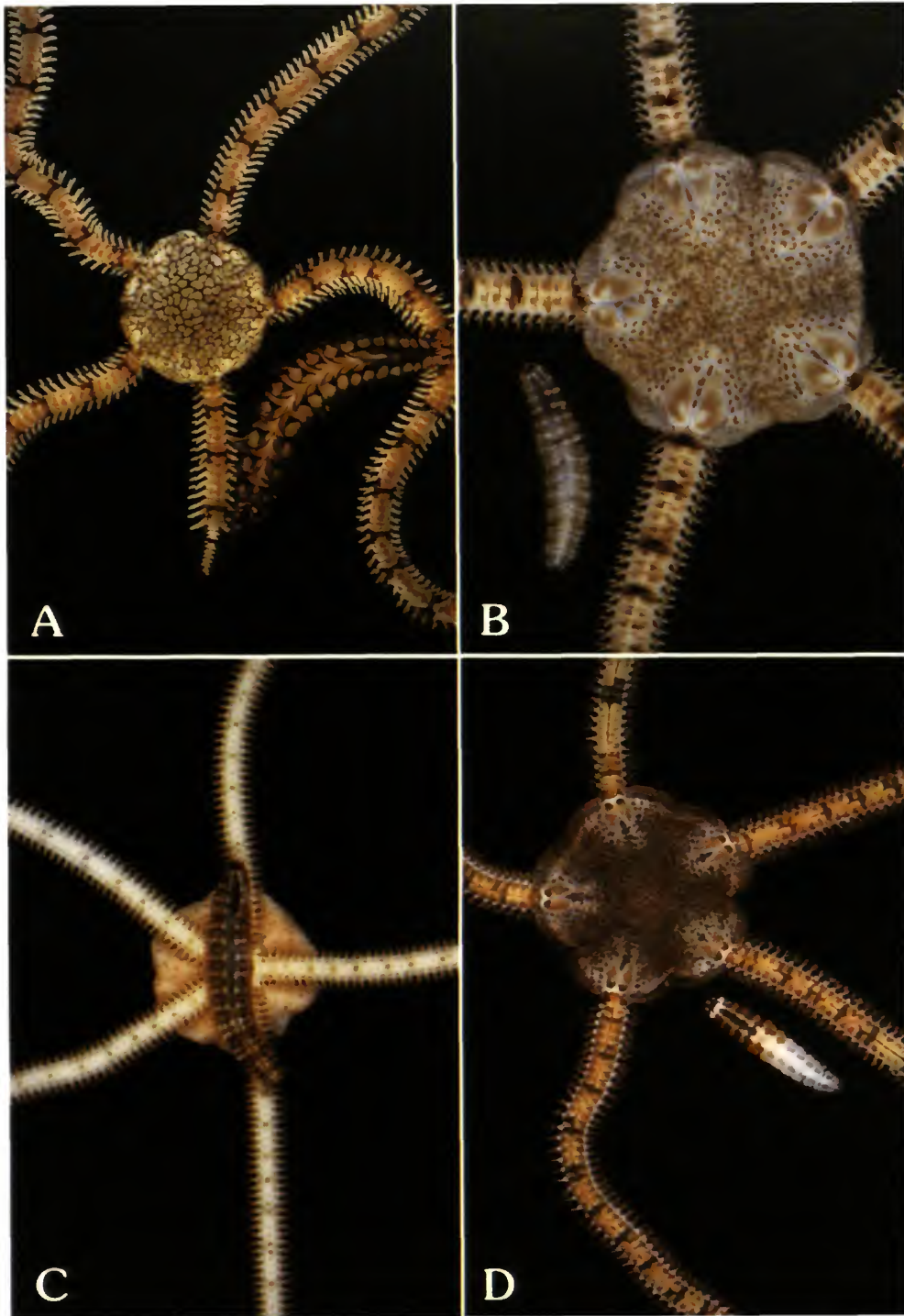
Emphasis upon publication as a means of "diffusing knowledge" was expressed by the first Secretary of the Smithsonian. In his formal plan for the Institution, Joseph Henry outlined a program that included the following statement: "It is proposed to publish a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge." This theme of basic research has been adhered to through the years by thousands of titles issued in series publications under the Smithsonian imprint, commencing with *Smithsonian Contributions to Knowledge* in 1848 and continuing with the following active series:

Smithsonian Contributions to Anthropology
Smithsonian Contributions to Astrophysics
Smithsonian Contributions to Botany
Smithsonian Contributions to the Earth Sciences
Smithsonian Contributions to the Marine Sciences
Smithsonian Contributions to Paleobiology
Smithsonian Contributions to Zoology
Smithsonian Folklife Studies
Smithsonian Studies in Air and Space
Smithsonian Studies in History and Technology

In these series, the Institution publishes small papers and full-scale monographs that report the research and collections of its various museums and bureaux or of professional colleagues in the world of science and scholarship. The publications are distributed by mailing lists to libraries, universities, and similar institutions throughout the world.

Papers or monographs² submitted for series publication are received by the Smithsonian Institution Press, subject to its own review for format and style, only through departments of the various Smithsonian museums or bureaux, where the manuscripts are given substantive review. Press requirements for manuscript and art preparation are outlined on the inside back cover.

Robert McC. Adams
Secretary
Smithsonian Institution



FRONTISPIECE.—A, *Malgreniella variegata* with *Ophiophragmus reticulata*; B, *M. puntotorensis* with *Ophiophragmus cubanus*; C,D, *M. puntotorensis* with *Ophiophragmus pulcher*. (Photographs by John E. Miller.)

Scaled Polychaetes (Polynoidae)
Associated with Ophiuroids and Other
Invertebrates and Review of Species
Referred to *Malmgrenia* McIntosh and
Replaced by *Malmgreniella* Hartman,
with Descriptions of New Taxa

Marian H. Pettibone



SMITHSONIAN INSTITUTION PRESS

Washington, D.C.

1993

ABSTRACT

Pettibone, Marian H. Scaled Polychaetes (Polynoidae) Associated with Ophiuroids and Other Invertebrates and Review of Species Referred to *Malmgrenia* McIntosh and Replaced by *Malmgreniella* Hartman, with Descriptions of New Taxa. *Smithsonian Contributions to Zoology*, number 538, 92 pages, frontispiece, 55 figures, 1993. Included in this report are new distribution records and descriptions of 44 species of Polynoidae distributed between two subfamilies: Lepidonotinae, with *Hermenia verruculosa* Grube and *Lepidonopsis humilis* (Augener); and Harmothoinae, with *Subadyte pellucida* (Ehlers), and three species and one new combination of *Hololepidella* Willey. The study includes a replacement of *Malmgrenia* McIntosh, 1874 (= indeterminable) with *Malmgreniella* Hartman, 1967, emended, with a redescription of *M. dicirra* Hartman, 1967, the type species, and a review and revision of the species that have been referred to *Malmgrenia*, resulting in 13 new combinations (with 2 new synonyms) and 19 new species of *Malmgreniella*. In addition, three new genera are added, including *Paragattiana*, for *P. micropoides* (Augener), new combination, and *P. intesi*, new species; *Rullieriella*, for *R. monoechinata* (Rullier), new combination, with synonym *Parahalosydna chryostictus* Hutchings and Rainer; and *Wiltoniella* for *W. furcosetosa* (Loshamn), new combination. Most of the species show a more or less close association with other invertebrates, including echinoderms (ophiuroids, spatangoid echinoids, synaptid holothurians), coelenterates (hydrocorals), and other polychaetes (arenicolids, terebellids, and chaetopterids).

OFFICIAL PUBLICATION DATE is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, *Smithsonian Year*. SERIES COVER DESIGN: The coral *Montastrea cavernosa* (Linnaeus).

Library of Congress Cataloging-in-Publication Data

Pettibone, Marian H.

Scaled polychaetes (Polynoidae) associated with ophiuroids and other invertebrates and review of species referred to *Malmgrenia* McIntosh and replaced by *Malmgreniella* Hartman, with descriptions of new taxa / Marian H. Pettibone. p. cm. — (Smithsonian contributions to zoology ; no. 538)

Includes bibliographical references (p.).

1. Polynoidae—Classification. 2. *Malmgreniella*—Classification. 3. Ophiuroidae—Ecology. 4. Commensalism. I. Title. II. Series.

QL1.S54 no. 538 [QL391.A6] 591 s-dc20 [595.1'47] 92-35329

∞ The paper used in this publication meets the minimum requirements of the American National Standard for Permanence of Paper for Printed Library Materials Z39.48—1984.

Contents

| | <i>Page</i> |
|---|-------------|
| Introduction | 1 |
| Acknowledgments | 1 |
| Subfamily LEPIDONOTINAE Willey, 1902 | 2 |
| Genus <i>Hermenia</i> Grube, 1856 | 2 |
| <i>Hermenia verruculosa</i> Grube, 1856 | 2 |
| Genus <i>Lepidonopsis</i> Pettibone, 1977 | 2 |
| <i>Lepidonopsis humilis</i> (Augener, 1922) | 2 |
| Subfamily HARMOTHONINAE Willey, 1902 | 2 |
| Genus <i>Subadyte</i> Pettibone, 1969 | 2 |
| <i>Subadyte pellucida</i> (Ehlers, 1864) | 2 |
| Genus <i>Hololepidella</i> Willey, 1905 | 4 |
| <i>Hololepidella nigropunctata</i> (Horst, 1915) | 4 |
| <i>Hololepidella</i> sp. | 7 |
| <i>Hololepidella ophiuricola</i> Gibbs, 1969 | 7 |
| <i>Hololepidella arabica</i> (Monro, 1937), new combination | 7 |
| Genus <i>Malmgreniella</i> Hartman, 1967, emended | 9 |
| Key to the Species of <i>Malmgreniella</i> from the Southern Ocean, South Atlantic Ocean (South Africa), Indian Ocean (South Arabian Coast), and South Pacific Ocean (New Guinea, SE Australia) | 10 |
| <i>Malmgreniella dicirra</i> Hartman, 1967 | 11 |
| <i>Malmgreniella agulhana</i> (Day, 1960), new combination | 14 |
| <i>Malmgreniella dayi</i> , new species | 15 |
| <i>Malmgreniella capensis</i> (McIntosh, 1885), new combination | 17 |
| <i>Malmgreniella inhacaensis</i> , new species | 19 |
| <i>Malmgreniella murrayensis</i> , new species | 19 |
| <i>Malmgreniella pettiti</i> , new species | 22 |
| <i>Malmgreniella phillipensis</i> (Knox and Cameron, 1971), new combination | 23 |
| Key to the Species of <i>Malmgreniella</i> from the Northeastern Atlantic Ocean (Spitsbergen, Norway, Sweden, England, France, Mediterranean Sea) | 25 |
| <i>Malmgreniella andreapolis</i> (McIntosh, 1874), new combination | 25 |
| <i>Malmgreniella arenicolae</i> (Saint-Joseph, 1888), new combination | 26 |
| <i>Malmgreniella castanea</i> (McIntosh, 1876), new combination | 30 |
| <i>Malmgreniella marphysae</i> (McIntosh, 1876), new combination | 31 |
| <i>Malmgreniella mcintoshi</i> (Tebble and Chambers, 1982), new combination | 33 |
| <i>Malmgreniella lunulata</i> (Delle Chiaje, 1830), new combination | 35 |
| <i>Malmgreniella darbouxi</i> , new species | 39 |
| Key to the Species of <i>Malmgreniella</i> from the Western Atlantic Ocean (Virginia to Florida, Caribbean Sea, Belize, Panama, Gulf of Mexico, Brazil) | 39 |
| <i>Malmgreniella macroryae</i> , new species | 40 |
| <i>Malmgreniella taylori</i> , new species | 42 |
| <i>Malmgreniella variegata</i> (Treadwell, 1917), new combination | 45 |
| <i>Malmgreniella pierceae</i> , new species | 49 |
| <i>Malmgreniella hendleri</i> , new species | 51 |
| <i>Malmgreniella galetaensis</i> , new species | 52 |
| <i>Malmgreniella panamensis</i> , new species | 54 |

| | |
|--|----|
| <i>Malmgreniella puntotorensis</i> , new species | 54 |
| <i>Malmgreniella liliana</i> , new species | 59 |
| Key to the Species of <i>Malmgreniella</i> from the Eastern Pacific Ocean (British Columbia, Washington, California, Galapagos, Panama) | 59 |
| <i>Malmgreniella nigralba</i> (E. Berkeley, 1923), new combination | 60 |
| <i>Malmgreniella berkeleyorum</i> , new species | 63 |
| <i>Malmgreniella bansei</i> , new species | 63 |
| <i>Malmgreniella liei</i> , new species | 65 |
| <i>Malmgreniella scriptoria</i> (Moore, 1910), new combination | 68 |
| <i>Malmgreniella macginitiei</i> , new species | 70 |
| <i>Malmgreniella sanpedroensis</i> , new species | 70 |
| <i>Malmgreniella baschi</i> , new species | 72 |
| <i>Malmgreniella pacifica</i> (Monro, 1928), new combination | 75 |
| <i>Paragattyana</i> , new genus | 76 |
| <i>Paragattyana micropoides</i> (Augener, 1918), new combination | 76 |
| <i>Paragattyana intesi</i> , new species | 78 |
| <i>Rullieriella</i> , new genus | 80 |
| <i>Rullieriella monoechinata</i> (Rullier, 1965), new combination | 80 |
| <i>Wilsoniella</i> , new genus | 84 |
| <i>Wilsoniella furcosetosa</i> (Loshamn, 1981), new combination | 84 |
| Genus <i>Lobopelma</i> Hanley, 1987 | 87 |
| <i>Lobopelma microscala</i> (Kudenov, 1977) | 87 |
| <i>Malmgrenia perspicua</i> Intes and Le Loeuff, 1975, incertae sedis | 87 |
| Literature Cited | 88 |

Scaled Polychaetes (Polynoidae) Associated with Ophiuroids and Other Invertebrates and Review of Species Referred to *Malmgrenia* McIntosh and Replaced by *Malmgreniella* Hartman, with Descriptions of New Taxa

Marian H. Pettibone

Introduction

Many polynoid polychaetes have been reported living in close associations with other animals, including ophiuroid echinoderms. Reports in the literature of the association of ophiuroids and commensal polynoids include publications by Millott (1953), Spooner et al. (1957), Devaney (1967, 1974a), Gibbs (1969, 1971, 1972), Boesch (1977), and Weston (1984).

In connection with his studies on the Ophiuroidea, Gordon Hendler collected commensal polynoids on different species of burrowing ophiuroids from the following localities: Galeta Point and Punto Toro, Panama; Dry Tortugas, Looe Key, and Virginia Key, Florida; and Belize. These polynoids were given to me for study, along with the identifications of the ophiuroids. During his study of the bioluminescent ophiuroid *Ophiopsila californica* on Santa Catalina Island, Lawrence Basch collected commensal polynoids and sent them to me for identification. Additional polynoids were received from Liliana Fomeris from the Bay of Flamengo, São Paulo, Brazil; from John Taylor and Stuart Santos from Tampa Bay, Florida; from Marvin Wass from the York River and Chesapeake Bay, Virginia; from Anne McCrary from Wrightsville Sound, North Carolina; from Susan Oldfield from the Perlas Islands, Gulf of Panama; from Nancy Maciolek from Corpus Christi Bay, Texas; and from K. Banse from the Puget Sound, Washington area. In addition, numerous polynoids from the Plymouth area, England, were sent by Peter Gibbs, including some collections by G.M. Spooner.

ACKNOWLEDGMENTS

I am indebted to the above-mentioned people for their cooperation and help and for allowing me to examine the material upon which this study is based. The numerous collectors mentioned in the text, who have deposited their collections in the Smithsonian Institution, National Museum of Natural History, and furnished collecting data, also have contributed greatly to the study. Special thanks go to Gordon Hendler for the numerous polynoids, along with the identifications of their ophiuroid hosts, and to Stephen Cairns for the polynoids and the identifications of their stylasterine hydrocoral hosts.

In addition to the collections in the Smithsonian Institution (USNM = the former United States National Museum, collections now in the National Museum of Natural History), material was obtained on loan or in exchange from the following sources: Allan Hancock Foundation, Los Angeles (LACM-AHF), through J. Pilger; American Museum of Natural History, New York (AMNH), through E. Kirsteur and H. Feinberg; Australian Museum, Sydney (AMS), through P. Hutchings and P. Coleman; The Natural History Museum, London, formerly the British Museum (Natural History) (BMNH), through J.D. George and A.I. Muir; Los Angeles County Museum of Natural History (LACM), through G. Hendler; The Laboratory, Citadel Hill, Plymouth, England (LCHP), through P. Gibbs; Natural History Museum of Gothenburg (NMG), through A. Eliason; National Museum of Victoria (NMV), through B.J. Smith; Museum National d'Histoire Naturelle, Paris (MNHN), through J. Renaud-

Marian H. Pettibone, Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.

Mornant; Naturhistoriska Riksmuseet, Stockholm (NRS), through R. Oleröd; University Zoological Museum, Copenhagen (UZMC), through J.B. Kirkegaard and M. Petersen; Zoological Institute of Science, Leningrad (ZIASL), through V.C. Averincev; Zoologisches Museum, Universiteit van Amsterdam (ZMA), through S. van der Spoel; Zoologisches Museum, Berlin (ZMB), through G. Hartwick; Zoologisches Staats-museum, Hamburg (ZMH), through G. Hartmann-Schröder; Zoological Museum, Trondheim (ZMT), through A.-A. Loshamn; Zoologisk Museum Universitet, Bergen (ZMUB), through J. Kjennerud. The manuscript benefited from the careful reviews of Thomas H. Perkins, Gordon Hendler, and an anonymous reviewer.

Subfamily LEPIDONOTINAE Willey, 1902

Genus *Hermenia* Grube, 1856

Hermenia verruculosa Grube, 1856

Hermenia verruculosa Grube, 1856:44.—Devaney, 1974a:122, 140.—Pettibone, 1975:235, figs. 1, 2 [synonymy].—San Martin et al., 1986:7.

MATERIAL EXAMINED.—WESTERN ATLANTIC OCEAN: *Virgin Islands*: St. John, Brown Bay, West Point, 3 Jul 1984, L. Leward, collector, found crawling on pavement type substrate, 1 specimen. *Belize*: Carrie Bow Cay, 16°48'N, 88°05'W, 23 Apr 1974, K. Ruetzler, collector, 1 specimen (USNM 80540). *Panama*: S. of Holandes Cay, 30–42 m, *Anton Bruun* cruise 10, 18 Sep 1965, S.A. Earle, collector, 1 specimen (USNM 71540). *Florida*: Dry Tortugas, west side of Loggerhead Key, spur, groove, and seagrass habitats, 1–5 m, 29 Sep 1982, G. Hendler, collector, 1 specimen (USNM 80060).

REMARKS.—Devaney (1974a:122, 140) reported *H. verruculosa* as a possible commensal on the ophiuroid *Ophiocoma pumila* Lütken from Belize. The ophiuroid had transversely banded brown and white arms and the polynoid was similarly banded on its dorsum. The dorsal side of the polynoid also was covered with papillae, similar in size and color to the disc granules of the ophiuroid, giving the polynoid a similar appearance.

DISTRIBUTION.—Western Atlantic Ocean, West Indies and Caribbean Sea, Bahamas, Central and South America, Gulf of Mexico, Atlantic Ocean off New Jersey. Intertidal to 223 meters (Pettibone, 1975).

Genus *Lepidonopsis* Pettibone, 1977

Lepidonopsis humilis (Augener, 1922)

Lepidonotus humilis Augener, 1922:40.—Fauchald and Reimer, 1975:80 [key].—Fauchald, 1977:6.

?*Malmgrenia lunulata* variety.—Gardiner, 1976:90 [part; not Delle Chiaje, 1830].

Lepidonopsis humilis.—Pettibone, 1977:51, figs. 5, 6 [synonymy].

MATERIAL EXAMINED.—WESTERN ATLANTIC OCEAN: *North Carolina*: Bird Shoal, western tip, intertidal, on oral surface of keyhole sand dollar *Melliita quinquesperforata*, 28 Apr 1975, C. Jenner, collector, 1 specimen (USNM 52850, as ?*Malmgrenia lunulata* var. by Gardiner, 1976). *Florida*: Looe Key, 24°32'N, 81°24'W, sta LK-22, 8 May 1985, 6–8 m, on *Ophiothrix lineata*, with sponges and large rubble slabs, G. Hendler, collector, 1 specimen (USNM 133565). *Panama*: Galeta Reef, coralline algae and *Laurencia* zones, 1970–1973, A.A. Reimer, collector, 4 specimens (USNM 54376, 54377, 66008, K. Fauchald, ident.). *Turks and Caicos Islands*: Rockawash Cay, calcareous alga wash, 13 Apr 1989, R.W. Heard, collector, 5 specimens (USNM 133566).

EASTERN PACIFIC OCEAN: *Panama*: Whorehouse Reef, Panama Survey sta 133-1, 5 Apr 1973, low tide, M.L. Jones, collector, 1 specimen (USNM 71710). *Mexico*: Ixtapa Island, Playa Quieto, Guerrero, about 100 miles WNW of Acapulco, intertidal, among sabellarid tubes, 26 Feb 1982, C. Kerby, collector, 1 specimen (USNM 72819).

BIOLOGY.—Free-living or commensal with irregular echiroids and ophiuroids.

DISTRIBUTION.—Western Atlantic Ocean, off North Carolina to Florida, West Indies, and Caribbean Sea, Gulf of Mexico, Central America. Eastern Pacific Ocean from Southern California to Peru. Intertidal to 40 meters (Pettibone, 1977).

Subfamily HARMOTHONINAE Willey, 1902

Genus *Subadyte* Pettibone, 1969

Subadyte pellucida (Ehlers, 1864)

FIGURE 1

Polynoe pellucida Ehlers, 1864:105, pl. 2: fig. 10; pl. 3: figs. 5, 7–13; pl. 4: figs. 1–3.

Hermadion fragile Claparède, 1868:383, pl. 5: fig. 2.

Scalisetosus communis.—Cuénot, 1912:40.

Scalisetosus pellucidus.—Fauvel, 1923:74, fig. 27a–f [synonymy].—Sponner et al., 1957:112.—Bellan, 1960:6; 1964:29.—Guille, 1965:286.—Hamond, 1966:388.—Hartmann-Schröder, 1971:69, fig. 21a–e.

Harmothoe crosetensis.—Monro, 1930:57 [part; not McIntosh, 1885].

Scalisetosus sp.—Hartman, 1939:6, fig. 1f–k.

Subadyte pellucida.—Pettibone, 1969a:8, fig. 4a–e [synonymy].—Intes and Loeuff, 1975:274.—Hartmann-Schröder, 1977:68.—Barel and Kramers, 1977:54.—Campoy, 1982:52.

Adyte pellucida.—Tebble and Chambers, 1982:63, figs. 5a, 20c,d, 56b.

MATERIAL EXAMINED.—SOUTH ATLANTIC OCEAN: *South Africa*: Simon's Town, False Bay, Basin of H.M. Dockyard, 0–2 m, *Discovery* sta 90, 10 Jul 1926, 1 specimen (BMNH; mixed with *Harmothoe crosetensis* by Monro, 1930).

EASTERN PACIFIC OCEAN: *Galápagos Islands*: James Island, Sullivan Bay, shore and tide-pool collecting, W.L. Schmitt, collector, *Presidential* cruise sta 13, 24 Jul 1938, 1 specimen (USNM 20517, as *Scalisetosus* sp. by Hartman, 1939). Isla Isabella, Tagus Cove, in *Amphiroa* mat, Feb 1978,

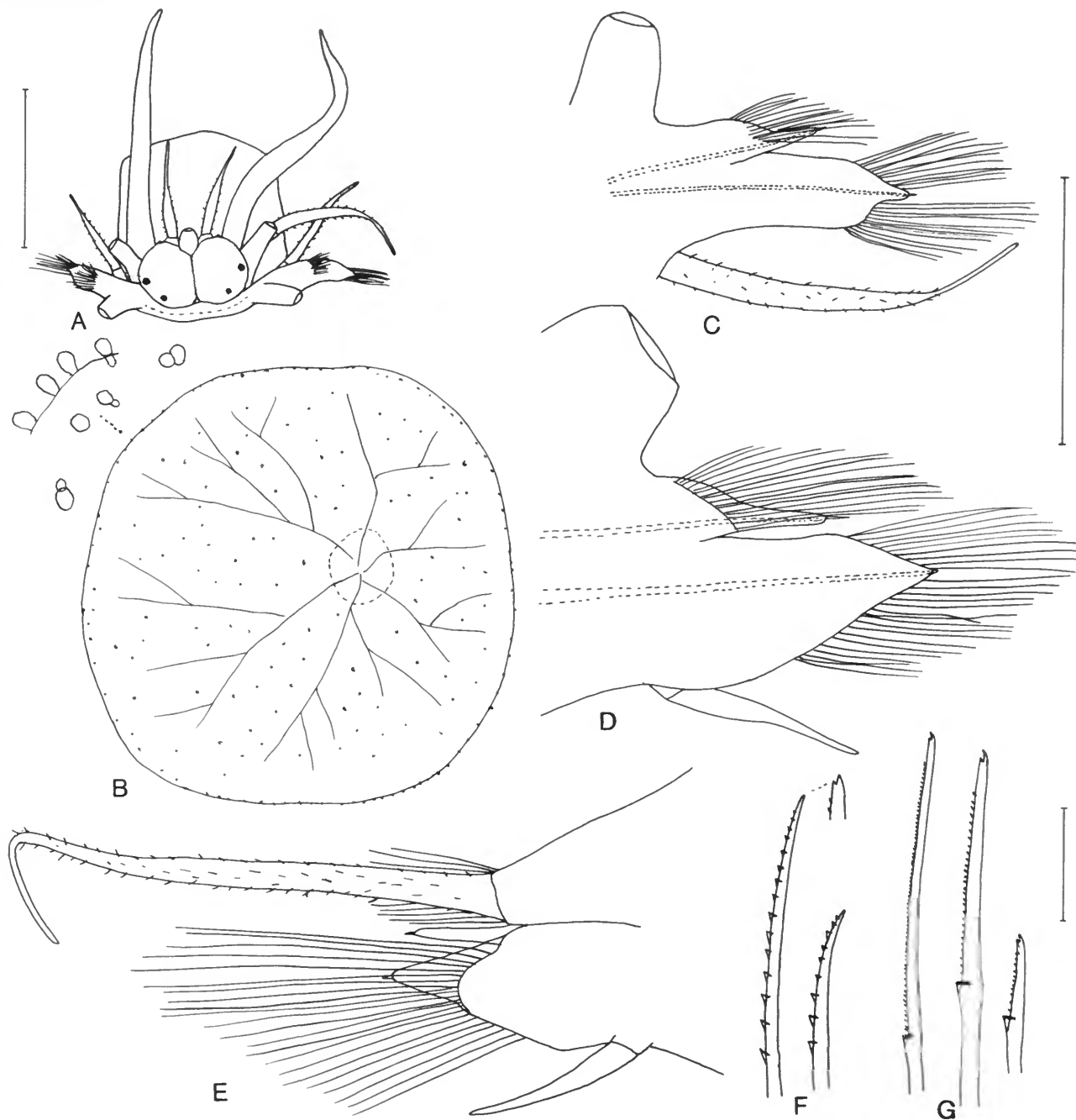


FIGURE 1.—*Subadyte pellucida*, specimen from Galápagos (USNM 20517): A, dorsal view of anterior end, pharynx partially extended; styles of median antenna, right dorsal and left dorsal and ventral tentacular cirri missing; B, right elytron showing venation, with detail of border and surface papillae; C, left elytrigerous parapodium from segment 2, anterior view, acicula dotted; D, left elytrigerous parapodium from segment 7, anterior view, acicula dotted; E, left cirriferous parapodium from segment 8, posterior view; F, long and short notosetae, with detail of tip; G, upper, middle, and lower neurosetae. (Scales = 1.0 mm for A; 0.5 mm for B-E; 0.1 mm for F,G.)

W.D. Hope, collector, 1 specimen (USNM 75375).

DESCRIPTION OF SPECIMEN FROM GALÁPAGOS ISLANDS (USNM 20517, as *Scalisetosus* sp. by Hartman, 1939).—Body flattened, elongate-oval, with 40 segments, last one minute, 14 mm long, 3 mm wide including setae. Elytra 15 pairs, on segments 2, 4, 5, 7, then on alternate segments to 23, 26, 29, and 32. Elytra oval, delicate, transparent, dotted with oval sensory papillae and some larger papillae, with "veins" emanating from place of attachment to elytophores (Figure 1B; Hartman, 1939, fig. 1g,h).

Prostomium bilobed, with minute cephalic peaks and 2 pairs of small eyes in posterior half of prostomium; ceratophore of median antenna in anterior notch, style absent; ceratophores of lateral antennae inserted ventrally, with short papillate styles; palps long, tapering; tentaculophores of first segment lateral to prostomium, without setae, each with pair of dorsal and ventral papillate tentacular cirri (Figure 1A; Hartman, 1939, fig. 1f). Second or buccal segment with small nuchal lobe, first pair of elytophores, biramous parapodia, and papillate ventral buccal cirri longer than following ventral cirri (Figure 1A,C).

Parapodia biramous, notopodium short, conical, with projecting acicular lobe on lower side; neuropodium with long conical presetal acicular lobe from which tip of aciculum projects, and shorter rounded postsetal lobe (Figure 1C-E). Notosetae subequal in width to neurosetae, with spinose pouches and blunt tips, shorter ones with entire tips, longer ones with minute bifid tips (Figure 1F; Hartman, 1939, fig. 1j). Neurosetae each with basal semilunar pocket and distal spinose region, upper ones longer than lower ones, all with bifid hooked tip (Figure 1G; Hartman, 1939, fig. 1i,k). Dorsal cirri with cylindrical cirrophores on posterior sides of notopodia and long papillate styles; ventral cirri short, tapered (Figure 1E).

BIOLOGY.—*Subadyte pellucida* has been reported on the discs or arms of two species of *Ophiothrix*: (1) *O. fragilis* (Abildgaard) from Plymouth, England (Spooner et al., 1957), including postlarvae in the plankton (7–12 setigers); Norfolk, England (Hamond, 1966); NE Atlantic (Barel and Kramers, 1977); English Channel (Bellan, 1964); Arcachon, France (Cuénot, 1912); Portugal (Bellan, 1960); Iberian Peninsula (Campoy, 1982); and (2) *O. quinque maculata* (Delle Chiaje) from the Mediterranean by (Bellan, 1964); Banyuls, France (Guille, 1965), including many young stages (15–20 setigers).

Some records of *S. pellucida* were indicated as free-living or their associations were not noted. The species also is commensal with asteroids.

DISTRIBUTION.—Eastern Atlantic Ocean, North Sea, English Channel, Adriatic and Mediterranean Seas, West and South Africa; Indian Ocean, Bay of Bengal; Eastern Pacific Ocean, Galápagos Islands. Intertidal to 100 meters (Pettibone, 1969a).

Genus *Hololepidella* Willey, 1905

Hololepidella nigropunctata (Horst, 1915)

FIGURES 2, 3

Polynoe nigro-punctata Horst, 1915:20; 1917:104, pl. 21: figs. 15–17.
Allmaniella marquesensis Monro, 1928b:469, figs. 1–4. [New synonymy.]

Malmgrenia marquesensis.—Day, 1962:628; 1967:50, fig. 1.4.p-s.—Intes and Le Loeuff, 1975:273.—Kudenov, 1975b:79

Hololepidella nigropunctata.—Devaney, 1967:287, figs. 1–5; 1974b:154.—Pettibone, 1969a:50, fig. 2a–g.—Gibbs, 1971:117, 120; 1972:203.—Uchida, 1975:19, figs. 1–3.—Amoureux et al., 1978:67, 156.—Sloan et al., 1979:94.—Hendler and Meyer, 1982:742.—Hartmann-Schröder, 1984:66 [key].—Bailey-Brock and Hartman, 1987:234, fig. 3.11.3a–g.—Devaney and Bailey-Brock, 1987:97, 98.—Hanley, 1987:156.

Hololepidella minuta.—Gibbs, 1969:448, 449, fig. 131 [not *Polynoe minuta* Potts, 1910].

?*Harmothoe minuta*.—Amoureux et al., 1978:63 [not *Polynoe minuta* Potts, 1910].

Harmothoe lunulata spp. *synaptae*.—Amoureux et al., 1978:63 [not Saint-Joseph, 1888].

MATERIAL EXAMINED.—CENTRAL PACIFIC OCEAN: *Hawaii*: North coast of Oahu, underside of ledge in cave, 7 m, on asteroid *Mithrodia* sp., 15 Aug 1975, A. Birtles, collector, 1 small specimen (USNM 52793). North shore of Oahu, Pupukea Bay, Beach Park at Kahuku, 2–13 m, sandy pothole, 27 Jul 1976, C. Roper and M. Sweeney, collectors, 1 small specimen (USNM 54147). *Marquesas Islands*: Tai O Hae Pool, C. Crossland, collector, 6 syntypes of *Allmaniella marquesensis* (BMNH 1928.1.11.1-3; USNM 45567). *Solomon Islands*: Graham Point, Marau Sound, on ophiuroids *Ophiarthrum elegans* Peters and *Ophiocoma brevipes* Peters, 2 Oct 1965, P.E. Gibbs, collector and identifier, 5 specimens (BMNH 1970.115,118,121,127; USNM 48053).

WESTERN PACIFIC OCEAN: *Okinawa*: 26°30'N, 127°51'E, 54–57 m, diving, from Ophiuroidea, 14 Mar, 8, 10 Apr 1981, R.F. Bollard, collector, 6 specimens (USNM 100443).

INDIAN OCEAN: *Red Sea*: Gulf of Elat, from toxic sponge *Latrunculia magnifica* Keller, 1 specimen (TAV 6928, as *H. minuta* by Rullier); on solitary coral *Fungia scutaria* Lamarck, 1 specimen (TAV 9565, as *H. lunulata synaptae* by Rullier). *Mozambique*: Inhaca Island, west shore Delagoa Bay, commensal with asteroid *Linckia multifora* (Lamarck), from J.H. Day, 2 specimens (USNM 45568, as *Malmgrenia marquesensis*). *Australia*: Western Australia, Rosemary Island, Dampier, 2 m, on echinoid, 24 Sep 1972, N. Coleman, collector, 1 specimen (AMS W5475).

DESCRIPTION OF SYNTYPES AND SPECIMENS FROM INHACA ISLAND.—Largest complete syntype 9 mm long with 41 segments and 19 pairs of elytra, elytophores on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 31, 34, 36, 38, 40. Smallest complete syntype 7 mm long, 37 segments, and 17 pairs of elytra, in similar arrangement. Complete specimen from Inhaca Island with 36 segments and 17 pairs of elytophores (15 pairs indicated by Day). Elytra oval, darkly pigmented, smooth except for group of microtubercles on anterior region (Figure 2B; Monro, 1928b, fig. 2).

Prostomium bilobed with lobes subtriangular, without distinct cephalic peaks, darkly pigmented except for light areas around 2 pairs of small eyes; ceratophore of median antenna in anterior notch, with long style; ceratophores of lateral antennae inserted terminoventrally, with short styles; palps stout, long, tapered; tentaculophores of first segment lateral to prostomium,

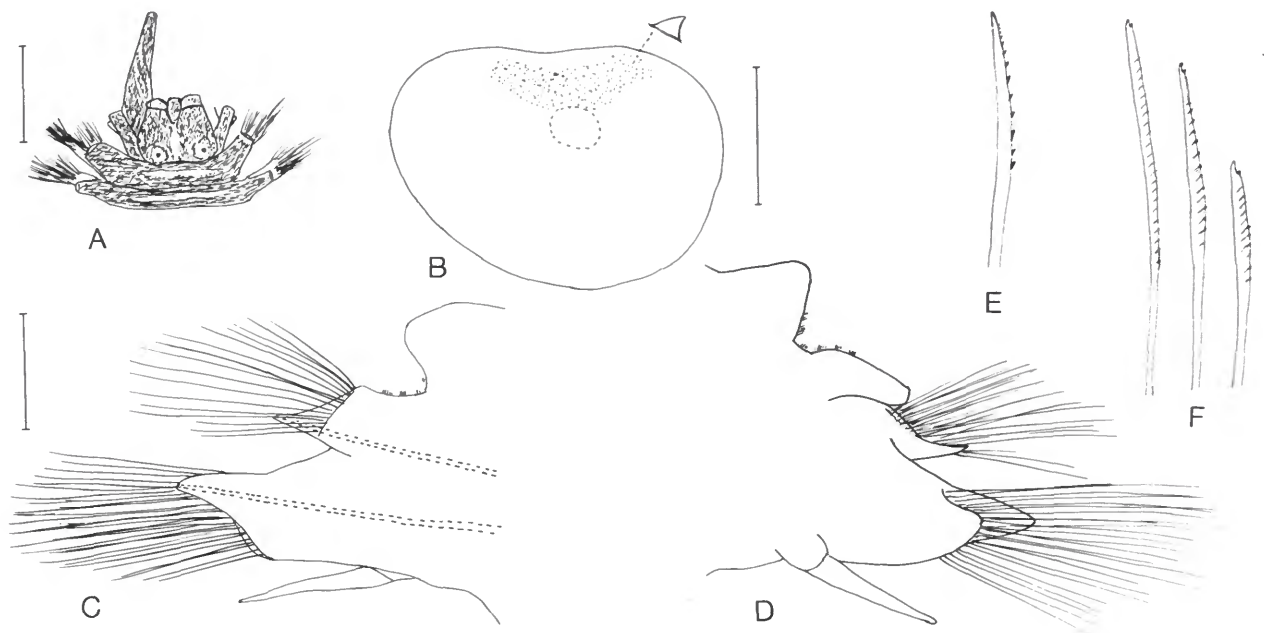


FIGURE 2.—*Hololepidella nigropunctata*, syntype of *Allmaniella marquesensis* (USNM 45567): A, dorsal view of anterior end; right palp and styles of antennae, tentacular cirri, and dorsal cirri of segment 2 missing; B, right elytron, with detail of microtubercle; C, right elytrigerous parapodium, anterior view, acicula dotted; D, right cirriferous parapodium, posterior view, style of dorsal cirrus missing; E, notoseta; F, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A; 0.5 mm for B; 0.2 mm for C,D; 0.1 mm for E,F.)

each with single seta and pair of dorsal and ventral tentacular cirri (Figure 2A; Day, 1967, fig. 1.4.r).

Parapodia biramous, smaller notopodium with projecting acicular lobe on lower side, larger neuropodium with subtriangular presetal acicular lobe and shorter rounded postsetal lobe (Figure 2C,D; Monro, 1928b, fig. 2; Day, 1967, fig. 1.4.s). Notosetae slightly stouter than neurosetae, with single row of 10–16 widely spaced spines on slightly convex side and abruptly pointed tip (Figure 2E; Monro, 1928b, fig. 3; Day, 1967, fig. 1.4.p). Neurosetae with faint spinose rows, upper ones with longer spinose regions, all with bifid, hooked tip (Figure 2F; Monro, 1928b, fig. 4; Day, 1967, fig. 1.4.q,q'). Dorsal cirri with cylindrical cirrophores on posterior sides of notopodia, with long styles extending to tips of neurosetae or beyond; dorsal tubercles nodular; ventral cirri short (Figure 2D; Monro, 1928b, fig. 2; Day, 1967, fig. 1.4.s).

DESCRIPTION OF YOUNG SPECIMEN FROM CAVE ON OAHU, HAWAII (USNM 52793).—Body in life pinkish orange with pale elytra (noted by A. Birtles, in litt., who collected it on the asteroid *Mithrodia* sp.). Body flattened, tapered posteriorly, 5.5 mm long, 2 mm wide including setae, with 31 segments. Elytra 15 pairs, on segments 2, 4, 5, 7, then on alternate segments to 23, 26, 29, 31 (small on last small segment). Elytra oval, delicate, transparent, each with group of conical microtubercles on anterior part (Figure 3B).

Bilobed prostomium with subtriangular anterior lobes, without distinct cephalic peaks; ceratophore of median antenna in anterior notch, with style wider basally and with long slender tip; ceratophores of lateral antennae inserted terminoventrally, with short subulate styles; palps long, stout, with filamentous tips; eyes small, 2 pairs; tentaculophores of first segment lateral to prostomium, each with few setae, with pair of dorsal and ventral tentacular cirri similar to median antenna (Figure 3A). Second segment without nuchal fold, with first pair of elytriphores, with biramous parapodia and long ventral buccal cirri similar to tentacular cirri (Figure 3A). Notopodium smaller than neuropodium, rounded basally with digitiform acicular lobe on lower side, aciculum projecting; larger neuropodium with conical presetal acicular upper part with projecting aciculum, rounded lower part, and shorter rounded postsetal lobe (Figure 3C,D). Notosetae, about 15, forming radiating bundle, each with single row of 7–10 widely spaced spines along curved side (Figure 3E). Neurosetae relatively few, about 11, subacicular, with bifid tips and faint spinose rows, upper ones with longer spinose regions than lower ones (Figure 3F). Dorsal cirri with cylindrical cirrophores posterior to notopodia, with long tapered styles extending beyond neurosetae; dorsal tubercles small, nodular; ventral cirri rather large, extending to tip of neuropodium (Figure 3C).

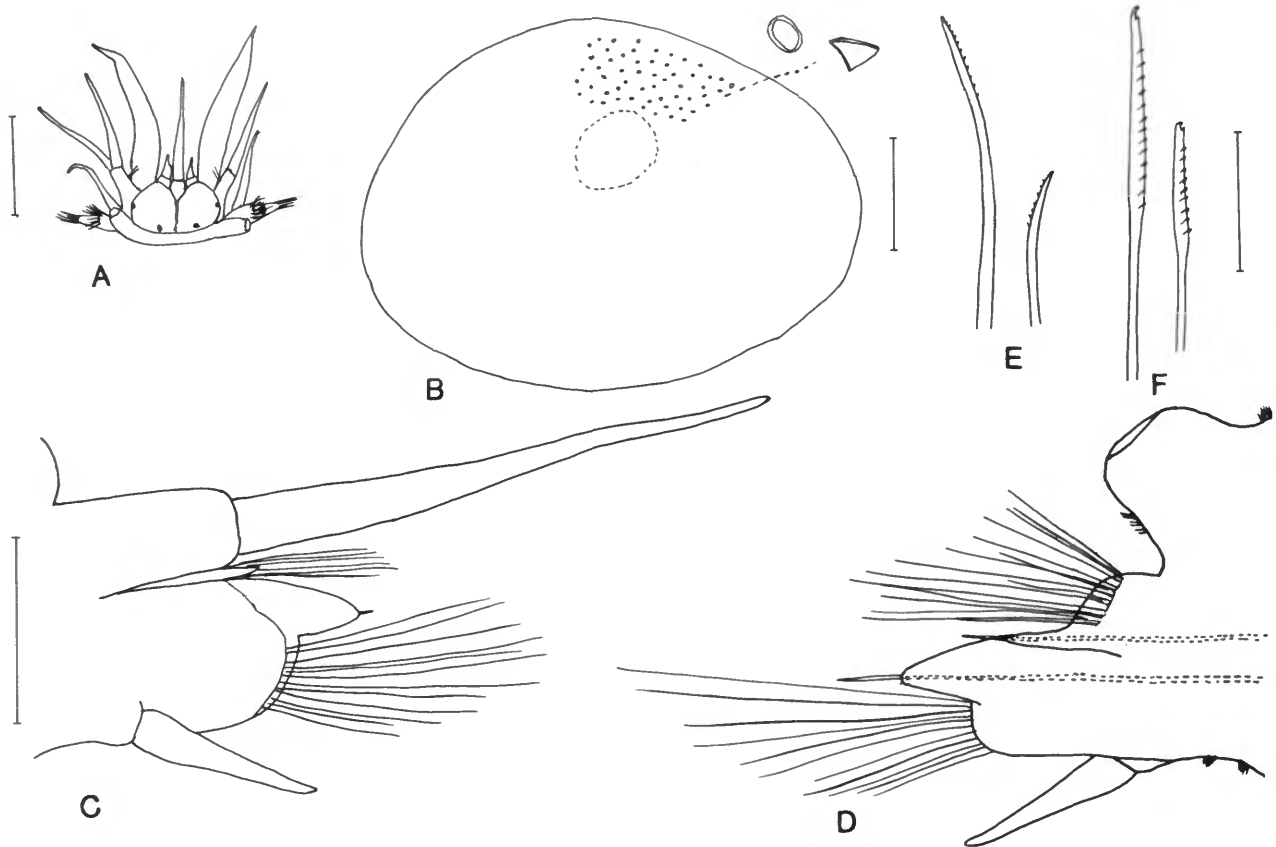


FIGURE 3.—*Hololepidella nigropunctata*, young specimen from Hawaii (USNM 52793): A, dorsal view of anterior end, style of right tentacular cirrus missing; B, left elytron, with detail of microtubercles; C, right cirriferous parapodium, posterior view; D, right elytrigerous parapodium, anterior view, acicula dotted; E, long and short notosetae; F, upper and lower neurosetae. (Scales = 0.5 mm for A; 0.2 mm for B; 0.2 mm for C,D; 0.1 mm for E,F.)

REMARKS.—The young specimen differs from the adults in the shape of the neuropodia, the subacicular distribution of the neurosetae, and paler pigmentation. Perhaps the dark pigmentation is accumulated as the polychaete grows larger.

BIOLOGY.—*Hololepidella nigropunctata* is commensal with ophiuroids, asteroids, echinoids, and other invertebrates. On the Hawaiian Islands, Devaney (1967:296) reported numerous specimens of *H. nigropunctata* on brittle stars of the family Ophiocomidae. They were especially common on *Ophiocoma dentata* Müller and Troschel, occasionally on *O. brevipes* Peters, and rarely on *O. erinaceus* Müller and Troschel. Single specimens were found on the oral surfaces of the brittle stars in contact with the oral arm plates near or below the disc, often with the head toward the oral cavity or in the interradius and on the aboral surface of the disc (Devaney, 1967:298, fig. 5a,b). According to Devaney, it appeared to be an adaptation protecting the commensal from predation and affording a place

to obtain food. Multiple polynoids (2–5) were found on single specimens of the multirayed starfish *Acanthaster planci* (Linnaeus) on Oahu by Devaney (1967:298). Uchida (1975:19) also described *H. nigropunctata* on *A. planci* from Japan.

On Eniwetok Atoll, Marshall Islands, a single specimen of *H. nigropunctata* was reported by Devaney (1967:297) on *Ophiocoma anaglyptica* Ely. In the Marquesas Islands, Devaney (1974b:154) reported the polynoid associated with *O. doederleini* Lorient. On the Solomon Islands, Gibbs (1969:450; 1971:120) reported specimens of *H. nigropunctata* living on the oral surface of the discs of *Ophiocoma brevipes*, *O. dentata*, and *Ophiarthrum elegans* Peters, under coral boulders, and in crevices on the reef platform. From the Cook Islands, Gibbs (1972:203) reported *H. nigropunctata* commensal with *Ophiarthrum elegans* and *Ophiocoma dentata*. On Aldabra, Sloan et al. (1979:94) reported *H. nigropunctata* on *Ophiocoma brevipes*.

DISTRIBUTION.—Indo-west and central Pacific Ocean. Intertidal to 57 meters.

Hololepidella sp.

Hololepidella nigropunctata.—Day, 1957:65, fig. 1a-f.—Balinsky, 1957:18.—Macnae and Kalk, 1962:101. [Not Horst, 1915.]

Polyeunoa nigropunctata.—Day, 1967:54, fig. 15r-u.—Amoureux, 1977:1101. [Not Horst, 1915.]

REMARKS.—The specimens from Inhaca Island, Mozambique, identified by Day (1957; 1967) as *H.* and *P. nigropunctata*, were found on the common brittle star *Macrophiothrix hirsuta cheneyi* (Lyman) by Balinsky (1957:18; polynoids identified by Day) and Macnae and Kalk (1962:101). As indicated by Devaney (1967:292) and Uchida (1975:29), the polynoids should be separated from *H. nigropunctata* based on the striking color pattern of dark stripes on the dorsum and the description by Day of the neurosetae. These polynoids need to be reexamined and more completely described.

Hololepidella ophiuricola Gibbs, 1969

FIGURE 4

Hololepidella commensalis.—Gibbs, 1969:451, fig. 132 [not Willey, 1905].

Hololepidella ophiuricola Gibbs, 1971:121, fig. 3A-H.—Hartmann-Schröder, 1984:66 [key].

MATERIAL EXAMINED.—CENTRAL PACIFIC OCEAN: *Solomon Islands*: Graham Point, Marau Sound, on oral surface of ophiuroid *Macrophiothrix koehleri* A.M. Clark, 2/5 Oct 1965, P.E. Gibbs, collector, holotype (BMNH 1970.20) and 3 paratypes (BMNH 1970.21-23). Kalota Island, Auki, Malaita, on oral surface of ophiuroid *Ophiarthrum pictum* Müller and Troschel, 21 Nov 1965, P.E. Gibbs, collector, paratype (BMNH 1970.24).

DESCRIPTION.—Holotype 15 mm long, 3 mm wide including setae, with 53 segments and 25 pairs of elytra; 4 paratypes with 41–50 segments and 19–23 pairs of elytra, with arrangement as in *H. nigropunctata*. Pigmentation appearing on dorsal cirrophores and styles of dorsal cirri, on dorsum as broken or nearly continuous transverse bands, and as dark spots on ventral bases of parapodia and elytophores (Figure 4 A-C,E,F; Gibbs, 1969, fig. 132). Elytra oval, delicate, transparent, without microtubercles or papillae, with some scattered pigment spots (Gibbs, 1971, fig. 3B,C).

Bilobed prostomium with triangular lobes, pigmented medial part, and 2 pairs of small eyes; median antenna with dark ceratophore in anterior notch and long dark style; lateral antennae with small ceratophores inserted ventrally and short styles; palps long, tapered, pigmented on lateral sides; tentaculophores lateral to prostomium, without setae, each with pair of dorsal and ventral tentacular cirri similar to median antenna, minutely papillate (Figure 4A,B; Gibbs, 1971, fig. 3A). Second or buccal segment without nuchal lobe, with first pair

of elytophores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae similar to those of following segments; neurosetae similar to upper ones of following segments (Figure 4A-D).

Notopodium of parapodium with projecting acicular lobe on lower side; larger neuropodium with tapered subtriangular presetal acicular lobe and shorter rounded postsetal lobe (Figure 4C,E,F; Gibbs, 1971, fig. 3D). Notosetae about same width as neurosetae, minutely serrated along one border (Figure 4G; Gibbs, 1971, fig. 3E). Few supraacicular neurosetae with prominent spinose rows on basal part and minute spinose row on distal part extending to near bare tips (Figure 4H; Gibbs, 1971, fig. 3F); more numerous subacicular neurosetae with faint spinose rows and slightly hooked, bare tips (Figure 4H,I; Gibbs, 1971, fig. 3G,H); all neurosetae with entire tips. Dorsal cirri with long cylindrical cirrophores on posterior sides of notopodia, styles extending close to tips of neurosetae; dorsal tubercles inconspicuous; ventral cirri extending near to tip of neuropodial lobe (Figure 4F).

BIOLOGY.—*Hololepidella ophiuricola* is commensal with ophiuroids. Individual specimens have been found on the oral surfaces of the discs of two species of ophiuroids: *Macrophiothrix koehleri* A.M. Clark and *Ophiarthrum pictum* Müller and Troschel, living under coral boulders and in crevices on the reef platform of the Solomon Islands. The pigment pattern of the polynoids differed somewhat: on *M. koehleri* the black bands were essentially longitudinal and on *O. pictum*, transverse, presumably imparting a cryptic coloration (Gibbs, 1969, fig. 132).

DISTRIBUTION.—Central Pacific Ocean, Solomon Islands. Low water.

Hololepidella arabica (Monro, 1937), new combination

FIGURE 5

Hamothoe arabica Monro, 1937:257, fig. 5a-f.—Fauvel, 1953:46, fig. 20c-g.

MATERIAL EXAMINED.—INDIAN OCEAN: *Maldives Islands*: East side of Kolumandulu Atoll, 02°13'S, 73°09'E, coral sand, John Murray Expedition sta 139, 25 Mar 1934, holotype (BMNH 1937.9.2.27).

DESCRIPTION.—Holotype, female with eggs (in 2 pieces), 8 mm long, 3 mm wide including setae, with 38 segments and 18 pairs of elytra, on segments 2, 4, 5, 7, then on alternate segments to 23, 26, 29, 31, 34, 36, 38, last pair of elytra very small. Body flattened, tapering slightly anteriorly and more so posteriorly, with transverse ciliated bands between elytophores and dorsal tubercles, 2 per segment. Elytra round, delicate, transparent, without tubercles or papillae, with light brown mottled pigmentation on medial and posterior sides (Figure 5B).

Prostomium deeply bilobed, with triangular lobes, 2 pairs of small eyes, and light pigmentation on posterior half; ceratophore of median antenna in anterior notch, with very small style

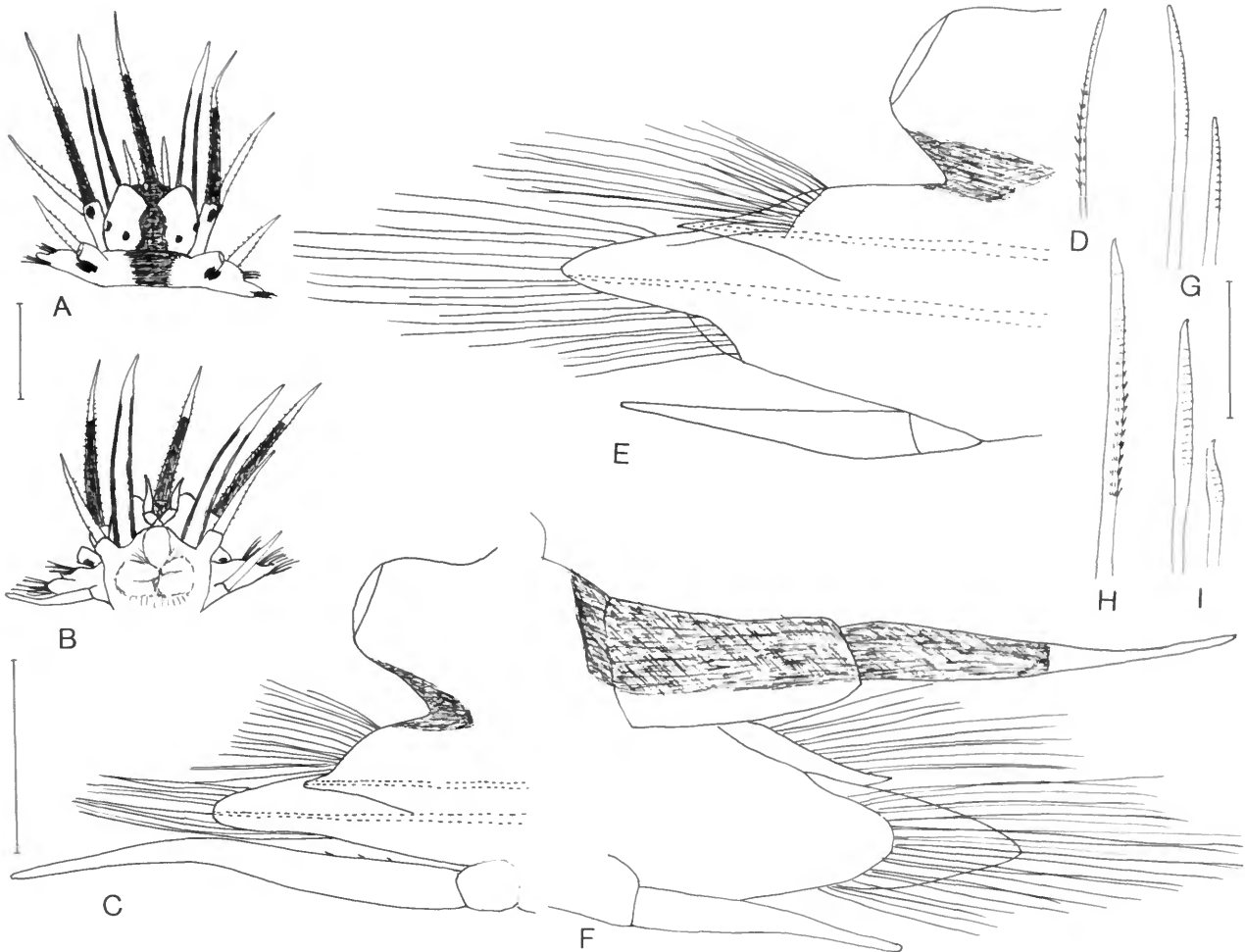


FIGURE 4.—*Hololepidella ophiuricola*, paratype (BMNH 1970.22): A, anterior end, dorsal view; B, same, ventral view; C, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; D, neuroseta from same; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view; G, long and short notosetae; H, supraacicular neuroseta; I, subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.2 mm for C,E,F; 0.1 mm for D,G-I.)

(regenerating); small ceratophores of lateral antennae inserted ventrally, with short subulate styles; palps stout, tapered; tentaculophores lateral to prostomium, each with single seta on inner side and pair of long dorsal and ventral tentacular cirri; antennae and cirri with delicate papillae (Figure 5A; Monro, 1937, fig. 5a). Second or buccal segment without nuchal fold, with elytriphores, with biramous parapodia and long ventral buccal cirri similar to tentacular cirri (Figure 5A).

Parapodia with notopodium short, rounded, with projecting acicular lobe on lower side; longer neuropodium with projecting, conical presetal acicular lobe and shorter, rounded postsetal lobe; notosetae numerous, forming radiating bundle, extending to about tips of neuropodia; neurosetae numerous,

forming fan-shape bundle (Figure 5C,D; Monro, 1937, fig. 5b). Notosetae about as stout as neurosetae, short to long, slightly curved, appearing smooth or very finely serrated (Figure 5E; Monro, 1937, fig. 5c). Upper few neurosetae smooth, tapering to slender slightly hooked tips; remaining supraacicular neurosetae coarsely spinose on lower half and finely spinose on distal half, with faintly bidentate hooked tips (Figure 5F; Monro, 1937, fig. 5d,e); subacicular neurosetae finely spinose, with faintly bidentate, hooked tips; lower ones with tips entire or faintly notched (Figure 5G; Monro, 1937, fig. 5f). Dorsal cirri with long cylindrical cirrophores and long papillate styles extending to tips of neurosetae or beyond, with brown pigmentation on basal half; dorsal tubercles small, nodular;

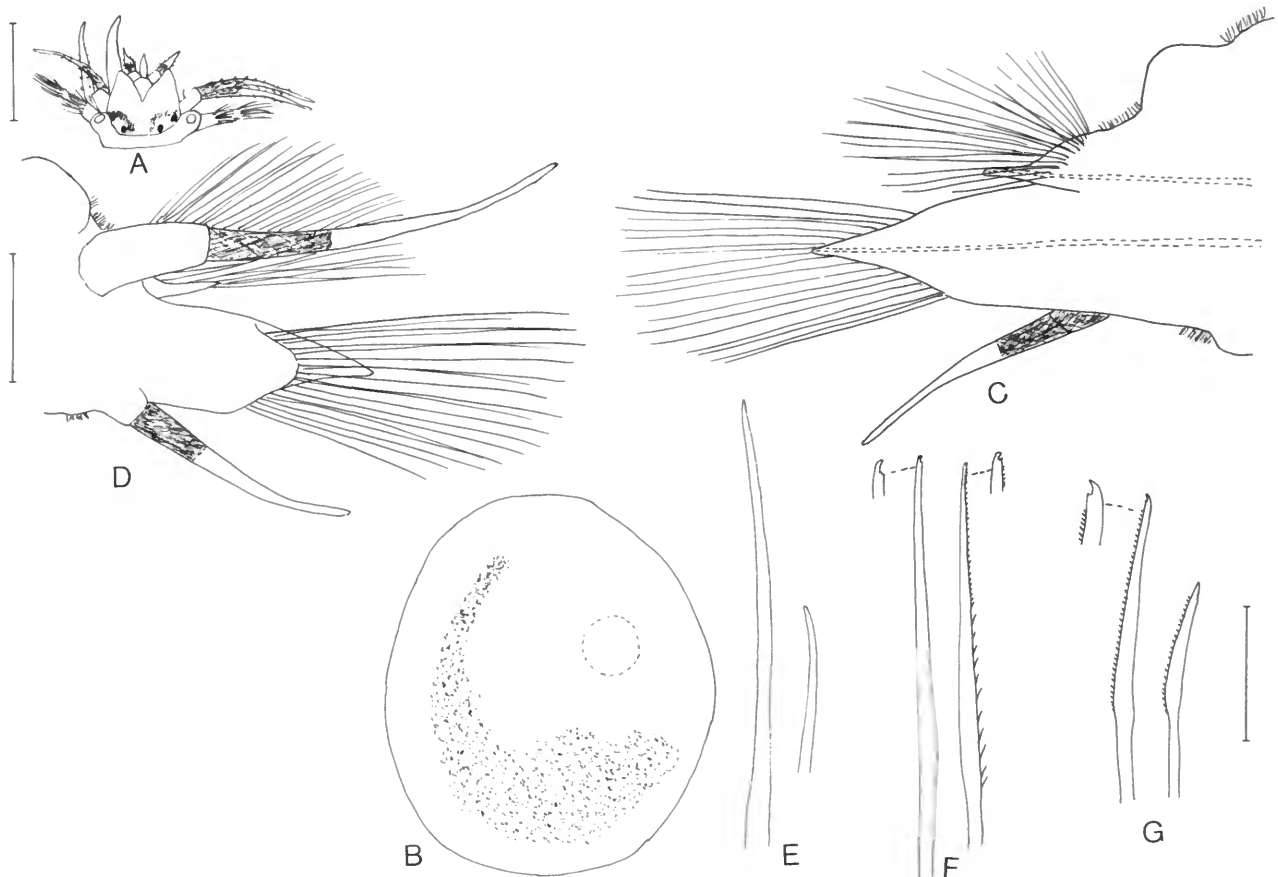


FIGURE 5.—*Hololepidella arabica*, holotype of *Harmothoe arabica* (BMNH 1937.9.2.27): A, dorsal view of anterior end, style of median antenna small, regenerating, right palp and left dorsal tentacular cirrus missing; B, right posterior elytron showing pigment pattern; C, right elytrigerous parapodium, anterior view, acicula dotted; D, right cirriferous parapodium, posterior view; E, long and short notosetae; F, supraacicular neurosetae, with detail of tips; G, subacicular neurosetae, with detail of tip. (Scales = 0.5 mm for A, 0.2 mm for B-D; 0.1 mm for E-G.)

ventral cirri short, tapering, extending to about tips of neuropodia, with brown pigmentation on basal half (Figure 5D). Pair of long anal cirri similar to dorsal cirri.

DISTRIBUTION.—Indian Ocean, Maldive Islands. Low water.

Genus *Malmgreniella* Hartman, 1967, emended

Malmgreniella Hartman, 1967:37. [Type-species: *Malmgreniella dicirra* Hartman, 1967, by monotypy. Gender: feminine.]

REMARKS.—*Malmgreniella*, as used herein and followed by Weston (1984), includes some of the species that have been referred to *Malmgrenia* McIntosh, 1874, and reviewed by Kudenov (1975b:79, key; 1977:95, key) and Hanley (1987:150, tables 1, 2). *Malmgrenia whiteavesii* McIntosh,

1874, from eastern Canada, the type species of the genus by monotypy, was poorly described by McIntosh (1874a:263, pl. 9: figs. 5-7) and the type specimen in the BMNH consists only of fragments. The genus *Malmgrenia* is considered to be indeterminable (also see Hanley, 1987:148). *Malmgreniella* (including *Malmgrenia*, as currently used) is close to *Harmothoe* Kinberg, 1856. As used herein, *Malmgreniella* includes harmothoid species having a close commensal relationship with other invertebrates. The elytra are delicate, with microtubercles, if present, confined to small anterior groups, sometimes with a few scattered on the surface; papillae are absent or confined to micropapillae, rarely with some longer lateral papillae. In *Harmothoe*, the elytra are tough, with numerous microtubercles and sometimes macro-tubercles on the surface, and usually with long papillae. In *Malmgreniella*, the bilobed

prostomium usually lacks cephalic peaks, with the lateral antennae inserted terminoventrally, compared with *Harmothoe* with prostomial cephalic peaks and ventral insertion of the lateral antennae.

DIAGNOSIS.—Segments up to 46. Elytra and elytophores 14–15 pairs in adults, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, and 32. Elytra delicate, with or without micropapillae, with or without anterior group of microtubercles, without macro-tubercles. Prostomium bilobed, anterior lobes truncate, round or subtriangular, usually without distinct cephalic peaks, with 3 antennae, 2 palps, and 2 pairs of eyes; ceratophore of median antenna in anterior notch; lateral antennae with distinct ceratophores inserted terminoventrally, subterminally, or ventrally (converging midventrally). Tentaculophores of first segment lateral to prostomium, each with

or without few setae on inner side, and pair of dorsal and ventral tentacular cirri. Second or buccal segment with first pair of elytophores, subbiramous or biramous parapodia, and long ventral buccal cirri lateral to mouth. Parapodia subbiramous or biramous, with smaller notopodia and larger neuropodia, both rami with projecting acicular lobes; presetal acicular lobe of neuropodium longer, usually with supraacicular process; postsetal lobe shorter, rounded. Notosetae short, rodlike, similar in width to neurosetae, with tapering entire or notched blunt tips, with or without spinose rows. Neurosetae with spinose rows, with tips either all bifid, bifid and unidentate, or all unidentate. Dorsal cirri with cylindrical cirrophores and long styles; dorsal tubercles slightly developed or nodular. Ventral cirri short. Pygidium with pair of anal cirri. Pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

**Key to the Species of *Malmgreniella* from the Southern Ocean,
South Atlantic Ocean (South Africa), Indian Ocean (South Arabian Coast),
and South Pacific Ocean (New Guinea, SE Australia)**

1. Parapodia subbiramous, with relatively few short notosetae that do not extend beyond tips of notopodia [Figures 7B, 8E]; short notosetae with few (0–6) spines [Figures 7C,F, 8F]. Elytra without microtubercles [Figure 8B,C] *M. dicirra* Hartman
- Parapodia biramous, with numerous notosetae forming radiating bundles and/or extending far beyond tips of notopodia [Figures 10C, 11F, 12D, 13H, 14E, 15C, 16G]; long notosetae with numerous spinose rows [Figures 10D, 11H, 12F, 13J, 14G, 15E, 16I]. Elytra with group of microtubercles on anterior part [Figures 10B, 11B,C, 12B, 13C-E, 14B,C, 15B, 16C,D] 2
2. Bilobed prostomium with anterior lobes subtriangular [Figure 10A]. Neuropodia with extra large digitiform supraacicular process [Figure 10C] *M. agulhana* (Day), new combination
- Bilobed prostomium with anterior lobes truncate [Figures 11A, 12A, 13A, 14A, 15A, 16A]. Neuropodia with small supraacicular process [Figures 11C,D, 12D, 13H,I, 14E, 15E, 16H] 3
3. Elytra without color pattern [Figure 11B,C] *M. dayi*, new species
- Elytra with color pattern [Figures 12B, 13B-E, 14B-D, 15B, 16B,C] 4
4. Prostomium with anterior pair of eyes anteroventral [Figure 15A]. Long notosetae with notched tips [Figure 15E] *Malmgreniella pettiti*, new species
- Prostomium with anterior pair of eyes anterolateral or anterodorsal [Figures 12F, 13J, 14G, 16I] 5
5. Lower neurosetae with entire tips, rest with bifid tips [Figure 16J] *M. phillipensis* (Knox and Cameron), new combination
- Neurosetae all with bifid tips [Figures 12G, 13K, 14H] 6
6. Elytra uniformly darkly colored on posterior two-thirds [Figure 12B] *M. capensis* (McIntosh), new combination
- Elytral pigmentation forming circular pattern [Figures 13B-E, 14B-D] 7
7. Anterior pair of eyes anterodorsal [Figure 14A] *M. murrayensis*, new species
- Anterior pair of eyes anterolateral [Figure 13A] *M. inhacaensis*, new species

Malmgreniella dicirra Hartman, 1967

FIGURES 6-9

Malmgreniella dicirra Hartman, 1967:37, pl. 11A-D.—Cairns, 1983:130, 140, 145, 151.*Polynoe leioseta* Averincev, 1978:65, pl. 7:55-59. [New synonymy.]

MATERIAL EXAMINED.—SOUTHERN OCEAN: *Pacific Antarctic Ridge*: 54°49'S, 129°48'W, 549 m, *Eltanin* sta 1346, 7 Nov 1964, 13 syntypes of *M. dicirra* (USNM 55493-4; BMNH 1986.57; ZMH); 1 specimen with *Stylaster densicaulis* Moseley (USNM 65951). 51°00'S, 162°01'E, 333-371 m, with *Allopora eguchii*, Boschma, *Eltanin* sta 1411, 8 Feb 1965, 1 specimen (USNM 65952). 56°21'S, 158°28'E, 1574-1693 m, with *Calyptopora reticulata* Boschma, *Eltanin* sta 1423, 12 Feb 1965, 5 specimens (USNM 65953). 54°09'S, 52°08'W, 419-483 m, with *S. densicaulis*, *Eltanin* sta 1521, 30 Jan 1966, 1 specimen (USNM 65954). 54°29'S, 39°22'W, 659-686 m, with *S. densicaulis*, *Eltanin* sta 1536, 8 Feb 1966, 1 specimen (USNM 65955). 54°43'S, 55°30'W, 1647-2044 m, with *S. densicaulis* and *Conopora pauciseptata* Brock, *Eltanin* sta 1592, 14 Mar 1966, 4 specimens (USNM 65956). 54°39'S, 170°22'E, 1862-2103 m, with *Calyptopora reticulata* and *Conopora pauciseptata*, *Eltanin* sta 1991, 2 Jan 1968, 6 specimens (USNM 65957). *Weddell Sea*: Off Cape Norvegia, 71°50'S, 15°50'W, with *Conopora pauciseptata* and *Lepidopora* sp., Deep Freeze IV, USS *Edisto* TD-2, sta 14, 18 Jan 1959, 2 specimens (USNM 65950). *Australia*: Off Macquarie Island, 54°56'S, 158°49'E, 320 m, stony bottom, R/V *D. Mendeleev* sta 1294, 25 Jan 1976, paratype of *P. leioseta*

(ZIASL 2/43284).

DESCRIPTION.—Syntypes of *M. dicirra* up to 23 mm long, 6 mm wide including setae, with 46 segments. Paratype of *P. leioseta* 12 mm long, 4 mm wide, with 40 segments. Additional specimens, commensal with stylasterine hydrocorals, 8-18 mm long, 3-5 mm wide, with 34-43 segments. Body colorless except for black eyes. Elytra 15 pairs, small, leaving middorsum uncovered, delicate, oval, without tubercles or papillae (Figure 8B,C; Hartman, 1967, pl. 11G; Averincev, 1978, fig. 7:56).

Prostomium bilobed, with truncate anterior border and 2 pairs of eyes on posterior half; median antenna with ceratophore in anterior notch, and long style with filamentous tip; lateral antennae with distinct ceratophores inserted terminoventrally and short styles; palps stout, tapered; tentaculophores each with pair of dorsal and ventral tentacular cirri similar to median antenna, without setae (Figures 6A, 8A; Hartman, 1967, pl. 11A; Averincev, 1978, fig. 7:55). Second segment with first pair of elytriphores, subbiramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae stouter than neurosetae, with 3-5 spinous rows; neurosetae tapering to slender, blunt, entire tips, with spinous rows (Figure 6A-D).

Parapodium subbiramous, with notopodium shorter and smaller than neuropodium, rounded with projecting acicular lobe on lower side and slightly projecting notoaciculum; longer neuropodium subconical with tapering presetal acicular lobe and short, thick, digitiform supraacicular process above projecting neuroaciculum and shorter, rounded postsetal lobe (Figures 6B, 7A,B,E, 8D,E, 9A,B; Hartman, 1967, pl. 11D). Notosetae short, relatively few in number, slightly stouter than

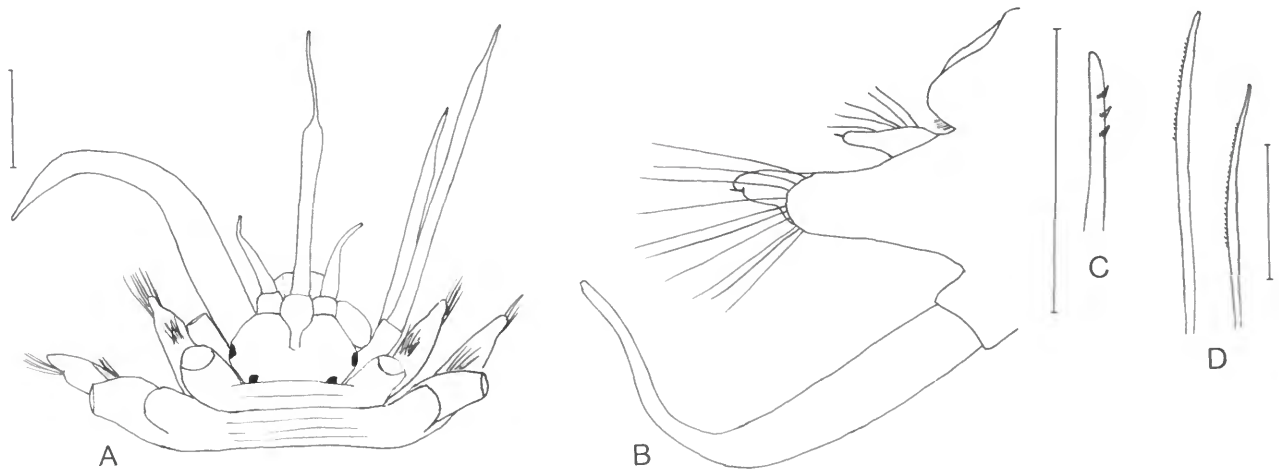


FIGURE 6.—*Malmgreniella dicirra*, syntype (USNM 55494): A, dorsal view of anterior end, pharynx partially extended, right palp, left dorsal and ventral tentacular cirri and dorsal cirri of segment 3 missing; B, right elytrigerous parapodium from segment 2, posterior view; C, notoseta from same; D, upper and lower neurosetae from same. (Scales = 0.5 mm for A; 0.5 mm for B; 0.1 mm for C,D.)

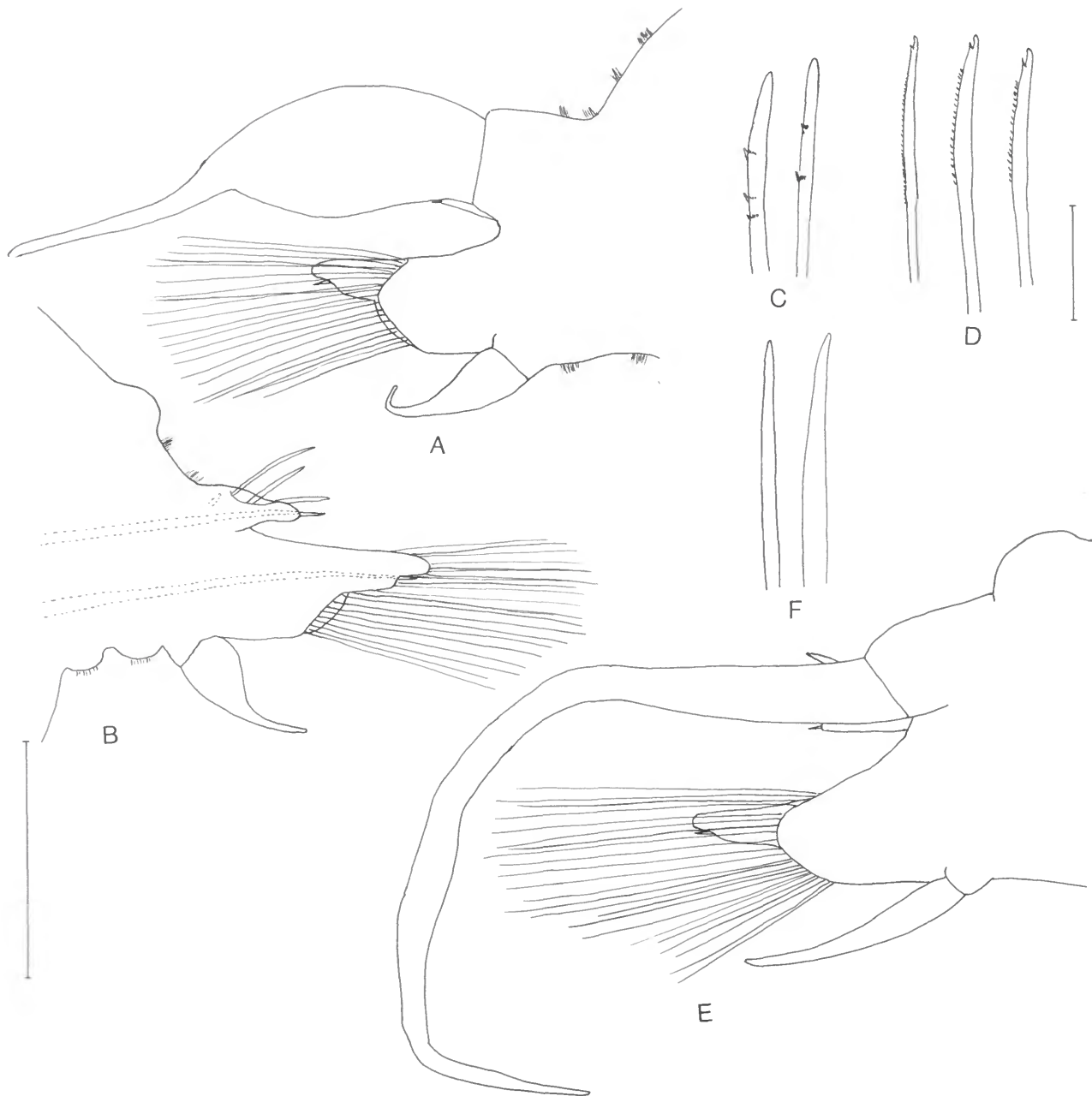


FIGURE 7.—*Malmgreniella dicirra*, syntype (USNM 55494): A, right cirriferous parapodium from segment 6, posterior view; B, right elytriferous parapodium from segment 7, anterior view, acicula and newly formed internal notoseta dotted; C, notosetae from same; D, upper, middle, and lower neurosetae from same; E, left cirriferous parapodium from segment 26, posterior view; F, notosetae from same. (Scales = 0.5 mm for A,B,E; 0.1 mm for C,D,F.)

neurosetae, with 2–6 spines along one side (none on posterior segments) (Figures 6C, 7C,F, 8F, 9C; Hartman, 1967, pl. 11E; Averincev, 1978, pl. 7:58). Neurosetae long, more numerous

(25–30), with slightly enlarged spinose regions with close-set spines along cutting edges, with bifid tips (Figures 7D, 8G, 9D; Hartman, 1967, pl. 11F; Averincev, 1978, pl. 7:59). Dorsal cirri

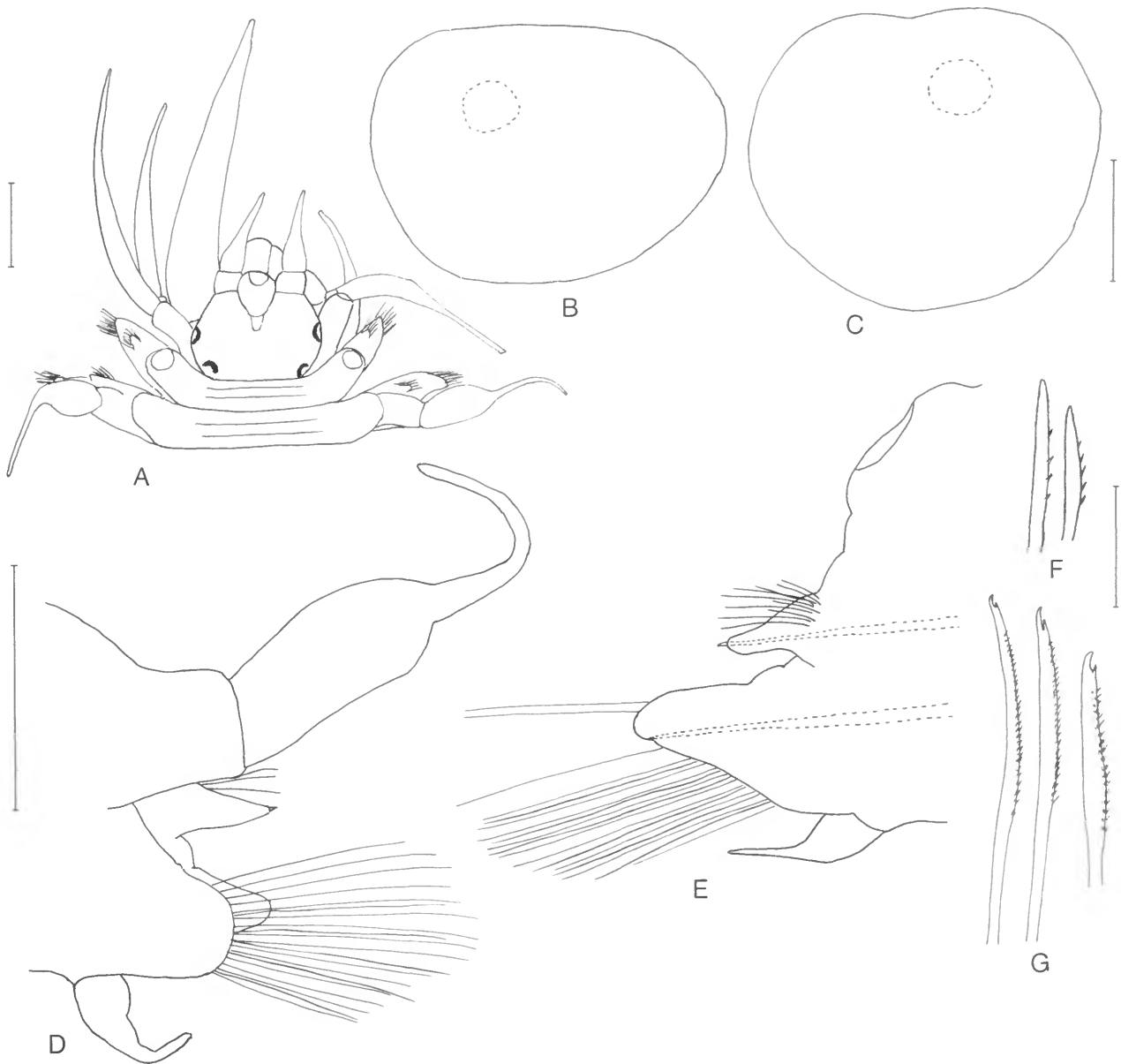


FIGURE 8.—*Malmgreniella dicirra*, paratype of *Polynoe leioseta* (ZIASL 2/43284): A, dorsal view of anterior end, right palp and styles of median antenna and right dorsal tentacular cirrus missing; B, left elytron from segment 9; C, right elytron from segment 26; D, right cirriferous parapodium from segment 10, posterior view; E, right elytigerous parapodium from segment 11, anterior view, acicula dotted; F, notosetae from same; G, upper and middle neurosetae from same. (Scales = 0.5 mm for A; 0.5 mm for B,C; 0.5 mm for D,E; 0.1 mm for F,G.)

with short cylindrical cirrophores; styles either short, bulbous basally or longer, cirriform, former type occurring on segments 3, 6, 8, then more or less alternating regularly with latter type; dorsal tubercles slightly developed on anterior parapodia,

bulbous on posterior ones; ventral cirri inflated basally on anterior parapodia, gradually tapering on posterior ones (Figures 7A,E, 8A,D, 9A; Hartman, 1967, pl. 11B,C). Pygidium with pair of long anal cirri.

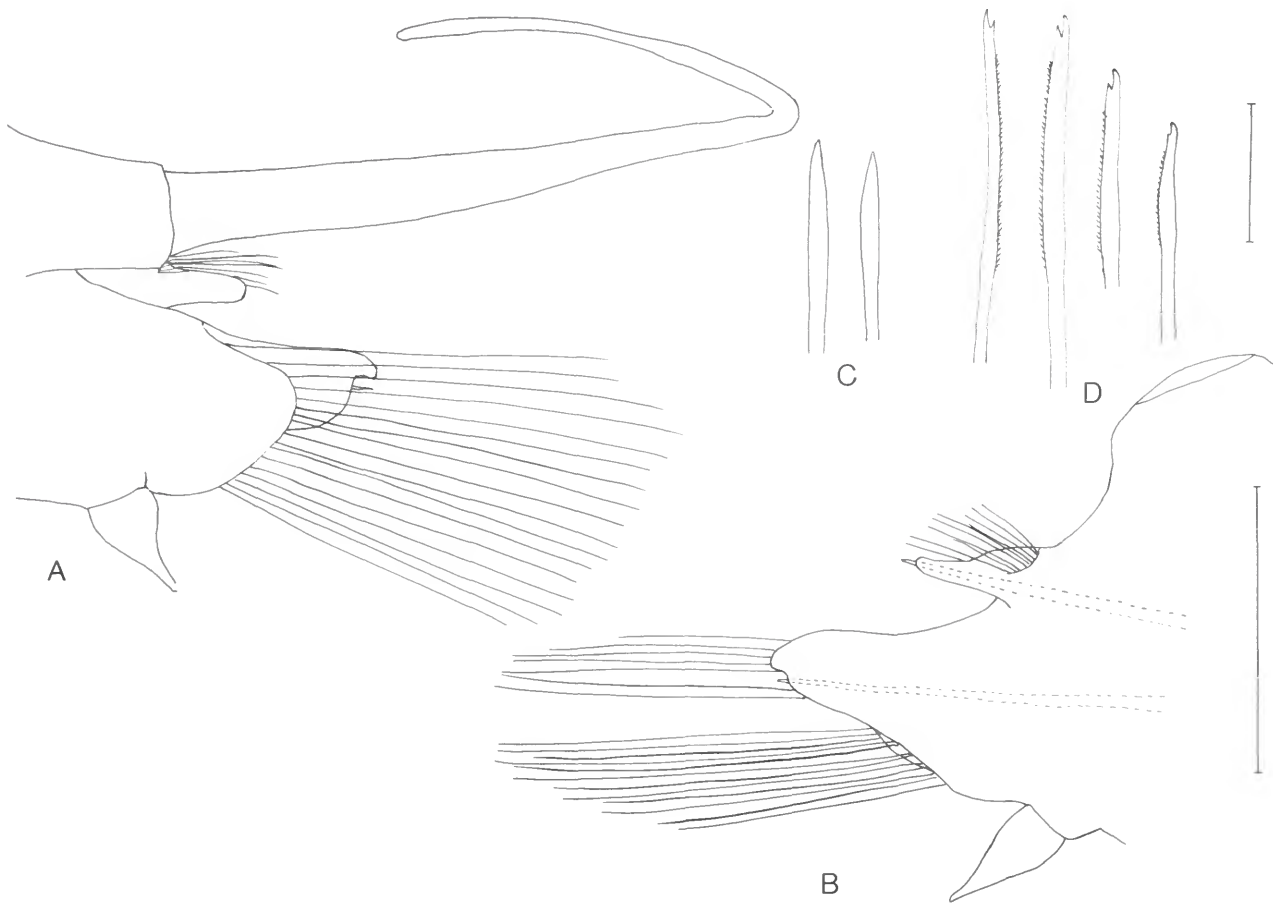


FIGURE 9.—*Malmgreniella dicirra*, paratype of *Polynoe leioseta* (ZIASL 2/43284): A, right cirriferous parapodium from segment 25; B, right elytrigerous parapodium from segment 26; C, notosetae from same; D, upper, middle, and lower neurosetae from same. (Scales = 0.5 mm for A,B; 0.1 mm for C,D.)

BIOLOGY.—*Malmgreniella dicirra* was found by Cairns (1983) living commensally with four stylasterine hydrocorals: *Conopora pauciseptata* Broch, *Stylaster densicaulis* Moseley, *Allopora eguchii* Boschma, and *Calyptopora reticulata* Boschma. According to Cairns (1983:130), the polynoid induced *Conopora pauciseptata* to form a flattened tube about 3.8×2.2 mm in diameter (often considerably larger than the branch to which it was attached); the tubes were found on either the anterior or posterior sides and sometimes on both sides of the branch. On *Stylaster densicaulis*, the polynoid induced the coral to form a broad, flat tube on its anterior side. The tubes were quite long and up to 3×5.5 mm in diameter and even bifurcate at various points. The polynoid appeared to induce an anterior rectangular ridge, a preliminary step in tube formation (Cairns, 1983:140, fig. 41A). On *Calyptopora reticulata*, the polynoids induced the coral to form flattened tubes, about 3×2.2 mm in diameter, on either the anterior or

posterior sides or both sides of the colony (Cairns, 1983:151).

DISTRIBUTION.—Southern Ocean, Pacific Antarctic Ridge, off Macquarie Island, Weddell Sea. In 320–2103 meters.

***Malmgreniella agulhana* (Day, 1960), new combination**

FIGURE 10

Harmothoe agulhana Day, 1960:277, fig. 1g–i; 1967:74, fig. 1.11.q–u.

MATERIAL EXAMINED.—SOUTH ATLANTIC OCEAN: *South Africa*: False Bay, $34^{\circ}12'S$, $18^{\circ}37'E$, University of Cape Town Ecological Survey, sta FAL 419, 15 May 1961, 48 m, sand and shell, identified by J.H. Day, 1 specimen (BMNH 1961.9.834).

DESCRIPTION.—Type material not available. According to Day, holotype 12 mm long, 2 mm wide without setae, and 36 segments. Anterior fragment from False Bay 3 mm long, 2 mm

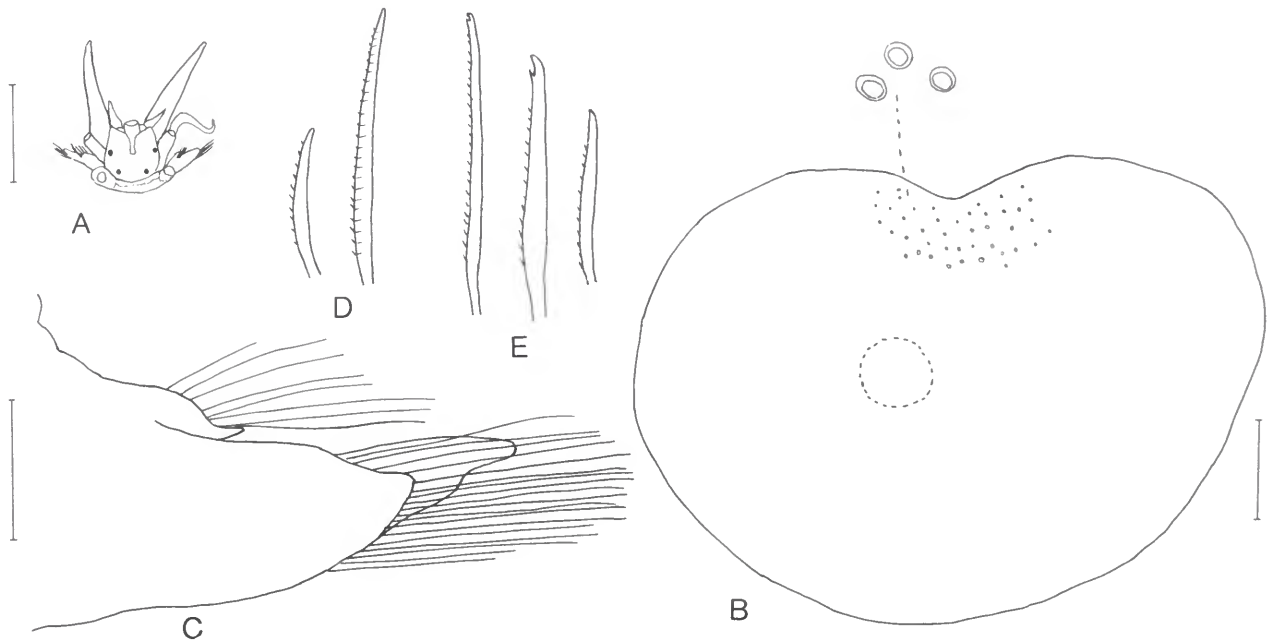


FIGURE 10.—*Malmgreniella agulhana*, specimen from False Bay, South Africa (BMNH 1961.9.834): A, dorsal view of anterior end, styles of median antenna, left dorsal and ventral, and right dorsal tentacular cirri missing; B, left elytron with detail of microtubercles; C, right elytrigerous parapodium, posterior view, ventral cirrus missing; D, short and long notosetae; E, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A; 0.1 mm for B; 0.1 mm for C-E.)

wide including setae, and 18 segments. Elytra large, oval to subreniform, smooth except for group of microtubercles near anteromedial margin (with faint network of brown pigmentation on exposed part, according to Day) (Figure 10B; Day, 1960, fig. 1k).

Bilobed prostomium with lobes rounded to subtriangular, without distinct peaks; eyes small, anterior pair in region of greatest width, slightly larger than posterior pair; ceratophore of median antenna in anterior notch, with style about as long as prostomium; ceratophores of lateral antennae inserted terminoventrally, with short subulate styles; palps stout, tapered; tentaculophores lateral to prostomium, without setae, with dorsal and ventral tentacular cirri similar to median antenna (Figure 10A; Day, 1960, fig. 1j). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 10A; Day, 1960, fig. 1j).

Biramous parapodia with notopodia shorter than neuropodia, rounded, with projecting acicular lobes on lower sides; larger neuropodia with presetal conical acicular lobes with large digitiform supraacicular processes and shorter rounded postsetal lobes (Figure 10C; Day, 1960, fig. 1g). Notosetae about as stout as neurosetae, short, curved to longer, nearly straight, with spinose rows and tapered bare tips (Figure 10D; Day,

1960, fig. 1h). Upper neurosetae with longer spinose regions and bifid tips; middle ones with shorter spinose regions and bifid tips; lower neurosetae with entire tips (Figure 10E; Day, 1960, fig. 1i). Dorsal cirri with cylindrical cirrophores and papillate styles, extending beyond tips of neuropodia; dorsal tubercles nodular; ventral cirri short, subulate (Day, 1960, fig. 1g, j).

DISTRIBUTION.—Atlantic Ocean, South Africa. In 26–48 meters (see Day, 1960).

Malmgreniella dayi, new species

FIGURE 11

Harmothoe waahli.—Day, 1934:21, fig. 2a–d [not Kinberg, 1856].

MATERIAL EXAMINED.—SOUTH ATLANTIC OCEAN: *South Africa*: False Bay, intertidal, J.H. Day, collector, 1933, holotype (BMNH 1934.1.19.97, as *Harmothoe waahli* by Day, 1934).

DESCRIPTION.—Holotype in 2 pieces, with segments 15 and 16 missing, 13 mm long, 4 mm wide including setae, and 36 segments. Body flattened, tapering slightly anteriorly and posteriorly. Elytra 15 pairs, on usual segments, oval to subreniform, smooth, opaque, with group of microtubercles on

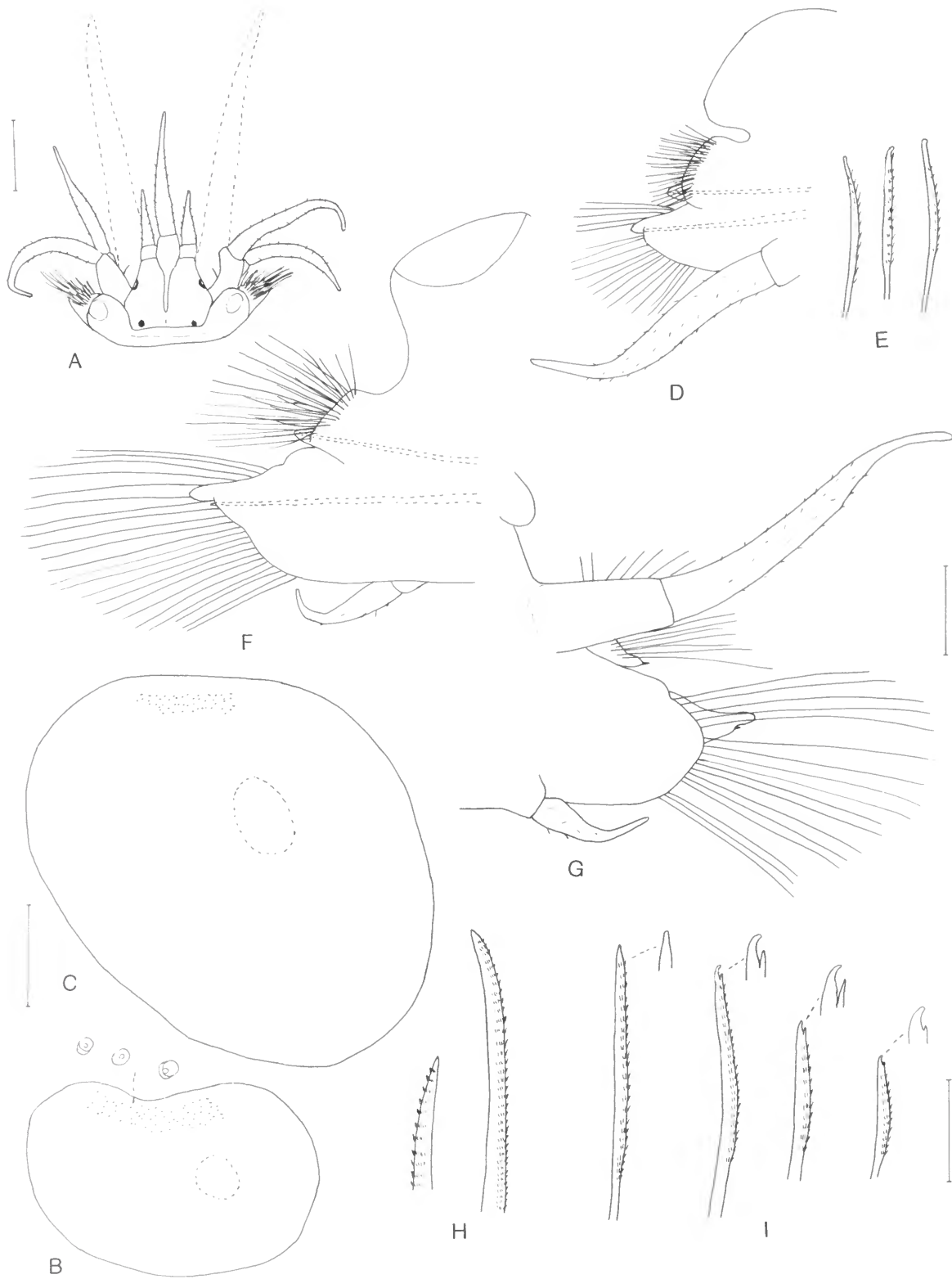


FIGURE 11 (opposite page).—*Malmgreniella dayi*, new species, holotype (BMNH 1934.1.19.97): A, dorsal view of anterior end, palps missing (drawn as dotted lines, taken from fig. 2a by Day, 1934); B, right 2nd elytron from segment 4, with detail of microtubercles; C, right posterior elytron; D, right parapodium from segment 2, anterior view, acicula dotted; E, upper, middle, and lower notosetae from same; F, right elytrigerous parapodium, anterior view, acicula dotted; G, right cirriferous parapodium, posterior view; H, short and long notosetae; I, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B,C; 0.2 mm for D,F,G; 0.1 mm for E,H,I.)

anterior part, and some scattered micropapillae on surface; no color pattern visible (Figure 11B,C; Day, 1934, fig. 2b,c).

Bilobed prostomium with anterior lobes truncate, without peaks; anterior pair of eyes anterolateral, larger than posterodorsal pair; ceratophore of median antenna large, in anterior notch, with papillate style longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, with short, papillate, subulate styles; palps long, stout, tapering (now missing); tentaculophores lateral to prostomium, with single seta on inner side; dorsal and ventral tentacular cirri similar to median antenna (Figure 11A; Day, 1934, fig. 2a). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 11A,D). Notosetae numerous, similar to those of following segments; neurosetae more slender than those following, lower and upper ones with bulbous entire tips, middle ones each with secondary tooth (Figure 11E).

Biramous parapodia with smaller notopodia rounded, with projecting acicular lobes on lower sides; larger neuropodia with subconical presetal acicular lobes with thick supraacicular processes; postsetal lobes shorter, rounded (Figure 11D,F,G). Notosetae moderate in number, of several lengths, slightly stouter than neurosetae, each with faint spinose rows and short tapered bare tips (Figure 11H). Neurosetae moderate in number, upper ones with long spinose regions, upper few with tapered entire tips, rest with secondary tooth; lower neurosetae with shorter spinose regions, with small secondary tooth or entire (Figure 11I; Day, 1934, fig. 2d). Dorsal cirri with cylindrical cirrophores and styles, extending to tips of neurosetae or slightly beyond, with scattered short papillae; dorsal tubercles nodular; ventral cirri short, subulate, with short papillae (Figure 11G; Day, 1934, fig. 2a). Pygidium with dorsal anus medial to parapodia of posterior small segment, with pair of long anal cirri.

ETYMOLOGY.—The species is named for John H. Day, in recognition of his many contributions to the study of the Polychaeta.

DISTRIBUTION.—Atlantic Ocean, South Africa. Intertidal.

Malmgreniella capensis (McIntosh, 1885), new combination

FIGURE 12

Polynoe capensis McIntosh, 1885:114, pl. 4: fig. 4; pl. 15: fig. 1; pl. 19: fig. 4; pl. 9A: figs. 4, 5.

?*Polynoe capensis*.—Day, 1960:283 [examination of types].

Malmgrenia purpurea Day, 1960:281, fig. 2f-k.—1967:50, fig. 1.4.1-o.—

Intes and Le Loeuff, 1975:273.—Kudenov, 1975b:79.—Hanley, 1987:160 [under *incertae sedis*]. [New synonymy.]

Parahalosydna capensis.—Day, 1967:86, fig. 1.15.a-d.

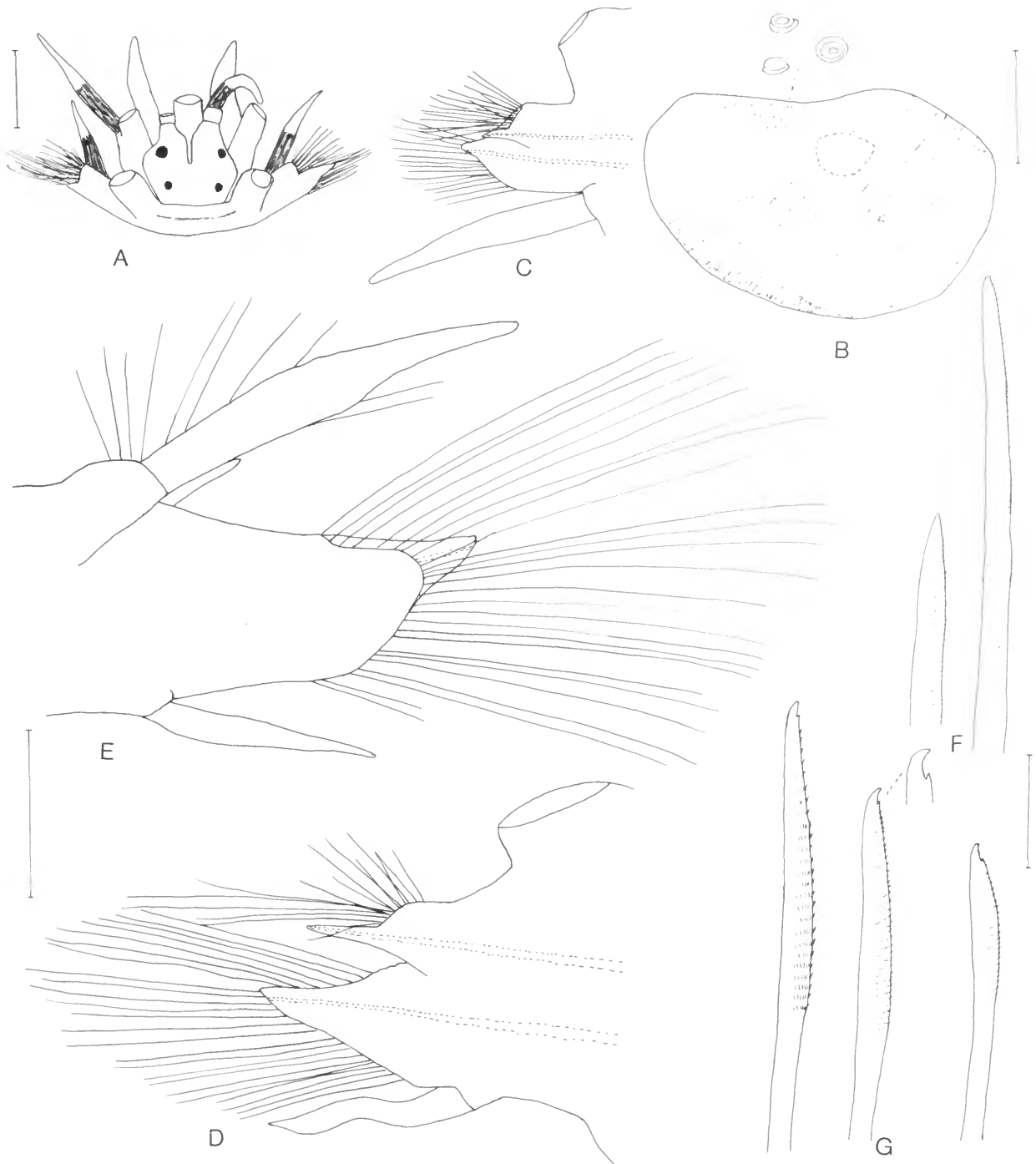
MATERIAL EXAMINED.—SOUTH ATLANTIC OCEAN: *South Africa*: Near Cape of Good Hope, 34°41'S, 18°36'E, 179 m, green sand, *Challenger* sta 141, 17 Dec 1873, 2 syntypes of *Polynoe capensis* (BMNH 1885.12.1.94). False Bay, 34°16'S, 18°40–42'E, 60–62 m, sand and shell, with *Spatangus capensis* Döderlein, University of Cape Town Ecological Survey, sta FAL 359/375, 24/25 Feb 1959, 2 syntypes of *Malmgrenia purpurea* (USNM 53540).

TYPE MATERIAL.—The two syntypes of *P. capensis* are fragmented, somewhat hardened, and in rather poor condition, measuring 19 mm in length, 7 mm in width including the setae, with 38–39 segments. The two syntypes of *M. purpurea* also are fragmented but in fair condition, the larger and smaller syntypes measuring 16 and 10 mm in length, 5 and 3 mm in width, with 38 and 37 segments, respectively.

DESCRIPTION.—Body elongated, flattened, tapering slightly anteriorly and posteriorly; 15 pairs of elytra, dull blackish grey where exposed (McIntosh, 1885, pl. 19: fig. 1; figure incorrectly shown with 16 pairs of elytra); color of body dark purple, according to Day (1960); posterior most 6 or so segments of dorsum and ventrum with dark bands and dark pigment spots on anterior sides and bases of parapodia. Elytra large, oval to subreniform, with posterior two-thirds uniformly darkly colored and with group of microtubercles near anterior notch (Figure 12B; McIntosh, 1885, pl. 19: fig. 4; Day, 1960, fig. 2j).

Bilobed prostomium with lobes truncate, without peaks; eyes moderate in size, anterior pair anterolateral, larger than posterodorsal pair; ceratophore of median antenna large, in anterior notch, with large, club-shape style; ceratophores of lateral antennae distinct, inserted terminoventrally, with short, tapered styles; palps stout, tapered; tentaculophores lateral to prostomium with 0–1 seta on inner side, with dorsal and ventral tentacular cirri (Figure 12A; McIntosh, 1885, pl. 4: fig. 4; Day, 1960, fig. 2g). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 12A,C; Day, 1960, fig. 2g).

Biramous parapodium with smaller subconical notopodium with projecting acicular lobe on lower side; larger neuropodium with conical presetal acicular lobe with supraacicular triangular lip and shorter, rounded postsetal lobe (Figure 12C-E; Day, 1960, fig. 2k). Notosetae moderate in number, long to short, about as stout as neurosetae, with minute serrations and abruptly tapered tips, forming radiating bundle (Figure 12C,F; McIntosh, 1885, pl. 9A: fig. 4; Day, 1960, fig. 2h,h'). Neurosetae moderate in number, forming fan-shape bundle; upper ones with longer spinose regions and slight indication of secondary tooth; middle and lower neurosetae with shorter, faintly marked spinose rows, more developed hooked tip, and small secondary tooth (Figure 12D,G; McIntosh, 1885, pl. 9A:



anterior end, styles of median and left lateral antennae and left dorsal and right dorsal and ventral tentacular cirri missing; B, right elytron, with detail of microtubercles; C, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; D, right middle elytrigerous parapodium, anterior view, acicula dotted; E, right cirriferous parapodium, posterior view; F, short and long notosetae; G, upper, middle, and lower neurosetae, with detail of tip. (Scales = 0.5 mm for A; 1.0 mm for B; 0.5 mm for C-E; 0.1 mm for F,G.)

fig. 5; Day, 1960, fig. 2f, f'). Dorsal cirri with cylindrical cirrophores and styles inflated subdistally, smooth, shorter than neurosetae; dorsal tubercles nodular; ventral cirri extending almost to tips of neuropodia (Figure 12D,E; Day, 1960, fig. 2g,k). Pygidium with pair of dark sausage-like anal cirri.

BIOLOGY.—The dark coloration of *Malmgreniella capensis* strongly suggests a commensal relationship. The types of the synonym *M. purpurea* Day were collected with the echinoid spatangid *Spatangus capensis* Döderlein, and this allowed Day (1960) to suggest it as the probable host for the polychaete.

DISTRIBUTION.—South Atlantic Ocean, South Africa. In 60–179 meters.

Malmgreniella inhacaensis, new species

FIGURE 13

Harmothoe lunulata.—Day, 1962:629 [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—INDIAN OCEAN: *Mozambique*: Inhaca Island, Delagoa Bay, 25°50'S, 32°50'E, University of Cape Town Ecological Survey (IN 145A), commensal in burrows of *Balanoglossus* sp. and *Ptychodera* sp., holotype (BMNH 1963.1.4, as *Harmothoe lunulata* by Day, 1962).

DESCRIPTION.—Length of holotype 17 mm, width 5 mm including setae, 37 segments, last segment minute. Body flattened, tapering slightly anteriorly and posteriorly, with 2 transverse ciliated bands per segment. Ventral surface of posterior region with brown transverse bands. Elytra 15 pairs, on usual segments, oval to subreniform, with rather large group of microtubercles on anterior part beginning on 2nd elytra, fewer in number on posterior elytra, and with some scattered micropapillae on surface; brown pigmentation pattern consisting of transverse bands and bands along medial and posterior borders (Figure 13B–E).

Bilobed prostomium with lobes truncate, without peaks; anterior pair of eyes anterolateral, nearly hidden from view dorsally, smaller posterior pair posterodorsal; ceratophore of median antenna large, in anterior notch of prostomium, style missing; lateral antennae with ceratophores inserted terminoventrally, with styles short, subulate, with short papillae; palps stout, tapered; tentaculophores lateral to prostomium, each with single seta on inner side and long tapered papillate dorsal and ventral tentacular cirri (Figure 13A). Segment 2 with first pair of large elytraphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae similar to those of following parapodia; neurosetae more slender than following, with entire and bifid bulbous tips (Figure 13F,G).

Biramous parapodia with notopodia much shorter than neuropodia, rounded with projecting acicular lobes on lower sides; larger neuropodia with subconical presetal acicular lobes with thick supraacicular processes and shorter, rounded postsetal lobes (Figure 13H,I). Notosetae very numerous, of several lengths, forming spreading bundle, about as stout as neurosetae, with numerous spinose rows and tapered to

rounded tip (Figure 13J). Neurosetae numerous, forming fan-shape bundle, upper ones with longer spinose regions and long slender secondary tooth; middle and lower ones with shorter spinose regions and shorter secondary tooth (Figure 13K). Dorsal cirri with cylindrical cirrophores; styles with short papillae and filamentous tips extending to about tips of neurosetae; dorsal tubercles bulbous; ventral cirri short, tapered, with short papillae (Figure 13I). Pygidium with dorsal anus medial to parapodia of posterior small segment, with pair of long anal cirri.

BIOLOGY.—*Malmgreniella inhacaensis* is found living commensally in the burrows of the enteropneusts *Ptychodera* and *Balanoglossus*.

ETYMOLOGY.—The species is named for the collection site of Inhaca Island.

DISTRIBUTION.—Indian Ocean, Mozambique, Inhaca Island.

Malmgreniella murrayensis, new species

FIGURE 14

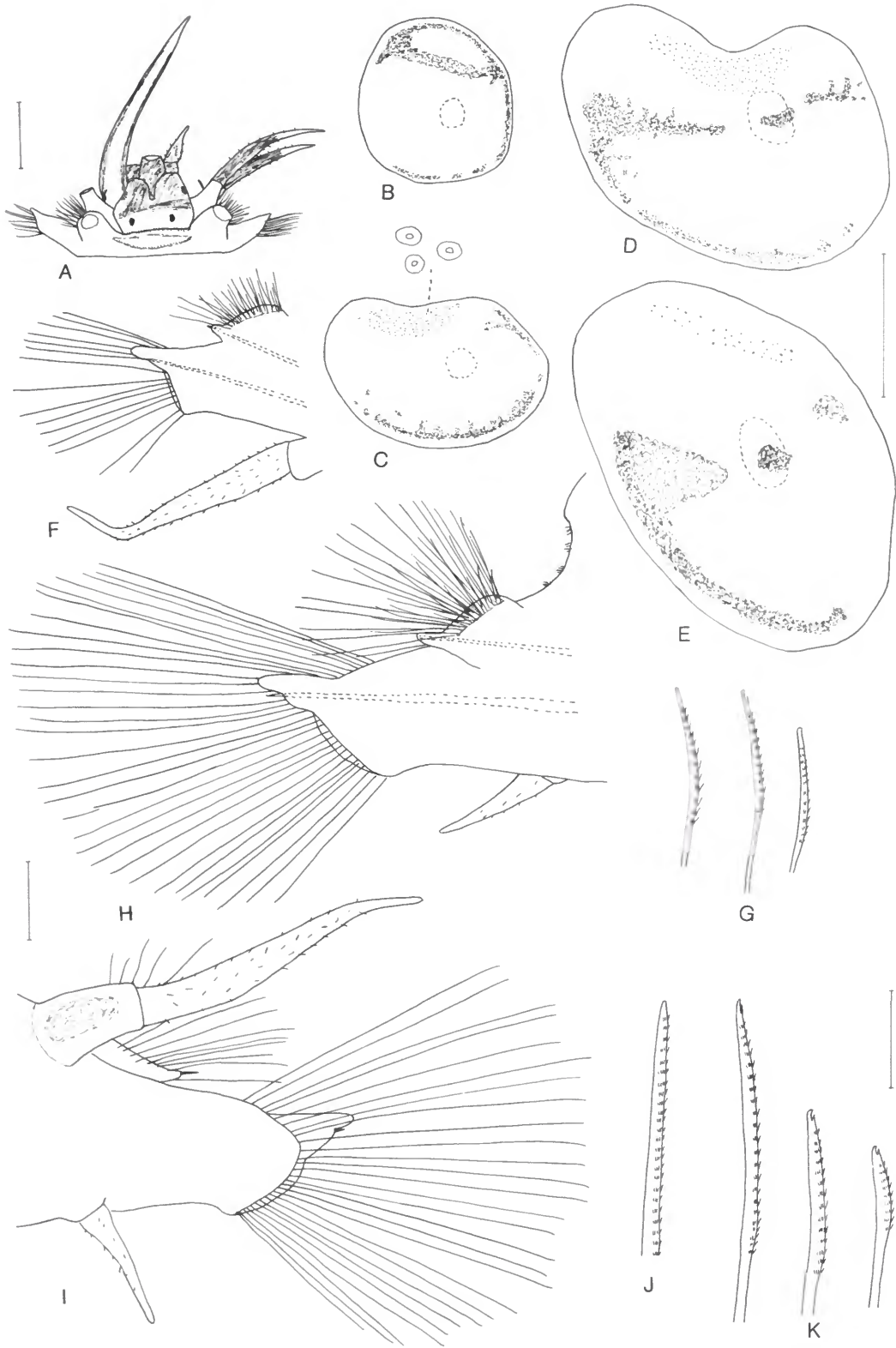
Harmothoe lunulata.—Monro, 1937:258 [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—INDIAN OCEAN: *South Arabian Coast*: 18°03'N, 57°02'E, 38 m, *Lithothamnion* bottom, in cavity of sponge, John Murray Expedition, 29 Jul 1933, holotype (BMNH 1937.9.2.28, as *H. lunulata* by Monro, 1937).

DESCRIPTION.—Length 8 mm, width 3 mm including setae, 36 segments, last 2 segments very small. Body flattened, tapered slightly anteriorly and posteriorly, ventral side of posterior end with brownish streaks. Elytra 15 pairs, on usual segments, oval to subreniform, with group of microtubercles on anterior side of more anterior elytra, and scattered micropapillae on surface; brownish pigmentation forming almost complete circle, wider in some areas (Figure 14B–D).

Bilobed prostomium with anterior lobes truncate, without peaks; eyes small, anterior pair anterolateral, anterior to greatest width of prostomium, slightly smaller posterior pair posterodorsal; ceratophore of median antenna in anterior notch, style missing; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate, papillate; palps stout, tapered, appearing wrinkled; tentaculophores lateral to prostomium with single seta on inner side, tentacular cirri missing (Figure 14A). Segment 2 with first pair of large elytraphores, biramous parapodia, and long papillate ventral buccal cirri (Figure 14A). Pharynx not extended and not examined.

Biramous parapodium with notopodium shorter and smaller than neuropodium, rounded with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe with small supraacicular process and shorter, rounded postsetal lobe (Figure 14E,F). Notosetae moderate in number, of several lengths, with faint close-set spinose rows; shorter notosetae with longer tapered bare tips, longer notosetae with wider and shorter blunt bare tips, tips thinner on one side forming sort of flange (Figure 14G). Neurosetae moderate in number, with



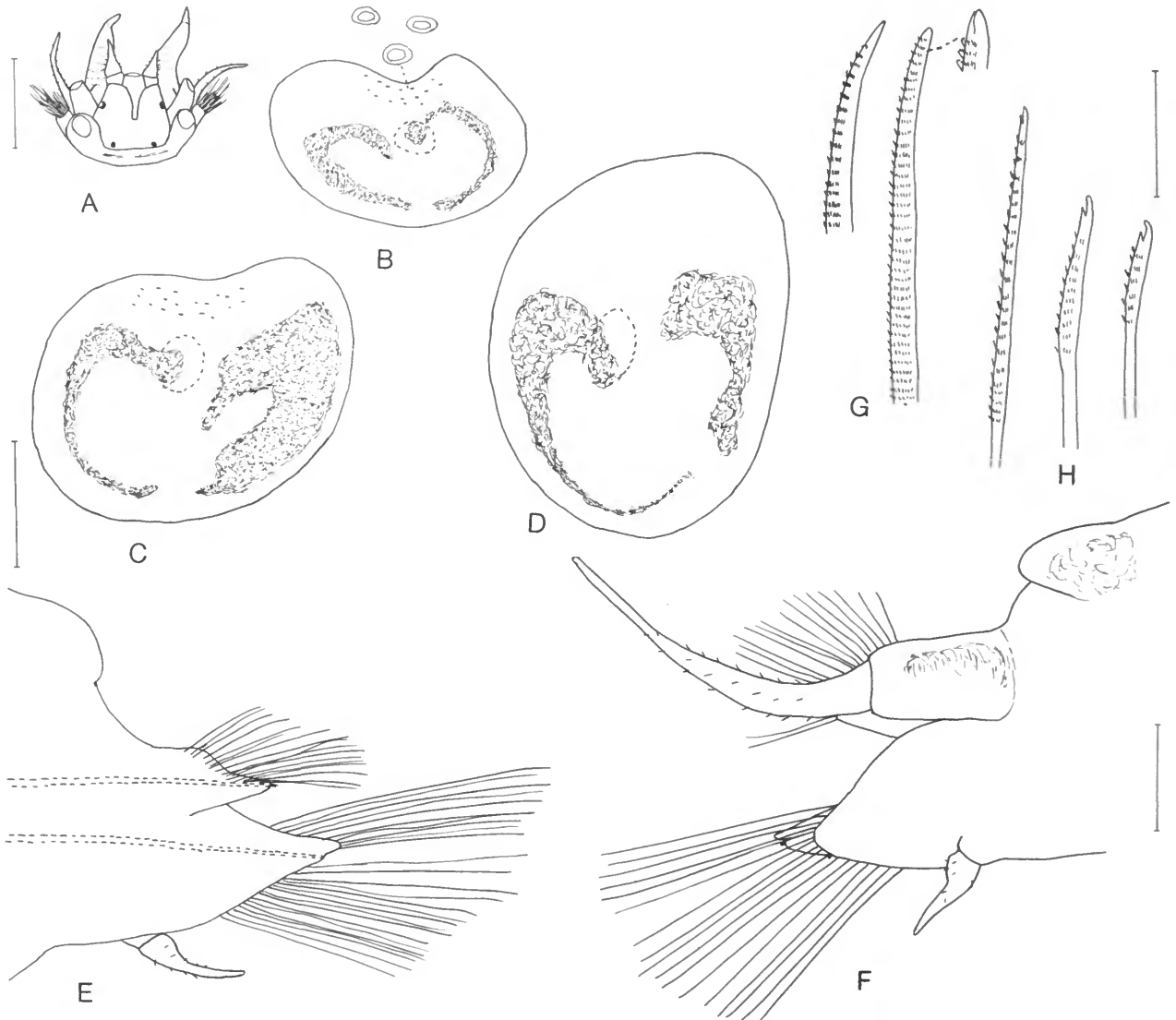


FIGURE 14.—*Malmgreniella murrayensis*, new species, holotype (BMNH 1937.9.2.28): A, dorsal view of anterior end, styles of median antenna and tentacular cirri missing; B, right 2nd elytron from segment 4, with detail of microtubercles; C, left 5th elytron from segment 9; D, left posterior elytron; E, left elytrigerous parapodium, anterior view, acicula dotted; F, left cirriferous parapodium, posterior view; G, short and long notosetae, with detail of tip; H, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A; 0.5 mm for B-D; 0.2 mm for E,F; 0.1 mm for G,H.)

FIGURE 13 (opposite page).—*Malmgreniella inhacaensis*, new species, holotype (BMNH 1963.1.4): A, dorsal view of anterior end, styles of median and left lateral antennae and left tentacular cirri missing; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles; D, right middle elytron; E, right 13th elytron from segment 26; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; G, upper, middle, and lower neurosetae from same; H, right middle elytrigerous parapodium, anterior view, acicula dotted; I, right cirriferous parapodium, posterior view; J, notoseta; K, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A; 1.0 mm for B-E; 0.2 mm for F,H,I; 0.1 mm for G,J,K.)

rather faint spinose rows, all with bifid tips, upper ones with longer spinose regions (Figure 14H). Dorsal cirri with cylindrical cirrophores, with slightly raised glandular areas on posterior sides; styles extending to tips of neurosetae, with filamentous tips and short clavate papillae; dorsal tubercles nodular; ventral cirri short, subulate, with short papillae (Figure 14F). Pygidium with dorsal anus medial to small posterior parapodia; anal cirri missing.

BIOLOGY.—*Malmgreniella murrayensis* was found living deeply embedded in the cavity of a sponge.

ETYMOLOGY.—The species is named for the John Murray Expedition.

DISTRIBUTION.—Indian Ocean, South Arabian Coast. In 38 meters.

***Malmgreniella pettiti*, new species**

FIGURE 15

MATERIAL EXAMINED.—SOUTH PACIFIC OCEAN: *New*

Guinea: Papua, Bootless Inlet, about 4 mi NE of Raine Point, 28 May 1981, removed from Alcyonacea, G.R. Pettit, collector, holotype (USNM 80508).

DESCRIPTION.—Holotype 5 mm long, 1.5 mm wide including setae, and 34 segments. Body flattened, tapered posteriorly, colorless. Elytra 15 pairs, on usual segments, large, oval, covering dorsum; mottled brownish pigmentation on medial two-thirds and scattered microtubercles on anterior part (Figure 15B).

Prostomium oval, bilobed, with anterior lobes truncate, without peaks; anterior pair of eyes anteroventral, larger than posterodorsal pair; ceratophore of median antenna bulbous, in anterior notch, style missing; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate, minutely papillate; palps stout, tapered; tentaculophores lateral to prostomium, each with single seta on inner side; dorsal and ventral tentacular cirri about length of palps, with short papillae (Figure 15A). Segment 2 with first pair of large elytraphores, biramous parapodia, and long ventral buccal cirri similar to

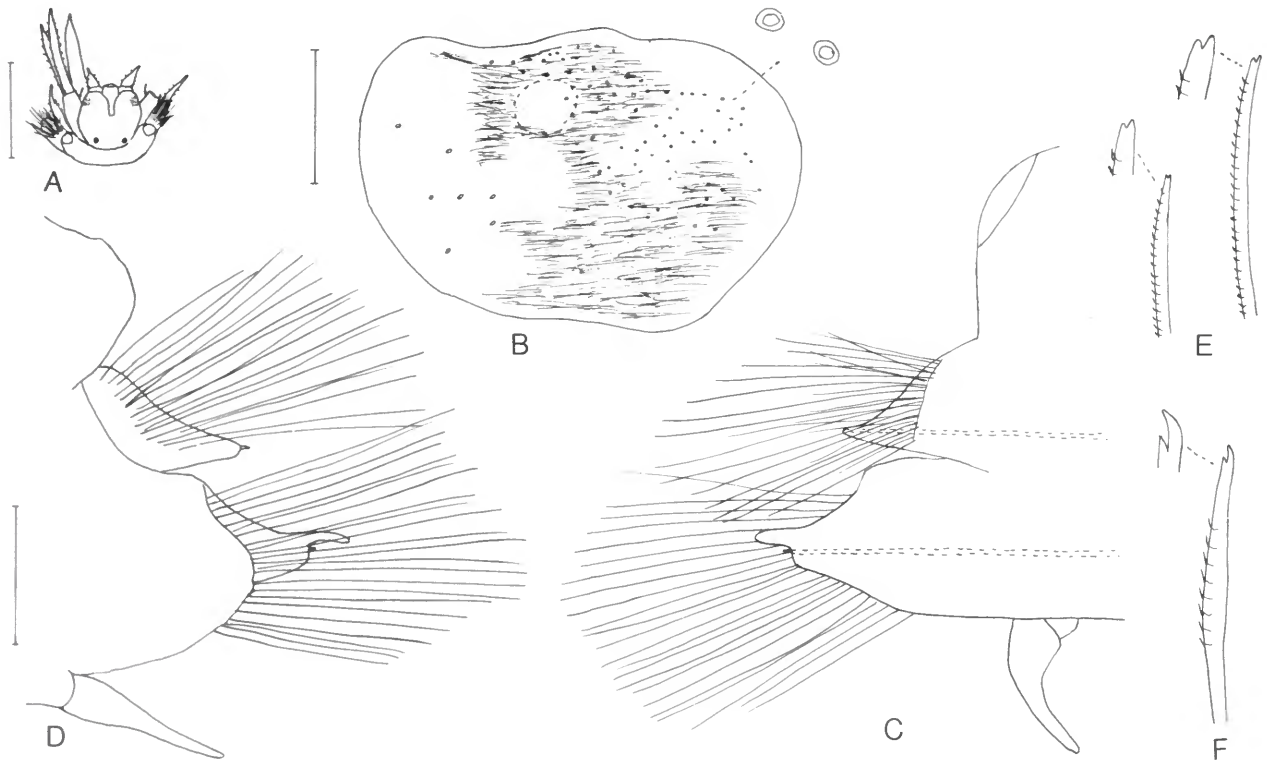


FIGURE 15.—*Malmgreniella pettiti*, new species, holotype (USNM 80508): A, dorsal view of anterior end, style of median antenna, right dorsal and ventral tentacular cirri, and right palp missing; B, left elytron, with detail of microtubercles; C, right elytrigerous parapodium, anterior view, acicula dotted; D, right cirriferous parapodium, posterior view, style of dorsal cirrus missing; E, short and long notosetae, with detail of tips; F, middle neuroseta, with detail of tip. (Scales = 0.5 mm for A; 0.2 mm for B; 0.1 mm for C-F.)

tentacular cirri (Figure 15A).

Biramous parapodium with notopodium short, rounded, with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe with digitiform supraacicular process; postsetal lobe shorter, rounded (Figure 15C,D). Notosetae numerous, of several lengths, forming radiating bundle. Notosetae about equal in width to neurosetae, with numerous spinose rows, shorter ones with tips entire and pointed or notched, longer ones mostly with notched tips (Figure 15E). Neurosetae numerous, forming fan-shape bundle, all with rather long, bare, bifid hooked tips, upper ones with longer spinose regions (Figure 15F). Dorsal cirri with cylindrical cirrophores and papillate styles extending to tips of neurosetae; dorsal tubercles nodular; ventral cirri short, subulate (Figure 15D).

BIOLOGY.—Associated with Alcyonacea.

ETYMOLOGY.—The species is named for the collector, G.R. Pettit.

DISTRIBUTION.—South Pacific Ocean, New Guinea.

***Malmgreniella phillipensis* (Knox and Cameron, 1971),
new combination**

FIGURE 16

Malmgrenia phillipensis Knox and Cameron, 1971:22, figs. 1–6.—Kudenov, 1977:85, pl. 1a–n.

Harmothoe phillipensis.—Hanley, 1987:153, fig. 3I.

MATERIAL EXAMINED.—PACIFIC OCEAN: *Australia*: Victoria, Port Phillip Bay Survey, 1957–63, area 14 (175), 2 paratypes (NMV G1737).

DESCRIPTION.—Two paratypes examined, consisting of anterior fragments, 9 and 11 mm long, 6 and 7 mm wide including setae, with 18 and 22 segments (up to 20 mm long, 6 mm wide, with 38 segments in original description). Middorsum reddish brown to cream, ventrum pale cream; according to Kudenov (1977), posterior ventral half of each posterior segment with transverse brown bands. Elytra 15 pairs, on usual segments, large, overlapping, covering dorsum. Elytra oval to subreniform, stiff, slick and shiny, sometimes showing 1–3 indistinct parallel longitudinal ridges (due to preservation, according to Kudenov, 1977:88), with wide band of numerous microtubercles on anterior region and some scattered on surface; brownish pigmentation in form of large anteromedial patch, continuing as narrow band along medioposterior border (Figure 16C,D; Knox and Cameron, 1971, figs. 2, 3; Kudenov, 1977, pl. 1d–g).

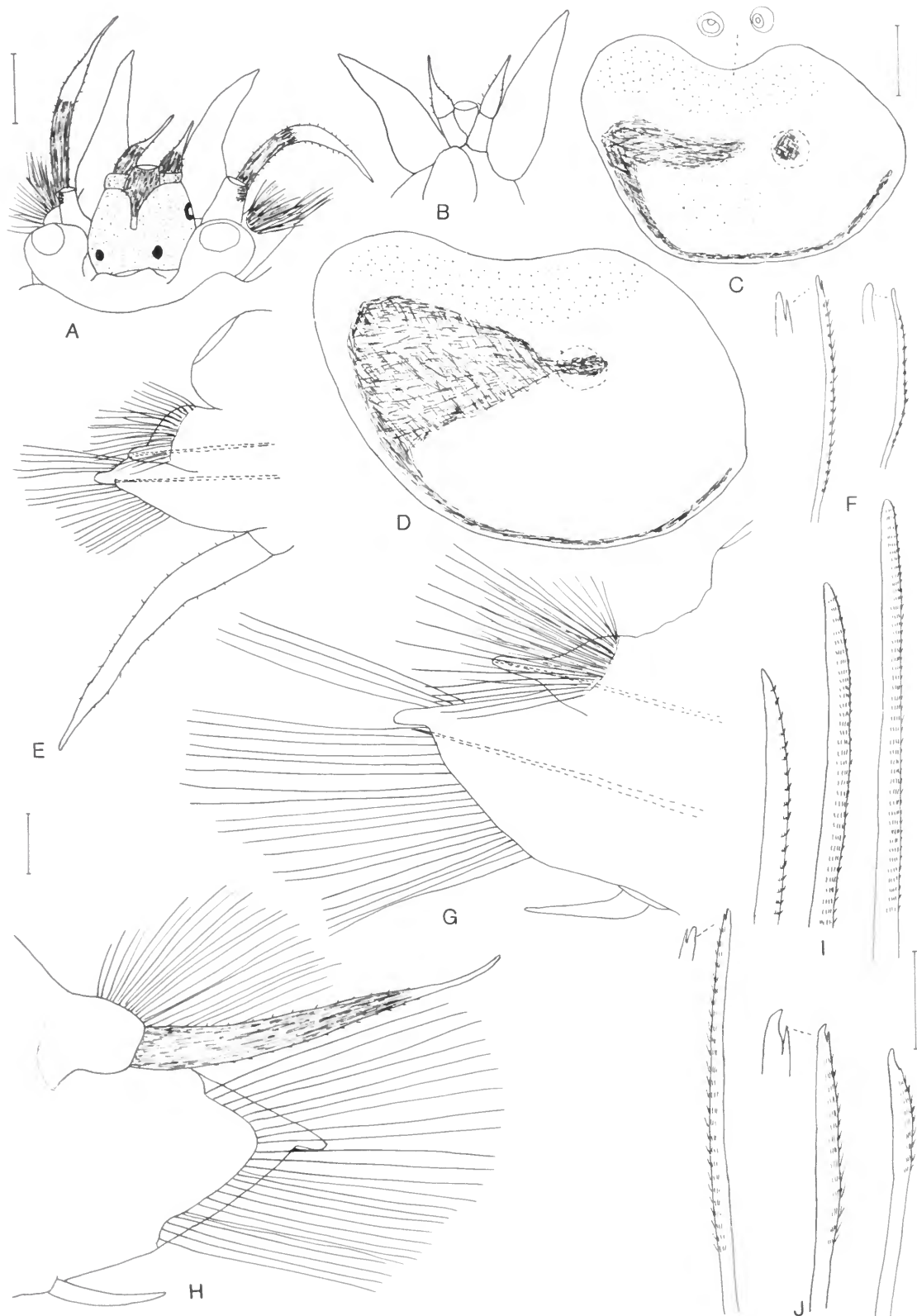
Bilobed prostomium with anterior lobes truncate, without peaks; anterior pair of eyes anterolateral, anterior to widest part of prostomium, larger than posterodorsal pair; ceratophore of median antenna large, in anterior notch, style about length of prostomium; ceratophores of lateral antennae distinct, inserted

FIGURE 16 (following page).—*Malmgreniella phillipensis*, paratype of *Malmgrenia phillipensis* (NMV G1737): A, dorsal view of anterior end, turned slightly to right side and showing lateral position of anterior eye; styles of median antenna, right and left dorsal tentacular cirri missing; B, midventral view of anterior end, showing position of ceratophores of lateral antennae between palps and facial tubercle; C, right anterior elytron, with detail of microtubercles; D, right middle elytron; E, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; F, upper and lower neurosetae from same, with detail of tips; G, right elytrigerous parapodium, anterior view, acicula dotted; H, right cirriferous parapodium, posterior view; I, short and longer notosetae; J, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,G,H; 0.1 mm for F,I,J.)

terminoventrally, with styles short, subulate; palps large, stout, tapering; tentaculophores lateral to prostomium, with 0–1 seta on inner sides and pair of dorsal and ventral tentacular cirri similar to median antenna; antennae and tentacular cirri with scattered micropapillae; subconical facial tubercle between ventral bases of palps; antennae, tentacular cirri, facial tubercle, and anterior lip of ventral mouth showing brownish pigmentation (Figure 16A,B; Knox and Cameron, 1971, fig. 1; Kudenov, 1977, pl. 1a; Hanley, 1987, fig. 3I). Segment 2 with small, slightly bilobed nuchal fold, first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae similar to following notosetae; neurosetae more slender than those following, upper ones with bifid tips, lower ones ending in rounded blunt tips (Figure 16A,E,F).

Notopodia of biramous parapodia rounded, with projecting acicular processes on lower side; larger neuropodia with subconical presetal lobes with projecting supraacicular processes and shorter, rounded postsetal lobes (Figure 16E,G,H; Knox and Cameron, 1971, fig. 4; Kudenov, 1977, pl. 1b,c). Notosetae very numerous, of 3 lengths, slightly curved, moderately stout, slightly stouter than neurosetae, forming radiating bundles. Notosetae with numerous rows of fine serrations, with rounded to tapered pointed tips, showing varying degrees of wear (Figure 16I; Knox and Cameron, 1971, fig. 5; Kudenov, 1977, pl. 1h–j). Neurosetae numerous, forming fan-shape bundle, upper ones with longer spinose regions, with tips entire or with small secondary tooth; middle ones with shorter spinose regions and bifid tips; lower ones with entire tips or slight indication of secondary tooth (Figure 16J; Knox and Cameron, 1971, fig. 6; Kudenov, 1977, pl. 1k–n). Dorsal cirri with cylindrical cirrophores, with long, tapered styles extending to about tips of neurosetae, with scattered micropapillae; dorsal tubercles slightly inflated to nodular; ventral cirri short, tapered (Figure 16H; Knox and Cameron, 1971, fig. 4; Kudenov, 1977, pl. 1c).

DISTRIBUTION.—South Pacific Ocean, SE Australia. Low water to 24 meters.



**Key to the Species of *Malmgreniella* from the Northeastern Atlantic Ocean
(Spitzbergen, Norway, Sweden, England, France, Mediterranean Sea)**

1. Neuropodial presetal acicular lobes without supraacicular process [Figures 21F,G, 22E,F] 2
 Neuropodial presetal acicular lobes with supraacicular process [Figures 17H,I, 19A,B, 20H,I, 23D,E, 24C,D] 3
2. Neuropodial presetal acicular lobe with deep acicular notch [Figure 21F,G]. Elytra with small band of microtubercles on anterior part and micropapillae scattered on surface [Figure 21B-E]. Short notosetae with blunt tips, longer ones tapering to fine tips [Figure 21H] *H. marphysae* (McIntosh), new combination
 Neuropodial presetal acicular lobe entire, not notched [Figure 22E,F]. Elytra with wide band of microtubercles on anterior part, lateral border with long papillae [Figure 22C,D]. Short and long notosetae with tapered blunt tips [Figure 22G] *M. mcintoshi* (Tebble and Chambers), new combination
3. Elytra without pigmented pattern [Figure 20B-E] *M. castanea* (McIntosh), new combination
 Elytra with pigmented pattern [Figures 17B-E, 18B-E, 23B,C, 24B] 4
4. Neuropodial presetal acicular lobe with wide bulbous or subconical supraacicular process [Figures 17H,I, 19A,B] 5
 Neuropodial presetal acicular lobe small, digitiform [Figures 23D,E, 24C,D] 6
5. Upper and lower neurosetae with entire tips [Figure 17K,L]. Notosetae with faint spinose rows [Figure 17J] *M. andreapolis* (McIntosh), new combination
 Upper and lower neurosetae with bifid tips [Figure 19D]. Notosetae with pronounced spinose rows [Figure 19C] *M. arenicolae* (Saint-Joseph), new combination
6. Elytra with mottled areolate pigmentation [Figure 23B,C]. Neurosetae all with bifid tips [Figure 23G]. Long and short notosetae with short bare tips *M. lunulata* (Delle Chiaje), new combination
 Elytral pigmentation confined to small area [Figure 24B]. Lower neurosetae with entire tips [Figure 24F]. Long notosetae tapering to slender tips, short notosetae with short bare tips [Figure 24E] *M. darbouxi*, new species

***Malmgreniella andreapolis* (McIntosh, 1874),
new combination**

FIGURE 17

- Laenilla glabra* Malmgren, 1865:73 [part, not same as lectotype].
Malmgrenia andreapolis McIntosh, 1874b:195; 1876a:377, pl. 67: figs. 20-23; 1900:382, pl. 28: fig. 8; pl. 31: fig. 3; pl. 33: fig. 11; pl. 40: figs. 27-30.
Harmothoe synaptae Saint-Joseph, 1906:147, pl. 1: figs. 1-6. [New synonymy.]
Harmothoe lunulata.—Cuénot, 1912:102, figs. 23-26.—Southern, 1914:52.—Orton, 1923:861, fig. 1 [part].—Cazaux, 1968:506, figs. 7, 8. [Not *Delle Chiaje*, 1830.]
Harmothoe lunulata var. *andreapolis*.—Fauvel, 1923:72, fig. 26k-o.
Harmothoe lunulata var. *synaptae*.—Fauvel, 1923:73.
Malmgrenia lunulata.—Pettibone, 1953:25 [part; not *Delle Chiaje*, 1830].
Harmothoe lunulata, var. E.—Spooner in Plymouth Marine Fauna, 1957:xxxviii, 112.
Malmgrenia castanea.—Amanieu and Cazaux, 1963:168 [not McIntosh, 1876a].
Harmothoe andreapolis.—Tebble and Chambers, 1982:49, figs. 16a-d, 46, 47.—Hanley, 1987:151, fig. 3D.

MATERIAL EXAMINED.—NORTHEASTERN ATLANTIC OCEAN: *Sweden*: Gullmaren, S. Lovén, collector, 1 speci-

men mixed with lectotype of *Laenilla glabra* Malmgren (NRS 5752). *Scotland*: St. Andrews, washed ashore after storms and in stomachs of cod and haddock, 17 syntypes of *Malmgrenia andreapolis* (BMNH 1921.5.1.5.0-511; USNM 54161). *England*: Plymouth area, var. E, with ophiuroid *Acrocnida brachiata* (Montagu): Salcombe, east side, G.M. Spooner, collector, 7 small specimens (LCHP-S-7); Salcombe, west side, 16 Mar 1966, P.E. Gibbs, collector, 4 small specimens (LCHP-G-5, USNM 55049). Plymouth area, var. E. *synaptae*, with *Leptosynapta bergenensis* (as *L. inhaerens*): Salcombe, west side, 26 Mar 1952, G.M. Spooner, collector, 1 specimen (LCHP-S-12); Salcombe, west side, 16 Mar 1968, P.E. Gibbs, collector, 2 specimens (LCHP-G-6; USNM 55050). Plymouth area var. E, with synaptid *Labidoplax digitata* (Montagu): Salcombe, east side, 25 Mar 1955, G.M. Spooner, collector, 1 specimen (USNM 55048, from LCHP-S-9); Salcombe, west side, 28 Mar 1967, P.E. Gibbs, collector, 1 specimen (LCHP-G-9). *France*: Terrenez, off Roscoff, commensal with synaptid, 15 Sep 1913, 1 specimen (MNHN).

TYPE MATERIAL.—Syntypes of *M. andreapolis* all fragmented, consisting of 17 anterior, 9 middle, and 2 posterior

fragments. Anterior and posterior fragments of 12 and 23 segments, totaling 37, 25 mm long and 7 mm wide including setae. Pharynx extended on one of syntypes.

NONTYPE MATERIAL.—Larger specimens from Plymouth area, with synaptids, 18–29 mm long, 6–9 mm wide including setae, with 37–38 segments. Smaller specimens, with ophiuroids, 11–13 mm long, 4.5 mm wide, with 35–37 segments; smallest specimen 6 mm long, 3 mm wide, with 27 segments. Small specimen from Sweden 12 mm long, 5 mm wide, with 36 segments.

DESCRIPTION.—Body flattened, tapering slightly anteriorly and more so posteriorly. Dorsum of posterior segments with 2 dark bands per segment; posterior 10–15 segments ventrally with characteristic color pattern (Figure 17M; Cuénot, 1912, fig. 25). Fifteen pairs of elytra, large, soft, completely covering dorsum; first pair oval, with narrow dark band near anterior border, complete circle and dark spot on place of attachment to elytophore, and some scattered micropapillae (Figure 17B); following elytra subreniform to oval, with complete or nearly complete circular band on posterior half and band of microtubercles near anterior border (Figure 17C,D; McIntosh, 1900, pl. 33: fig. 11); more posterior elytra without microtubercles and with pigmentation scattered, less concentrated (Figure 17E).

Bilobed prostomium with anterior lobes wide, truncate; eyes rather small, anterior pair anterolateral, about twice as large as posterodorsal pair; ceratophore of median antenna large, in anterior notch, with style about as long as prostomium; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate; antennae darkly pigmented, with scattered minute papillae; palps stout, tapered, smooth, variable in length; tentaculophores with 0–1 seta on inner side and pair of dorsal and ventral tentacular cirri, similar to median antenna (Figure 17A; McIntosh, 1900, pl. 28: fig. 8; Cuénot, 1912, fig. 26; Hanley, 1987, fig. 3D). Biramous parapodia of segment 2 with long ventral buccal cirri similar to tentacular cirri; notosetae similar to those following; neurosetae more slender than those following, upper and lower ones with entire bulbous tips, middle ones with long bare regions and bifid tips (Figure 17A,F,G). Extended pharynx with 9 pairs of border papillae and 2 pairs of reddish amber-colored jaws.

Notopodium short, rounded, with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe with thick digitiform supraacicular process and shorter rounded postsetal lobe (Figure 17H,I). Notosetae moderate in number, short to long, extending to about tip of neuropodia; slender, translucent, similar in size to neurosetae, with faint spinose rows and rounded bulbous tips (Figure 17J; McIntosh, 1900, pl. 40: fig. 27). Neurosetae moderate in number, forming fan-shape bundle, long, translucent; upper supraacicular neurosetae with longer spinose regions and entire bulbous tips and lower supraacicular neurosetae with secondary tooth (Figure 17K); upper subacicular neurosetae stouter, with shorter spinose regions, slightly hooked tips with secondary tooth, and

lower ones with single knobbed tips (Figure 17L; McIntosh, 1900, pl. 40: figs. 28–30). Cirrophores of dorsal cirri long, cylindrical; styles tapered, extending to about tips of neurosetae, with scattered clavate papillae; dorsal tubercles nodular; ventral cirri short, subulate, with few clavate papillae (Figure 17I). Pygidium dorsal, medial to bases of small posterior parapodia, with pair of long anal cirri.

BIOLOGY.—In the Plymouth area, Spooner in Plymouth Marine Fauna (1957:112) and Orton (1923:861, fig. 1) observed *Malmgreniella andreapolis* (as *Harmothoe lunulata* var. E, with a strong circular pattern) commensal in the burrows of echinoderms. Smaller specimens were found with the ophiuroid *Acrocnida brachiata* (Montagu) whereas larger specimens were associated with the synaptids *Leptosynapta galliennii* (Herapath) (as *L. inhaerens* and *L. bergenensis*) and *Labidoplax digitata* (Montagu), hence *M. andreapolis* apparently changes hosts.

In Arcachon, France, Cuénot (1912:102, figs. 23–26) found the polynoids (as *Harmothoe lunulata*) living commensally with synaptids. The polynoids were found in the galleries excavated in the sand by the synaptids, crawling either on the body of its host or on the wall. When touched or when the water was agitated, the polynoids showed very brilliant white greenish luminescence.

Cazaux (1968:506–510, figs. 7, 8) studied the early development of the species (as *Harmothoe lunulata*) from the eggs to trochophores, metatrochophores I and II, nectochaetes I and II until when, after 3 weeks, they reached 10 segments and a length of 1.7 mm. Cazaux also noted that adults were very abundant on beaches of Arcachon with synaptids and were found in the galleries and along the walls of the hosts.

DISTRIBUTION.—Northeastern Atlantic Ocean from Sweden to France. Intertidal.

Malmgreniella arenicolae (Saint-Joseph, 1888),
new combination

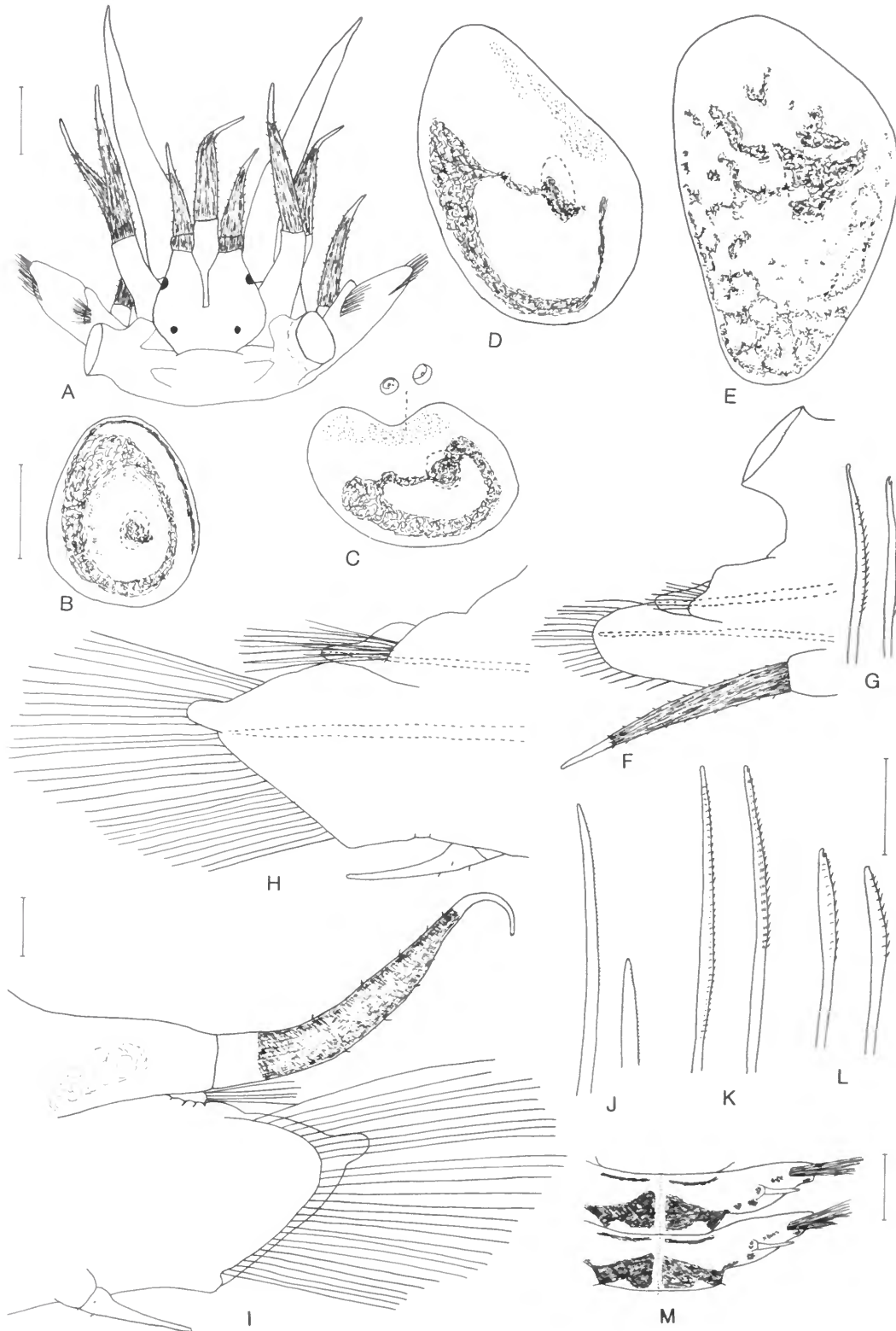
FIGURES 18, 19

Harmothoe arenicolae Saint-Joseph, 1888:174, pl. 6: figs. 22, 23 [with *Arenicola marina*].

Harmothoe lunulata var. *arenicolae*.—Fauvel, 1923:72, 73.

Harmothoe lunulata (var. *nigra*).—Orton, 1923:861 [part; with *Golfingia vulgaris*].

FIGURE 17 (opposite page).—*Malmgreniella andreapolis*, specimen from Plymouth area, with synaptid (USNM 55048): A, dorsal view of anterior end; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles; D, right 8th elytron from segment 15; E, right 15th elytron from segment 32; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; G, upper and middle neurosetae from same; H, right middle elytrigerous parapodium, anterior view, acicula dotted; I, right cirriferous parapodium, posterior view; J, short and long notosetae; K, upper and lower supraacicular neurosetae; L, upper and lower subacicular neurosetae; M, ventral view of left side of segments 28 and 29, showing pigmentation pattern. (Scales = 0.5 mm for A; 1.0 mm for B–E; 0.2 mm for F,H,I; 0.1 mm for G, J–L; 1.0 mm for M.)



Malmgrenia alba.—Augener, 1928:694 [not *Laenilla alba* Malmgren, 1865].
Harmothoe lunulata var. and form A.—Spooner, in Plymouth Marine Fauna, 1957:xxxvi, 112 [with *Arenicola marina*].
Harmothoe lunulata, form I.—Spooner in Plymouth Marine Fauna, 1957:112 [with *Amphitrite johnstoni*].
Harmothoe lunulata, var. G.—Spooner in Plymouth Marine Fauna, 1957:xxxvi, 112 [with *Golfingia elongata* and *G. vulgaris*].
Harmothoe lunulata.—Plymouth Marine Fauna, 1957:xxxvi [with *Notomastus latericeus*].—Hamond, 1966:386 [with *Lanice conchylega*]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—NORTHEASTERN ATLANTIC OCEAN: *Spitzbergen*: Grube, collector, 2 specimens (ZMB 1121, as *Malmgrenia alba* by Augener, 1928). *Norway*: Kreknag, with *Arenicola*, C. Dons, collector, 10 Aug 1938, 1 specimen (ZMT). *England*: Plymouth area: Salcombe Estuary, with *Arenicola marina* (Linnaeus): Salcombe, east side, 18 Mar 1947; Millbay, 12 May 1953; west side, 13 Apr 1960, G.M. Spooner, collector, 9 specimens (LCHP-S-11/13/16; USNM 55052); Salcombe, west side, 15 Oct 1966, G.E. Gibbs, collector, 1 specimen (LCHP-G-2). Salcombe Estuary, with *Notomastus latericeus* Sars: 20 Mar 1954, G. Spooner, collector, 1 specimen (LCHP-S-4). Salcombe Estuary, with *Golfingia elongata* (Keferstein): Ox Point, 5 Oct 1956, 2 specimens (LCHP-S-3/5, as var. J). Salcombe Estuary, with *Amphitrite johnstoni* Malmgren: below Marine Hotel, 29 Jul 1957, G. Spooner, collector, 1 specimen (LCHP-S-15, as var. J). Salcombe Estuary, with *Loimia medusa* (Savigny): east side, 18 Mar 1957, 26 Mar 1959, G. Spooner, collector, 3 specimens (LCHP-S-1/6, as var. J); Millbay, 25 Mar 1970, P. Gibbs, collector, 1 specimen (LCHP-G-4). Yealm Estuary, with *Amphitrite johnstoni*: River Yealm, 15 Apr 1953, 17 Mar 1961, G. Spooner, collector, 6 specimens (LCHP-S-14/17; USNM 55051, as var. J). Yealm Estuary, with *Golfingia elongata*: Yealm Mouth, 26 Mar 1963, G. Spooner, collector, 2 specimens (LCHP-S-2/8, as var. P); River Yealm, 16 Sep 1974, P. Gibbs, collector, 1 specimen (LCHP-G-8). Plymouth, 1 specimen (BMNH 1932.7.11.13, as *Harmothoe lunulata* by Monro). St. Peters Port, Guernsey, Channel Islands, 1 specimen (BMNH 1921.5.1.444, as *H. lunulata* by McIntosh). Southport, Lancashire, 4 specimens (BMNH 1921.5.1.445, as *H. lunulata* by McIntosh). Norfolk Coast, with *Lanice conchylega* (Pallas), R. Hamond, collector, 2 specimens (BMNH 1969:99, as *H. lunulata* by Hamond, 1966). *Ireland*: Blacksod Bay, Irish Fisheries, Eire sta W, shore, Sep 1905, 1 specimen (BMNH 1914.12.12.17, as *H. lunulata*). *France*: North coast, Roscoff, Grube, collector, 3 specimens (ZMB 1124, as *Malmgrenia alba* by Augener, 1928). St. Malo, Grube, collector, 2 specimens (ZMB 1127, as *M. alba* by Augener, 1928). *Netherlands*: East Friesland, Grube, collector, 1 specimen (ZMB 1123, as *M. alba* by Augener, 1928).

DESCRIPTION.—No type material available. Size given by Saint-Joseph (1888) for specimen with *Arenicola marina*, 25 mm long, 4 mm wide, with 36 segments. Additional specimens from Plymouth area: with *A. marina*, 16–29 mm long, 5–8 mm

wide including setae, with 37–38 segments; with *Amphitrite johnstoni*, 18–42 mm long, 6–10 mm wide, with 32–38 segments; with *Loimia medusa*, 22–27 mm long, 9 mm wide, with 38 segments; with *Golfingia elongata*, 12–19 mm long, 4–5 mm wide, with 37 segments; with *Notomastus latericeus*, 14 mm long, 4 mm wide, with 37 segments. Specimen from Norfolk Coast, 12 mm long, 4.5 mm wide, with 37 segments.

Body elongate, flattened, tapered slightly anteriorly and posteriorly. Dorsum colorless, ventrad sometimes lightly pigmented in posterior region with one band per segment and spots medial to ventral cirri. Elytra 15 pairs, on usual segments, large, covering dorsum, round, subreniform to elongate-oval, without papillae, with transverse group of microtubercles near anterior border (absent on first pair and few or absent on posterior elytra), usually with transverse band of dark pigment in line with elytriphore and lighter mottled areas more posteriorly (Figure 18B–E). Elytra on specimens with *Arenicola* light to dark brownish on exposed part, with indications of darker band on anterior part.

Bilobed prostomium truncate anteriorly, without distinct peaks; eyes rather small, anterior pair anterolateral, larger than posterodorsal pair; ceratophore of median antenna large, in anterior notch, with style longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate; antennae with minute papillae; palps stout, tapered, variable in length, minutely papillate; tentaculophores without setae, with dorsal and ventral tentacular cirri similar to median antenna (Figure 18A; Saint-Joseph, 1888, pl. 6: fig. 22). Biramous parapodia of segment 2 with long ventral buccal cirri, similar to tentacular cirri; notosetae forming thick bundle, similar to following parapodia; neurosetae more slender than following, upper and lower ones with entire bulbous tips, middle ones with bulbous bifid tips (Figure 18A,F,G). Extended pharynx with 9 pairs of border papillae and 2 pairs of reddish amber-color jaws.

Notopodium short, rounded, with projecting acicular lobe on lower side; neuropodium with longer presetal acicular lobe, diagonally truncate on lower side and thick conical supraacicular process; postsetal lobe shorter, rounded (Figure 19A,B). Notosetae numerous, forming very thick bundle of several lengths, not extending beyond tips of neuropodia, about as stout as neurosetae, with spinose rows, tapering to short bare blunt tips (Figure 19C). Neurosetae numerous, forming fan-shape bundle; upper ones with longer spinose regions and slender bifid tips; middle ones with shorter spinose regions and larger bifid tips; lower ones with minute secondary tooth or sometimes entire (Figure 19D; Saint-Joseph, 1888, pl. 6: fig. 23). Cirrophores of dorsal cirri long, cylindrical, wider basally, with style extending slightly beyond tips of neurosetae, with scattered short clavate papillae and filamentous tip; dorsal tubercles nodular; ventral cirri short, subulate, with minute papillae (Figure 19B). Pygidium medial to last pair of parapodia, with pair of long anal cirri.

BIOLOGY.—*Malmgreniella arenicolae* is commensal with

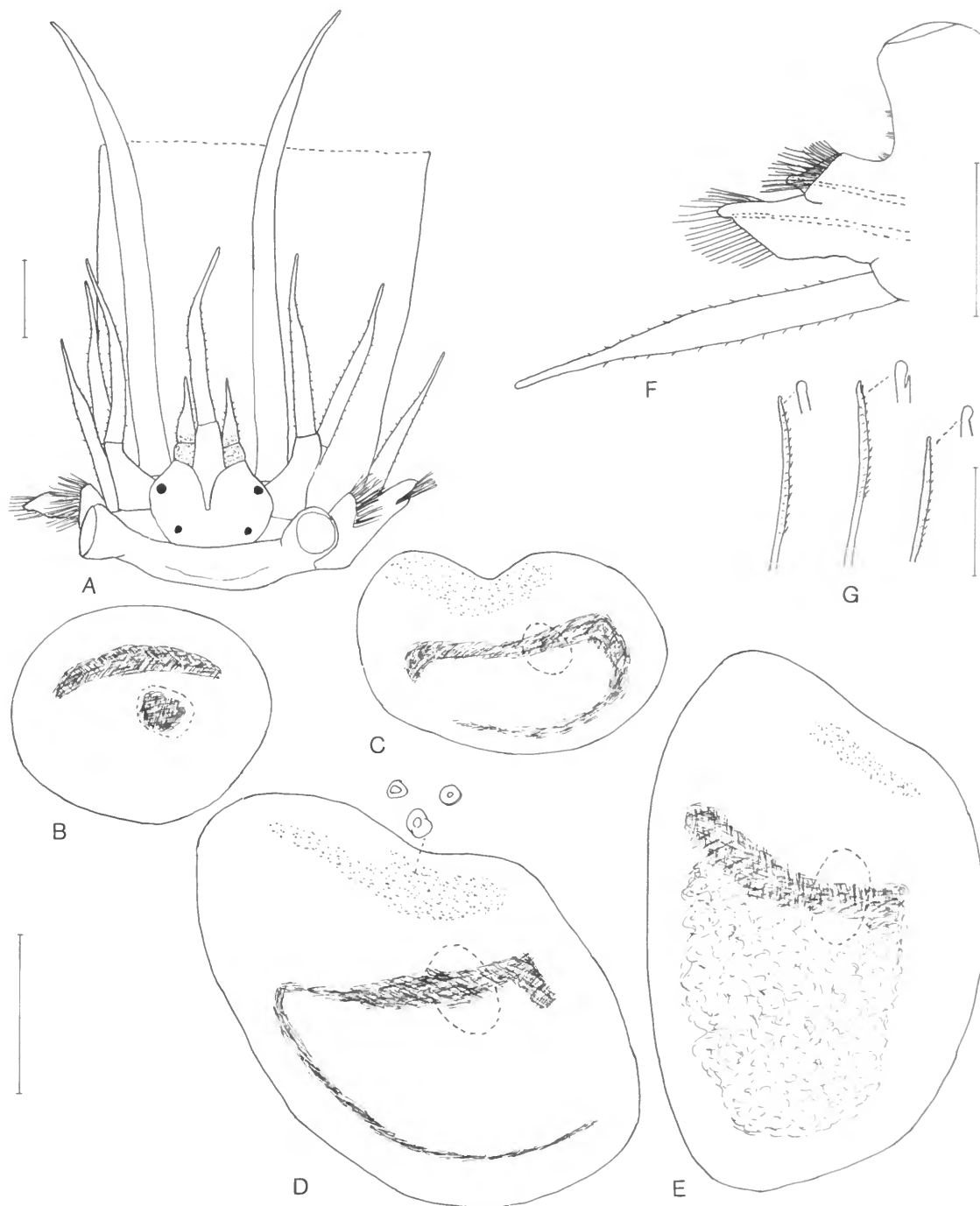


FIGURE 18.—*Malmgreniella arenicolae*, specimen from Yealm Estuary, with *Amphitrite johnstoni*, as *Harmothoe lunulata* var. J (USNM 55051): A, dorsal view of anterior end, pharynx extended (only basal part shown); B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4; D, right 10th elytron from segment 19, with detail of microtubercles; E, right 15th elytron from segment 32; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; G, upper, middle, and lower neurosetae from same, with detail of tips. (Scales = 0.5 mm for A; 1.0 mm for B-E; 0.5 mm for F; 0.1 mm for G.)

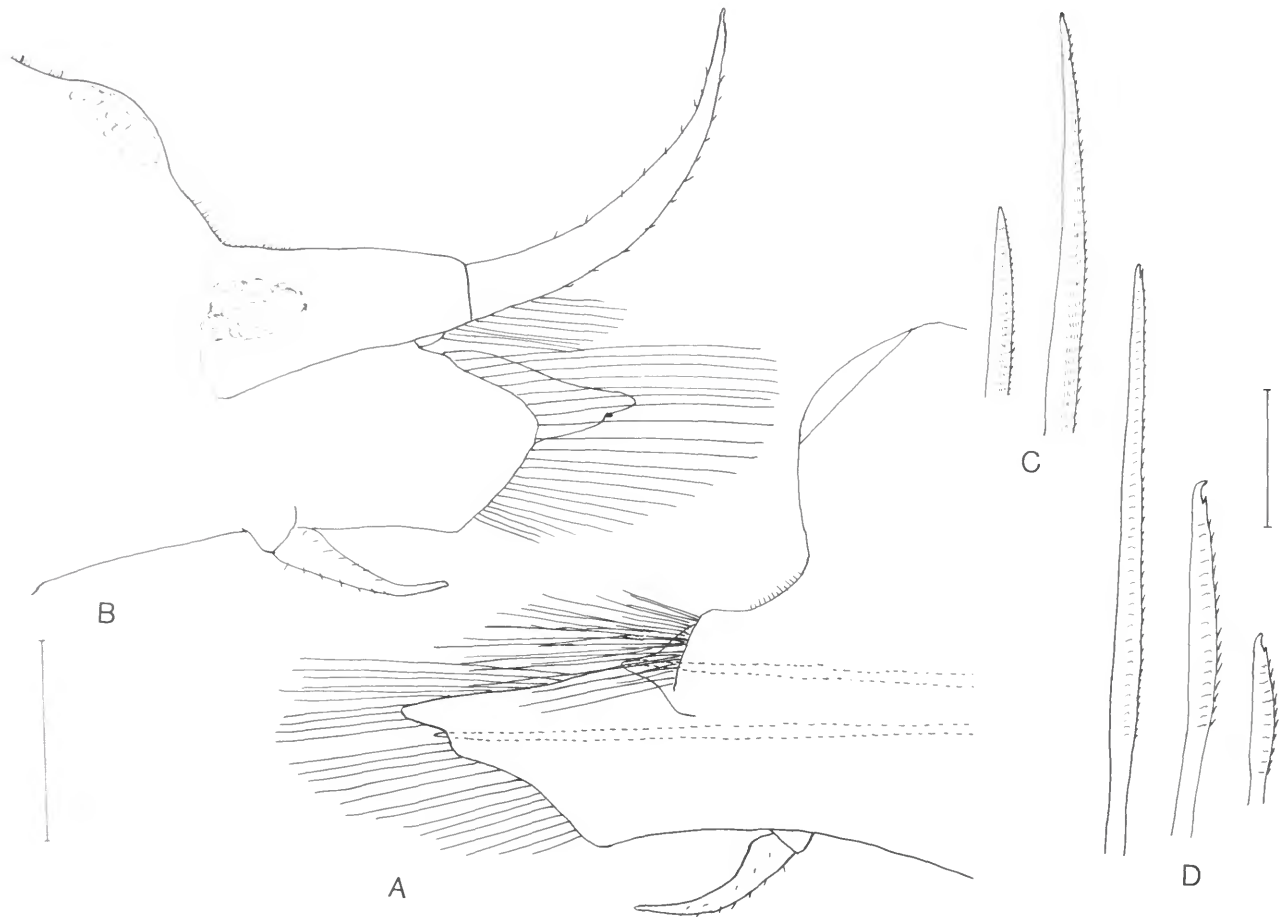


FIGURE 19.—*Malmgreniella arenicolae*, specimen from Yealm Estuary, with *Amphitrite johnstoni*, as *Harmothoe lunulata* var. J. (USNM 55051): A, right middle elytrigerous parapodium, anterior view, acicula dotted; B, right middle cirriferous parapodium, posterior view; C, short and long notosetae; D, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A,B; 0.1 mm for C,D)

sipunculids and polychaetes: arenicolids, capitellids, and terebellids. It was found in the burrows of *Arenicola marina* (Linnaeus) in Norway by C. Dons (ZMT), in Dinard, France, by Saint-Joseph (1888), and by Spooner (in Plymouth Marine Fauna, 1957) in the Plymouth area (as *Harmothoe lunulata* var. A). Also in the Plymouth area the species was collected by Spooner (1957) in the burrows of the capitellid *Notomastus latericeus* Sars and the sipunculids *Golfingia elongata* (Keferstein) and *G. vulgaris* (Blainville) (as var. G), and in the tubes of the terebellids *Amphitrite johnstoni* Malmgren and *Loimia medusa* (Savigny) (as var. J). On the Norfolk Coast, the species was found in the tubes of *Lanice conchylega* (Pallas) by Hamond (1966) (as *H. lunulata*).

DISTRIBUTION.—Northeastern Atlantic Ocean, Spitzbergen, Norwegian Sea to France. Intertidal.

***Malmgreniella castanea* (McIntosh, 1876),
new combination**

FIGURE 20

Eunoa n. sp.—McIntosh, 1868:337, 338.

Malmgrenia castanea McIntosh, 1876a:376, pl. 67: figs. 15–19; pl. 68: fig. 15; 1900:379, pl. 28: fig. 15; pl. 30: fig. 5; pl. 33: fig. 10; pl. 40: figs. 23–26.—Allen, 1915:612.—Fauvel, 1923:48, fig. 17h-m.—Ditlevsen, 1929:5.—Støp-Bowitz, 1948:7, fig. 3.—Plymouth Marine Fauna, 1957:110.—Picard, 1965:53 [footnote].—Intes and Le Loeuff, 1975:273.—Kudenov, 1975b:79.

Laenilla castanea.—Giard, 1886:3, figs.

Polynoe (Malmgrenia) castanea.—Hornell, 1891:235.

Harmothoe castanea.—Saint-Joseph, 1898:236.—Ditlevsen, 1917:27, figs. 9, 10.—Tebble and Chambers, 1982:47, figs. 15, 44, 45.—Hanley, 1987:151, fig. 3E.

Malmgrenia lunulata.—Pettibone, 1953:25 [part; not Delle Chiaje, 1830].

Harmothoe lunulata.—Pérès, 1954:92.—Bellan, 1964:27 [part].—Picard, 1965:53 [part]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—NORTHEASTERN ATLANTIC OCEAN: *Norwegian Sea*: 50°57'N, 10°46'W, 184 and 200 m, *Michael Sars* sta 96, 27 Jul 1910, 2 specimens (ZMUB 29582, 41504, identified by Støp-Bowitz, 1948). *Shetland Islands*: 25 mi NNE of North Unst, 155 m, shell and sand, 1868, on *Spatangus purpureus* O.F. Müller, G. Jeffreys, collector, 6 syntypes of *Malmgrenia castanea* (BMNH 1921.5.1.507; ZMB 1162; USNM 54714). *SW Ireland*: 50 mi west of Valentia, 146–201 m, G. Jeffreys, collector, 2 syntypes of *Malmgrenia castanea* (BMNH 1921.5.1.509). *Channel Islands*: Off St. Peter Port, Guernsey, 9–13 m, 1868, syntype of *Malmgrenia castanea* (BMNH 1921.5.1.508). *English Channel*: 50°21'N, 03°01'W, 53 m, *Manihine* sta 69, 30 Aug 1949, 1 specimen (BMNH 1950.6.6.1). *England*: Plymouth area, Eddystone, on *Spatangus purpureus*, shell and gravel, 26 Mar 1953, 24 Mar 1960, G.M. Spooner, collector, 2 specimens (LCHP-S-21). Plymouth area, P. Gibbs, collector, 2 specimens (LCHP-G-3; USNM 55047).

MEDITERRANEAN SEA: *France*: Marseille, 8 m, on oral surface of *Spatangus purpureus*, in *Amphioxus* sand, G. Bellan, collector, 1 specimen (USNM 59929).

DESCRIPTION.—Nine syntypes mostly fragmented. Length of complete syntype 15.5 mm, width including setae 6 mm, with 38 segments. Length of 2 specimens from Norwegian Sea 20–21 mm, width 7–8 mm, with 38 segments. Length of 4 specimens from Plymouth area 8–15 mm, width 2.5–8 mm, with 34–39 segments. Body elongated, flattened, tapering slightly anteriorly and posteriorly. Dorsum, exposed part of elytra, and dorsal cirri with light to dark brownish pigmentation. Elytra 15 pairs, on usual segments, large, covering dorsum, round to subreniform, without papillae, with group of microtubercles on anterior part but absent on first pair and some posterior elytra (Figure 20B–E; McIntosh, 1900, pl. 33: fig. 10).

Bilobed prostomium truncate anteriorly, without distinct peaks; eyes moderate in size, anterior pair slightly anterior to greatest width, slightly larger than posterodorsal pair; ceratophore of median antenna in anterior notch, with style longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate; palps stout, tapered; tentaculophores without setae, dorsal and ventral tentacular cirri similar to median antenna (Figure 20A; McIntosh, 1900, pl. 28: fig. 15; Støp-Bowitz, 1948, fig. 3). Segment 2 with first pair of large elytraphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae similar to following notosetae; neurosetae more slender than those following, with entire bulbous tips (Figure 20A,F,G). Extended pharynx with 9 pairs of border papillae and 2 pairs of jaws.

Biramous parapodia with translucent, pale setae; notopodium shorter than neuropodium, subconical, with projecting acicular lobe on lower side; neuropodium with subconical

presetal acicular lobe with thick supraacicular process and shorter rounded postsetal lobe (Figure 20H,I; McIntosh, 1900, pl. 30: fig. 5). Notosetae moderate in number, short to long, slightly stouter than neurosetae, slightly curved, tapering toward tips, with faint spinose rows (Figure 20J; McIntosh, 1876a, pl. 67: fig. 15; 1900, pl. 40: fig. 23). Neurosetae moderate in number, with faint spinose regions, slightly hooked tips, some with very small secondary tooth (Figure 20K; McIntosh, 1876a, pl. 67: figs. 16–19, 1900, pl. 40: figs. 24–26). Cirriferous of dorsal cirri cylindrical, wider basally, with styles smooth, tapered distally, extending to tips of neurosetae or beyond; dorsal tubercles bulbous; ventral cirri short, subulate (Figure 20H; McIntosh, 1900, pl. 30: fig. 5). Pygidium medial to last pair of small parapodia, with pair of long tapered anal cirri.

BIOLOGY.—*Malmgreniella castanea* is commensal with spatangid echinoids. It has been found clinging to the test near the mouth of the burrowing spatangid *Spatangus purpureus* O.F. Müller.

DISTRIBUTION.—Northeast Atlantic Ocean, Norwegian Sea, Shetland Islands to Mediterranean Sea. In 8–878 meters (see McIntosh, 1876a).

***Malmgreniella marphysae* (McIntosh, 1876),
new combination**

FIGURE 21

Harmothoe marphysae McIntosh, 1876a:384, pl. 69: figs. 11–15; pl. 70: fig. 18; 1900:339, pl. 27: fig. 11; pl. 29: fig. 15; pl. 32: fig. 13; pl. 39: figs. 7–11.—Malaquin, 1890:283.—Orton, 1923:861.—Plymouth Marine Fauna, 1957:112.—Tebble and Chambers, 1982:43, figs. 13d,e, 40, 41a,b.
Harmothoe marphysae var. *watsoni* McIntosh, 1919:163; 1923:521, pl. 137: figs. 1, 1a, 1b.—Fauvel, 1927:406. [New synonymy.]
Harmothoe lunulata var. *marphysae*.—Fauvel, 1923:72, fig. 26i.—Bellan, 1962:89.
Harmothoe lunulata.—Pettibone, 1953:25 [part; not Delle Chiaje, 1830].

MATERIAL EXAMINED.—NORTHEASTERN ATLANTIC OCEAN: *Channel Islands*: English Channel, Guernsey, Jul, in galleries of *M. sanguinea*, lectotype (BMNH 1921.5.1.443). *England*: Plymouth Sound, in galleries of *M. sanguinea* (Montagu), rock crevices: off Mount Edgcume, 14 Apr 1961, G.M. Spooner, collector, 4 specimens (LCHP-S-10; USNM 55064); West Lose, 20 Mar 1969, P.E. Gibbs, collector, 1 specimen (LCHP-G-7). *North Wales*: In tube of *Lagis koreni* Malmgren, Arnold Watson, collector, holotype of *Harmothoe marphysae* var. *watsoni* (BMNH 1921.5.1.485).

REMARKS.—The type material of *Harmothoe marphysae* in The Natural History Museum, London (BMNH 1921.5.1.443), consists of two syntypes. The larger specimen, a female filled with eggs, has 31 segments of which 22 are normal-size segments and 9 smaller, regenerating segments. It is 11 mm long, 4.5 mm wide including setae, with two elytra free in the vial. It agrees with the original description and is selected as the lectotype. The smaller syntype is an anterior fragment of 18

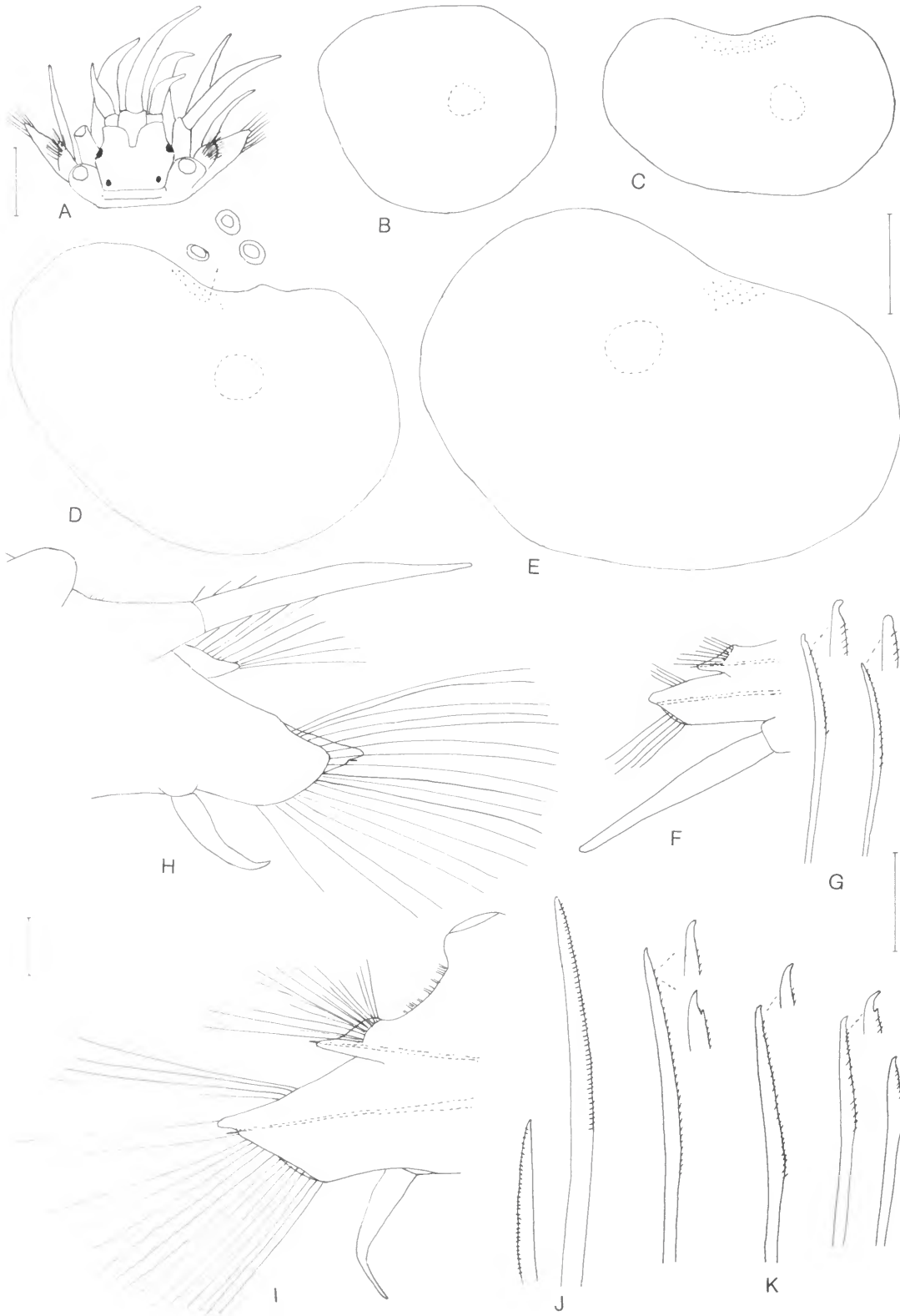


FIGURE 20 (opposite page).—*Malmgreniella castanea*, syntype from Channel Islands (BMNH 1921.5.1.508): A, dorsal view of anterior end, left dorsal and ventral tentacular cirri missing; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4; D, right 5th elytron from segment 11, with detail of microtubercles; E, right middle elytron; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted, upper neurosetae mostly broken; G, upper and lower neurosetae from same, with detail of tips; H, right cirriferous parapodium from segment 10, posterior view; I, right elytrigerous parapodium from segment 11, anterior view, acicula dotted; J, short and long notosetae; K, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B-E; 0.2 mm for F,H,I; 0.1 mm for G,J,K.)

segments and belongs to another species. The holotype of *H. marphysae* var. *watsoni* in The Natural History Museum, London (BMNH 1921.5.1.485), is a small specimen, incomplete posteriorly, with 22 segments, 4 mm long, and 2.5 mm wide; elytra are now missing (described and figured by McIntosh). It is considered to be a young specimen of *M. marphysae*.

DESCRIPTION.—Length of 2 complete specimens from Plymouth area 14–19 mm, width 5–6 mm, with 38 segments. Body flattened, tapering slightly anteriorly and more so posteriorly. Elytra 15 pairs, on usual segments, oval, subreniform to quadrate, smooth, pellucid, some with small group of microtubercles on anterior part and scattered micropapillae on surface; most of elytra with 1–2 longitudinal thickened ridges, longer one near inner border and smaller one near place of attachment to elytophore; some elytra showing spot over elytophore and transverse band of pigmentation (Figure 21B–E; McIntosh, 1900, pl. 32: fig. 13).

Bilobed prostomium with anterior lobes wide, subtriangular, without distinct peaks; eyes small, anterior pair anterolateral, anterior to greatest width of prostomium, posterior pair posterodorsal; ceratophore of median antenna in anterior notch, with style papillate, longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, with short, papillate, subulate styles; palps stout, tapered; tentaculophores with 0–2 setae, dorsal and ventral tentacular cirri similar to median antenna (Figure 21A; McIntosh, 1900, pl. 27: fig. 11; Tebble and Chambers, 1982, fig. 40). Segment 2 with first pair of elytophores, biramous parapodia, and long ventral cirri similar to tentacular cirri. Extended pharynx with 9 pairs of border papillae and 2 pairs of jaws.

Biramous parapodia with notopodia much shorter than neuropodia; notopodium small, subconical, with projecting acicular lobe on lower side; neuropodium large, with presetal acicular lobe diagonally truncate, with deep acicular notch, forming rounded longer upper and shorter lower processes; postsetal lobe shorter, rounded (Figure 21F,G). Notosetae relatively few, extending only slightly beyond tips of notopodia, with spinose rows, short ones with blunt tips, longer ones tapering to fine tips (Figure 21F,H; McIntosh, 1876a, pl. 69: fig. 11, pl. 70: fig. 18; 1900, pl. 39: fig. 7; Tebble and Chambers, 1982, fig. 13d,e). Neurosetae numerous, forming fan-shape bundle; upper ones with longer spinose regions, tapering to

slender entire tips, some lower upper ones with bifid tips; middle neurosetae with shorter spinose regions, and small secondary tooth; lower ones with entire tips (Figure 21I; McIntosh, 1876a, pl. 69: figs. 12–15; 1900, pl. 39: figs. 8–11; Tebble and Chambers, 1982, fig. 41b). Cirrophores of dorsal cirri cylindrical, wider basally, with glandular area; styles extending to tips of neurosetae or beyond, with scattered short papillae; dorsal tubercles small, nodular; ventral cirri short, subulate, with few short papillae (Figure 21G; McIntosh, 1900, pl. 29: fig. 16).

REMARKS ON YOUNG HOLOTYPE OF *Harmothoe marphysae* var. *watsoni*, REFERRED TO *Malmgreniella marphysae* (Figure 21J–N; McIntosh, 1923, pl. 137: fig. 1).—The young specimen agrees in most respects with the adults. The elytra lack the longitudinal thickened ridges found on some elytra (McIntosh, 1923, pl. 137: fig. 1a). The anterior end is similar (Figure 21J). The parapodia are similar in general outline but lack the deep acicular notch on the neuropodial presetal acicular lobes (Figure 21K,L; McIntosh, 1923, pl. 137: fig. 1). The notosetae are of the same two types: short ones with a blunt tip and longer ones tapering to a fine tip (Figure 21M); the neurosetae have mostly a bifid tip (Figure 21N; McIntosh, 1923, pl. 137: fig. 1b), instead of the lower ones having an entire tip.

BIOLOGY.—*Malmgreniella marphysae* has been found in the galleries of the eunicid polychaete *Marphysa sanguinea* (Montagu) and in the tube of the pectinariid polychaete *Lagis koreni* Malmgren.

DISTRIBUTION.—Northeastern Atlantic Ocean, Irish Sea, English Channel to Northwest France.

Malmgreniella mcintoshi (Tebble and Chambers, 1982), new combination

FIGURE 22

Lagisca Jeffreysii McIntosh, 1900:305, pl. 27: fig. 10; pl. 32: fig. 7; pl. 38: figs. 7–9; pl. 42: fig. 30 [primary homonym; not *Lagisca jeffreysi* McIntosh, 1876b].

Harmothoe haliaeti.—Fauvel, 1914:57, pl. 3: fig. 17; 1923:57, fig. 19f–h. [Not McIntosh, 1876b.]

Harmothoe jeffreysi.—Ditlevsen, 1917:9 [not McIntosh, 1876b].

Malmgrenia jeffreysi.—Augener, 1925:108, figs. 1, 1a [not McIntosh, 1876b].

Harmothoe mcintoshi Tebble and Chambers, 1982:53, figs. 17a,b, 50.

MATERIAL EXAMINED.—NORTHEASTERN ATLANTIC OCEAN: *Shetland Islands*: 9 mi off Balta, 110 m, G. Jeffreys, collector, 1868, holotype of *Lagisca Jeffreysii* McIntosh, 1900 (BMNH 1921.5.1.310). *Sweden*: Gunnarskar, Kristineberg Zoological Station, 20 m, shelly sand, A. Eliason, collector, 13 May 1965, 1 specimen (USNM 43230, as *Harmothoe haliaeti* by Eliason). *Ireland*: Galway, 1 specimen (BMNH 1921.5.1.288, mixed with *Lagisca floccosa* by McIntosh).

REMARKS.—McIntosh (1876b:397) described *Lagisca jeffreysi* from specimens collected off the west coast of Iceland in 298 meters and in the Channel slope in 1262 meters. Later,

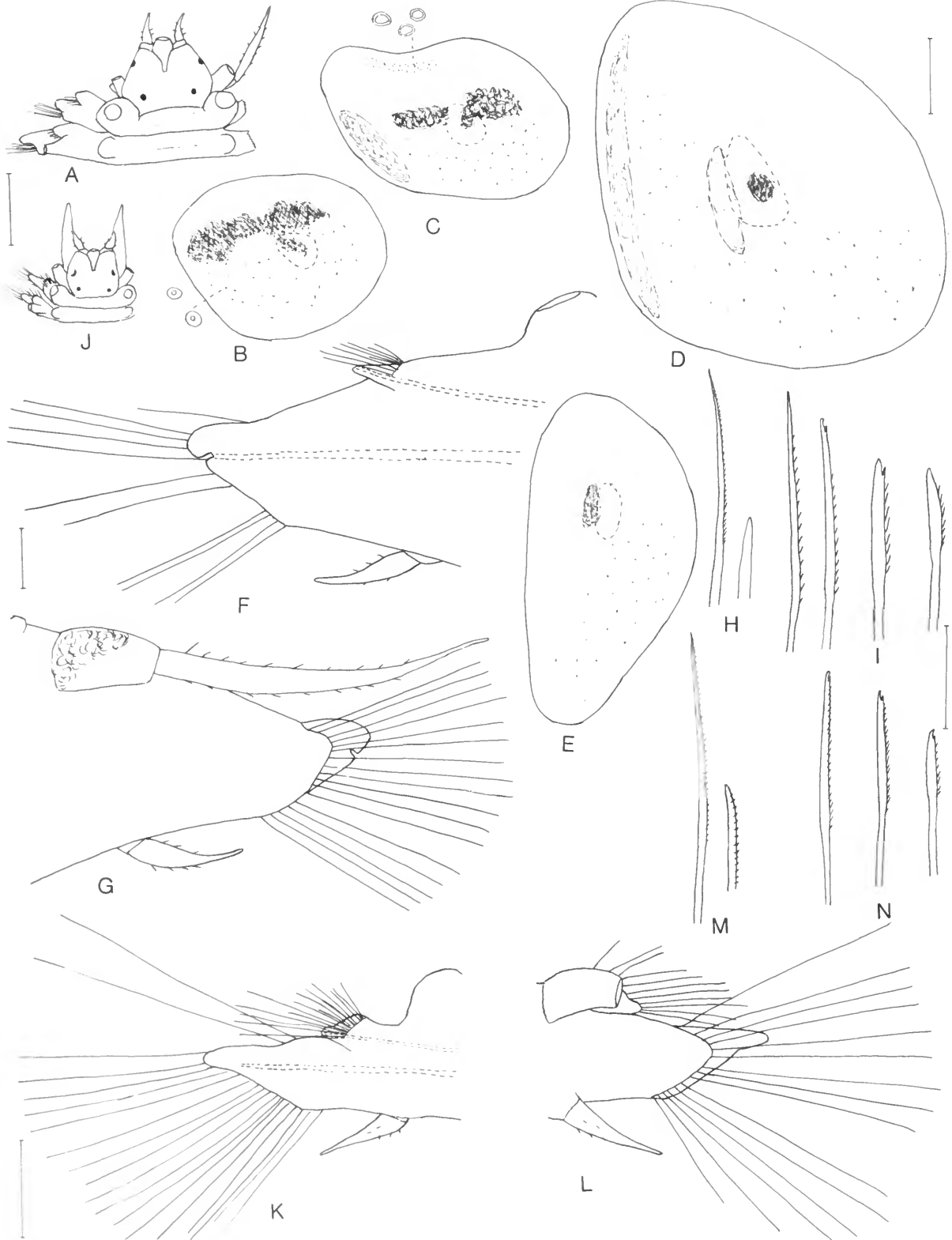


FIGURE 21 (opposite page).—*Malmgreniella marphysae*. A, F-I, lectotype of *Harmothoe marphysae* (BMNH 1921.5.1.443); B-E, specimen from Plymouth area (USNM 55064); J-N, holotype of *Harmothoe marphysae* var. *watsoni* (BMNH 1921.5.1.485): A, dorsal view of anterior end; styles of median antenna, left dorsal and ventral and right dorsal tentacular cirri, palps, and dorsal cirri from segment 3 missing; right parapodia of segment 2 and 3 had been cut off. B, right 1st elytron from segment 2, with detail of micropapillae. C, right 2nd elytron from segment 4, with thickened ridge on inner side and detail of microtubercles. D, right middle elytron, with 2 thickened ridges. E, right 15th elytron from segment 32. F, right elytrigerous parapodium, anterior view, acicula dotted; most of lower neurosetae broken. G, right cirriferous parapodium, posterior view. H, long and short notosetae. I, upper, middle, and lower neurosetae. J, dorsal view of anterior end; styles of median antenna, tentacular cirri, and dorsal cirri of segment 3 missing; right parapodia of segments 2 and 3 had been cut off. K, right elytrigerous parapodium, anterior view, acicula dotted. L, right cirriferous parapodium, posterior view, style of dorsal cirrus missing. M, long and short notosetae; N, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A,J; 0.5 mm for B-E; 0.2 mm for F,G; 0.1 mm for H,I,M,N; 0.2 mm for K,L.)

McIntosh (1900:307) referred the above species to *L. extenuata* (Grube) and proceeded to describe a new species from the Shetland Islands in 110 meters as *Lagisca jeffreysii*. The latter species, being a homonym, was given a new name by Tebble and Chambers (1982:53), *Harmothoe mcintoshi*.

McIntosh (1876a:384) described a posterior fragment without elytra from the Minch, Scotland, under the name *Harmothoe haliaeti*. Only the setae were described and figured (pl. 69: figs. 7-10). As pointed out by Tebble and Chambers (1982:70), who examined the fragmented holotype in The Natural History Museum, London, the species must be considered to be indeterminable. *Harmothoe haliaeti* has been used widely by Fauvel (1914, 1923) and others. At least some of these records, including those of Fauvel, agree with *Malmgreniella mcintoshi* as indicated in the above synonymy.

DESCRIPTION.—Holotype with 36 segments, posterior 4 segments small, regenerating, 18 mm long, 6.5 mm wide including setae. Incomplete specimen from Ireland with 28 segments, 13 mm long, and 5 mm wide. Specimen from Sweden with 36 segments, 9 mm long, and 3 mm wide. Specimens reported by Tebble and Chambers (1982) from Isle of Man up to 21 mm long, 6 mm wide, and 38 segments.

Elytra 15 pairs, on usual segments, large, oval to subreniform, some with anterior fold connected to place of attachment to elytophore, with wide band of microtubercles on anterior part, lateral border with long papillae, and some scattered micropapillae on surface (Figure 22C,D; McIntosh, 1900, pl. 32: fig. 7; Tebble and Chambers, 1982, fig. 17a).

Bilobed prostomium with anterior lobes truncate, without peaks; anterior pair of eyes anterior to greatest width, posterior pair posterodorsal; median antenna with large ceratophore in anterior notch, with papillate style longer than prostomium; ceratophore of lateral antennae inserted terminoventrally, with short subulate papillate styles; palps long, tapered; tentaculophores with 0-2 setae on inner side, with dorsal and ventral tentacular cirri similar to median antenna (Figure 22A,B;

McIntosh, 1900, pl. 27: fig. 10; Tebble and Chambers, 1982, fig. 50). Segment 2 with first pair of large elytophores, biramous parapodia, and long papillate ventral buccal cirri similar to tentacular cirri (Figure 22A,B); notosetae similar to following notosetae; neurosetae more slender than those following, upper ones with long secondary tooth, lower ones ending in entire, slightly bulbous tip.

Biramous parapodium with notopodium shorter and smaller than neuropodium, subconical with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe, without supraacicular process, and shorter, rounded postsetal lobe (Figure 22E,F; McIntosh, 1900, pl. 42: fig. 30). Notosetae numerous, forming radiating bundle, short to long, with distinct spinose rows and short bare tapered tips (Figure 22G; McIntosh, 1900, pl. 38: fig. 7). Upper neurosetae with longer spinose regions, with tips entire or with small secondary tooth; middle neurosetae with long secondary tooth; lower neurosetae with shorter spinose regions and entire tips (Figure 22M; McIntosh, 1900, pl. 38: figs. 8, 9). Dorsal cirri with cylindrical cirriphores, wider basally, with glandular areas; styles papillate, extending beyond neurosetae; dorsal tubercles nodular; ventral cirri short, papillate (Figure 22F). Pygidium with pair of long anal cirri.

DISTRIBUTION.—Northeastern Atlantic Ocean, Sweden, Faeroe Islands, Shetland Islands to Ireland. In 21-128 meters (see Ditlevsen, 1917).

***Malmgreniella lunulata* (Delle Chiaje, 1830),
new combination**

FIGURE 23

Polynoe lunulata Delle Chiaje, 1830 ("1822"), pl. 79: figs. 5, 6; 1841:57, 106, pl. 144: figs. 5, 6.—Claparède, 1868:373, pl. 2: fig. 1, 1A-F.
Harmothoe lunulata.—Alaejos y Sanz, 1905:46, pl. 6: figs. 7-9; pl. 7: figs. 1-9.—Saint-Joseph, 1906:194, pl. 3: figs. 71, 72.—Fauvel, 1913:15; 1923:70, fig. 26a-h [part]. [Not Day, 1962.—Monro, 1937.—Katzmann, 1983.]
Malmgrenia lunulata.—Pettibone, 1953:25 [part].

REMARKS.—No type material is available for *Polynoe lunulata* Delle Chiaje from the Mediterranean, which was incompletely described and figured by Delle Chiaje and Claparède. The species has been widely reported as *Harmothoe lunulata* (Delle Chiaje) by McIntosh (1900), Fauvel (1923), and many others; and as *Malmgrenia lunulata* (Delle Chiaje) by Pettibone (1953) and others. As a northern species it has been reported from the eastern Atlantic and eastern Pacific, living commensally with a variety of hosts, including echinoderms, polychaetes, and balanoglossids. Far too many species have been lumped under *M. lunulata*.

As a part of this study, an available specimen in the Paris Museum from off Monaco in the Mediterranean is selected for study and referred to *Malmgreniella lunulata*. It is supplemented by the description and figures of Saint-Joseph (1906) on two specimens from the Mediterranean. The group will need

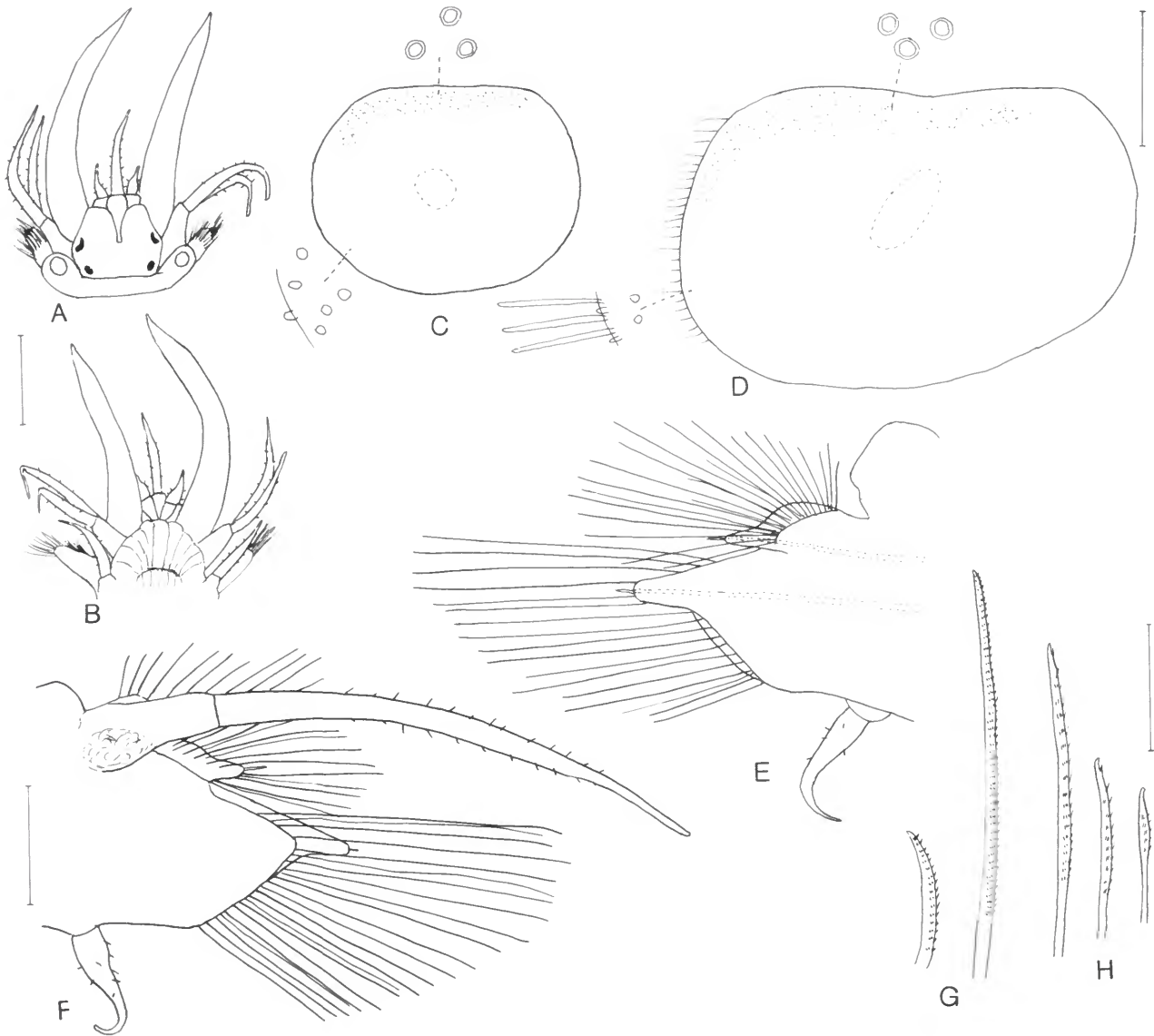


FIGURE 22.—*Malmgreniella mcintoshi*, specimen from Sweden (USNM 43230): A, dorsal view of anterior end; B, ventral view of anterior end; C, left 1st elytron from segment 2, with detail of microtubercles and micropapillae; D, left middle elytron, with detail of microtubercles, lateral papillae and micropapillae on surface; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view; G, short and long notosetae; H, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,F; 0.1 mm for G,H.)

further study to tie down the various records. Some records are dealt with herein. Others will need further study.

MATERIAL EXAMINED.—EASTERN ATLANTIC OCEAN: *Mediterranean Sea*: Off Monaco, 17–18 Mar 1903, 16–30 m, collection of S.A.S. le Prince de Monaco, sta

Cap d'Ail, 1 specimen (MNHN, as *Harmothoe lunulata* by Fauvel, 1913).

DESCRIPTION.—Specimen from off Monaco, female with large yolk eggs in body cavity, 10 mm long, 4 mm wide including setae, and 37 segments, last one very small. Female

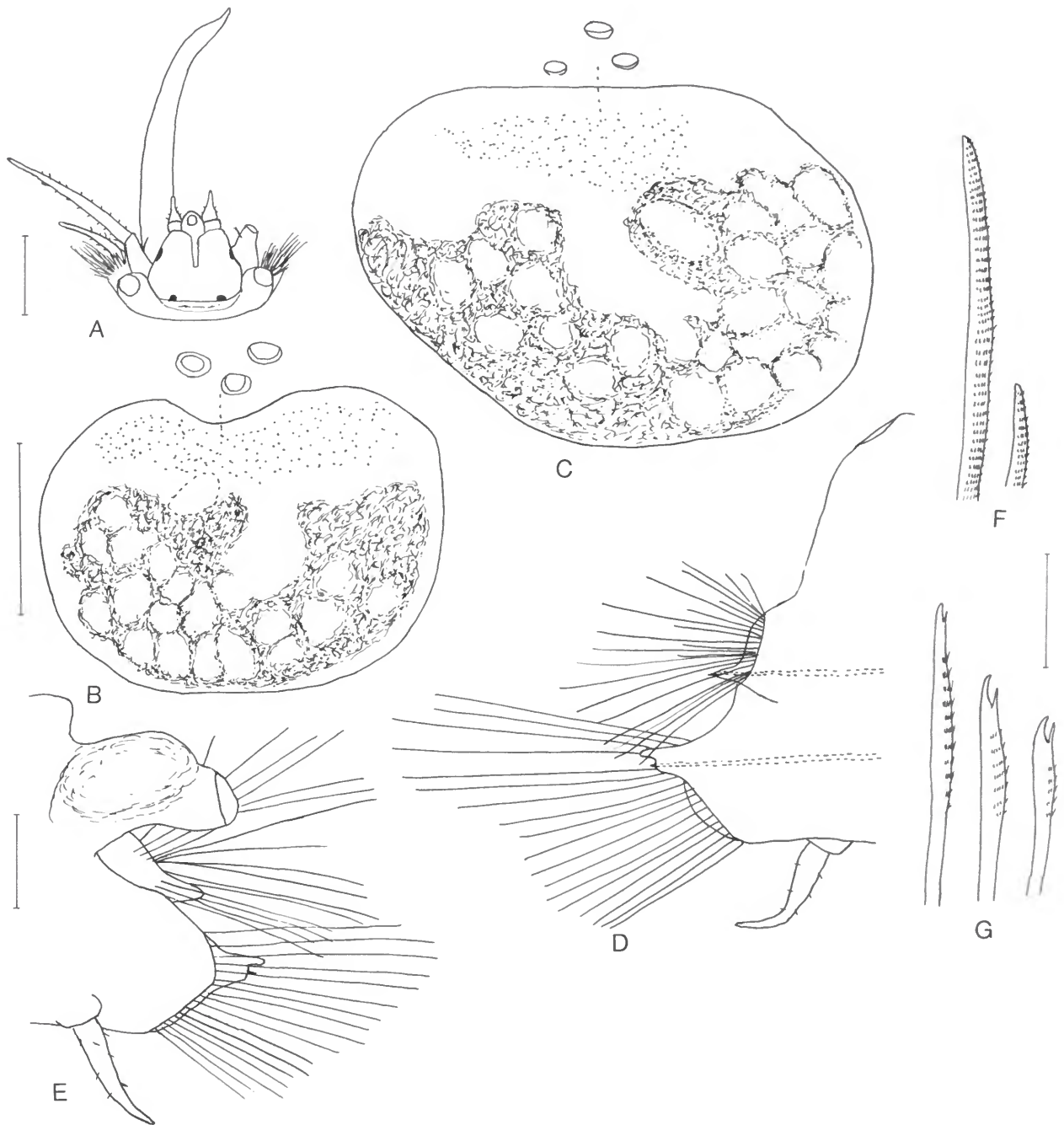


FIGURE 23.—*Malmgreniella lunulata*, specimen from off Monaco (MNHNP): A, dorsal view of anterior end; styles of median antenna, right dorsal and ventral and left ventral tentacular cirri, and right ventral buccal cirrus of segment 2 missing. B, left 3rd elytron from segment 5, with detail of microtubercles. C, right 6th elytron from segment 11, with detail of microtubercles. D, right elytrigerous parapodium, anterior view, acicula dotted. E, right cirriferous parapodium, posterior view, style of dorsal cirrus missing. F, long and short notosetae. G, upper, middle, and lower neurosetae. (Scales = 0.5 mm for A; 0.5 mm for B,C; 0.2 mm for D,E; 0.1 mm for F,G.)

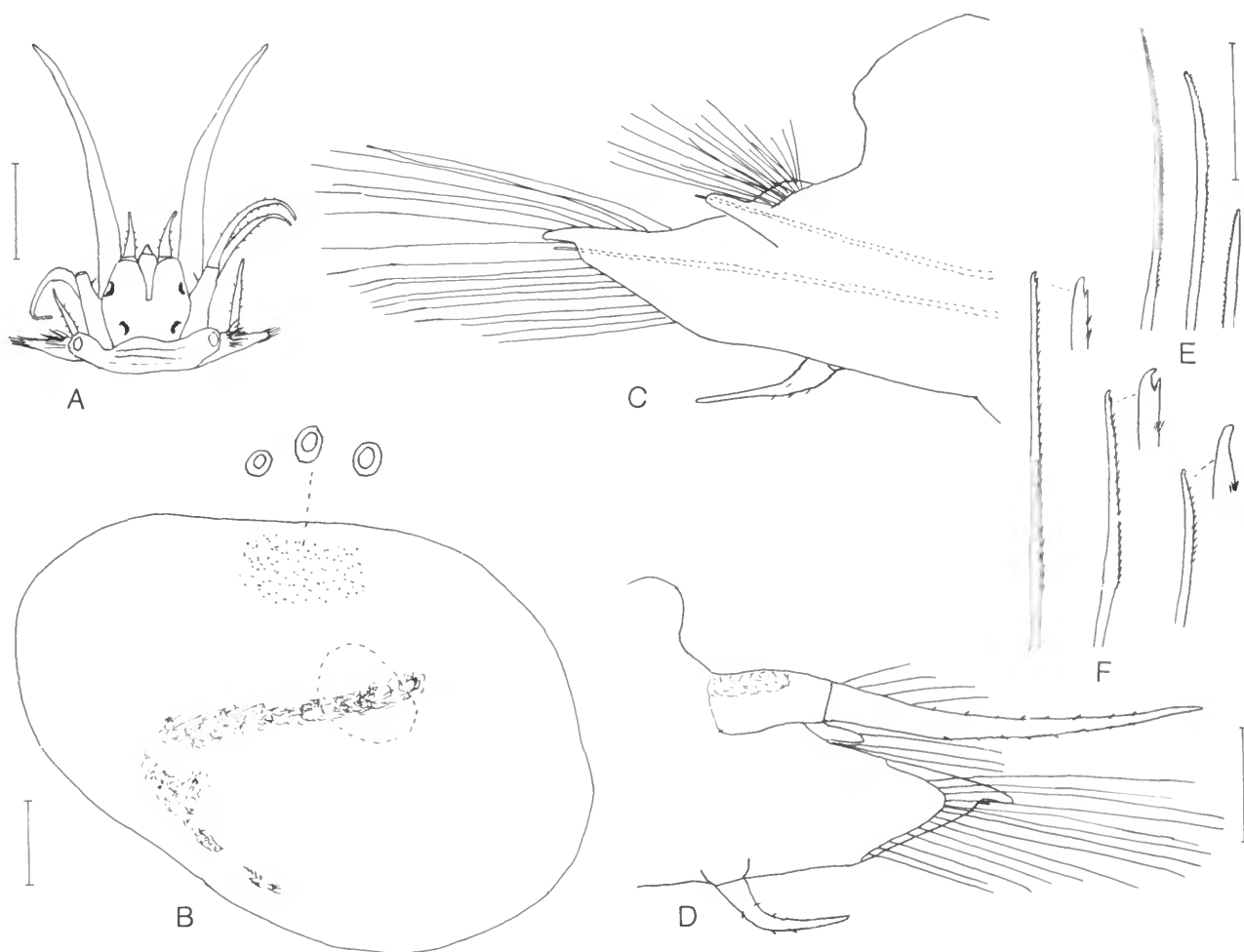


FIGURE 24.—*Malmgreniella darbouxi*, new species, holotype (USNM 74370): A, dorsal view of anterior end, style of median antenna small, regenerating, styles of left dorsal and ventral tentacular cirri missing; B, right elytron, with detail of microtubercles; C, right elytrigerous parapodium, anterior view, acicula dotted; D, right cirriferous parapodium, posterior view; E, long and short notosetae; F, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.2 mm for B; 0.2 mm for C,D; 0.1 mm for E,F.)

specimen from Mediterranean, described by Saint-Joseph (1906), 25 mm long, 4 mm wide, with 37 segments.

Elytra 15 pairs, on usual segments, large, oval to subreniform, last pair elongate-oval, nearly covering small posterior segments; posterior two-thirds of elytra nearly covered with mottled areolate brownish pigmentation; numerous microtubercles on anterior part and scattered globular micropapillae on surface (Figure 23B,C; Saint-Joseph, 1906, pl. 3: fig. 71).

Bilobed prostomium with anterior lobes truncate, without peaks; anterior pair of eyes anterolateral, larger than postero-dorsal pair; ceratophore of median antenna in anterior notch, with papillate style about twice as long as prostomium;

ceratophores of lateral antennae inserted terminoventrally, with very short papillate styles; palps long, stout, tapered; tentaculophores lateral to prostomium, with single seta on inner side; dorsal and ventral tentacular cirri similar to median antenna; small conical facial tubercle medial to ventral bases of tentaculophores (Figure 23A; Saint-Joseph, 1906, pl. 3: fig. 72). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth, similar to tentacular cirri and longer than following ventral cirri (Figure 23A). Extended pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

Biramous parapodium with smaller notopodium rounded,

with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with small digitiform supraacicular process and shorter rounded postsetal lobe (Figure 23D,E). Notosetae numerous, forming radiating bundle, of several lengths, slightly stouter than neurosetae, with close-set spinose rows continuing to very short bare tips (Figure 23F). Neurosetae numerous, forming fan-shape bundle, upper ones with longer spinose regions and tapered tips with secondary tooth; middle and lower neurosetae with shorter spinose regions and more distinctly hooked tips, all with rather long secondary tooth (Figure 23G). Dorsal cirri with cylindrical cirrophores with bulbous glandular areas on posterior sides, and papillate styles extending beyond tips of neurosetae; dorsal tubercles nodular; ventral cirri short, papillate, tapered (Figure 23E). Pygidium with pair of long papillate anal cirri.

BIOLOGY.—Specimens from Santander, Bay of Biscay, Northern Spain, were reported by Alaejos y Sanz (1905) as commensal with balanoglossids, found on compact beaches near the surface of the sand under small rocks. The polynoids were encased in the mucus produced by the host. When the burrow was disturbed, the very lively polynoid was apt to escape.

DISTRIBUTION.—Eastern Atlantic Ocean, Mediterranean Sea. Depth 16–30 meters.

***Malmgreniella darbouxi*, new species**

FIGURE 24

Harmothoe lunulata.—Katzmann, 1983:93 [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—EASTERN ATLANTIC OCEAN: *Mediterranean Sea*: Near Zlorin Island, Yugoslavia, middle Adriatic Sea, 20–60 m, sand and mud, 1971, W. Katzmann, collector, holotype (USNM 74370).

DESCRIPTION.—Holotype, male with sperm, 9 mm long, 3.5 mm wide including setae, 34 segments. Ventral surface of posterior segments transversely banded with dark pigmentation (suggesting commensal relationship with unknown host).

Elytra 15 pairs, on usual segments, large, oval, delicate, transparent; small group of microtubercles near middle of anterior border; dark pigmentation in form of transverse band over scar of attachment to elythrofore, to medial side, and continuing posteriorly along medial side (Figure 24B).

Bilobed prostomium with anterior lobes truncate, without peaks; anterior pair of eyes just anterior to greatest width, larger than posterodorsal pair; ceratophore of median antenna in anterior notch, with style small, regenerating; ceratophores of lateral antennae inserted terminoventrally, with styles short, subulate, with short papillae; palps long, tapered; tentaculophores lateral to prostomium, with single seta on inner side; dorsal and ventral tentacular cirri longer than prostomium, with short papillae (Figure 24A). Segment 2 with first pair of large elythrofores, biramous parapodia, and long ventral buccal cirri, similar to tentacular cirri (Figure 24A).

Biramous parapodium with smaller notopodium rounded, with projecting acicular lobe on lower side; larger neuropodium with subconical projecting presetal acicular lobe with digitiform supraacicular process and shorter, rounded postsetal lobe (Figure 24C,D). Notosetae moderate in number, slender, of several lengths, with faint spinose rows, longest ones tapering to more slender tips (Figure 24E). Neurosetae numerous, slender, about same width as notosetae; upper ones with longer spinose regions and tapered bifid tips; middle and lower ones with shorter spinose regions and more distinct hooked tips, lower ones with entire tips (Figure 24F). Dorsal cirri with cylindrical cirrophores, inflated basally, with glandular areas on upper side; styles with short papillae, tapered and extending to about tips of neurosetae; dorsal tubercles nodular; ventral cirri short, tapered, with few short papillae (Figure 24D). Pygidium rounded, with pair of long anal cirri.

ETYMOLOGY.—The species is named for J. Gaston Darboux, in recognition of his basic research on the aphroditoid polychaetes (Darboux, 1900).

DISTRIBUTION.—Eastern Atlantic Ocean, Mediterranean Sea (Adriatic Sea), in 20–60 meters.

Key to the Species of *Malmgreniella* from the Western Atlantic Ocean (Virginia to Florida, Caribbean Sea, Belize, Panama, Gulf of Mexico, Brazil)

1. Parapodia subbiramous, with small notopodia and relatively few, short notosetae; neuropodial presetal acicular lobes without supraacicular process [Figures 36C, 37E] *M. puntotorensis*, new species
- Parapodia biramous, with larger notopodia and numerous notosetae forming radiating bundles; neuropodial presetal acicular lobes with digitiform or bulbous supraacicular process [Figures 25D,E, 26E,F, 28G,H, 32D,E, 33F,G, 34E,F, 35F,G, 38G,H] 2
2. Neurosetae all with entire tips [Figures 26H,I, 35I,J, 38J-L] 3
- At least some neurosetae with bifid tips 5

3. Supraacicular process of neuropodial presetal acicular lobe not sharply set off [Figure 35F,G]. Elytra without papillae or microtubercles [Figure 35C-E]. Prostomium with pigmentation, anterior lobes subtriangular [Figure 35A]. Noto setae appearing smooth, but finely spinose [Figure 35H] *M. panamensis*, new species
Supraacicular process of neuropodial presetal acicular lobe digitiform [Figures 26E,F, 38G,H]. Elytra with papillae, without microtubercles [Figures 26B-D, 38B-D]. Prostomium without pigmentation, anterior lobes rounded [Figures 26A, 38A]. Noto setae with faint spinose rows or with distinct spines 4
4. Elytra with cylindrical papillae and only faint color pattern [Figures 26B-D, 27A-D]. Noto setae with faint close-set spinose rows [Figure 26G] *M. taylori*, new species
Elytra with micropapillae and prominent color pattern [Figure 38B-D]. Noto setae with distinct spines [Figure 38i] *M. liliana*, new species
5. Elytra colorless [Figure 32C]. Upper and lower neurosetae with entire tips, middle ones with long, slender secondary tooth [Figure 32G-I] *M. pierceae*, new species
Elytra with pigmented pattern [Figures 25B,C, 28B,C, 30D-F, 33C-E, 34C,D]. Neurosetae otherwise 6
6. Upper and middle neurosetae with bifid tips, lower few with entire tips [Figures 28J,K, 30J,K]. Noto setae stouter than neurosetae, with very faint spinose rows, longer ones with blunt tips [Figures 28i, 30i]. Elytra with group of microtubercles on anterior part [Figures 28C, 30E,F] *M. variegata* (Treadwell), new combination
Supraacicular neurosetae with bifid tips, subacicular ones with entire tips [Figures 25G,H, 33I,J, 34H,I]. Noto setae otherwise. Elytra without microtubercles [Figures 25B,C, 33C-E, 34C,D] 7
7. Noto setae slightly stouter than neurosetae, with close-set spines along convex border [Figure 25F]. Elytra with micropapillae [Figure 25B,C]. Neuropodial presetal supraacicular process long, digitiform [Figure 25D,E] *M. maccraryae*, new species
Noto setae more slender than neurosetae, with faint spinose rows [Figures 33H, 34G]. Elytra without micropapillae [Figures 33C-E, 34C,D]. Neuropodial presetal supraacicular process otherwise 8
8. Neuropodial presetal supraacicular process not sharply set off [Figure 33F,G]. Anterior lobes of prostomium truncate [Figure 33A]. Ventral pigmentation of posterior segments in form of 4 spots per segment [Figure 33B] *M. hendleri*, new species
Neuropodial presetal supraacicular process short, bulbous [Figure 34E,F]. Anterior lobes of prostomium subtriangular [Figure 34A]. Ventral pigmentation of posterior segments in form of 3 round spots, middle one extra large [Figure 34B] *M. galetaensis*, new species

***Malmgreniella maccraryae*, new species**

FIGURE 25

Harmothoe lunulata.—Taylor, 1971:70 [not Delle Chiaje, 1830].

?*Malmgrenia lunulata*, variety Gardiner, 1976:90, fig. 3a-e [part; not USNM 52850 = *Lepidonopsis humilis* (Augener)].

Malmgreniella sp. B.—Weston, 1984:21-20, figs. 21-15, 16a-g.

Malmgrenia lunulata.—Fox and Ruppert, 1985:127, 194, 254 [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC

OCEAN: North Carolina: Banks Channel, Wrightsville Sound, 1967, taken from brittle star, A.B. McCrary, collector, paratype (USNM 55065). Wrightsville Beach, intertidal, commensal on brittle star *Amphipholis gracillima* (Stimpson), Apr 1972, Mar 1973, S.L. Gardiner and T. Fox, collectors, holotype (USNM 52050) and 2 paratypes (USNM 52849, 55066, as ?*Malmgrenia lunulata*, variety by Gardiner, 1976). Georgia: Off Georgia, 31°55'N, 80°51'W, 8 m, Texas Instruments, R/V *Pierce* sta 4A, 20 Feb 1977, 3 specimens (USNM 59169). Florida: Off Florida, 29°27'N, 81°03'W, 20

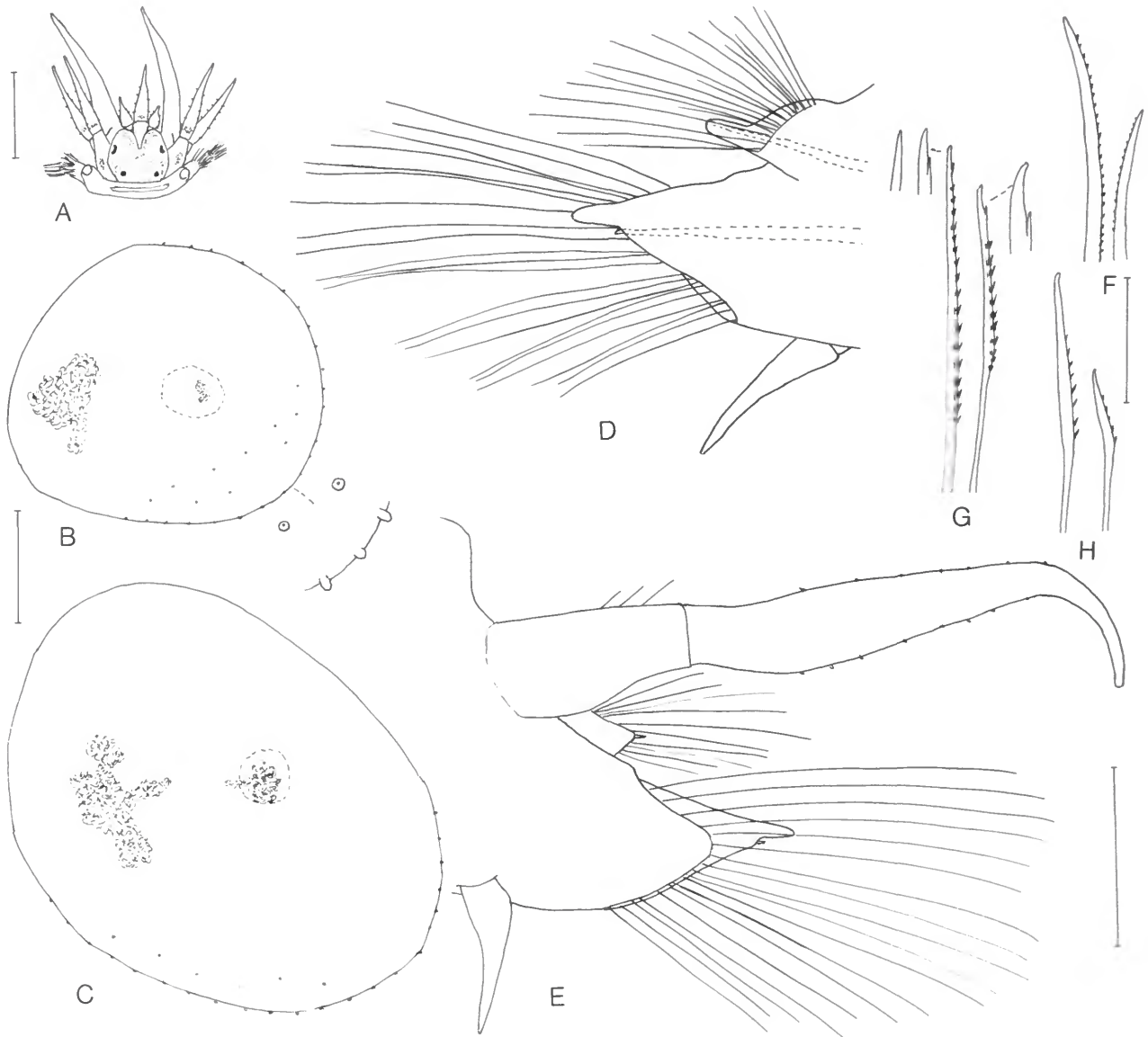


FIGURE 25.—*Malmgreniella macrariae*, new species, holotype (USNM 52050): A, dorsal view of anterior end; B, right 1st elytron, with detail of micropapillae; C, right middle elytron; D, right elytrigerous parapodium, anterior view, acicula dotted; E, right cirriferous parapodium, posterior view; F, long and short notosetae; G, supraacicular neurosetae, with detail of tips; H, subacicular neurosetae. (Scales = 0.5 mm for A; 0.2 mm for B,C; 0.2 mm for D,E; 0.1 mm for F-H.)

m, R/V *Pierce*, sta 7A, 4 Mar 1977, 3 specimens (USNM 59171). Off Virginia Key: near Miami, 1 m, on brittle star *Amphioplus sepultus* Hendler, 23 Feb 1970, G. Hendler, collector, 2 paratypes (USNM 55067); 26 Feb 1970, 2 specimens (USNM 133560; LACM).

GULF OF MEXICO: *Florida*: Tampa Bay, J.L. Taylor, collector, 7 paratypes (USNM 45513, as *Harmothoe lunulata*

by Taylor, 1971). Hillsborough Bay, Tampa, sand and shell, 7 May 1975, S.L. Santos, collector, 9 paratypes (USNM 55068). Mississippi-Alabama-Florida (MAFLA) sta IV-2419, off Apalachicola River, Feb 1978, 29°47'N, 84°05'W, 10 m, medium-fine sand, 2 specimens (USNM 89685). *Alabama*: Mouth of Mobil Bay, 30°14'N, 88°03'W, 6.4 m, Mobile Oil sta Mc151A,D, Jul 1978, 40 specimens (USNM 70075-6). About

3 miles SE of Dauphin Island, 30°11'N, 88°07'W, 13 m, Continental Shelf Assoc. sta 14, 18 Sep 1981, 6 specimens (USNM 71156). *Texas*: Bay City-Freeport, inner shelf, 28°53'N, 95°15'W, 15 m, T.R. Calnan, collector, 2 specimens (USNM 68008), as *Malmgreniella* sp. B. by Weston, 1984: Southwest Florida (SOFLA) sta 25B, Nov 1980, 24°47'N, 82°13'W, 24 m, silt-clay, 2 specimens (USNM 89684). South Texas Outer Continental Shelf (STOCS) sta II-1, off Port Aransas, Fall 1976, 27°40'N, 96°59'W, 22 m, sandy silty clay, 1 specimen (USNM 89688); sta IV-4, off Port Isabel, Fall 1976, 1977, 26°10'N, 97°08'W, 15 m, sand, 2 specimens (USNM 89686-7).

DESCRIPTION.—Holotype 7 mm long, 2.5 mm wide including setae, with 33 segments and 15 pairs of elytra. Paratype from Wrightsville Sound (USNM 55065, male with sperm) 5 mm long, 2.5 mm wide, with 31 segments and 14 pairs of elytra. Paratypes from Tampa Bay (USNM 45513) 4–6 mm long, 2–3 mm wide, with 27–34 segments and 13–15 pairs of elytra. Body short, depressed, tapering slightly anteriorly and posteriorly. Dorsum with transverse dark bands on posterior third of body; ventrum with wide longitudinal stripe along body or confined to posterior segments. Elytra up to 15 pairs, some sexually mature males with fewer than 15 pairs and fewer segments. Elytra oval, without tubercles, with scattered micropapillae along lateral and posterior borders and few on surface, with dark pigment spots on area of attachment to elytophores, on larger medial semilunar areas, and sometimes additional scattered spots (Figure 25B,C; Gardiner, 1976, fig. 3a,e; Weston, 1984, fig. 21-16a).

Bilobed prostomium with anterior lobes rounded to subtriangular, without distinct cephalic peaks; anterior pair of eyes larger than posterior pair, located just anterior to widest part of prostomium, median antenna with ceratophore in anterior notch, with rather short, subulate style; ceratophores of lateral antennae inserted ventrally, meeting midventrally, with styles about half as long as median antenna; palps long, smooth, tapered; tentaculophores each with 1–2 setae on inner side and pair of dorsal and ventral tentacular cirri, longer than median antenna and shorter than palps; antennae and tentacular cirri minutely papillated; light, net-like pigmentation on prostomium, tentaculophores, bases of styles of median antenna, and tentacular cirri (Figure 25A; Weston, 1984, fig. 21-16b). Segment 2 with biramous parapodia and long ventral buccal cirri similar to tentacular cirri. Pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

Notopodium short, rounded, with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe, thick, digitiform supraacicular process, and shorter, rounded postsetal lobe (Figure 25D,E; Gardiner, 1976, fig. 3d). Notosetae numerous, forming radiating bundle, slightly stouter than neurosetae, short to long, with close-set spines along curved borders and tapered blunt tips (Figure 25F; Weston 1984, fig. 21-16d). Neurosetae moderate in number, forming fan-shape bundle; supraacicular neurosetae with longer spinose

regions and secondary tooth rather far removed from slightly hooked tips (Figure 25G; Weston, 1984, fig. 21-16e,f); subacicular neurosetae with shorter spinose regions and bare, slightly hooked tips (Figure 25H; Weston, 1984, fig. 21-16g); neurosetae of segment 2 more slender than following, upper ones with bifid tips, middle and lower ones with slender, slightly clubbed, entire tips. Cirrhopores of dorsal cirri cylindrical, wider basally, with papillate styles extending beyond tips of neurosetae; dorsal tubercles nodular; ventral cirri short, subulate, papillate, extending to tip of neuropodial postsetal lobe (Figure 25E). Pygidium medial to posterior, small parapodia, with pair of long anal cirri.

BIOLOGY.—*Malmgreniella macrarya* was collected intertidally in Wrightsville Sound from a ophiuroid by A.B. McCrary and from the burrowing ophiuroid *Amphipholis gracillima* (Stimpson) by S.L. Gardiner and T. Fox. From Virginia Key near Miami, the species was collected subtidally on *Amphioplus sepultus* Hendler by G. Hendler.

ETYMOLOGY.—The species is named for Anne B. McCrary, who first collected one of the paratypes and who first noted its association with a brittle star.

DISTRIBUTION.—Northwestern Atlantic Ocean from North Carolina to southern Florida and Gulf of Mexico. Intertidal to 34 meters (see Weston, 1984).

Malmgreniella taylori, new species

FIGURES 26, 27

Hermadion sp.—Behre, 1950:14.

Polynoid B.—Taylor, 1971:89, fig. 2D-I.

Harmothoe, sp.—Wass, 1972:116.—Boesch, 1977:254.

Harmothoe lunulata.—Dauer, 1980:487 [not Delle Chiaje, 1830].

Malmgreniella sp. A.—Weston, 1984:21-20, figs. 21-13, 14a-g.

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC OCEAN: *Virginia*: York River, 9 m, mud, detritus, Nov-Dec 1960, M. Wass, collector, 11 specimens (USNM 55088). York River, mud, Jan-Mar 1961, M. Wass, collector, 16 specimens (USNM 55089). Rappahanock Shoals Channel, silty clay, 20 Nov 1963, M. Wass, collector, 1 specimen (USNM 55090). Chesapeake Bay and York River, 2–13 m, silty bottom, 1964, M. Wass, collector, 15 specimens (USNM 55091, as *Harmothoe* sp. by Wass, 1972, and Boesch, 1977). York River, 9 m, silty sand, on brittle star *Amphiodia atra* (Stimpson), Feb 1970, D. Boesch, collector, 6 paratypes (USNM 55078). Southern portion of Chesapeake Bay, 21 m, May 1976, D. Weston, collector, 1 specimen (USNM 55092). *North Carolina*: Wrightsville Sound, 23 Jun 1967, muddy sand, on oral disc of brittle star *Amphipholis gracillima* (Stimpson), A.B. McCrary, collector, paratype (USNM 55076). *Georgia*: Sapelo Island, 31°23'N, 81°12'W, about 7 m, Apr 1970, A.S. Leiper, collector, 5 paratypes (USNM 55077).

GULF OF MEXICO: *Florida*: Tampa Bay, 1963, J.L. Taylor, collector, holotype (USNM 55073) and 5 paratypes (USNM 55074; LACM; as Polynoid B by Taylor, 1971).

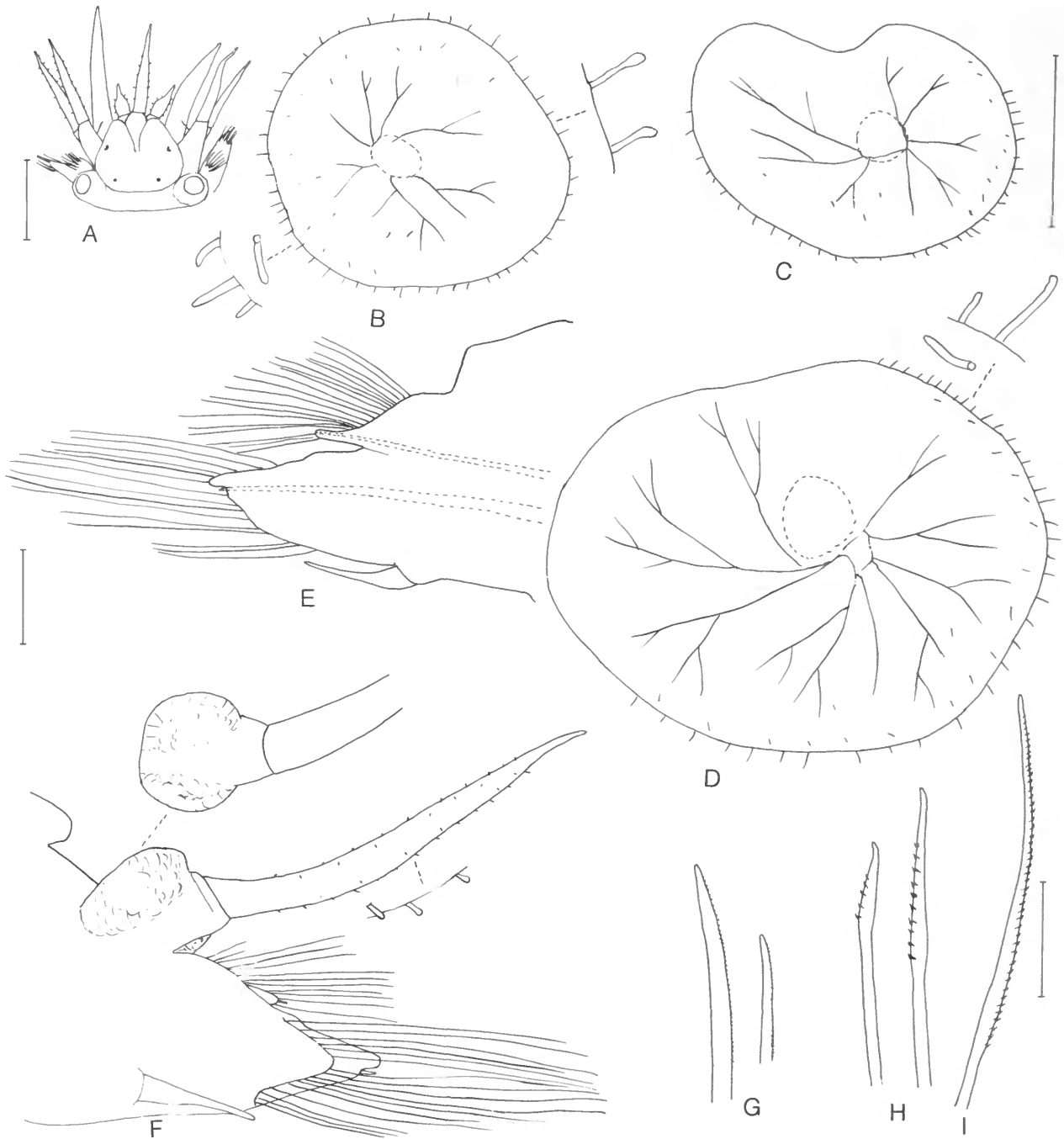


FIGURE 26.—*Malmgreniella taylora*, new species, holotype (USNM 55073): A, dorsal view of anterior end; B, right 1st elytron from segment 2, with detail of papillae; C, right 2nd elytron from segment 4; D, right middle elytron, with detail of papillae; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view, with dorsal view of cirrophore of dorsal cirrus and detail of papillae; G, long and short notosetae; H, lower and middle neurosetae; I, upper neuroseta. (Scales = 0.5 mm for A; 0.5 mm for B-D; 0.2 mm for E,F; 0.1 mm for G-I.)

Hillsborough Bay, Tampa Bay, sand and shells, 7 May 1975, S.L. Santos, collector, 11 paratypes (USNM 55075). *Alabama*: Mouth of Mobile Bay, 30°14'N, 88°03'W, Mobile Oil sta 051A, 154E,F, 6.1–8.2 m, sandy and grey mud, Jul–Aug 1978, 10 specimens (USNM 70077–8). About 3 miles SE of Dauphin Island, 30°11'N, 88°07'W, 13 m, Continental Shelf Assoc. sta 14, 18 Sep 1981, 1 specimen (USNM 71738). *Louisiana*: Grande Isle, 1934, 1 specimen (USNM 21379, as *Hermadion* sp. by Behre, 1950). *Texas*: Corpus Christi Bay, 27°45' to 57'N, 97°00' to 20'W, shelly clay and slightly shelly with fine sandy mud, sta 122, 127, 141, 142, 147, 152, Jun 1974 to Apr 1975, J.S. Holland and N.J. Maciolek, collectors, 202 specimens (USNM 55079–87). South Texas Outer Continental Shelf (STOCS) sta III-4, Spr 1976, 26°58'N, 97°20'W, 15 m, sand, 1 specimen (USNM 89682, as *Malmgreniella* sp. A by Weston, 1984). Off Texas, IXTOC Oil Spill sta N-40, 5 Dec 1979, 28°14'N, 96°29'W, 10 m, sand-silt-clay, 1 specimen (USNM 89683).

SOUTHWESTERN ATLANTIC OCEAN: *Brazil*: Bay of Flamengo, São Paulo, 23°27'S, 45°06'W, 12 m, Jan 1963, L. Forneris, collector, 15 specimens (USNM 55093).

DESCRIPTION.—Holotype from Tampa Bay (USNM 55073) 9 mm long, 4 mm wide including setae, with 33 segments, and 15 pairs of elytra; three paratypes (USNM 55075) 6–7.5 mm long, 3 mm wide, with 31–32 segments and 14–15 pairs of elytra. Paratype from Wrightsville Sound (USNM 55076) 6 mm long, 2.5 mm wide, with 31 segments and 14 pairs of elytra. Two paratypes from Sapelo Island (USNM 55077) 10 mm long, 3.5–4 mm wide, with 34–35 segments and 15 pairs of elytra. Three paratypes from York River (USNM 55078) 5–9 mm long, 2–4 mm wide, with 29–32 segments and 14–15 pairs of elytra. Larger specimens from Corpus Christi Bay

(USNM 55083) 5.5–7 mm long, 2.5–3 mm wide, with 29–30 segments and 14 pairs of elytra; small specimens 1.5–3 mm long, 1–2 mm wide, with 17–24 segments and 8–12 pairs of elytra. Specimens from Brazil (USNM 55093) 6–10 mm long, 3–5.5 mm wide, with 33–35 segments and 15 pairs of elytra.

Body short, flattened, tapering slightly anteriorly and posteriorly, colorless (rose color when living, according to M. Wass, in litt.), sometimes with greyish pigment on ventral side of posterior segments, with segments up to 35. Elytra up to 15 pairs, round, subreniform to oval, smooth, delicate, with prominent "veins," without tubercles, with marginal fringe of clavate papillae on lateral and posterior borders (all around on first pair), without prominent color pattern but with opaque, denser area around place of attachment to elytraphore, sometimes faintly pigmented in this area and on additional crescent-shape area more medially (Figures 26B–D, 27A–D; Taylor, 1971, fig. 2E; Weston, 1984, fig. 21-14a). Bilobed prostomium with truncate anterior lobes and 2 pairs of minute eyes, anterior pair anterior to greatest width of prostomium and larger than posterior pair; ceratophore of median antenna in anterior notch, with style about as long as prostomium; ceratophores of lateral antennae inserted terminoventrally, with short subulate styles; palps stout, tapered, longer than median antenna; tentaculophores each with single seta on inner side and pair of dorsal and ventral tentacular cirri, similar to median antenna; styles of antennae and tentacular cirri with minute papillae (Figure 26A; Taylor, 1971, fig. 2D; Weston, 1984, fig. 21-14b). Segment 2 with first pair of elytraphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri.

Parapodium with short, rounded notopodium with projecting acicular lobe on lower side; longer neuropodium with

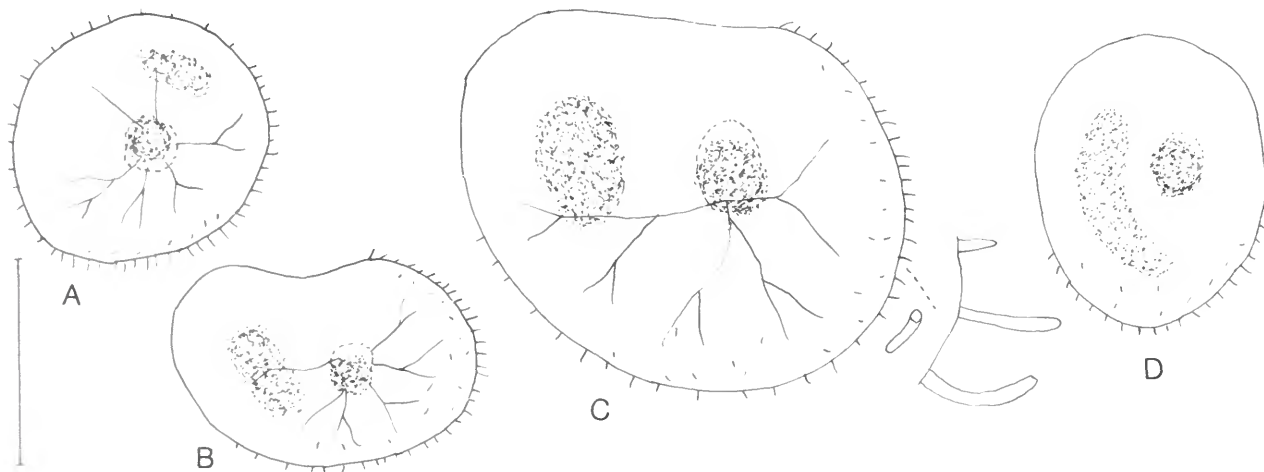


FIGURE 27.—*Malmgreniella taylori*, new species, paratype (USNM 55075): A, right 1st elytron from segment 2; B, right 2nd elytron from segment 4; C, right middle (7th) elytron from segment 13, with detail of papillae; D, right posterior (14th) elytron from last segment (29). (Scale = 0.5 mm.)

subconical presetal acicular lobe with bulbous supraacicular process, with shorter rounded postsetal lobe (Figure 26E,F). Notosetae numerous, forming radiating bundle, short to long, about as thick as neurosetae, tapering to blunt tips, with very faint spinose rows (Figure 26G; Weston, 1984, fig. 21-14d). Neurosetae forming fan-shape bundle, upper ones with longer spinose regions and more prominent spines, tapering to short, bare, entire tips (Figure 26i; Weston, 1984, fig. 21-14e); middle and lower neurosetae with shorter spinose regions and long, bare, slightly hooked tips (Figure 26H; Weston, 1984, fig. 21-14f,g). Cirrophores of dorsal cirri cylindrical, with bilobed glandular areas on anterior and posterior sides; styles extending to tips of neurosetae or beyond, with scattered clavate micropapillae; dorsal tubercles nodular; ventral cirri short, tapered (Figure 26F). Pygidium between last pair of parapodia, with pair of long anal cirri.

BIOLOGY.—In Tampa Bay, the type locality, Taylor (1971) reported the species (as Polynoid B) as the most common and widely distributed polynoid in the area. A specimen of *M. taylori*, filled with large yolky eggs, was taken from the oral disc of the brittle star *Amphipholis gracillima* (Stimpson) in Wrightsville Sound in June by Anne McCrary. The species was reported as commensal with the common burrowing brittle star *Amphiodia atra* (Stimpson) in the Chesapeake-York estuary by D.F. Boesch (1977) and in Mobile Bay, Alabama, by D. Weston (1984).

ETYMOLOGY.—The species is named for John L. Taylor, who first described the species (as Polynoid B) in his doctoral dissertation.

DISTRIBUTION.—Western Atlantic Ocean, from Chesapeake Bay to Georgia, Gulf of Mexico, Brazil. Low water to 21 meters.

***Malmgreniella variegata* (Treadwell, 1917),
new combination**

FIGURES 28-31, FRONTISPIECE A

Harmothoe variegata Treadwell, 1917:260, pl. 1: figs. 17, 18; pl. 2: figs. 1-3.—Hartman, 1956:251, 265, 273.

Paralepidonotus boholensis Gr. var. *curacaoensis* Horst, 1922:198.

Malmgrenia curacaoensis.—Augener, 1927:45, fig. 2A-D.—Kudenov, 1975b:79.

Harmothoe lunulata.—Millott, 1953:96, figs. 1, 2 [not Delle Chiaje, 1830].

Harmothoe sp.—Hanley, 1987:156.

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC OCEAN: *Florida*: Gulf of Mexico, Dry Tortugas, Jun-Jul 1909, holotype of *Harmothoe variegata* (AMNH 971). Straits of Florida, Looe Key, 24°33'N, 81°24'W, on brittle star *Ophionereis reticulata* (Say), G. Hendler, collector, by scuba: sta LK-1, 28 Aug 1984, fore reef spur and groove coral reef, 7 m, 1 specimen (USNM 133579; color photo by J.E. Miller); sta LK-33, 12 May 1985, back reef, 4 m, 1 small specimen (USNM 133578); sta LK-53, 16 Aug 1985, near northeastern core marker, 2-3 m, 1 specimen (LACM).

CARIBBEAN SEA: *Belize*: Norval Cay, on *Ophionereis reticulata*, G. Hendler, J. Miller, collectors, 1.5 m, sta 89-11, 4 Mar 1989, 2 specimens (USNM 133576). *Curaçao*: "Spaansch water," in *Porites porites*, 10 Apr 1920, van der Horst, collector, 3 syntypes of *Paralepidonotus boholensis* var. *curacaoensis* (ZMA 1039; as *Malmgrenia curacaoensis* by Augener, 1927, and as *Harmothoe* sp. by Hanley, 1987). Piscadera Beach, adjacent to Caribbean Marine Biological Institute, sand and rubble, 25 Sep 1976, M.L. Jones, collector, 1 specimen (USNM 133580).

EAST PACIFIC OCEAN: *Panama*: Gulf of Panama, Perlas Islands, Pedro Gonzales, on *Ophionereis annulata* (Le Contel), low water, under stones in coarse sand, 26 Apr 1976, S. Oldfield, collector, 2 specimens (USNM 133577).

DESCRIPTION.—Holotype of *Harmothoe variegata* from Dry Tortugas (AMNH 971) 26 mm long, 7 mm wide including setae, with 39 segments and 15 pairs of elytra. Complete syntype of *Paralepidonotus boholensis* var. *curacaoensis* from Curaçao (ZMA 1039) 18 mm long, 7 mm wide, with 39 segments and 15 pairs of elytra. Specimen from Curaçao (USNM 133580) 24 mm long, 7 mm wide, with 40 segments; largest specimen from Looe Key (USNM 133579) 24 mm long, 7 mm wide, with 40 segments. Young specimen from Looe Key (USNM 133578) 4 mm long, 2 mm wide, 22 segments with small posterior end, short anal cirri, and 11 pairs of elytra. Specimen on *Ophionereis reticulata* from Belize (USNM 133576) 23 mm long, 7 mm wide, with 38 segments. Two specimens on *O. annulata* from Gulf of Panama (USNM 133577), one incomplete with elytra, 11 mm long, 4 mm wide, with 32 segments; complete one with elytra missing, 13 mm long, 5 mm wide, with 40 segments, last one very small.

Body elongated, flattened, with sides nearly parallel, tapering posteriorly. Striking black or brown markings on elytra; on dorsum with small marks beginning on middle of body, becoming wider bands on posterior fourth (Figure 30B); on ventrum along midventral groove, on lateral bases of parapodia, and on ventral cirri (Figure 30C); and anteriorly on upper, lateral, and posterior lips of ventral mouth (Figure 29B). Transverse ciliated bands on dorsum, 2 per segment, between elytophores and dorsal tubercles (Figures 28A, 29A). Fifteen pairs of elytra, covering dorsum except for few posterior segments. Elytra oval to subreniform, without papillae, with group of microtubercles near anterior borders (absent on first and some posterior elytra); pigmentation denser in some areas, consisting of wide funnel-shape area on posterior half of elytra, radiating from region of attachment to elytophore to medial-posterior part, continuing as narrow band along posterior-lateral border, then to narrow transverse band completing the circle (Figures 28B,C, 30D-F; Treadwell, 1917, pl. 1: fig. 17; Augener, 1927, fig. 2A).

Bilobed prostomium with anterior lobes truncate or subtriangular, without distinct peaks, with 2 pairs of rather small eyes, anterior pair anterior to widest part of prostomium, posterior pair near posterior border; large ceratophore of median antenna



FIGURE 28 (opposite page).—*Malmgreniella variegata*, holotype of *Harmothoe variegata* (AMNH 971): A, dorsal view of anterior end, styles of median antenna, right dorsal and left dorsal and ventral tentacular cirri missing, first left elytron partially shown; B, right 1st elytron from segment 2; C, right middle elytron, with detail of microtubercles; D, right elytrigerous parapodium from segment 2, posterior view; E, long and short notosetae from same; F, neurosetae from same; G, right middle elytrigerous parapodium, anterior view, acicula dotted; H, right middle cirriferous parapodium, posterior view; I, short and long notosetae, with detail of tip; J, lower neuroseta; K, middle and upper neurosetae. (Scales = 0.5 mm for A; 1.0 mm for B,C; 0.5 mm for D,G,H; 0.1 mm for E,F,I-K.)

in anterior notch, with long style; ceratophores of lateral antennae inserted terminoventrally, converging midventrally and with ciliated ridge on ventral side, and short styles; palps stout, tapered, with longitudinal rows of minute papillae; tentaculophores each with small projecting acicular lobe on inner side, without setae, and pair of dorsal and ventral tentacular cirri similar to median antenna; all appendages variously pigmented (Figures 28A, 29A,B, 30A, 31A; Treadwell, 1917, pl. 1: fig. 18). Segment 2 with first pair of elytophores, biramous parapodia, and ventral buccal cirri with large cirrophores lateral to ventral mouth and long styles similar to tentacular cirri (Figures 28A,D, 29A,B, 30A). Notosetae similar to those of following segments; neurosetae slender, curved, tapering to fine blunt tips (Figure 28D-F).

Parapodia biramous, with notopodia shorter than neuropodia; notopodium rounded with projecting acicular lobe on lower side; larger neuropodium with longer subconical, presetal acicular lobe with bulbous or digitiform supraacicular process, with shorter, rounded postsetal lobe (Figures 28G,H, 30G,H, 31B,C; Treadwell, 1917, pl. 2: fig. 2). Notosetae numerous, forming radiating bundle, stouter than neurosetae, with numerous, faint, close-set spinose rows, shorter notosetae with tapered tips, longer ones with blunt tips (Figures 28E,I, 30I, 31D; Augener, 1927, fig. 2B). Neurosetae numerous, forming fan-shape bundle, with numerous, faint, close-set spinose rows, tapering distally to slightly hooked tips, all, except for some lower shorter neurosetae, with secondary tooth (Figures 28J,K, 30J,K, 31E,F; Treadwell, 1917, pl. 2: fig. 3; Augener, 1927, fig. 2C,D). Dorsal cirri with cylindrical cirrophores and long styles extending beyond neurosetae, with 2 dark bands near tip; dorsal tubercles nodular; ventral cirri short, tapered (Figures 28H, 30H, 31C). Pygidium with anus between last pair of small parapodia, with pair of long anal cirri, color grading from darkly pigmented to colorless distal tips.

BIOLOGY.—Norman Millott (1953, figs. 1, 2) described and published photographs of two polynoids, one wrapped around the aboral disc of the banded ophiuroid *Ophionereis reticulata* (Say), the other crawling along the arm of another individual, all found in sand beneath a submerged stone near Kingston, Jamaica. The polynoids showed a color pattern matching closely that of the brittle stars. Although the specimens were not available for study, the polynoids, identified as *Harmothoe lunulata*, are considered herein to be *Malmgreniella variegata*. On Looe Key, two adults and one young specimen of *M.*

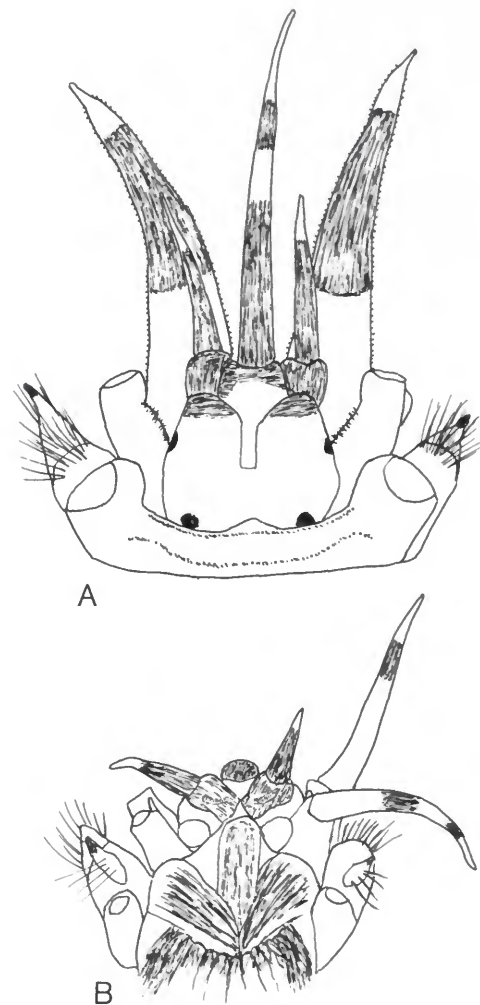


FIGURE 29.—*Malmgreniella variegata*, two syntypes of *Paralepidonotus boholensis* var. *curacaoensis* (ZMA 1039): A, dorsal view of anterior end, styles of tentacular cirri missing; B, ventral view of anterior end, palps, styles of median antenna, right tentacular cirri, and ventral buccal cirri of segment 2 missing. (Scale = 0.5 mm.)

variegata were collected by scuba in 2–7 meters on specimens of *O. reticulata* by Gordon Hendler and John Miller. The adults showed the characteristic color pattern (Figure 30A–H; Frontispiece). The young polynoid was nearly colorless, only showing color markings on some anterior elytra and spots on the lower lip (Figure 31). On the Perlas Islands, Gulf of Panama, two specimens of *M. variegata* were collected on *Ophionereis annulata* (Le Conte) under stones in coarse sand by Susan Oldfield (in litt.). On Norval Cay, Belize, G. Hendler (in litt.) observed a good number of *Ophionereis reticulata*. When turning over a piece of coral rubble that was sheltering two ophiuroids, a polynoid, identified later as *M. variegata*, was found on the rock between them, suggesting that the polynoids

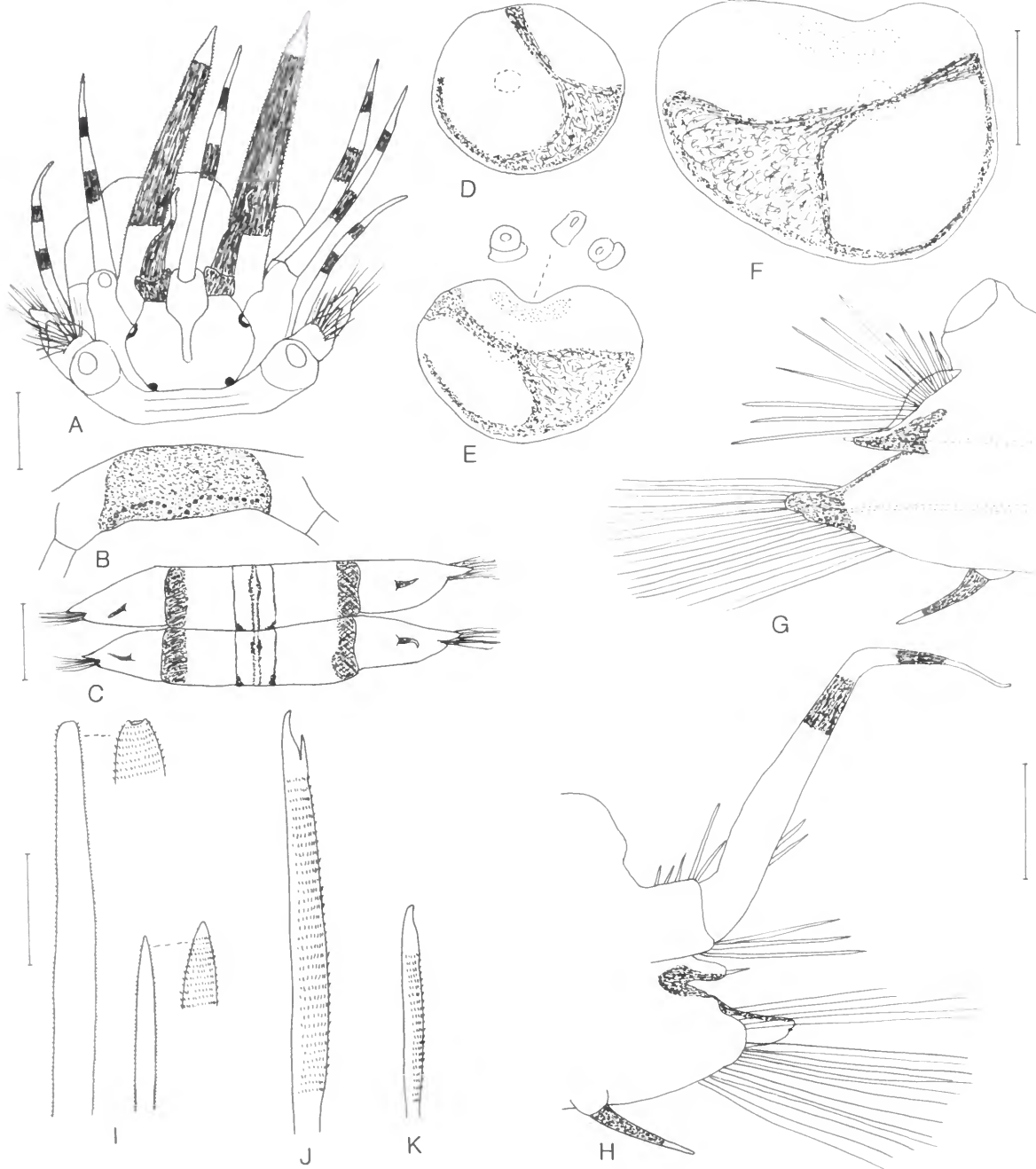


FIGURE 30.—*Malmgreniella variegata*, specimen from Looe Key (USNM 133579): A, dorsal view of anterior end, pharynx partially extended; B, middorsum of segment 36 showing pigmentation; C, ventral view of segments 21 and 22 showing pigmentation; D, left 1st elytron from segment 2; E, left 2nd elytron from segment 4, with detail of microtubercles; F, right 6th elytron from segment 11; G, right elytrigerous parapodium, anterior view, acicula dotted; H, right cirriferous parapodium, posterior view; I, long and short notosetae, with detail of tips; J, middle neuroseta; K, lower neuroseta. (Scales = 0.5 mm for A,B; 1.0 mm for C; 1.0 mm for D-F; 0.5 mm for G,H; 0.1 mm for I-K.)

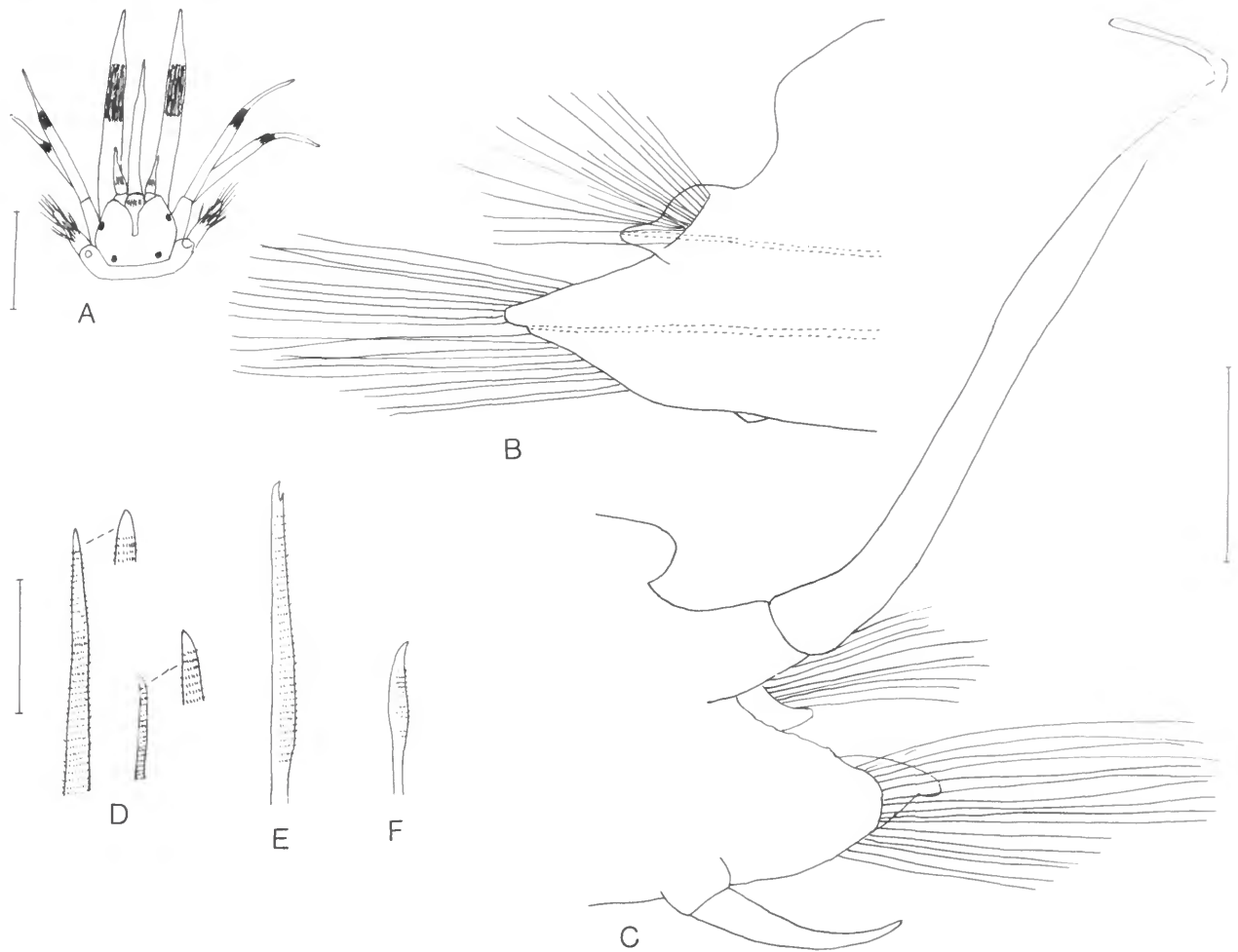


FIGURE 31.—*Malmgreniella variegata*, young specimen from Looe Key (USNM 133578): A, dorsal view of anterior end; B, right elytrigerous parapodium, anterior view, acicula dotted, style of ventral cirrus broken off; C, right cirriferous parapodium, posterior view; D, long and short notosetae, with detail of tips; E, middle neuroseta; F, lower neuroseta. (Scales = 0.5 mm for A; 0.2 mm for B,C; 0.1 mm for D-F.)

move on and off their hosts. According to G. Hendler (in litt.), both *O. annulata* and *O. reticulata*, the hosts of *M. variegata*, have similar pigmentations and color patterns, both have banded arms. See Frontispiece.

DISTRIBUTION.—Northwestern Atlantic Ocean, off Florida; Gulf of Mexico; Caribbean Sea; East Pacific Ocean, Gulf of Panama. Intertidal to 7 meters.

***Malmgreniella pierceae*, new species**

FIGURE 32

Malmgreniella sp. C.—Weston, 1984:21, 22, figs. 21-17,18a-g.

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC

OCEAN: *Georgia*: Off Georgia, 31°03'N, 80°26'W, 34 m, Texas Instruments, R/V *Pierce* sta 5E, 16 May 1977, holotype (USNM 61750). 31°01'N, 80°17'W, 40 m, sta 5F, 16 May 1977, paratype (USNM 61762). Same, 30 Aug 1977, 3 paratypes (USNM 61763-4). 30°59'N, 80°08'W, 46 m, sta G, 25 Feb 1977, paratype (USNM 61304).

GULF OF MEXICO: *Panama*: Caribbean coast, Galeta Reef, 11 m, 4 Oct 1980, on brittle star *Amphiura* cf. *fibulata* Koehler, G. Hendler, collector, 1 specimen (USNM 133561). *Florida*: as *Malmgreniella* sp. C by Weston, 1984: Southwest Florida (SOFLA) sta 20, Nov 1980, Jul 1981, 25°17'N, 82°09'W, 22 m, coarse sand, 2 specimens (USNM 89690-1). Mississippi-Alabama-Florida (MAFLA) sta 2422, off Apala-

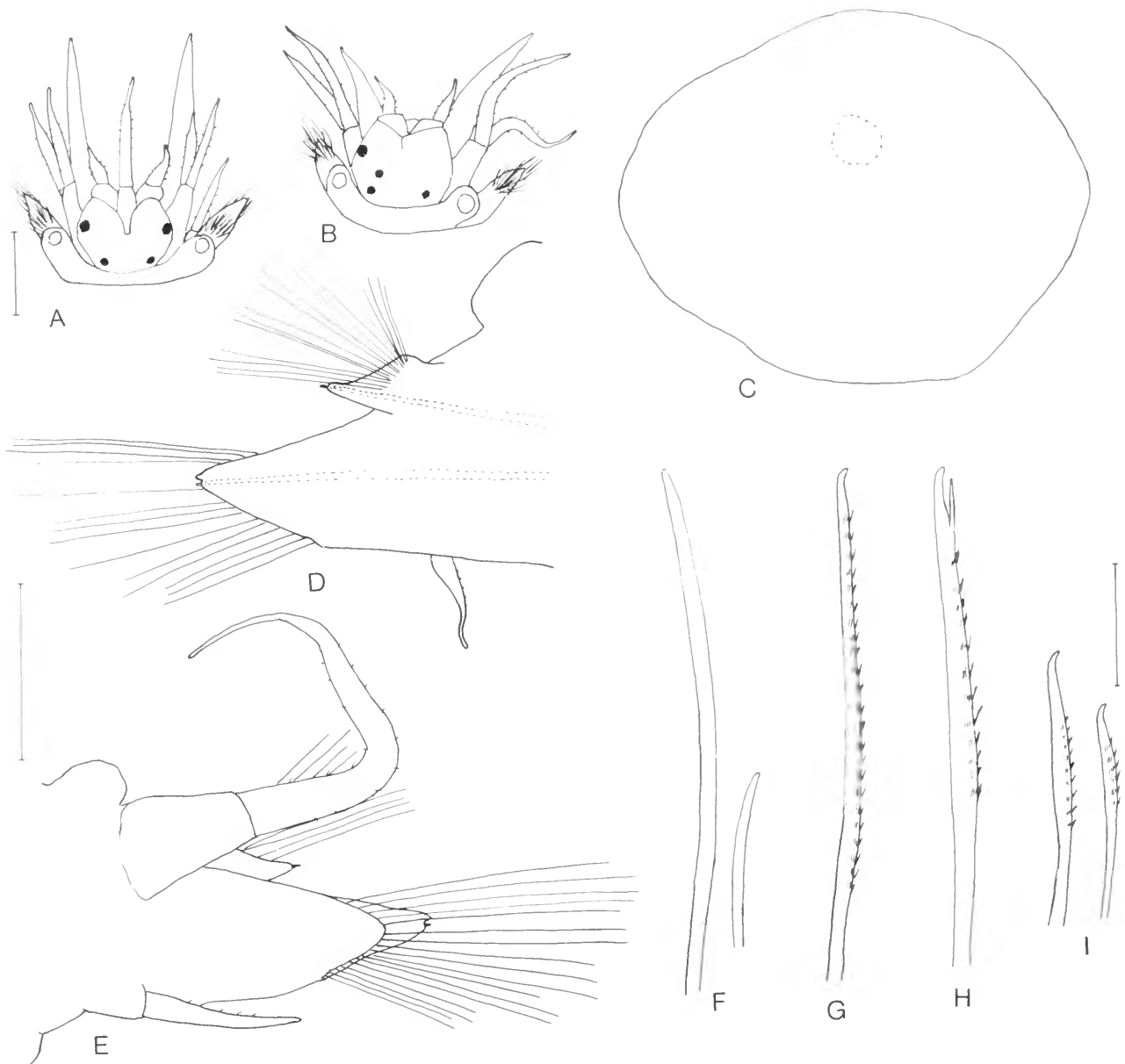


FIGURE 32.—*Malmgreniella pierceae*, new species, A, holotype (USNM 61750), B-I, paratype (USNM 61762): A, dorsal view of anterior end; B, same, prostomium defective, right eyes misplaced, ceratophore and style of median antenna missing; C, middle elytron; D, right elytrigerous parapodium, anterior view, acicula dotted; E, right cirriferous parapodium, posterior view; F, long and short notosetae; G, upper neuroseta; H, middle neuroseta; I, lower neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C-E; 0.1 mm for F-I.)

chicola River, 29°30'N, 84°27'W, 24 m, medium fine sand, 1 specimen (USNM 89689).

DESCRIPTION.—Holotype 10 mm long, 3 mm wide including setae, with 37 segments. Large paratype (USNM 61762) 13 mm long, 4 mm wide, with 37 segments. Two smaller

paratypes 3–6 mm long, 2 mm wide, with 33 segments. Body flattened, tapering slightly anteriorly and more so posteriorly, without color. Fifteen pairs of oval elytra, without tubercles and papillae, colorless (Figure 32C).

Bilobed prostomium with subtriangular anterior lobes,

without distinct peaks, with 2 pairs of rather large eyes on posterior half, and with some scattered pigment spots; ceratophore of median antenna in anterior notch, with style about length of prostomium; lateral antennae with distinct ceratophores inserted terminoventrally, converging midventrally, with short subulate styles; palps stout, tapered; tentaculophores without setae, dorsal and ventral tentacular cirri similar to median antenna; antennae and tentacular cirri minutely papillate (Figure 32A,B; Weston, 1984, fig. 21-18a). Segment 2 with long ventral buccal cirri similar to tentacular cirri.

Parapodium biramous, with notopodium shorter than neuropodium; notopodium rounded, with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with very small bulbous supraacicular process, with shorter, rounded postsetal lobe (Figure 32D,E; Weston, 1984, fig. 21-18b). Noto setae numerous, forming radiating bundle, about same width as neurosetae, short to long, slightly curved, with tapering blunt tips, appearing smooth but finely spinose along convex border (Figure 32F; Weston, 1984, fig. 21-18c). Neurosetae moderate in number, forming fan-shape bundle; upper neurosetae with long spinose regions and entire, bare tips; some larger middle neurosetae with shorter spinose regions and bifid tips, with secondary tooth very long and slender; lower neurosetae shorter with less prominent spinose rows and entire, slightly hooked tips (Figure 32G-I; Weston, 1984, fig. 21-18d-g). Dorsal cirri with cylindrical cirrophores, wider basally and long styles extending beyond tips of neurosetae, with scattered micropapillae; dorsal tubercles nodular; ventral cirri short, tapered, with scattered micropapillae on upper side (Figure 32E). Pygidium small, rounded, between posterior pair of small parapodia.

BIOLOGY.—*Malmgreniella pierceae* was collected on the brittle star *Amphiura* cf. *fibulata* Koehler on Galeta Reef, Panama, by G. Hendler.

ETYMOLOGY.—The species is named for the collecting ship R/V *Pierce*.

DISTRIBUTION.—Northwest Atlantic Ocean, off Georgia; Caribbean coast of Panama; Gulf of Mexico, off Florida. In 11–46 meters.

Malmgreniella hendleri, new species

FIGURE 33

MATERIAL EXAMINED.—NORTHWEST ATLANTIC OCEAN: *Panama*: Caribbean Sea, Galeta Reef, G. Hendler, collector, on burrowing brittle stars: 28 Oct 1977, on disc of *Ophionephthys limicola* Lütken, holotype (USNM 133567); 10 Oct 1977, 9 m, on mouth of *Amphiura* cf. *fibulata* Koehler, paratype (USNM 133570); 13–14 Sep 1978, 9–11 m, on *A.* cf. *fibulata*, young paratype (USNM 133569); 2–5 Oct 1980, 11 m, sand, on *O. limicola*, 7 paratypes (USNM 133568; LACM).

DESCRIPTION.—Holotype 6 mm long, 3 mm wide including setae, with 34 segments; paratypes 6–9 mm long, 2.5–3 mm wide, with 31–34 segments; young paratype 1 mm long, 1 mm wide, with 13 segments and budding area, with 7 pairs of elytra. Posterior fourth of dorsum with black pigment spots medial to elytophores and dorsal tubercles, and 4 groups of spots on posterior fourth of ventrum (Figure 33B). Color lacking on young paratype. Elytra 14–15 pairs, large, covering dorsum, oval to subreniform, without papillae or microtubercles; color pattern forming nearly complete circle on 1st and 2nd elytra, on following elytra, pattern is C-shape on medial part of elytra, including spot on place of attachment to elytophore (Figure 33C-E). Bilobed prostomium with anterior lobes truncate, without peaks, with light pigmentation on middle of prostomium; 2 pairs of eyes, larger anterior pair slightly anterior to greatest width of prostomium, smaller posterior pair near posterior border; median antenna with ceratophore in anterior notch, long style with filamentous tip; lateral antennae with ceratophores inserted terminoventrally, with short, subulate styles; palps stout, tapered, about same length as median antenna; tentaculophores with single seta on inner side, dorsal and ventral tentacular cirri similar to median antenna (Figure 33A). Second segment with first pair of elytophores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 33A). Extended pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

Biramous parapodium with notopodium shorter than neuropodium, rounded, with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe, with bulbous supraacicular process; postsetal lobe shorter, rounded (Figure 33F,G). Noto setae numerous, forming radiating bundle, shorter and more slender than neurosetae, with faint spinose rows and slightly bulbous bare tips (Figure 33H). Neurosetae moderate in number (about 15), forming fan-shape bundle; supraacicular neurosetae with longer spinose regions, and more prominent spinose rows, with bifid, bare tips (Figure 33I); subacicular neurosetae with shorter spinose regions and entire, bare tips (Figure 33I). Dorsal cirri with cylindrical cirrophore, long styles with minute sensory papillae, tapering to slender tips and extending beyond tips of neurosetae; dorsal tubercles nodular; ventral cirri short, subulate (Figure 33G). Pygidium rounded, between posterior pair of small parapodia, with pair of long anal cirri.

BIOLOGY.—*Malmgreniella hendleri* was collected on two species of burrowing ophiuroids, *Ophionephthys limicola* Lütken and *Amphiura* cf. *fibulata* Koehler, on Galeta Reef, Panama, by Gordon Hendler.

ETYMOLOGY.—The species is named for Gordon Hendler, specialist on the Ophiuroidea and collector of the polynoid commensals.

DISTRIBUTION.—Northwest Atlantic Ocean, Caribbean Sea, Panama. In 9–14 meters.

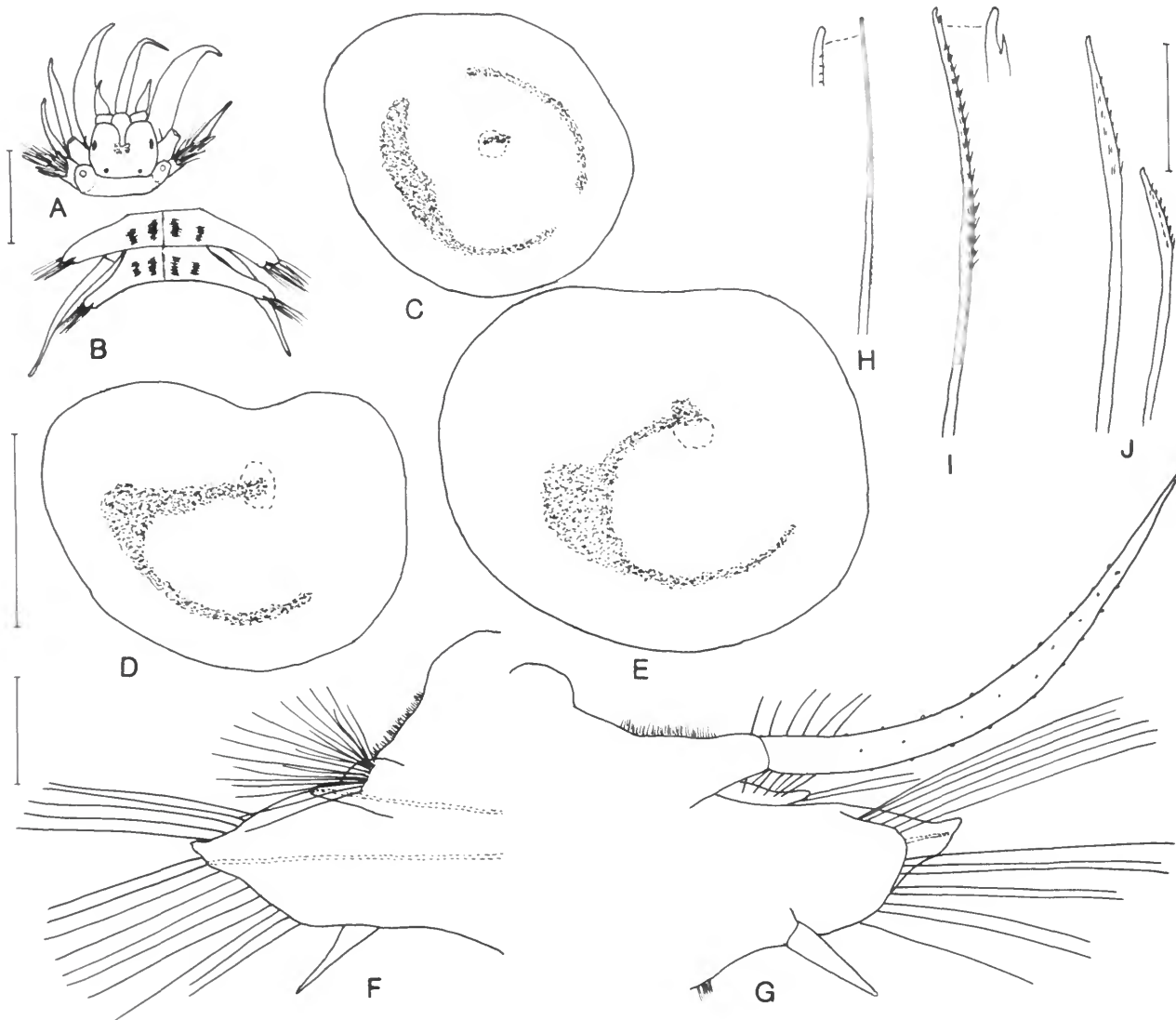


FIGURE 33.—*Malmgreniella hendleri*, new species, holotype (USNM 133567): A, dorsal view of anterior end, styles of right dorsal and ventral and left dorsal tentacular cirri missing; B, ventral view of posterior segments 27 and 28 showing pigmentation; C, right 1st elytron from segment 2; D, right 3rd elytron from segment 5; E, right middle elytron; F, right elytrigerous parapodium from segment 15, anterior view, acicula dotted; G, right cirriferous parapodium from segment 16, posterior view; H, notoseta, with detail of tip; I, supraacicular neuroseta, with detail of tip; J, subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C-E; 0.2 mm for F,G; 0.1 mm for H-J.)

***Malmgreniella galetaensis*, new species**

FIGURE 34

MATERIAL EXAMINED.—NORTHWEST ATLANTIC OCEAN: *Panama*: Caribbean Sea, Galeta Reef, 11–12 m, sand, on burrowing ophiuroids, G. Hendler, collector: 12 Sep 1978, on *Ophiophragmus septus* Lütken, holotype (USNM

133571); 2 Oct 1980, on *O. septus*, paratype (USNM 133573); 3 and 5 Oct 1980, on *O. septus*, 3 paratypes (USNM 133574; LACM); 3 Oct 1980, on *Amphiura* cf. *fibulata* Koehler, paratype (USNM 133575). *Florida*: Capron Shoals, 2 mi SE of Ft. Pierce Inlet, 14 m, shelly, silty sand, 11 Jul 1990, G. Hendler, collector, on disc of *O. septus*, paratype (USNM 133572).

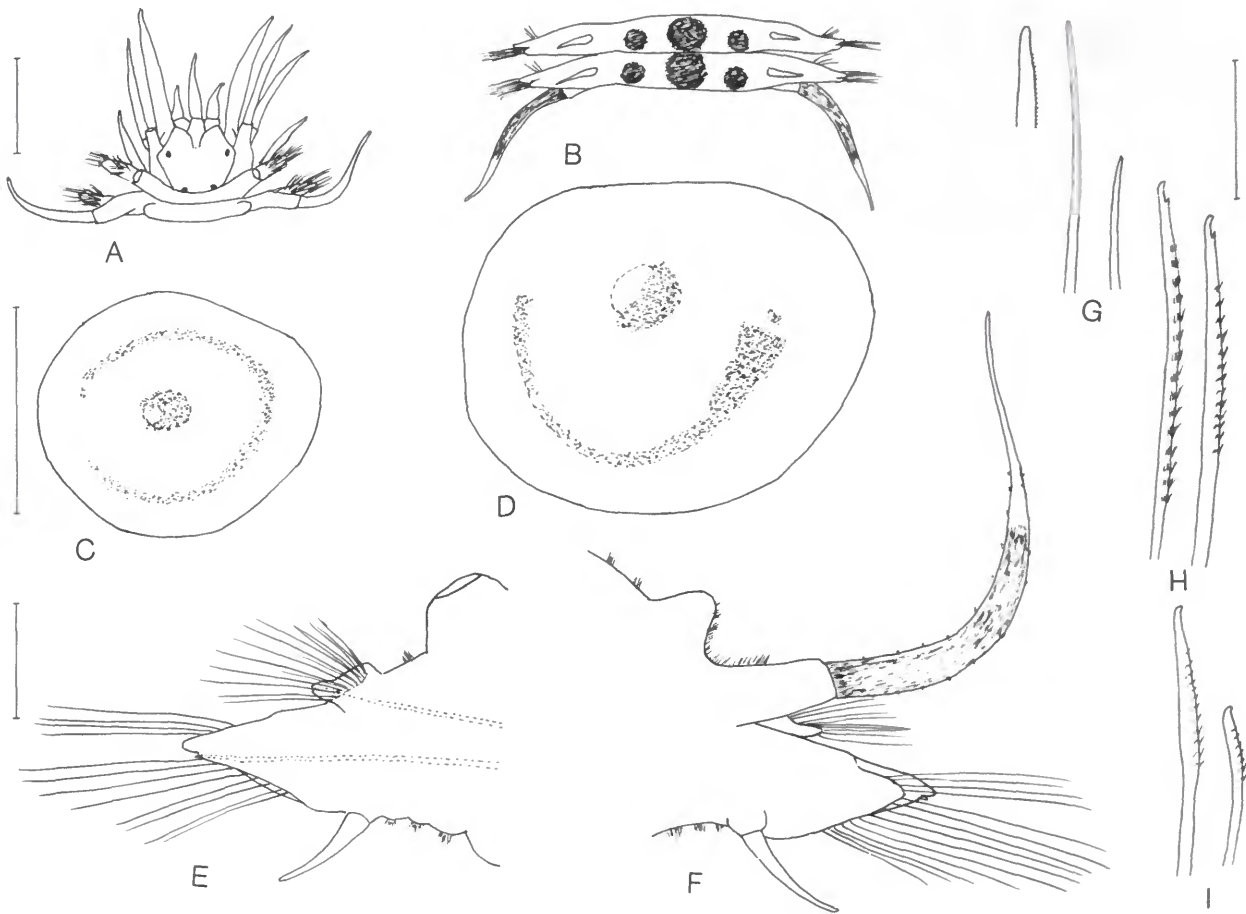


FIGURE 34.—*Malmgreniella galetaensis*, new species, holotype (USNM 133571): A, dorsal view of anterior end, left dorsal tentacular cirrus missing; B, ventral view of 2 segments near posterior end showing pigmentation pattern; C, left 1st elytron from segment 2; D, left middle elytron; E, right elytrigerous parapodium from segment 13, anterior view, acicula dotted; F, right cirriferous parapodium from segment 12, posterior view; G, long and short notosetae, with detail of tip; H, supraacicular neurosetae; I, subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,F; 0.1 mm for G-I.)

DESCRIPTION.—Holotype, female with eggs, 6 mm long, 2.5 mm wide including setae, with 32 segments, last one very small; complete paratype (USNM 133574), male with sperm, 5.2 mm long, 2 mm wide, with 30 segments; complete paratype (USNM 133572), male with sperm, 10 mm long, 4 mm wide, with 36 segments. Posterior one-half to two-thirds of body with black pigmentation in form of large oval midventral spots, smaller lateral spots on ventral bases of parapodia, and on basal two-thirds of dorsal cirri (Figure 34B,F). Elytra 14–15 pairs, oval, without papillae or microtubercles, with blackish pigmentation in spots over place of attachment to elytriphores, nearly complete ring on first elytra and semicircular ring on posterior half of following elytra (Figure 34C,D). Bilobed prostomium with subtriangular anterior lobes; 2 pairs of eyes, anterior pair

in region of greatest width, posterior pair near posterior border; ceratophore of median antenna in anterior notch, with style about length of prostomium; lateral antennae with ceratophores inserted terminoventrally, with short subulate styles; palps stout, tapered; tentaculophores with single seta on inner side, dorsal and ventral tentacular cirri nearly as long as palps (Figure 34A). Segment 2 with first pair of elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 34A). Extended pharynx with 9 pairs of border papillae, some with dark pigment inside, and 2 pairs of hooked jaws.

Biramous parapodium with notopodium shorter than neuropodium, rounded, with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe and

rounded supraacicular process; postsetal lobe shorter, rounded (Figure 34E,F). Notosetae numerous, forming radiating bundle, short to long, more slender than neurosetae, appearing smooth, but finely spinose with slightly bulbous bare tips (Figure 34G). Neurosetae moderate in number (about 14), forming fan-shape bundle; supraacicular neurosetae with long spinose regions, prominent spines, and bifid, bare tips (Figure 34H); subacicular neurosetae with shorter spinose regions, faint spinous rows, and slightly hooked, entire bare tips (Figure 34I). Dorsal cirri with long cylindrical cirrophores, styles long, with scattered micropapillae, tapering to slender tips and extending beyond neurosetae; dorsal tubercles nodular; ventral cirri short, tapered (Figure 34A,F). Pygidium between posterior pair of small parapodia, small, rounded, with ring of pigment, with pair of long anal cirri.

BIOLOGY.—*Malmgreniella galetaensis* was collected on two species of burrowing ophiuroids, *Ophiophragmus septus* (Lütken) and *Amphiura* cf. *fibulata* Koehler, on Galeta Reef, Panama, by Gordon Hendler. At Ft. Pierce Inlet, Florida, the species was collected on the disc of *O. septus* by G. Hendler.

ETYMOLOGY.—The species is named for the collecting site, Galeta Reef, Panama.

DISTRIBUTION.—Northwest Atlantic Ocean, Caribbean Sea, West coast of Florida. In 9–14 meters.

Malmgreniella panamensis, new species

FIGURE 35

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC OCEAN: Panama: Caribbean Sea, Galeta Reef, 13–14 Sep 1978, 9–12 m, sand, on *Ophiopsila* cf. *polysticta* H.L. Clark, G. Hendler, collector, holotype (USNM 133562); 3 Oct 1980, paratype (USNM 133563).

DESCRIPTION.—Holotype, female with eggs, 7 mm long, 3.5 mm wide including setae, with 31 segments; paratype, female with eggs, 8 mm long, 3.2 mm wide, with 35 segments. Posterior two-thirds of body with black pigmentation in form of large oval midventral spots and smaller spots on ventral bases of parapodia, and on basal halves of dorsal cirri (Figure 35B). Elytra 14–15 pairs, oval to subreniform, delicate, transparent, without papillae or microtubercles, with blackish pigmentation in spots over place of attachment to elytraphores, in complete ring on first elytra, semicircular bands on following elytra, and nearly complete circle on posterior elytra (Figure 35C-E).

Bilobed prostomium with subtriangular anterior lobes, with slight indication of peaks; 2 pairs of eyes subequal in size, anterior pair in region of greatest width, posterior pair near posterior border; scattered pigmentation on prostomium and bases of antennae; ceratophore of median antenna in anterior notch, with style about as long as palps; lateral antennae with ceratophores inserted terminoventrally, with short subulate

styles; palps stout, tapered; tentaculophores without setae, with dorsal and ventral tentacular cirri about same length as median antenna (Figure 35A). Segment 2 with first pair of elytraphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 35A).

Biramous parapodium with notopodium shorter than neuropodium, rounded with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe and conical supraacicular process, not sharply set off; postsetal lobe shorter, rounded (Figure 35F,G). Notosetae numerous, forming radiating bundle, short to long, more slender than neurosetae, appearing smooth but finely spinose with short, bare, rounded tips (Figure 35H). Neurosetae moderate in number (about 20) forming fan-shape bundle; supraacicular neurosetae with long spinose regions, prominent spines, with entire, tapered tips (Figure 35I), or few with very small secondary tooth (on paratype); subacicular neurosetae with shorter spinose regions, entire, slightly hooked, bare tips (Figure 35J). Dorsal cirri with long cylindrical cirrophores, with styles long, tapering to filamentous tips, extending far beyond neurosetae; black pigmentation on basal third of styles; dorsal tubercles nodular; ventral cirri short, tapered (Figure 35G). Pygidium with pair of pigmented anal cirri.

BIOLOGY.—*Malmgreniella panamensis* was collected subtidally in sand on the burrowing ophiuroid *Ophiopsila* cf. *polysticta* H.L. Clark by Gordon Hendler.

ETYMOLOGY.—The species is named for Panama, the collection area.

DISTRIBUTION.—Northwestern Atlantic Ocean, Caribbean Sea, Panama. In 9–12 meters.

Malmgreniella puntotorensis, new species

FIGURES 36, 37, FRONTISPIECE B-D

MATERIAL EXAMINED.—NORTHWESTERN ATLANTIC OCEAN: Florida: Looe Key, back reef, 24°33'N, 81°24'W, sta LK-33, 12 May 1985, 4 m, sand, *Thalassia*, few sponges, on ophiuroid, G. Hendler, collector, paratype (USNM 133590).

CARIBBEAN SEA: Panama: Punto Toro, Fort Sherman, sta 147-1, 16 Apr 1973, sand bottom between rocks and *Thalassia*, M.L. Jones, collector, holotype (USNM 71760) and paratype (USNM 71761). Galeta Reef, 9–11 m, with burrowing ophiuroid *Amphiodia trychna* H.L. Clark, G. Hendler, collector: 27 Oct 1977, paratype (USNM 133588); 13 Sep 1978, paratype (USNM 133589); 3–5 Oct 1980, 3 paratypes (USNM 133586; LACM); 3 Oct 1980, on *Ophiophragmus septus* (Lütken), paratype (USNM 133587). Belize: Twin Cays, 16°50'N, 86°06'W, 0–2 m, 30 May 1983, on *Ophiophragmus limicola* Lütken, G. Hendler, collector, paratype (USNM 133592). Twin Cays, Gator Creek, 1.5 m, 20 Jun 1985, on *Ophiophragmus pulcher* H.L. Clark, 3 paratypes (USNM 133596; LACM). Twin Cays, Hidden Creek, 1.5 m, G.

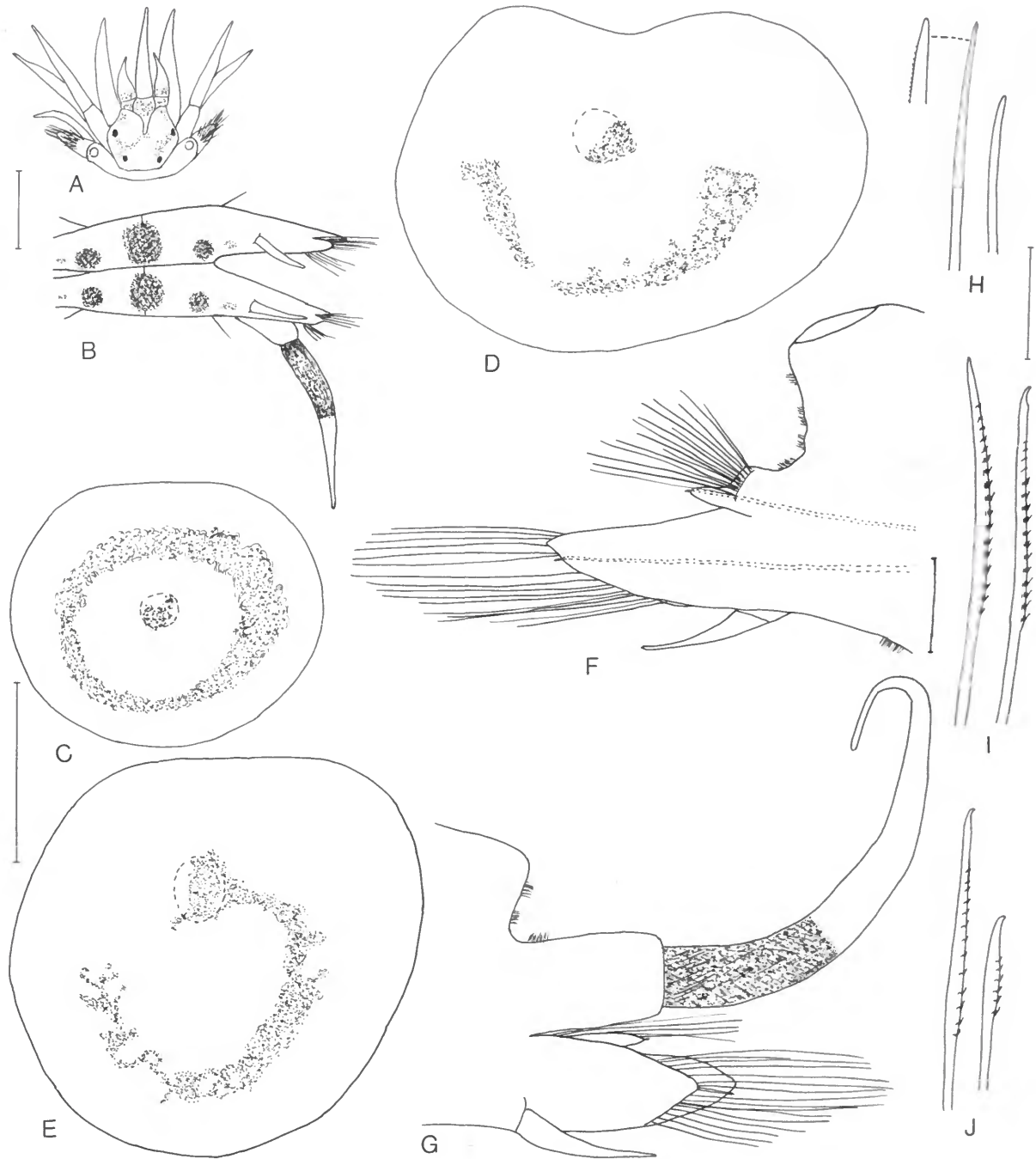


FIGURE 35.—*Malmgreniella panamensis*, new species, holotype (USNM 133562): A, dorsal view of anterior end; B, ventral view of 2 segments near posterior end showing pigmented pattern, right parapodia not shown; C, left 1st elytron from segment 2; D, left middle elytron; E, left 12th elytron from segment 23; F, right elytrigerous parapodium from segment 13, anterior view, acicula dotted; G, right cirrigerous parapodium from segment 12, posterior view; H, long and short notosetae, with detail of tip; I, supraacicular neurosetae; J, subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C-E; 0.2 mm for F,G; 0.1 mm for H-J.)

Hendler, collector, on *Ophiophragmus pulcher*, 30 May 1982, paratype (USNM 133591) and 23 Mar 1983, paratype (LACM); sta 85-11, 18 Jun 1985, 2 paratypes (USNM 133594); sta 85-12, 19 Jun 1985, 3 paratypes (USNM 133595, LACM); sta 86-7, 4 Apr 1986, 2 paratypes (USNM 133597); sta 89-14, 5 Mar 1989, paratype (USNM 133602); sta 89-22, 7 Mar 1989, paratype (USNM 133599); sta 89-25, 9 Mar 1989, paratype (USNM 133601); sta 89-31, 12 Mar 1989, 2 paratypes (USNM 133598); on *Ophiophragmus cubanus* (A.H. Clark), sta 85-12, 19 Jun 1985, paratype (LACM); sta 89-25, 9 Mar 1989, paratype (USNM 133600); on *Amphiodia trychna*, sta 85-11, 18 Jun 1985, paratype (USNM 133593).

DESCRIPTION.—Holotype (USNM 71760), female with eggs, 7.5 mm long, 2.5 mm wide including setae, with 34 segments; paratype (USNM 71761), male with sperm, 6.5 mm long, 2.5 mm wide, with 34 segments. Additional paratypes from Panama and Belize with 25–36 segments, 4–11 mm long, and 2–3 mm wide.

Body of type specimens from Panama without color; on specimens commensal with ophiuroids from Belize, color variable: body and elytra without color; uniformly reddish brown, darker on antennae, tentacular cirri, and mouth area (Figure 37A,B); some with anterior half or two-thirds of body dark and posterior region colorless; some with additional chalky white transverse segmental patches on middorsum and scattered spots on dorsal tubercles, cirrophores of dorsal cirri,

on midventral groove and ventral bases of parapodia, and cirrophores of ventral cirri. Elytra 15 pairs, large, oval, overlapping, covering dorsum, delicate, opaque, granular, denser around place of attachment to elytriphores, without papillae or tubercles (Figures 36B, 37C,D).

Bilobed prostomium with anterior lobes truncate, without peaks; 2 pairs of eyes, anterior pair slightly anterior to greatest width, posterior pair near posterior border; median antenna with ceratophore in anterior notch, with style about 1.5 times longer than prostomium; lateral antennae with ceratophores inserted terminoventrally, converging midventrally, with short subulate styles; palps stout, tapered; tentaculophores without setae, with dorsal and ventral tentacular cirri similar to median antenna (Figures 36A, 37A,B). Segment 2 with first pair of elytriphores, subbiramous parapodia and long ventral buccal cirri on cirrophores lateral to ventral mouth, with styles similar to tentacular cirri (Figures 36A, 37A,B). Extended pharynx with 9 pairs of border papillae and 2 pairs of jaws.

Parapodium subbiramous; notopodium small, digitiform, on anterodorsal side of larger neuropodium; neuropodium with conical presetal acicular lobe, without supraacicular process and shorter, rounded postsetal lobe (Figures 36C,D, 37E,F). Notosetae reduced to 1–2, short, smooth, acicular, with pointed tip, not extending beyond tip of notopodium and easily overlooked (Figures 36C,E, 37E–G). Neurosetae rather few

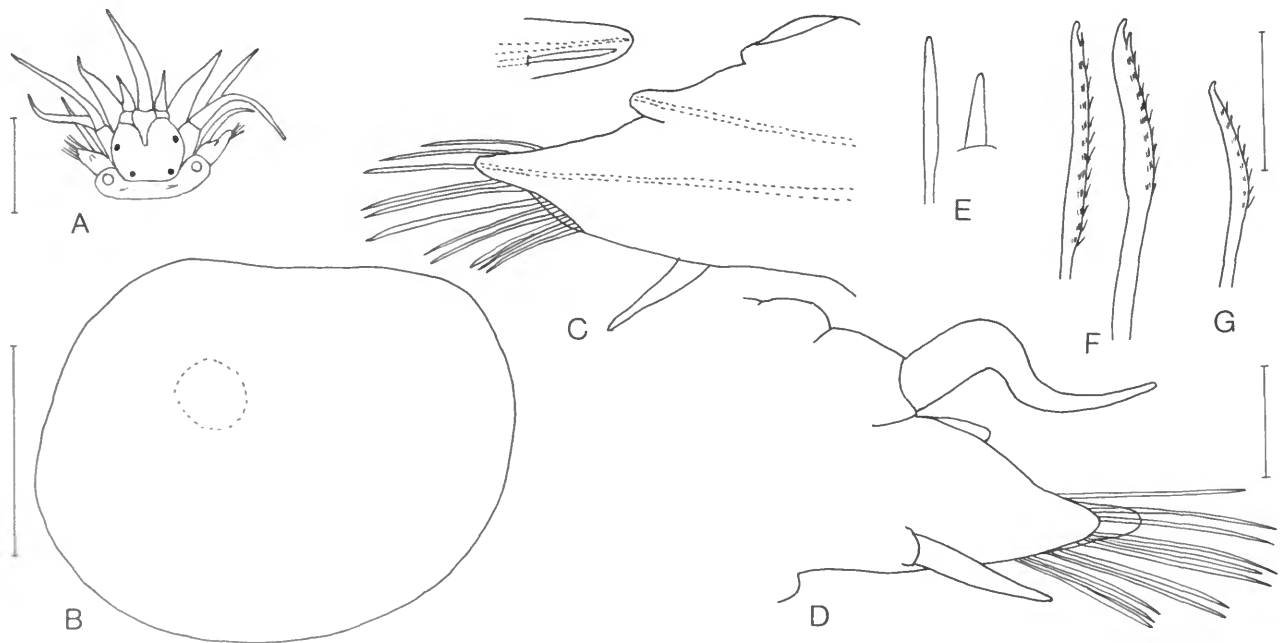


FIGURE 36.—*Malmgreniella puntotorensis*, new species, holotype (USNM 71760): A, dorsal view of anterior end; B, left elytron; C, right elytrigerous parapodium, anterior view, acicula dotted, with detail of notopodium and notoseta from posterior view; D, right cirriferous parapodium, posterior view; E, notosetae; F, upper and middle neurosetae; G, lower neuroseta. (Scales = 0.5 mm for A; 0.5 mm for B; 0.1 mm for C,D; 0.1 mm for E–G.)

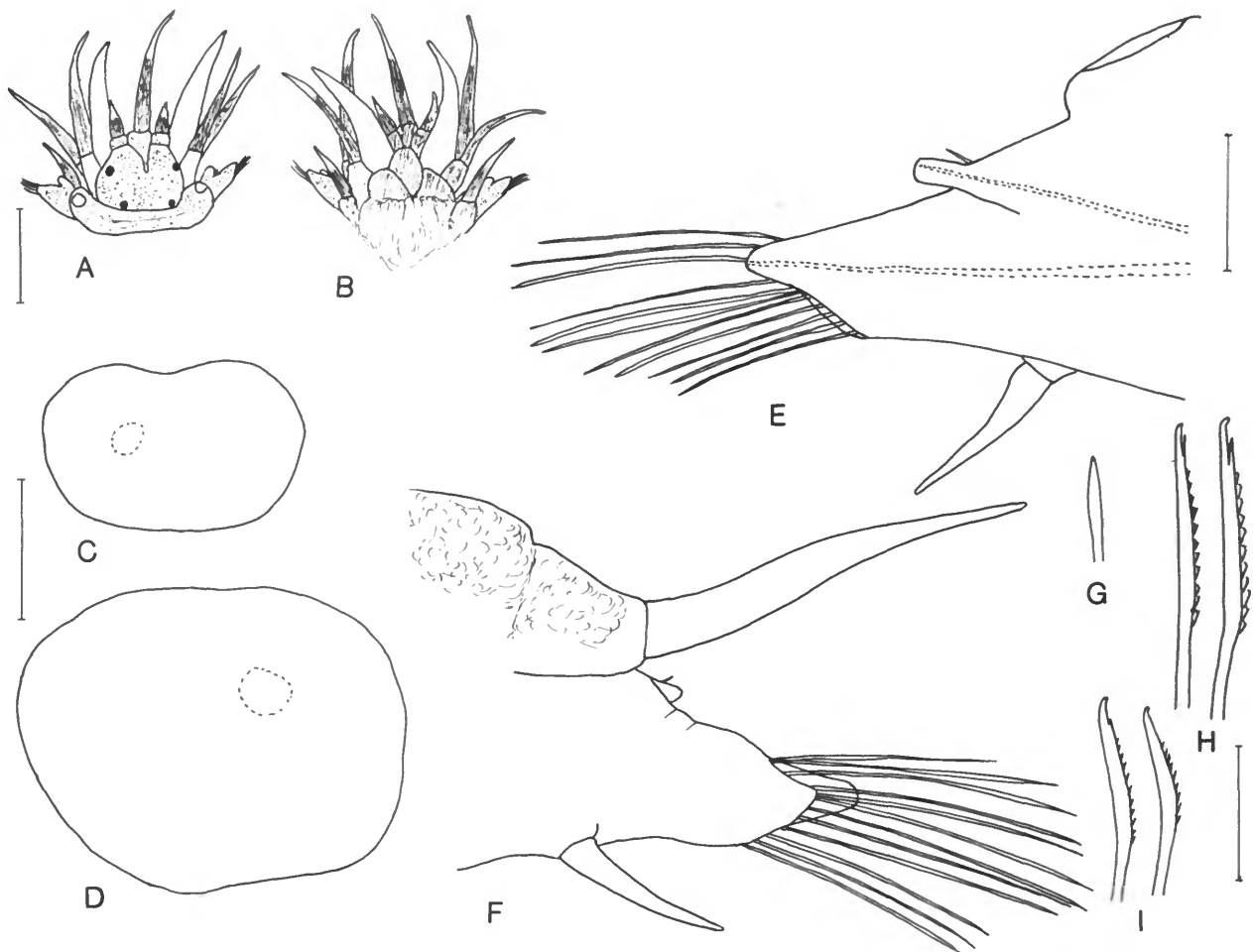


FIGURE 37.—*Malmgreniella puntotorensis*, new species, specimen from Belize (USNM 133591): A, dorsal view of anterior end, turned slightly to right; B, ventral view of anterior end; C, left 2nd elytron from segment 4; D, right middle elytron; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view; G, notoseta; H, middle and upper neurosetae; I, lower neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,F; 0.1 mm for G-I.)

(about 11), forming fan-shape bundle; upper and middle neurosetae with longer spinose regions and bifid tips, with long secondary tooth (Figures 36F, 37H); lower neurosetae with shorter spinose regions, with small secondary tooth, 3-4 lowest neurosetae with secondary tooth very small or absent (Figures 36G, 37I). Dorsal cirri with cylindrical cirrophores, bulbous basally, with styles smooth, tapering, and extending to tips of neurosetae or beyond; dorsal tubercles bulbous; ventral cirri short, tapered (Figures 36D, 37F). Small pygidium posterior to last segment, with pair of anal cirri.

BIOLOGY.—*Malmgreniella puntotorensis* was collected by G. Hendler on Galeta Reef, Panama, and at Belize on five species of burrowing amphiuroid ophiuroids: *Amphiodia*

trychna H.L. Clark (7 specimens), *Ophionephthys limicola* Lütken (1), *Ophiophragmus cubanus* (A.H. Clark) (2), *Ophiophragmus pulcher* H.L. Clark (17), and *Ophiophragmus septus* (Lütken) (1). The commensal polynoid was found by Hendler on the disc of a freshly excavated *O. pulcher* and, when the ophiuroid was allowed to burrow again in the sediment a couple of times, the polynoid remained attached to the disc of the brittle star. See color photos (Frontispiece B-D).

ETYMOLOGY.—The species is named for Punto Toro, the type locality.

DISTRIBUTION.—Northwestern Atlantic Ocean, Caribbean Sea, Florida (Looe Key), Panama, Belize. Intertidal to 11 meters.

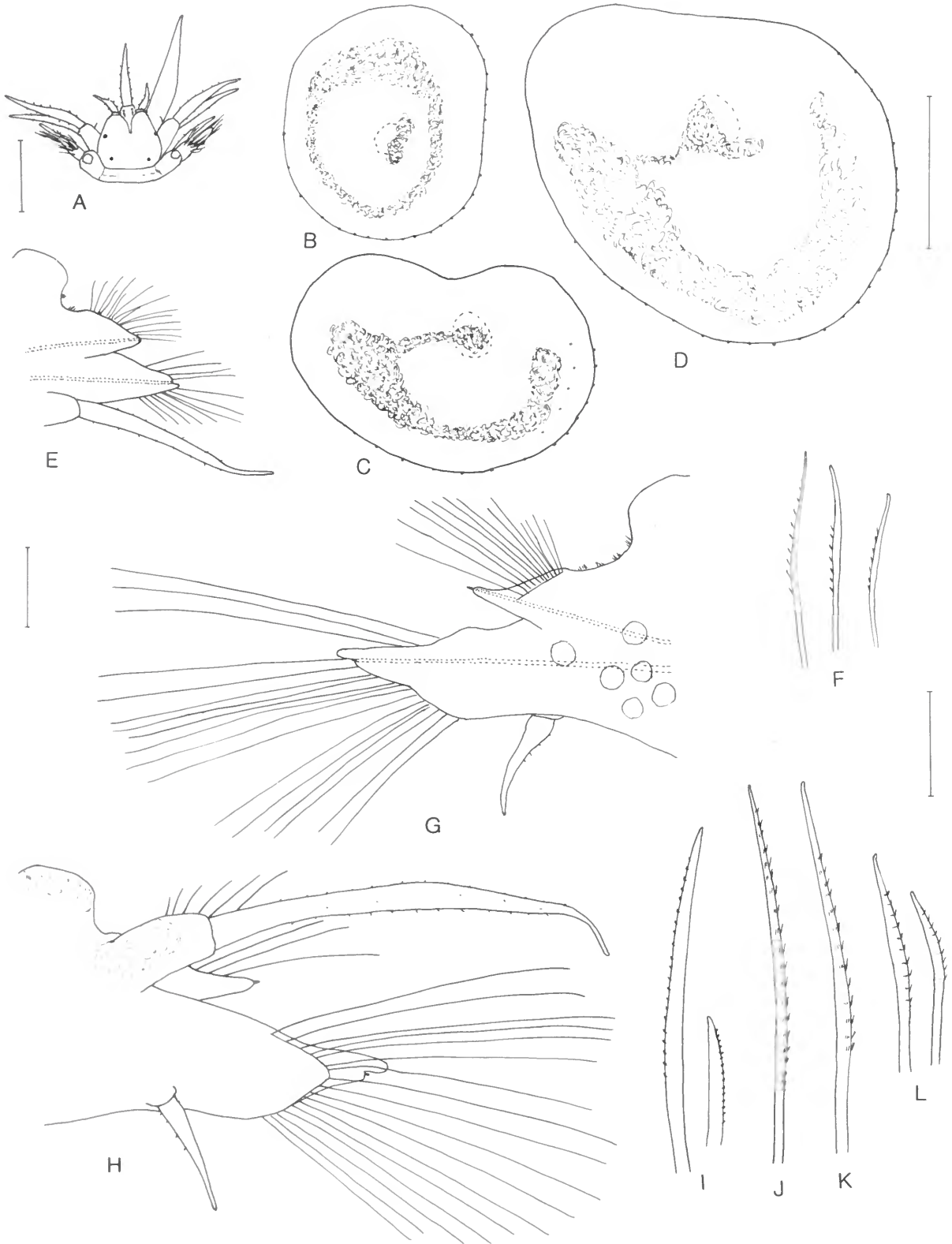


FIGURE 38 (opposite page).—*Malmgreniella liliana*, new species, paratype (USNM 55062): A, dorsal view of anterior end, left palp missing; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4; D, right middle elytron; E, left elytrigerous parapodium from segment 2, anterior view, acicula dotted; F, upper, middle, and lower neurosetae from same; G, right elytrigerous parapodium, anterior view, acicula dotted, eggs visible in body cavity; H, right cirriferous parapodium, posterior view; I, long and short notosetae; J, upper neuroseta; K, middle neuroseta; L, lower neurosetae. (Scales = 0.5 mm for A; 0.5 mm for B-D; 0.2 mm for E,G,H; 0.1 mm for F,I-L.)

***Malmgreniella liliana*, new species**

FIGURE 38

MATERIAL EXAMINED.—SOUTHWESTERN ATLANTIC OCEAN: *Brazil*: Bay of Flamengo, São Paulo, 23°27'S, 45°06'W, 12 m, Jan 1963, Liliana Forneris, collector, holotype (USNM 55061), 6 paratypes (USNM 55062).

DESCRIPTION.—Holotype, female with eggs, 8 mm long, 4 mm wide including setae, with 30 segments and 14 pairs of elytra. Paratypes (males and females with sperm and eggs) 6–7 mm long, 3–4 mm wide, with 29–30 segments and 13–14 pairs of elytra. Body flattened, tapering slightly anteriorly and posteriorly, with parapodia and setae longer than body width. Body transversely banded dorsally on posterior few segments and ventrally on posterior third to one half of body. Elytra oval, opaque, without tubercles, with some micropapillae along lateral and posterior borders and few on surface, with light grey to black pigmentation forming spots over place of attachment to elytriphore, complete circle on first elytra, and large C-shape area with larger portion on medial area on following elytra (Figure 38B–D).

Bilobed prostomium with anterior lobes rounded, without cephalic peaks, 2 pairs of small eyes, anterior pair anterior to greatest width of prostomium, posterior pair posterodorsal; ceratophore of median antenna in anterior notch with pigment

spots on lateral sides, and style about as long as prostomium; ceratophores of lateral antennae barely visible dorsally, inserted ventrally and converging midventrally, with short styles less than half length of median antenna; palps stout, tapered; tentaculophores with single seta on inner side, dorsal and ventral tentacular cirri similar to and slightly longer than median antenna; antennae and tentacular cirri minutely papillate (Figure 38A). Segment 2 with first pair of elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri; notosetae similar to those of following parapodia; neurosetae more slender than those following, upper ones tapering to slender, sharp tip, middle and lower ones with long, bare, bulbous tip (Figure 38A,E,F).

Biramous parapodia with body wall delicate, transparent, with internal structures and eggs in coelom clearly visible; notopodium shorter than neuropodium, rounded, with projecting acicular lobe on lower side; neuropodium with subconical presetal acicular lobe, digitiform supraacicular process and postsetal lobe shorter, rounded (Figure 38G,H). Notosetae numerous, about 3 lengths, longest extending to about tips of neuropodia, slightly stouter than neurosetae, with prominent spinose rows, tapering to pointed bare tips (Figure 38G,I). Neurosetae moderate in number (about 17), forming fan-shape bundle, upper ones with longer spinose region and pointed bare tips, middle and lower ones with shorter spinose region and slightly hooked bare tips, all with entire tips (Figure 38J–L). Cylindrical cirrophores of dorsal cirri with wide glandular areas on posterior sides, with styles finely papillate, with filamentous tips extending to about tips of neurosetae; dorsal tubercles nodular; ventral cirri short, tapered, with few micropapillae (Figure 38H). Pygidium with anus medial to last pair of small parapodia, with pair of long anal cirri.

ETYMOLOGY.—The species is named for the collector, Liliana Forneris.

DISTRIBUTION.—South Atlantic Ocean, Brazil. Depth 12 meters.

Key to the Species of *Malmgreniella* from the Eastern Pacific Ocean (British Columbia, Washington, California, Galapagos, Panama)

1. Prostomium without eyes [Figure 43A]. Neurosetae with bulbous, bifid, split tips [Figure 43F]. Elytra without pigment pattern [Figure 43G] *M. liei*, new species
 Prostomium with eyes. Neurosetae without bulbous, bifid, split tips. Elytra with or without pigment pattern 2
2. Prostomium with anterior pair of eyes anterolateral, visible dorsally [Figures 41A, 42A, 44A, 45A,B]. Elytra with or without pigment pattern 3
 Prostomium with anterior pair of eyes anteroventral, not visible dorsally [Figures 39A, 46A, 47A, 48A]. Elytra with pigment pattern [Figures 39B–D, 40A–D, 46C–E, 47C,D, 48B–D] 6
3. Elytra without pigment pattern [Figure 41H–J]. Middle bifid neurosetae with long, slender secondary tooth [Figure 41G] *M. berkeleyorum*, new species
 Elytra with pigment pattern [Figures 42B,C, 44B–D, 45C,D]. Middle bifid neurosetae with shorter secondary tooth [Figures 42I, 44K, 45J] 4

4. Bilobed prostomium with anterior lobes truncate, without peaks, without pigmentation [Figure 44A] *M. scriptoria* (Moore), new combination
Bilobed prostomium with anterior lobes subtriangular, with peaks [Figures 42A, 45A,B] 5
5. Neuropodial presetal supraacicular process tapering to curved tip [Figure 42F].
Prostomium not pigmented [Figure 42A] *M. bansei*, new species
Neuropodial presetal supraacicular process wide, subtriangular [Figure 45G].
Prostomium pigmented [Figure 45A,B] *M. macginitiei*, new species
6. Bilobed prostomium with anterior lobes truncate, not pigmented [Figures 39A, 46A].
Neuropodial presetal supraacicular lobe digitiform or triangular 7
Bilobed prostomium with anterior lobes subtriangular, pigmented [Figures 47A,B, 48A]. Neuropodial presetal supraacicular lobe digitiform [Figures 47E, 48E] . . . 8
7. Neuropodial presetal supraacicular process digitiform [Figure 39G,H]
. *M. nigralba* (E. Berkeley), new combination
Neuropodial presetal supraacicular process subtriangular [Figure 46H]
. *M. sanpedroensis*, new species
8. Neurosetae with entire tips [Figure 47H,I] *M. baschi*, new species
Neurosetae with bifid tips [Figure 48H]
. *M. pacifica* (Monro), new combination

***Malmgreniella nigralba* (E. Berkeley, 1923),
new combination**

FIGURES 39, 40

Malmgrenia nigralba E. Berkeley, 1923:213, pl. 1: figs. 5-7; 1924:193.—
Berkeley and Berkeley, 1941:21; 1942:187; 1948:10, fig. 8.—Pettibone,
1967:3.—Hartman, 1968:133, figs. 1-3.—Kudenov, 1975b:77, 79.
Harmothoe lunulata.—Hartman, 1944:244 [part]; 1968:81 [part]. [Not Delle
Chiaje, 1830.]
Malmgrenia lunulata.—Pettibone, 1953:25, pl. 9: fig. 77; pl. 10: figs. 80-82,
85, 87; pl. 11: figs. 96-103 [part].—Banse et al., 1968:525 [part].—Lie,
1968:303, 370, 371 [part: sta 5]. [Not Delle Chiaje, 1830.]
Harmothoe nigralba.—Hanley, 1987:153, fig. 3F,H.

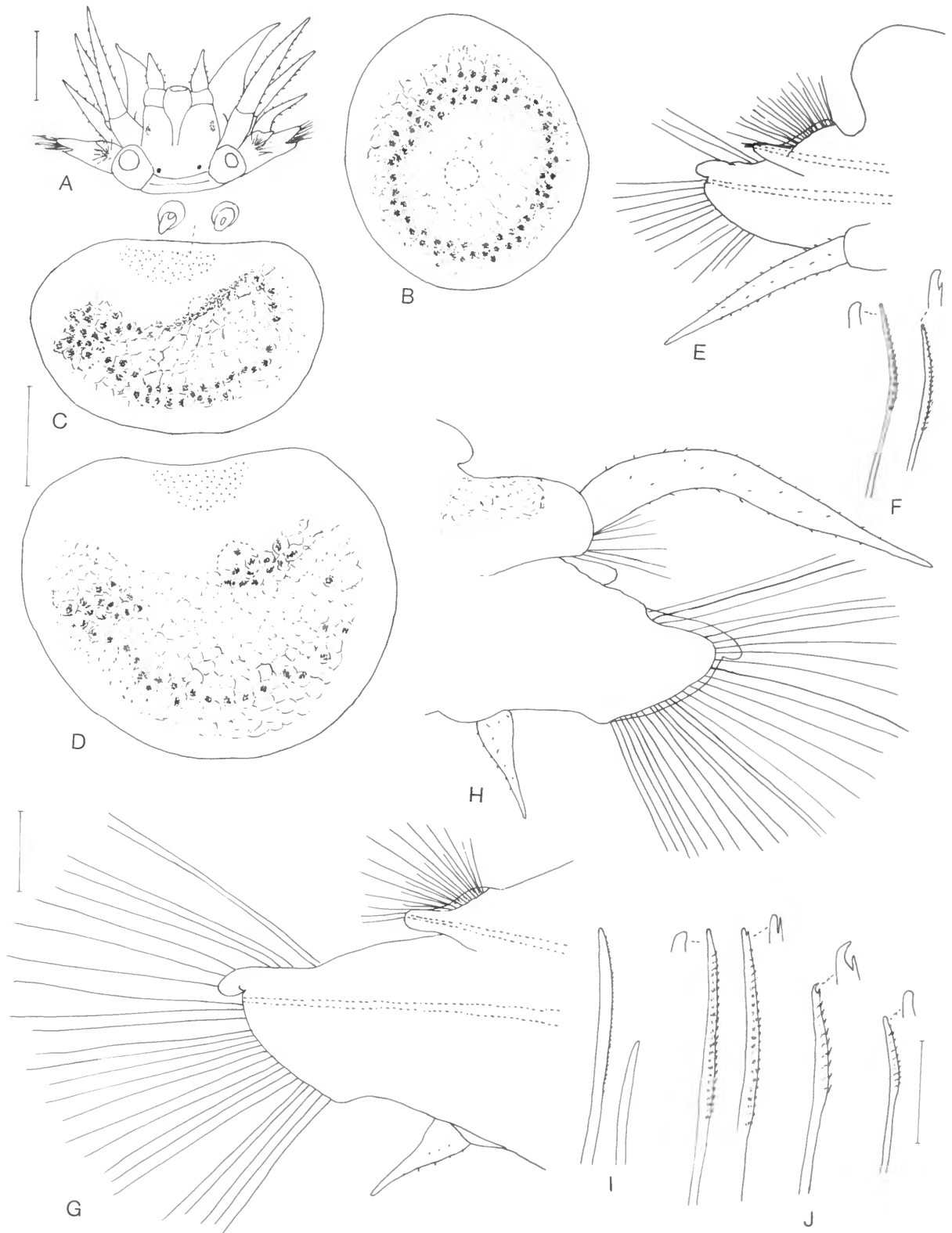
MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *British Columbia*: Vancouver Island, Piper's Lagoon, near Nanaimo, very low tide, sandy, 20 Jun 1920, E. Berkeley, collector, 3 syntypes (USNM 32875-6). Piper's Lagoon, 21 May 1924, coarse gravelly sand, commensal in vertical burrows of *Leptosynapta clarki* Heding, E. Berkeley, collector, 2 specimens (USNM 55040). *Washington*: Puget Sound, Seattle, Golden Gardens Park, shore, with *Leptosynapta clarki* Heding, 7 May 1949, M. Pettibone, collector, 2 specimens (USNM 55041). Olalla, shore, 22 Jun 1939, M. Pettibone, collector, 1 specimen (USNM 24931). Gig Harbor, shore, 3 Aug 1944, J.E. Lynch, collector, 2 specimens (USNM 24926). Near Dutchers Cove, Case Inlet, shore, gravelly, shelly sand, with *L. clarki*, 21 Jun 1947, 6 Jun and 17 Aug 1948, M. Pettibone, collector, 18 specimens (USNM 24925, as *M. lunulata* var. *nigralba* by Pettibone, 1953). Southwest of Johnson Point, Case Inlet, 47°10'N, 122°50'W, 15-36 m, coarse shelly sand mixed with rock and many *L. clarki*, sta 5, 12 Feb 1963, U. Lie, collector, 3 specimens (USNM 36444, as *M. lunulata* form A by Banse et al., 1968). *California*: Tomales Bay, sandy-mud, with *Lepto-*

synapta clarki, summer 1941, F. Pitelka and R. Paulson, collectors, 2 specimens (USNM 24929; AHF 1202, as *H. lunulata* by Hartman, 1944). Off Santa Cruz Island, 9-27 m, summer 1939, W.G. Hewatt, collector, 1 specimen (USNM 55042, as *M. nigralba* by Berkeley and Berkeley, 1941).

DESCRIPTION.—Syntypes all fragmented. Complete syntype, in 2 pieces (USNM 32876), 14 mm long, 5 mm wide including setae, and 40 segments, posterior segment very small. Adult specimens from Case Inlet (USNM 24925) 18-24 mm long, 5-7 mm wide, with 37-40 segments; small specimen 7.5 mm long, 3 mm wide, with 30 segments.

Body showing striking black and white pigmentation; both dorsal and ventral sides of posterior segments showing dark pigmentation. Elytra 15 pairs, on usual segments, circular to subreniform, with group of microtubercles on anterior medial part; microtubercles absent on 1st pair and some posterior elytra (Figure 39B-D). Pigmentation on elytra somewhat variable. On syntypes from Nanaimo and specimens from Tomales Bay, 1st pair of elytra with complete circle of dark pigmentation and large reticular area (Figure 39B); following elytra with reticular area confined to posterior two-thirds up to

FIGURE 39 (opposite page).—*Malmgreniella nigralba*, syntype of *Malmgrenia nigralba* (USNM 32875): A, dorsal view of anterior end, style of median antenna missing, anterior pair of eyes anteroventral (dotted); B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles; D, right middle elytron; E, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; F, upper and middle neurosetae from same, with detail of tips; G, right elytrigerous parapodium, anterior view, acicula dotted; H, right cirriferous parapodium, posterior view; I, long and short notosetae; J, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B-D; 0.2 mm for E,G,H; 0.1 mm for F,I,J.)



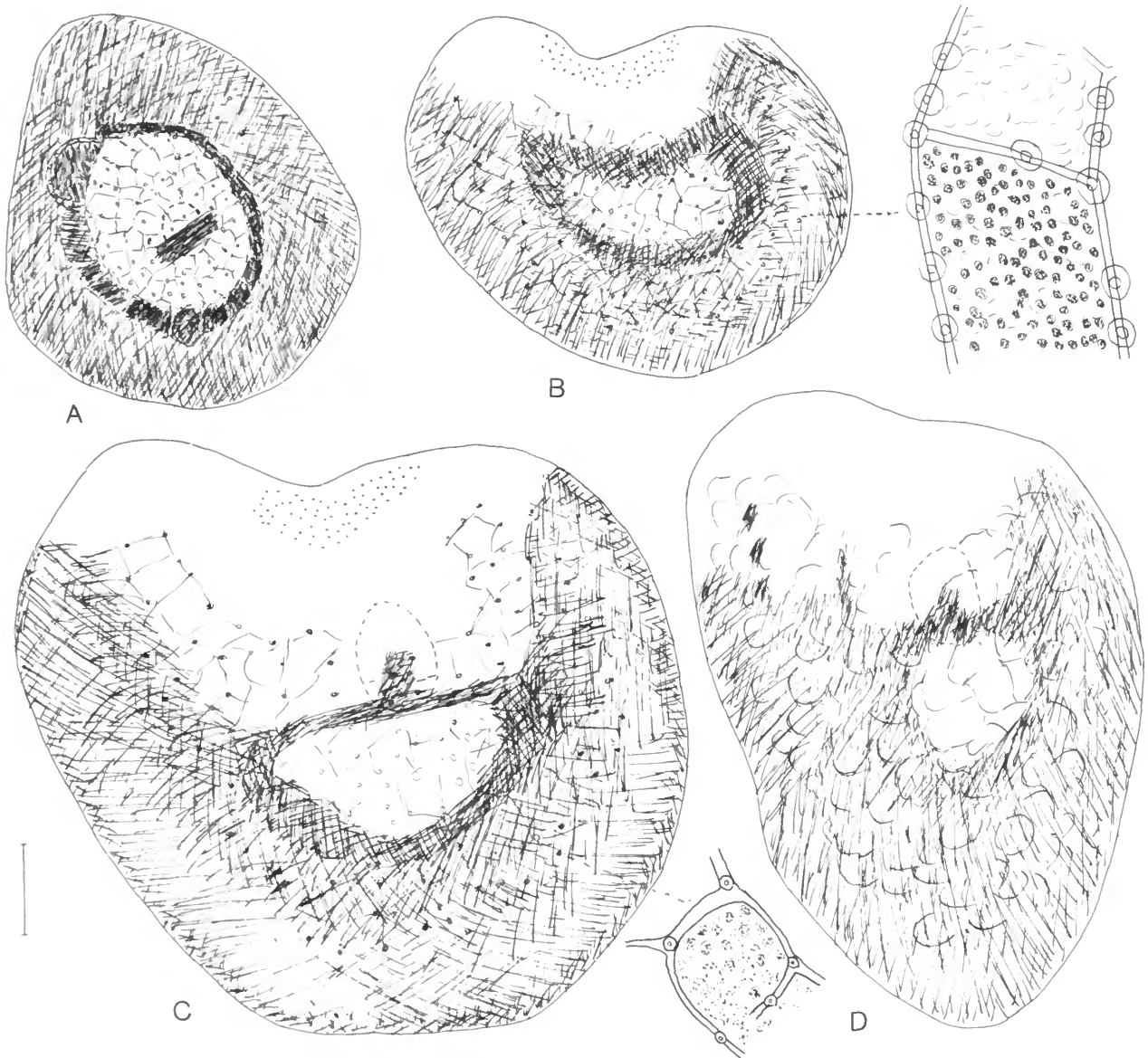


FIGURE 40.—*Malmgreniella nigralba*, melanistic specimen from Case Inlet (USNM 24925): A, right 1st elytron from segment 2; B, right 2nd elytron from segment 4, with detail of reticular area and microtubercles; C, right middle elytron; D, right 15th elytron from segment 32, with detail of reticular area and microtubercles. (Scale = 0.5 mm for A-D.)

near border, with some scattered microtubercles, and complete or nearly complete oval ring of dark pigmentation (Figure 39C,D; Berkeley, 1923, pl. 1: figs. 6, 7). Melanistic specimens from Case Inlet dark gray on most of posterior two-thirds of elytra, including borders; reticular area with scattered microtubercles, circle of darker color around central colorless area, and group of microtubercles on anterior medial part (absent on first pair and more posterior elytra) (Figure 40A-D; Pettibone, 1953,

pl. 11: figs. 96, 98-100).

Bilobed prostomium with anterior lobes truncate, without peaks; anteroventral pair of eyes slightly larger than postero-dorsal pair; ceratophore of median antenna bulbous, in anterior notch, style with minute papillae, slightly longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, converging midventrally, with styles short, subulate, papillate; palps stout, tapered; tentaculophores lateral to

prostomium, with 0–1 seta on inner side; dorsal and ventral tentacular cirri similar to median antenna (Figure 39A; Berkeley, 1923, pl. 1: fig. 5; Pettibone, 1953, pl. 11: figs. 96, 97; Hanley, 1987, fig. 3F,H).

Segment 2 with 1st pair of large elyptrophores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 39A,E); notosetae similar to following notosetae; neurosetae more slender than those following, with bulbous tips, upper and lower ones entire, middle ones with secondary tooth (Figure 39F). Extended pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

Biramous parapodia with smaller notopodium rounded, with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with digitiform or tapered supraacicular process and slightly shorter rounded postsetal lobe (Figure 39E,G,H; Pettibone, 1953, pl. 11: fig. 101). Notosetae moderate in number, about same width as neurosetae, short to longer, smooth or with faint spinose rows (Figure 39I). Neurosetae moderate in number, upper ones with longer spinose region, upper few with rounded blunt tip, some with small secondary tooth; middle ones with shorter spinose region, hooked tip with distinct secondary tooth; lower ones with entire rounded tip or with small tooth (Figure 39J; Pettibone, 1953, pl. 11: figs. 102, 103). Dorsal cirri with cylindrical cirrophore with glandular area on posterior side; style with short clavate papillae, tapered distally and extending to about tips of neurosetae; dorsal tubercles nodular; ventral cirri short, subulate, with small papillae (Figure 39H). Pygidium with anus medial to last pair of small parapodia, with pair of anal cirri.

BIOLOGY.—*Malmgreniella nigralba* was found in the Nanaimo area, Vancouver Island by Edith Berkeley in coarse gravelly sand living commensally in the vertical burrows of the synaptid *Leptosynapta clarki* Heding (as *L. inhaerens*) and by M. Pettibone in the Puget Sound area. In Tomales Bay, Central California, *M. nigralba* also was found associated with *L. clarki* (as *L. albicans*) by F. Pitelka and R. Paulson.

DISTRIBUTION.—Eastern Pacific Ocean from British Columbia to Central California, in low water to 36 meters.

Malmgreniella berkeleyorum, new species

FIGURE 41

Harmothoe lunulata.—Berkeley and Berkeley, 1945:321; 1948:11. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *British Columbia*: Gulf of Georgia, Mittelnacht Island off east coast of Vancouver Island, 183 m, 16 Jan 1929, E. and C. Berkeley, collectors, holotype (USNM 55039).

DESCRIPTION.—Holotype, female with eggs, with 30 segments, last 8 smaller, regenerating, 11 mm long, 4 mm wide including setae. Body dark. Elytra 14 pairs, on usual segments, last pair on segment 29 small (probably 15 pairs when

complete). Elytra oval and subreniform, dark, opaque, darker around area of attachment, showing “veins,” with large group of microtubercles on anterior part, except first pair (Figure 41H–J).

Bilobed prostomium with anterior lobes wide, subtriangular, eyes rather small, anterior pair anterolateral, anterior to greatest width of prostomium, slightly larger than posterodorsal pair; median antenna with large ceratophore in anterior notch, style missing; ceratophores of lateral antennae inserted ventrally, converging midventrally, with styles short, subulate, papillate; palps stout, tapered; tentaculophores lateral to prostomium, each with 0–1 seta on inner side; tentacular cirri longer than prostomium, with short papillae and filamentous tips, dorsal ones longer than ventral ones (Figure 41A). Segment 2 with first pair of large elyptrophores, biramous parapodia, and long ventral buccal cirri, similar to tentacular cirri (Figure 41A,B); notosetae similar to those following; neurosetae more slender than those following, otherwise similar (Figure 41C).

Biramous parapodia with notopodium short, rounded, with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe continuing distally as subtriangular supraacicular process and shorter, rounded postsetal lobe (Figure 41B,D,E). Short and long notosetae forming radiating bundle, stouter than neurosetae, with double row of minute spines along one border and tapered blunt bare tip (Figure 41F). Neurosetae forming fan-shape bundle, rather slender, upper ones (5 or so) with longer spinose region and long, bare, slender, slightly knobbed tip; middle ones with shorter spinose region and bifid tip with extra long secondary tooth; lower ones (10 or so) with shorter spinose region and slightly knobbed bare tip (Figure 41C,G). Dorsal cirri with cylindrical cirrophore with style long, papillate, tapering distally and extending beyond tips of neurosetae; dorsal tubercles nodular; ventral cirri short, subulate, papillate (Figure 41E).

ETYMOLOGY.—The species is named for Edith and Cyril Berkeley, in recognition of their early work on the polychaetes of British Columbia.

DISTRIBUTION.—Eastern Pacific Ocean from British Columbia, in 183 meters.

Malmgreniella bansei, new species

FIGURE 42

Malmgrenia lunulata.—Pettibone, 1953:25 [part].—Banse et al., 1968:525 [part].—Lie, 1968:317, 370 [part]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *Washington*: Puget Sound, Carr Inlet, off Green Point, 93 m, mud, 2 Aug 1938, M. Pettibone, collector, paratype (USNM 24932, as *M. lunulata* by Pettibone, 1953). Puget Sound, Carr Inlet, near Gertrude Island, between McNeil and Fox Islands, 128 m, mud, 25 Jun 1939, M. Pettibone, collector, holotype (USNM 24930). Puget Sound, Case Inlet, between Johnson

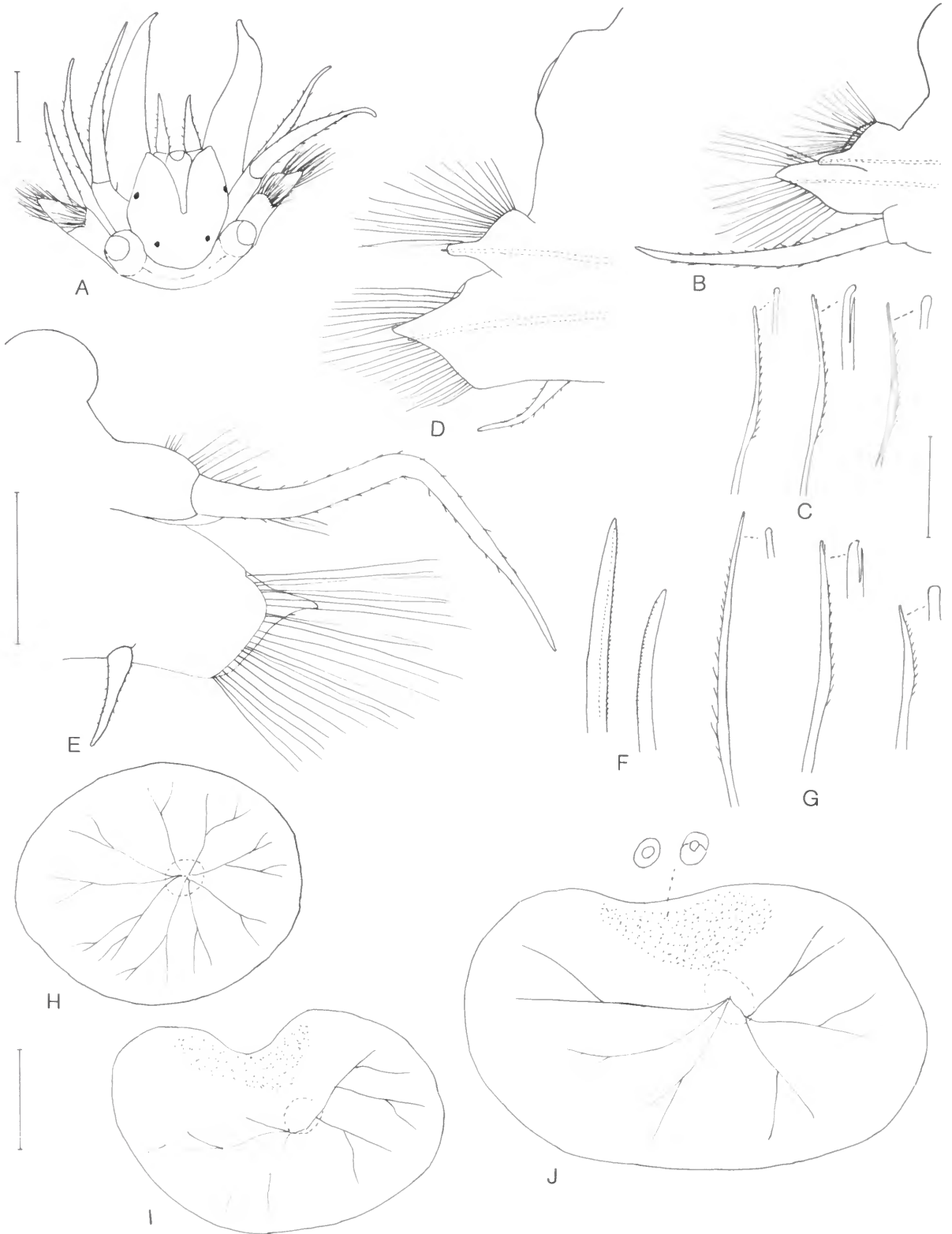


FIGURE 41 (opposite page).—*Malmgreniella berkeleyorum*, new species, holotype (USNM 55039): A, dorsal view of anterior end, style of median antenna missing; B, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; C, upper, middle, and lower neurosetae from same, with detail of tips; D, right elytrigerous parapodium, anterior view, acicula dotted; E, right cirriferous parapodium, posterior view; F, long and short notosetae; G, upper, middle, and lower neurosetae, with detail of tips; H, right 1st elytron from segment 2; I, right 2nd elytron from segment 4; J, right middle elytron, with detail of microtubercles. (Scales = 0.5 mm for A; 0.5 mm for B,D,E; 0.1 mm for C,F,G; 0.5 mm for H-J.)

Point and Heron Island, 47°13'N, 122°49'W, 47–89 m, sta 7, haul 4, 3 May 1963, U. Lie, collector, paratype (USNM 36445, as *M. lunulata* form C by Banse et al., 1968).

DESCRIPTION.—Holotype from Carr Inlet, male with sperm, 15.5 mm long, 4 mm wide including setae, and 34 segments. Paratype from Carr Inlet with posterior end regenerating, 28 segments, last 2 very small, 8 mm long, 4 mm wide. Paratype from Case Inlet, female with large eggs, 7 mm long, 3 mm wide, with 33 segments.

Body flattened, tapering slightly anteriorly and posteriorly. Elytra 15 pairs, on usual segments, subreniform, opaque, with branching "veins" and large group of microtubercles on anterior part; light brown pigmentation in form of spots over areas of attachment to elytophores and crescent-shape areas near medial and posterior borders (Figure 42B,C).

Bilobed prostomium with anterior lobes wide, subtriangular, with slight indication of peaks; ceratophore of median antenna bulbous, in anterior notch; style slightly longer than prostomium, with short papillae and filamentous tip; ceratophores of lateral antennae inserted ventrally, converging midventrally, with styles short, subulate, papillate; palps stout, tapered; eyes moderate in size, anterior pair slightly anterior to greatest width of prostomium, slightly larger than posterodorsal pair; tentaculophores lateral to prostomium, each with 1–2 setae on inner side, dorsal and ventral tentacular cirri similar to median antenna; light pigmentation on ceratophores, tentaculophores, and styles of tentacular cirri (Figure 42A). Segment 2 with first pair of large elytophores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 42A,D); notosetae similar to following; neurosetae more slender than those following, all with secondary tooth (Figure 42E).

Biramous parapodia with short, rounded notopodium with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe with projecting supraacicular process tapering to curved tip, and shorter, rounded postsetal lobe (Figure 42D,F,G). Notosetae numerous, forming radiating bundle, of several lengths, slightly stouter than neurosetae, clear, with double row of minute spines along one border and blunt tapered tips (Figure 42H). Neurosetae numerous, forming long fan-shape bundle; upper ones with longer spinose region, upper few with entire bare tip or with small secondary tooth; middle ones with shorter spinose region and slightly hooked tip with secondary tooth; lower few with

entire tip (Figure 42I). Dorsal cirri with cylindrical cirrophore and style extending slightly beyond tips of neurosetae, with scattered short papillae and filamentous tip; dorsal tubercles nodular; ventral cirri short, tapered, with short papillae (Figure 42G). Pygidium with anus medial to posterior pair of parapodia.

ETYMOLOGY.—The species is named for Karl Banse, in recognition of his many contributions to the study of polychaetes and who contributed specimens used in this study.

DISTRIBUTION.—Eastern Pacific Ocean, from Washington, Puget Sound, in 47–128 meters.

Malmgreniella liei, new species

FIGURE 43

Malmgrenia lunulata.—Banse et al., 1968:525 [part].—Lie, 1968:295, 370, 371 [part]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *Washington*: Puget Sound, Bainbridge Island, off Port Madison, 47°44'N, 122°32'W, 10–18 m, fine sand mixed with silt, sta 4, haul 10, 9 Jan 1963, U. Lie, collector, holotype (USNM 36446) and 2 paratypes (USNM 55058) (as *M. lunulata* form D by Banse et al., 1968).

DESCRIPTION.—Holotype, male with sperm, 10 mm long, 4 mm wide including setae, and 37 segments. Paratypes consisting of fragments of 2 anterior and one posterior ends. Body flattened, tapering slightly anteriorly and posteriorly, without color. Elytra 15 pairs, on usual segments, subreniform, delicate, opaque, denser around region of attachment, with group of microtubercles on anterior part of some elytra, absent on first and posterior elytra (Figure 43G).

Bilobed prostomium with anterior lobes wide, subtriangular, with distinct peaks; eyes not visible; ceratophore of median antenna large, bulbous, in anterior notch, with papillate style shorter than prostomium; ceratophores of lateral antennae inserted ventrally, converging midventrally, with papillate styles half as long as median antenna; palps stout, tapered; tentaculophores lateral to prostomium, each with 1–2 setae on inner side; tentacular cirri similar to and slightly longer than median antenna (Figure 43A). Segment 2 with first pair of large elytophores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 43A,B). Setae similar to those of following parapodia.

Biramous parapodia with notopodium shorter, rounded, with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe continuous with tapering supraacicular process and shorter rounded postsetal lobe (Figure 43B–D). Notosetae numerous, forming radiating bundle, slightly stouter than neurosetae, clear, with faint double row of spines along one side and blunt tapered tip (Figure 43E). Neurosetae numerous, forming fan-shape bundle, each with bifid split tip, upper ones with slightly longer spinose region and more prominent spines, lower ones with less prominent spines, appearing smooth (Figure 43F). Dorsal cirri with

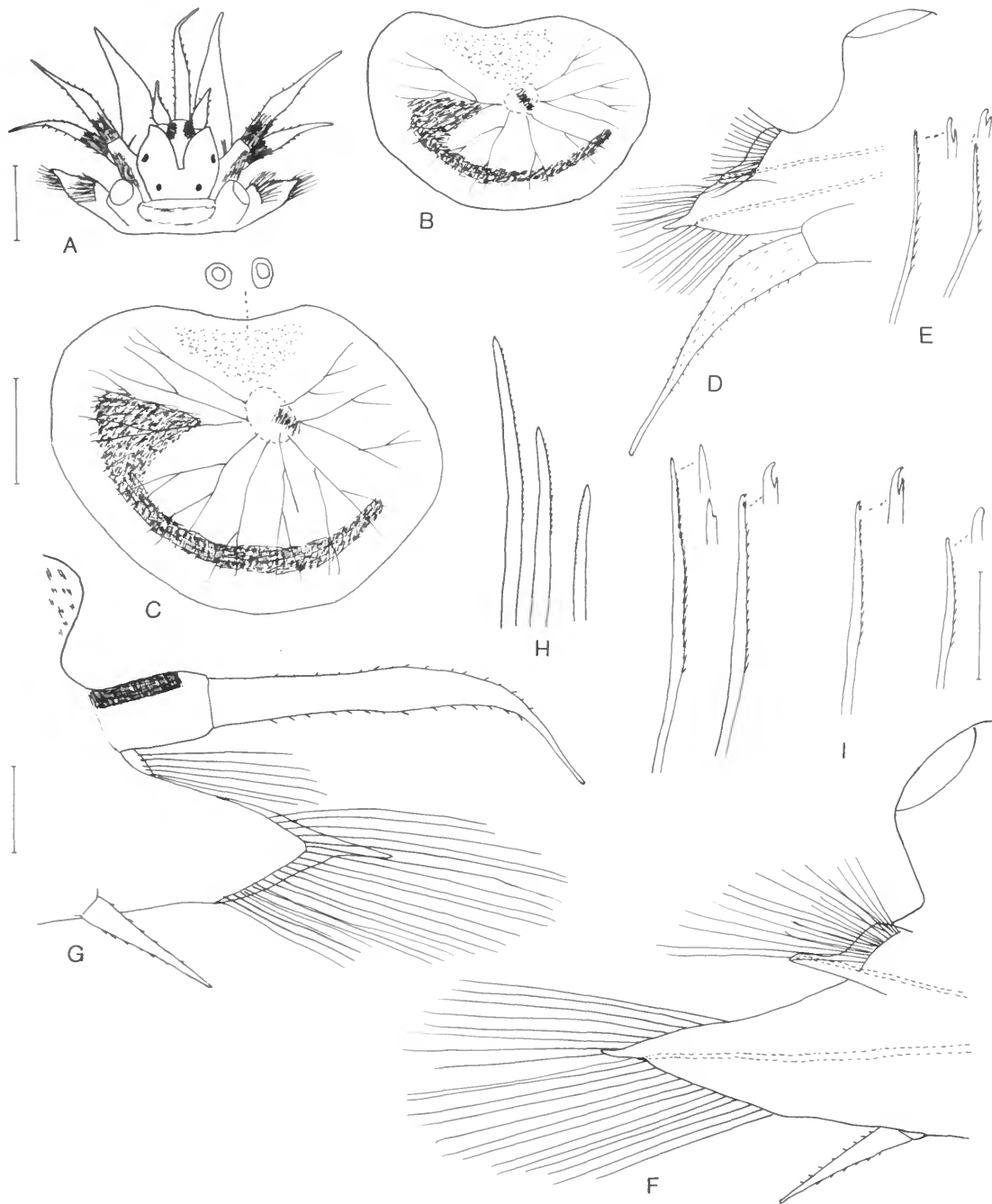


FIGURE 42.—*Malmgreniella bansei*, new species, holotype (USNM 24930): A, dorsal view of anterior end; B, right 2nd elytron from segment 4, C, right middle elytron, with detail of microtubercles; D, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; E, upper and lower neurosetae from same, with detail of tips; F, right elytrigerous parapodium, anterior view, acicula dotted; G, right cirriferous parapodium, posterior view; H, long and short notosetae; I, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B,C; 0.2 mm for D,F,G; 0.1 mm for E,H,I.)

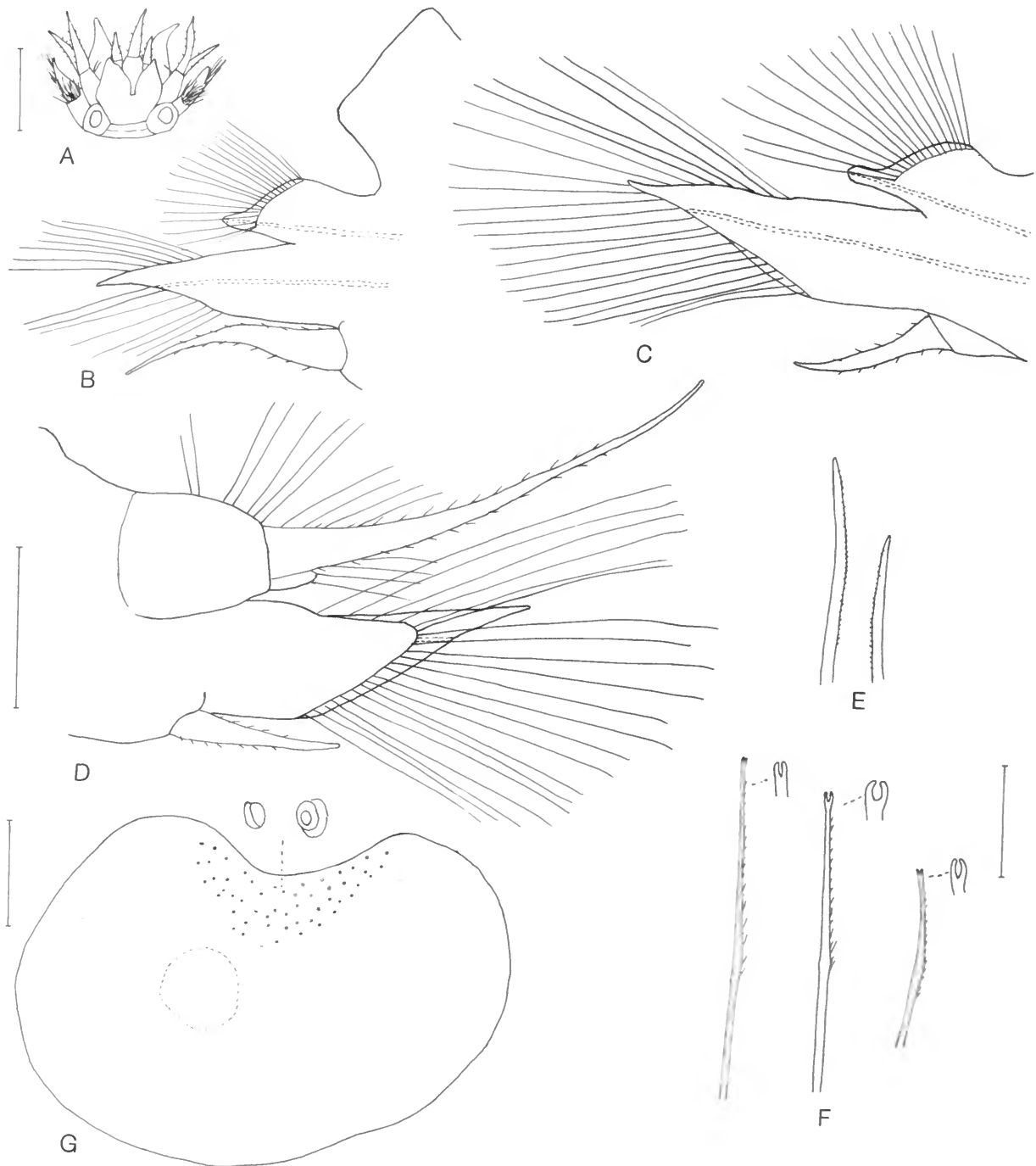


FIGURE 43.—*Malmgreniella liei*, new species, holotype (USNM 36446): A, anterior end, dorsal view; B, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; C, right middle elytrigerous parapodium, anterior view, acicula dotted; D, right cirriferous parapodium, posterior view; E, long and short notosetae; F, upper, middle, and lower neurosetae, with detail of tips; G, left 2nd elytron from segment 4, with detail of microtubercles. (Scales = 0.5 mm for A; 0.2 mm for B-D; 0.1 mm for E,F; 0.2 mm for G.)

cirrophores stout, cylindrical, with papillate styles tapering distally and extending to tips of neurosetae or slightly beyond; dorsal tubercles nodular, ventral cirri short, subulate, papillate (Figure 43D).

ETYMOLOGY.—The species is named for Ulf Lie, who collected the specimens as a part of his detailed study on the benthic infauna in Puget Sound.

DISTRIBUTION.—Eastern Pacific Ocean, from Washington, Puget Sound, in 10–18 meters.

***Malmgreniella scriptoria* (Moore, 1910), new combination**

FIGURE 44

Harmothoe scriptoria Moore, 1910:344, pl. 28: figs. 13–17.—Hartman, 1955:174; 1961:49; 1966:402; 1968:85, figs. 1–5.—Loi, 1980:124.
Malmgrenia lunulata.—Pettibone, 1953:25 [part], pl. 9: figs. 73–76; pl. 10: figs. 78, 79, 83, 84, 86; pl. 11: figs. 88–91.—Banse et al., 1968:525 [part].—Lie, 1968:271, 279, 370 [part; sta 2]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *California*: Monterey Bay, off Point Pinos Light, *Albatross* sta 4460, 12 May 1904, 101–305 m, green mud and gravel, from ambulacral groove of spatangoid, holotype of *Harmothoe scriptoria* (USNM 17156). *Washington*: Puget Sound, off Skiff Point, Bainbridge Island, 254 m, mud with heart urchin *Briaster townsendi*, 17 Jul and 2 Aug 1938, M. Pettibone, collector, 14 specimens (USNM 24928, as *M. lunulata* by Pettibone, 1953). Puget Sound, Point Richmond, 73 m, gravel, mud and shell, 4 Jul 1940, M. Pettibone, collector, 7 specimens (USNM 24927, as *M. lunulata* by Pettibone, 1953). Puget Sound, off Port Madison, 47°42'N, 122°26'W, 172–216 m, fine soft mud, with many *Briaster townsendi* Agassiz, sta 2, haul 7, 21 May 1963, U. Lie, collector, 4 specimens (USNM 36443, as *M. lunulata* form B by Banse et al., 1968).

DESCRIPTION.—Holotype, female with eggs, in 2 pieces, 16 mm long, 5.5 mm wide including setae, and 39 segments, last one minute. Specimens from Puget Sound area off Skiff Point 10.5–14 mm long, 3.5–5 mm wide, with 34–38 segments. Specimens from Point Richmond 18–22 mm long, 5–6 mm wide, with 37–40 segments.

Body flattened, tapering slightly anteriorly and posteriorly. Elytra 15 pairs, on usual segments, oval to subreniform, thin, delicate, smooth, except for small group of microtubercles on anterior part (absent on 1st and some posterior elytra) and scattered round micropapillae (Figure 44B–E). Elytra opaque, with complete or incomplete circle of brown color on 1st elytral pair, following elytra with color confined to semicircular area on posterior and medial sides, plus pigmented spot over place of elytral attachment (Figure 44B–D; Moore, 1910, pl. 28: fig. 15; Pettibone, 1953, pl. 9: fig. 73; pl. 10: figs. 78, 79).

Bilobed prostomium with anterior lobes truncate or wide subtriangular, without distinct peaks; eyes rather small, anterolateral pair slightly larger than posterodorsal pair; ceratophore of median antenna large, bulbous, with style longer than prostomium; ceratophores of lateral antennae inserted

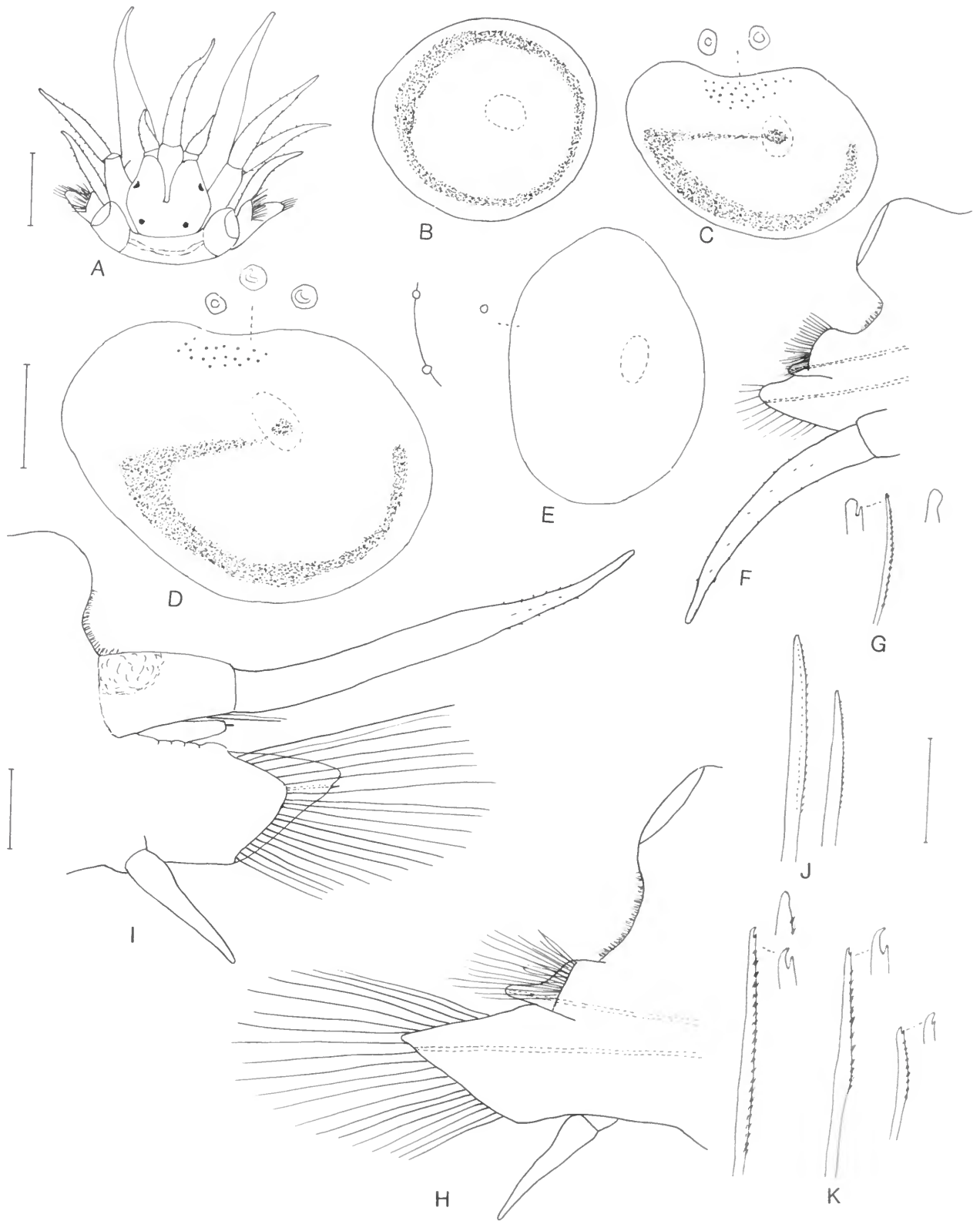
terminoventrally, converging midventrally, with styles less than half as long as median antenna; palps stout, tapered; tentaculophores lateral to prostomium with 0–1 seta on inner side; dorsal and ventral tentacular cirri similar to median antenna; styles of antennae and tentacular cirri with minute papillae and pigmented on basal half (Figure 44A; Moore, 1910, pl. 28: fig. 13; Pettibone, 1953, pl. 9: figs. 75, 76). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 44A,F); notosetae similar to those following; neurosetae more slender than those following, with bulbous tips, upper ones each with secondary tooth (Figure 44G).

Biramous parapodia with notopodium short, rounded, with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe with wide supraacicular process and shorter, rounded postsetal lobe (Figure 44F,H,I; Moore, 1910, pl. 28: fig. 14; Pettibone, 1953, pl. 10: figs. 83, 84). Notosetae moderate in number, about as stout as neurosetae, short and longer, with faint spinose rows, tapering to blunt bare tip (Figure 44J; Moore, 1910, pl. 28: fig. 17; Pettibone, 1953, pl. 10: fig. 86). Neurosetae moderate in number, upper ones with longer spinose region, upper few with entire tip, rest with distinct secondary tooth; middle ones with shorter spinose region and bifid tip; some lower ones with or without small secondary tooth (Figure 44K; Moore, 1910, pl. 28: fig. 16; Pettibone, 1953, pl. 11: figs. 88–91). Dorsal cirri with cylindrical cirrophore and long style, extending beyond tips of neurosetae, with minute papillae and pigmentation on basal half; dorsal tubercles nodular; ventral cirri short, subulate (Figure 44I; Pettibone, 1953, pl. 10: fig. 83). Pygidium with anus medial to last pair of small parapodia, with pair of anal cirri.

BIOLOGY.—The type specimen of *M. scriptoria* from Monterey Bay was collected from the ambulacral groove of a spatangoid. In the Puget Sound area, specimens were found by M. Pettibone occupying the ambulacral groove of the heart urchin *Briaster townsendi* Agassiz, where they were well protected by the ambulacral spines of the host. In the revision of *Briaster* by Markov (1989:87), *Briaster townsendi* Agassiz, 1898 is referred to as *B. latifrons* Agassiz, 1898.

DISTRIBUTION.—Eastern Pacific Ocean, from Washington, Puget Sound to southern California, in 42–373 meters (see Hartman, 1968).

FIGURE 44 (opposite page).—*Malmgreniella scriptoria*, specimen from Puget Sound off Bainbridge Island (USNM 24928): A, dorsal view of anterior end; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles; D, right middle elytron, with detail of microtubercles; E, right 15th elytron from segment 32, with detail of micropapillae; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; G, upper neurosetae from same, with detail of tips of upper and lower neurosetae; H, right middle elytrigerous parapodium, anterior view, acicula dotted; I, right cirriferous parapodium, posterior view; J, long and short notosetae; K, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B–E; 0.2 mm for F,H,I; 0.1 mm for G,J,K.)



***Malmgreniella macginitiei*, new species**

FIGURE 45

Harmothoe lunulata.—Berkeley and Berkeley, 1941:21 [part; not Delle Chiaje, 1830].

Malmgreniella lunulata.—Pettibone, 1953:25 [part], pl. 9: fig. 77; pl. 10: figs. 80–82, 85, 87; pl. 11: figs. 92–95 [not Delle Chiaje, 1830].

Harmothoe cf. *lunulata*.—Kudenov, 1975a:42, fig. 1a–g [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *Central California*: Tomales Bay, sandy mud flat, in burrow with ghost shrimp *Callianassa californiensis* Dana, 28 May 1941, F. Pitelka and R. Paulson, collectors, holotype (USNM 24933). Tomales Bay, Lawson's Flat, in tube of maldanid *Axiiothella rubrocincta* (Johnson), 31 Jan 1970, J.K. Kudenov, collector, paratype (AHF 1119, as *H. cf. lunulata* by Kudenov, 1975a). *Southern California*: Newport Bay, Mar 1933, in burrow with *Callianassa californiensis*, G.E. MacGinitie, collector, paratype (USNM 55059, as *H. lunulata* by Berkeley and Berkeley, 1941). Santa Monica Bay, 60 m, on arm of *Amphiodia urtica* (Lyman), M/V *Marine Surveyor*, from G. Hendler, 1 specimen (USNM 133564).

DESCRIPTION.—Holotype from Tomales Bay, male with sperm, 13 mm long, 4.5 mm wide including setae, with 35 segments, last one minute. Paratype from same area (AHF 1119), female with eggs, 9 mm long, 3.5 mm wide, with 34 segments. Paratype from Newport Bay (USNM 55059), female with eggs, 14 mm long, 5 mm wide, with 37 segments. Body darkly pigmented or with dorsal and ventral transverse dark bands in posterior region. Elytra 15 pairs, on usual segments, rounded to subreniform, with anterior group of microtubercles on some anterior elytra; central part of elytra showing compartments, with or without pigment; pigmentation forming C-shape pattern on central, median, and posterior areas; some scattered round micropapillae on surface and border (Figure 45C,D); Pettibone, 1953, pl. 10: figs. 80–82; Kudenov, 1975a, fig. 1c).

Bilobed prostomium with anterior lobes wide, subconical, with distinct peaks; eyes moderate in size, anterior pair anterolateral, anterior to greatest width of prostomium, slightly larger than posterodorsal pair; ceratophore of median antenna large, bulbous, in anterior notch, style missing; ceratophores of lateral antennae inserted ventrally, converging midventrally, styles short, subulate, with short papillae; palps stout, tapered; tentaculophores lateral to prostomium, each with single seta on inner side; dorsal and ventral tentacular cirri longer than prostomium, papillate (Figure 45A,B; Pettibone, 1953, pl. 9: fig. 77; Kudenov, 1975a, fig. 1a). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri, similar to tentacular cirri (Figure 45A,B,E); notosetae similar to those following; neurosetae more slender than those following, upper and lower ones with slender entire tips, middle ones with bifid tips (Figure 45F).

Biramous parapodia with notopodium short, rounded, with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with prominent subtriangular supraacicular process and shorter rounded postsetal lobe (Figure 45E,G,H; Pettibone, 1953, pl. 10: fig. 85; Kudenov, 1975a, fig. 1b). Notosetae numerous, forming radiating bundle, of several lengths, about as stout as neurosetae, clear, transparent, with double row of faint spines and blunt tapered tip (Figure 45I; Pettibone, 1953, pl. 10: fig. 87; Kudenov, 1975a, fig. 1d). Neurosetae numerous, forming fan-shape bundle, upper ones with longer spinose region, tapering to slender pointed tip, with or without slight indication of secondary tooth; middle ones with shorter spinose region and bifid hooked tip; lower ones with entire, slightly hooked tip (Figure 45J; Pettibone, 1953, pl. 11: figs. 92, 93; Kudenov, 1975, fig. 1e–g). Dorsal cirri with cylindrical cirrophore, style extending to about tips of neurosetae, with scattered short papillae; dorsal tubercles nodular, ventral cirri short, subulate, papillate (Figure 45H). Pygidium with anus medial to small parapodia of last segment, anal cirri lacking.

BIOLOGY.—*Malmgreniella macginitiei* was found living commensally in the burrows of the ghost shrimp *Callianassa californiensis* Dana by F. Pitelka and R. Paulson in Tomales Bay and by G. MacGinitie in Newport Bay. In Tomales Bay, J. Kudenov collected specimens occupying the tubes of the maldanid polychaete *Axiiothella rubrocincta* (Johnson). From Santa Monica Bay, the specimen was found by G. Hendler on the arm of the ophiuroid *Amphiodia urtica* (Lyman).

ETYMOLOGY.—The species is named for George E. MacGinitie, collector of one of the paratypes and outstanding observer, as indicated by his book on the *Natural History of Marine Animals* (1949).

DISTRIBUTION.—Eastern Pacific Ocean, central and southern California. Intertidal to 60 meters.

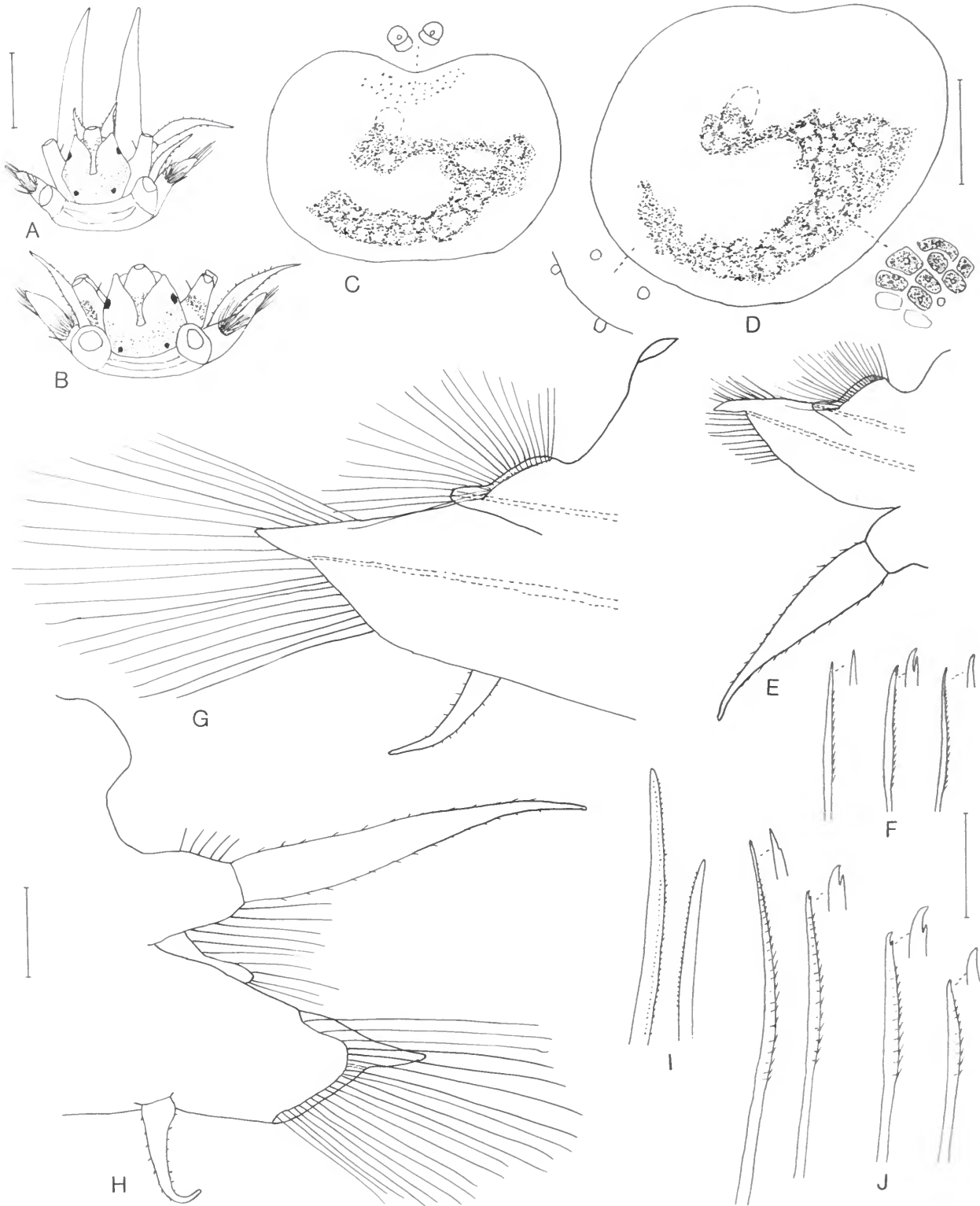
***Malmgreniella sanpedroensis*, new species**

FIGURE 46

Harmothoe lunulata.—Hartman, 1961:49 [part]; 1966:402 [part]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *California*: San Pedro Basin, 6.2 mi south of Pt. Ferman

FIGURE 45 (opposite page).—*Malmgreniella macginitiei*, new species, A, paratype (AHF 1119); B–J, holotype (USNM 24933): A, dorsal view of anterior end, styles of median antenna, left dorsal and ventral and right dorsal tentacular cirri missing; B, dorsal view of anterior end, median and lateral antennae, palps, and tentacular cirri missing; C, left 2nd elytron from segment 4, with detail of microtubercles; D, left middle elytron, with detail of pigmented area and micropapillae along border and surface; E, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; F, upper, middle, and lower neurosetae from same, with detail of tips; G, right middle elytrigerous parapodium, anterior view, acicula dotted; H, right cirriferous parapodium, posterior view; I, long and short notosetae; J, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,G,H; 0.1 mm for F,I,J.)



Light, 33°36'N, 118°18'W, 393 m, clay and mud, *Velero IV* sta 2306, 25 Apr 1953, holotype (AHF 1305).

DESCRIPTION.—Holotype, female with eggs, with posterior end incomplete, 14+ mm long, 5 mm wide including setae, and 33+ segments. Body without color. Elytra 15 pairs, on usual segments, oval and subreniform, delicate, with "veins"; large group of microtubercles on anterior part of elytra, absent on first pair, and smaller group on more posterior elytra; light brownish pigmentation in form of spots over area of attachment to elytriphores and C-shape masses on medial and posterior areas; exposed parts of elytra with scattered rusty red spots, giving speckled appearance (Figure 46B-E).

Bilobed prostomium with anterior lobes truncate, without distinct peaks; eyes moderate in size, anterior pair anteroventral, anterior to greatest width of prostomium, larger than posterodorsal pair; ceratophore of median antenna bulbous, in anterior notch, with papillate style about length of prostomium; ceratophores of lateral antennae inserted terminoventrally, with short, subulate, papillate styles; palps stout, tapered; tentaculophores lateral to prostomium, left one with up to 10 setae on inner side, 2 on slightly deformed right side (perhaps regenerating); tentacular cirri similar to median antenna, dorsal one slightly longer than ventral one; rusty red pigment spots on styles of lateral antennae and tentacular cirri (Figure 46A). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 46A,F); notosetae similar to those following; neurosetae more slender than those following, lower ones with rather long bare bulbous tips.

Biramous parapodia with notopodium short, rounded, with projecting acicular lobe on lower side; longer neuropodium with subconical presetal acicular lobe with subtriangular supraacicular process and shorter rounded postsetal lobe (Figure 46F-H). Notosetae numerous, forming radiating bundle, of several lengths, much stouter than neurosetae, clear, with faint, close-set spinose rows along one border, and short tapered bare tips (Figure 46I). Neurosetae numerous, forming fan-shape bundle; upper ones with longer spinose region, tapering to sharply pointed bare tips; middle ones with shorter spinose region and bifid tips; lower few with entire tips (Figure 46J). Cirrophore of dorsal cirri cylindrical, with bulbous glandular area on posterior side; style with short clavate papillae, rusty red pigment spots, and filamentous tip extending to tip of neuropodia; dorsal tubercles nodular; ventral cirri short, subulate, papillate (Figure 46G).

ETYMOLOGY.—The species is named for the collecting site, the San Pedro Basin.

DISTRIBUTION.—Eastern Pacific Ocean, southern California, San Pedro Basin, in 393 meters.

Malmgreniella baschi, new species

FIGURE 47

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *California*: Santa Catalina Island, Big Fisherman Cove,

33°27'N, 118°29'W, sand, 8–30 m, associated with ophiuroid *Ophiopsila californica* A.H. Clark, L.W. Basch, collector: no 5C, 20 Jul 1982, paratype (USNM 133582); no 6 and 7, 28 Jul 1982, 2 paratypes (USNM 133583; no 8, 24 Nov 1982, paratype (LACM); no 10, 9 Apr 1983, 2 paratypes (USNM 133584); no 11, 10 Apr 1983, 2 paratypes (USNM 133585); no 12, 16 Apr 1983, holotype (USNM 133581).

DESCRIPTION.—Holotype, male with sperm, 14 mm long, 4.5 mm wide including setae, with 38 segments and 15 pairs of elytra; figured paratype (USNM 133582), incomplete male with sperm, 9+ mm long, 5 mm wide, with 28+ segments; paratype (LACM), female with eggs, 9 mm long, 3.5 mm wide, with 37 segments.

Black pigmented bands on posterior 4 segments of dorsum and posterior 8 segments of ventrum. Elytra 15 pairs, oval to subreniform, delicate, opaque, with micropapillae on posterior and lateral borders and small group of microtubercles on anterior part of few elytra; some light to dark mottled pigmentation forming spots over place of attachment to elytriphores and larger C-shape areas more posteriorly (Figure 47C,D). Bilobed prostomium with anterior lobes subtriangular, without distinct peaks, with mottled pigmentation; 2 pairs of eyes, anterior pair larger, anteroventral, anterior to widest part of prostomium and not visible dorsally, smaller posterior pair near posterior border; ceratophore of median antenna in anterior notch, with style about twice as long as prostomium, with slender tip; lateral antennae with ceratophores inserted ventrally, with short subulate styles; palps long, tapered; tentaculophores without setae, with brown pigment spots; dorsal and ventral tentacular cirri similar to median antenna (Figure 47A,B). Second segment with biramous parapodia and long ventral buccal cirri similar to tentacular cirri.

Biramous parapodia with notopodia shorter than neuropodia, rounded, with projecting acicular lobe on lower side; neuropodium with presetal acicular lobe subconical, with digitiform supraacicular process; postsetal lobe shorter, rounded (Figure 47E,F). Notosetae numerous, forming radiating bundle, short to long, about as stout as neurosetae, tapering to short bare tips, with faint close-set spinose rows (Figure 47G). Neurosetae moderate in number, forming fan-shape bundle; supraacicular neurosetae with long spinose region with prominent spines, upper few tapering to pointed tips, some lower ones with slight indication of secondary tooth (Figure 47H); subacicular neurosetae with shorter spinose region, less prominent spines, and slightly hooked, bare tips (Figure 47I). Dorsal cirri with prominent cylindrical cirrophore, ciliated on upper side, with

FIGURE 46 (opposite page).—*Malmgreniella sanpedroensis*, new species, holotype (AHF 1305):—A, dorsal view of anterior end, right side slightly deformed, anterior pair of eyes not visible dorsally (dotted); B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles; D, right middle elytron; E, right posterior elytron; F, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; G, right cirriferous parapodium, posterior view; H, right elytrigerous parapodium, anterior view, acicula dotted; I, long and short notosetae; J, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B-E; 0.2 mm for F-H; 0.1 mm for I,J.)



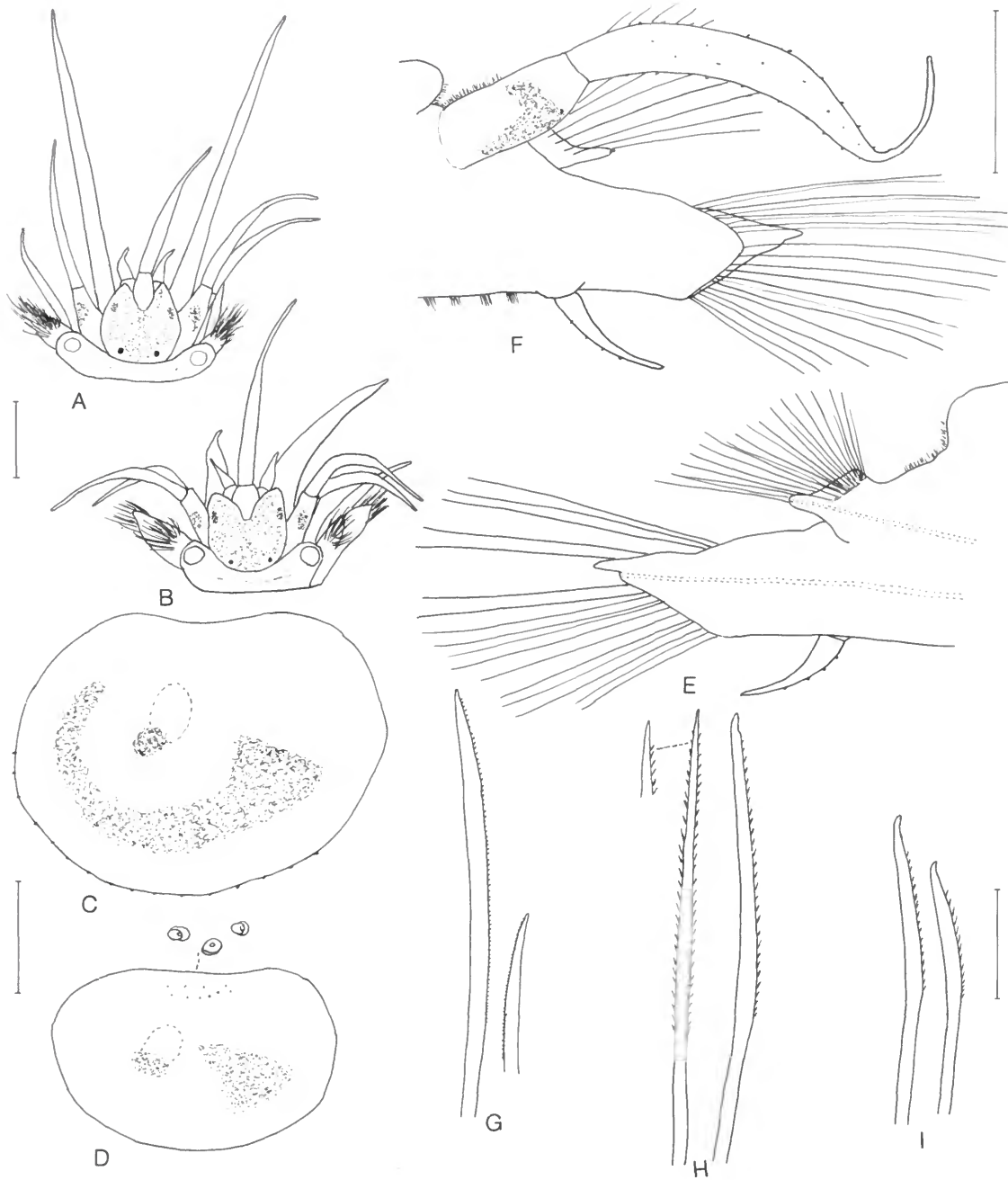


FIGURE 47.—*Malmgreniella baschi*, new species, A, holotype (USNM 133581), B-I, paratype (USNM 133582): A, dorsal view of anterior end, anterior pair of eyes anteroventral (dotted), left ventral tentacular cirrus missing; B, same, left palp short, regenerating; C, left elytron with few marginal micropapillae; D, left elytron, with detail of microtubercles; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view; G, long and short notosetae; H, supraacicular neurosetae, with detail of tip; I, subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.5 mm for E,F; 0.1 mm for G-I.)

black pigment on lower side; style long, flattened, with scattered micropapillae, and slender tip extending beyond tips of neurosetae; dorsal tubercles nodular; ventral cirri short, tapered, with micropapillae (Figure 47F). Pygidium with dorsal anus medial to posterior parapodia, with pair of long anal cirri.

BIOLOGY.—The specimens were collected at night by L.W. Basch from the discs of the very large and brilliantly bioluminescent ophiuroid *Ophiopsila californica* A.H. Clark, in 8–30 meters off Santa Catalina Island. According to the collector, the ophiuroids dwell in sand and in tubes of *Chaetopterus variopedatus* (Renier).

ETYMOLOGY.—The species is named for Lawrence V. Basch, the collector and donor of the specimens.

DISTRIBUTION.—East Pacific Ocean, off southern California, in 8–30 meters.

***Malmgreniella pacifica* (Monro, 1928), new combination**

FIGURE 48

Harmothoe lunulata var. *pacifica* Monro, 1928a:559 [part; see Fauchald, 1977:5, 16].

Harmothoe lunulata.—Hartman, 1944:246 [part; *H. lunulata* var. *pacifica* Monro in synonymy]. [Not Delle Chiaje, 1830.]

Harmothoe lunulata.—Pettibone, 1953:25 [part; *H. lunulata* var. *pacifica* Monro in synonymy]. [Not Delle Chiaje, 1830.]

MATERIAL EXAMINED.—EASTERN PACIFIC OCEAN: *Galapagos*: James Island, James Bay, 9–11 m, clean sand with several species of “weed,” C. Crossland, collector, “St. George” Pacific and Panamanian Expedition 1923–1924, 4 syntypes (BMNH 1928.9.14.73-75; USNM 54748). Fernandina Island, along shore of Espinosa Point, 00°15’S, 91°26’W, 1–3 m, associated with algal-covered rocks, R/V *Anton Bruun* cruise 16, 25 May 1966, S.A. Earle, collector, 2 specimens (USNM 71735). Nameless Island, intertidal, 22 Feb 1978, W.D. Hope, collector, 1 specimen (USNM 75368). *Panama*: Panama City, Paitilla Beach, 08°58’N, 79°30’W, sta 25-1, 26 Apr 1971, M.L. Jones, collector, 1 specimen (USNM 71736). Recife de Casa de Putas, hard rock substrate at low tide, sta 92-1, 18 Apr 1972, M.L. Jones, collector, 1 specimen (USNM 71737).

REMARKS.—According to Fauchald (1977:5, 16), the syn-

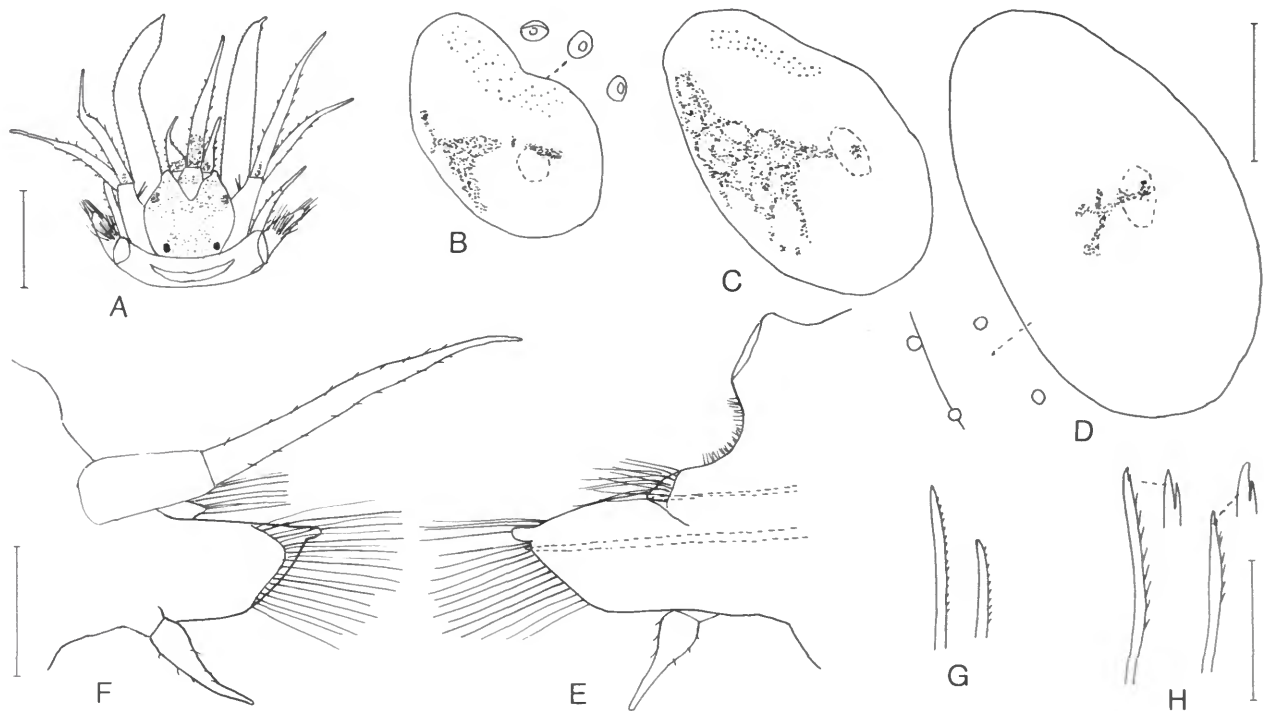


FIGURE 48.—*Malmgreniella pacifica*, syntype of *Harmothoe lunulata* var. *pacifica* from the Galapagos Islands (BMNH 1928.9.14.73-75): A, dorsal view of anterior end, anterior pair of eyes not visible dorsally (dotted); B, right 2nd elytron from segment 4, with detail of microtubercles; C, right 5th elytron from segment 9; D, right 13th elytron from segment 26, with detail of micropapillae; E, right elytrigerous parapodium, anterior view, acicula dotted; F, right cirriferous parapodium, posterior view; G, long and short notosetae; H, upper and middle neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B-D; 0.2 mm for E,F; 0.1 mm for G,H.)

type of *H. lunulata* var. *pacifica* from Taboga Island, Panama, deposited in the Zoological Museum, University of Copenhagen, is an unidentifiable hesionid species of *Gyptis*.

DESCRIPTION.—Four syntypes from Galapagos 9–13 mm long, 2–2.5 mm wide including setae, with 36–37 segments. Body elongated, slender, subrectangular. Elytra 15 pairs, on usual segments, rounded, subrectangular, and elongate oval, with group of microtubercles on anterior part (absent on first and more posterior elytra), and scattered rounded micropapillae; mottled pigmentation in form of spot on scar of attachment to elytraphore and irregular mass on medial part (Figure 48B–D).

Bilobed prostomium with anterior lobes wide, subtriangular, with cephalic peaks; eyes moderate in size, anterior pair anteroventral, anterior to greatest width, slightly larger than posterodorsal pair; ceratophore of median antenna in anterior notch, with papillate style longer than prostomium; ceratophores of lateral antennae inserted ventrally, with short subulate papillate styles; palps stout, tapered, minutely papillate; tentaculophores lateral to prostomium, each with 2 setae on inner side; tentacular cirri similar to median antenna; scattered pigmentation on prostomium and appendages (Figure 48A). Segment 2 with 1st pair of large elytraphores, biramous parapodia, and long ventral buccal cirri, similar to tentacular cirri (Figure 48A).

Biramous parapodia with small rounded notopodium with short projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe, with digitiform supraacicular process and shorter rounded postsetal lobe (Figure 48E,F). Notosetae not extending to tip of neuropodium, of several lengths, subequal in width to neurosetae, with rather prominent spinose rows and tapered blunt tip (Figure 48G). Neurosetae with prominent spinose rows, somewhat longer spinose region on upper neurosetae, with bifid split tip; lower neurosetae with slender secondary tooth or entire (Figure 48H). Dorsal cirri with cirrophore long, cylindrical, with papillate style extending beyond tips of neurosetae; dorsal tubercles low, nodular; ventral cirri short, subulate, papillate (Figure 48F). Pygidium with anus medial to last pair of small parapodia, anal cirri missing.

DISTRIBUTION.—Central Eastern Pacific Ocean, Galapagos, Panama, intertidal to 11 meters.

Paragattyana, new genus

TYPE SPECIES.—*Malmgrenia micropoides* Augener, 1918. Gender: feminine.

DIAGNOSIS.—Segments up to 40. Elytra and elytraphores 15 pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, and 32. Elytra with or without anterior group of microtubercles, and micropapillae. Prostomium bilobed, anterior lobes subtriangular, without distinct cephalic peaks, with 3 antennae, 2 palps, and 2 pairs of eyes; lateral antennae with distinct ceratophores inserted ventrally. Tentaculophores of first seg-

ment lateral to prostomium, each with aciculum, with or without few setae on inner side, and pair of dorsal and ventral tentacular cirri. Second or buccal segment with first pair of elytraphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth. Biramous parapodia with smaller notopodia and larger neuropodia, both rami with projecting acicular lobes; presetal acicular lobe of neuropodium longer, with supraacicular process; postsetal lobe shorter, rounded. Notosetae with spinose rows, of 2 types; shorter, with blunt tips and longer, with capillary tips. Neurosetae with spinose rows and bifid hooked tips or some lower ones with entire tips. Dorsal cirri on nonelytrigerous segments with cylindrical cirrophores and long styles; dorsal tubercles slightly developed; ventral cirri short. Pygidium with pair of anal cirri.

ETYMOLOGY.—From the Greek *Para* (besides) plus the genus *Gattyana* McIntosh.

COMPARISONS.—Among the genera of Harmothoinae, *Paragattyana* agrees with *Gattyana* in having two types of notosetae; upper shorter ones with blunt tips and lower longer ones ending in capillary tips. The latter genus differs from the new genus in having neurosetae with entire tips, not bifid; the elytral surfaces are covered with numerous microtubercles and some macrotubercles; and the prostomium has distinct cephalic peaks.

The genus is established for two species, both from West Africa: *P. micropoides* (Augener), new combination and *P. intesi*, new species.

Paragattyana micropoides (Augener, 1918), new combination

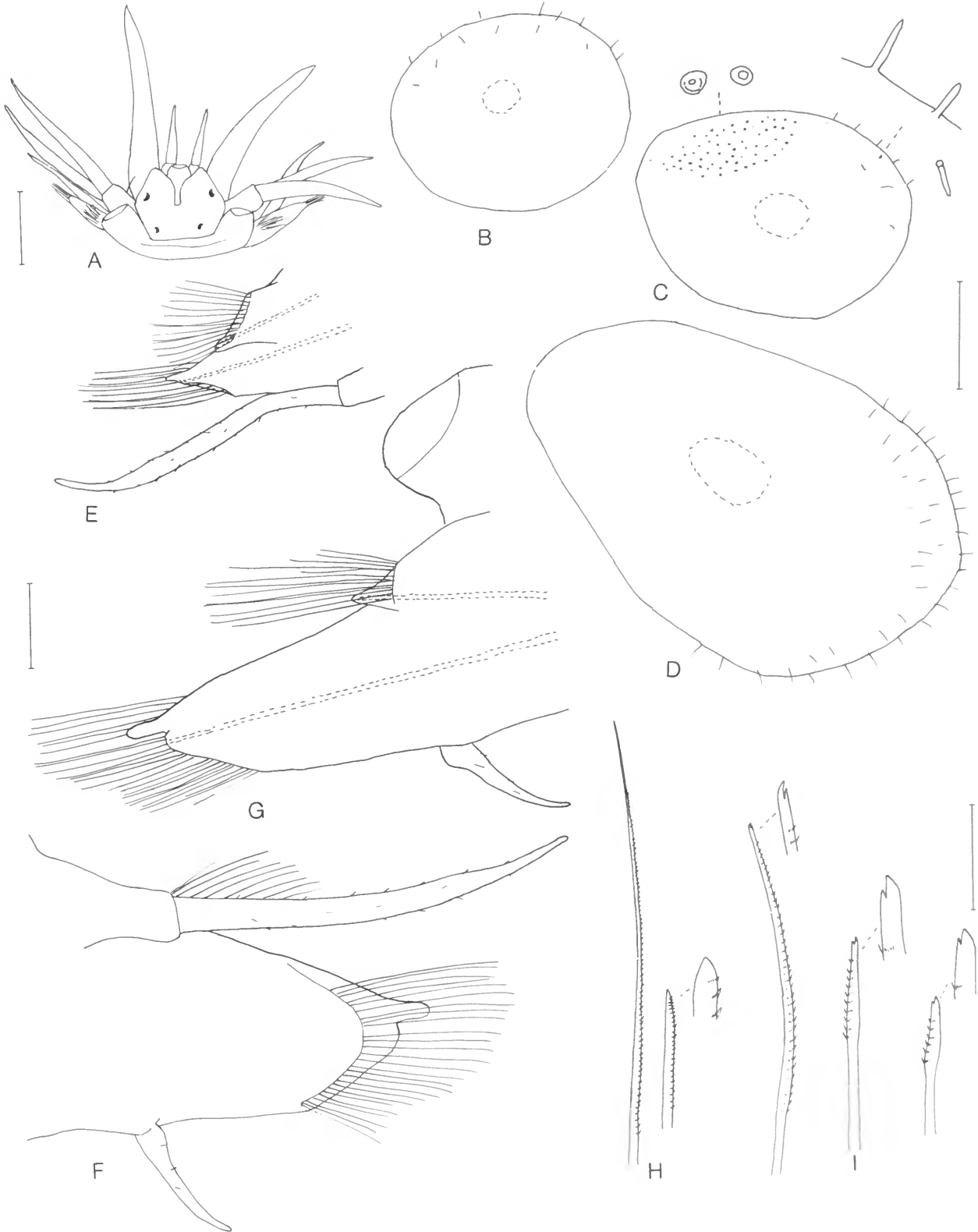
FIGURE 49

Malmgrenia micropoides Augener, 1918:146, pl. 2: fig. 21; pl. 3: fig. 43, text-fig. 8a–c.—Intes and Le Loeuff, 1975:271.—Kudenov, 1975b:79; 1977:95.—Hanley, 1987:160 [under incertae sedis].

MATERIAL EXAMINED.—NORTH ATLANTIC OCEAN: *West Africa*: Spanish Guinea, Bata, A. Hupfer, collector, holotype of *Malmgrenia micropoides* (ZMH V-595).

DESCRIPTION.—Holotype, female with eggs, with 36 segments, 12 mm long, and 4 mm wide including setae. Body delicate, flattened, tapering slightly anteriorly and more so posteriorly. Elytra 15 pairs, on usual segments, large, covering dorsum, round to oval; some anterior elytra with group of

FIGURE 49 (opposite page).—*Paragattyana micropoides*, holotype of *Malmgrenia micropoides* (ZMH V-595): A, dorsal view of anterior end, style of median antenna missing; B, right 1st elytron from segment 2; C, right 2nd elytron from segment 4, with detail of microtubercles and papillae; D, right middle elytron; E, right elytrigerous parapodium from segment 2, anterior view, acicular dotted; F, right middle cirriferous parapodium, posterior view; G, right middle elytrigerous parapodium, anterior view, acicula dotted; H, long and short notosetae, with detail of tip; I, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A; 0.5 mm for B–D; 0.2 mm for E–G; 0.1 mm for H,I.)



microtubercles on anterior part; scattered delicate, rather long papillae along external border and on surface; some darker pigmentation on central part (Figure 49B-D; Augener, 1918, pl. 2: fig. 21).

Bilobed prostomium with anterior lobes subtriangular, without peaks; eyes rather small, anterodorsal pair anterior to widest part of prostomium, larger than posterolateral pair; ceratophore of medial antenna oval, in anterior notch of prostomium, style missing (about twice as long as lateral antennae, according to Augener); ceratophores of lateral antennae inserted ventrally, with short, tapered styles; palps stout, long, tapered; tentaculophores lateral to prostomium, each with 0-1 seta on inner side; tentacular cirri almost as long as palps, dorsal ones slightly longer than ventral ones (Figure 49A). Segment 2 with first pair of large elythrochlores, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri (Figure 49A,E); notosetae similar to those following; neurosetae more slender than those following, with long spinose region, tapering to slender sharp tip.

Biramous parapodium with notopodium much shorter than neuropodium, conical, with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with digitiform supraacicular process; postsetal lobe shorter, rounded (Figure 49E-G; Augener, 1918, pl. 3: fig. 43). Notosetae rather numerous, subequal in width to neurosetae, with numerous spinose rows; upper shorter and longer ones ending in blunt, slightly pointed tips; longest lower ones tapering distally to long capillary tips (Figure 49H; Augener, 1918, text-fig. 8a,b). Upper neurosetae with longer spinose regions and bifid hooked tips; middle and lower neurosetae with shorter spinose regions and bifid tips or secondary tooth lacking on few lower ones (Figure 49I; Augener, 1918, text-fig. 8c). Dorsal cirri with cylindrical cirrophores, wider basally; styles long, extending beyond tips of neurosetae, with scattered minute papillae; dorsal tubercles indistinct; ventral cirri short, tapered, with minute papillae (Figure 49F). Pygidium with anus medial to posterior pair of small parapodia, with pair of anal cirri.

DISTRIBUTION.—North Atlantic Ocean, West Africa.

REMARKS.—The specimen from off Annobon in the Gulf of Guinea, questionably referred to this species by Monro (1930:45), was examined (BMNH 1930.10.8.225); it cannot be positively identified because it consists of a posterior fragment only, lacking elytra.

Paragattyana intesi, new species

FIGURE 50

Harmothoe lunulata.—Intes and Le Loeuff, 1975:275 [not Delle Chiaje, 1830].

MATERIAL EXAMINED.—NORTH ATLANTIC OCEAN: *West Africa*: Ivory Coast, 05°12'N, 04°02'W, 69 m, *Reine Pokou* sta SD59, 21 Nov 1969, A. Intes, collector, holotype (MNHN).

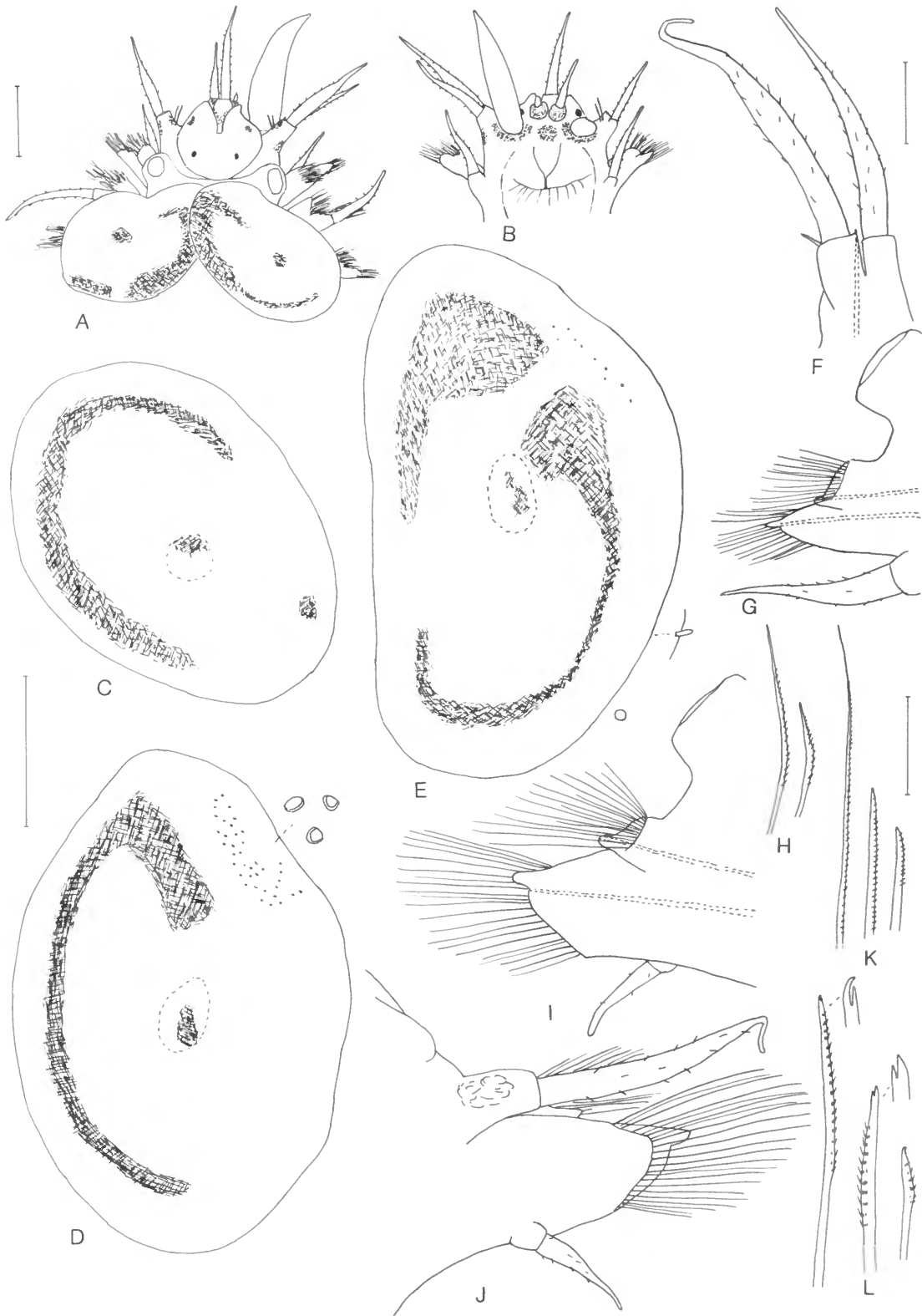
DESCRIPTION.—Holotype with 36 segments, last one minute,

12.5 mm long, and 3 mm wide including setae. Body subrectangular, flattened dorsoventrally, without color dorsally; ventral half of body with segmental brown spots lateral to midventral groove and brownish areas on ventral bases of parapodia on posterior fourth of body and pygidium. Elytra 15 pairs, on usual segments, large, oval, covering dorsum, delicate, with small group of microtubercles on anterolateral part, and some scattered micropapillae on border and surface; brownish pigmentation in form of spots over places of attachment to elythrochlores and crescent-shape area on medial and posterior sides, forming almost complete circle on some posterior elytra (Figure 50C,D).

Bilobed prostomium with anterior lobes subtriangular, without peaks; anterior pair of eyes anteroventral, larger than posterodorsal pair; ceratophore of median antenna oval, in anterior notch of prostomium, style longer than prostomium; ceratophores of lateral antennae inserted ventrally, with short tapered styles; palps stout, long, tapered; tentaculophores lateral to prostomium, each with aciculum, 2 setae on inner side, and pair of dorsal and ventral tentacular cirri, similar to median antenna; styles of antennae and tentacular cirri with small papillae; brownish pigmentation on prostomium, ceratophores of antennae, tentaculophores, and area between palps (Figure 50A,B,F). Segment 2 with first pair of large elythrochlores, biramous parapodia and long ventral buccal cirri similar to tentacular cirri, and lateral to ventral mouth (Figure 50A,B,G); notosetae similar to those of following parapodia; neurosetae more slender than those following, ending in slender sharp tips, upper ones with longer spinose regions (Figure 50H).

Biramous parapodia with notopodium much shorter than neuropodium, conical, with projecting acicular lobe on lower side; larger neuropodium with subconical presetal acicular lobe with digitiform supraacicular process; postsetal lobe shorter, rounded (Figure 50G,I,J). Notosetae numerous, subequal in width to neurosetae, with numerous spinose rows, of 3 lengths: shorter and longer upper ones ending in blunt tips; longest lower ones tapering distally to long capillary tips (Figure 50K). Upper neurosetae with longer spinose regions and bifid hooked tips; middle and lower ones with shorter spinose regions and bifid tips, few lower ones with entire tips (Figure 50L). Dorsal cirri with cylindrical cirrophores and styles extending to tips of

FIGURE 50 (opposite page).—*Paragattyana intesi*, new species, holotype (MNHN): A, dorsal view of anterior end, right lateral antenna small, regenerating, left palp and left dorsal tentacular cirrus missing, anterior pair of eyes anteroventral (dotted), first pair of elytra removed; B, same, ventral view; C, right 1st elytron from segment 2; D, right 7th elytron from segment 13, with detail of microtubercles; E, right 15th elytron from segment 32, with detail of microtubercles; F, right tentaculophore of segment 1, outer view (dorsal side left); G, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; H, upper and lower neurosetae from same; I, right middle elytrigerous parapodium, anterior view, acicula dotted; J, right cirriferous parapodium, posterior view; K, long capillary and 2 shorter notosetae; L, upper, middle, and lower neurosetae, with detail of tips. (Scales = 0.5 mm for A,B; 0.5 mm for C-E; 0.2 mm for F,G,I,J; 0.1 mm for H,K,L.)



neurosetae or beyond, with scattered minute papillae; dorsal tubercles indistinct; ventral cirri short, tapered, with minute papillae (Figure 50J). Pygidium small lobe with anus medial to posterior small parapodia, with pair of small anal cirri.

ETYMOLOGY.—The species is named for André Intes, the collector of the holotype.

DISTRIBUTION.—North Atlantic Ocean, West Africa, in 69 meters.

REMARKS.—*Paragattana intesi* differs from *P. micropoides* by the position of the anterior pair of eyes; anteroventral in the former and anterodorsal in the latter. The elytra of *P. intesi* have only scattered micropapillae and a marked color pattern, whereas the elytra of *P. micropoides* have some long delicate papillae on the border and surface and only an indistinct color pattern.

Rullieriella, new genus

TYPE SPECIES.—*Malmgrenia monoechinata* Rullier, 1965. Gender: feminine.

DIAGNOSIS.—Segments up to 44. Elytra and elytriphores 15 pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, and 32. Elytra with single recurved boss or tubercle, with or without anterior group of microtubercles, and micropapillae. Prostomium bilobed, with 3 antennae, 2 palps, and 2 pairs of eyes; ceratophore of median antenna in anterior notch; ceratophores of lateral antennae indistinct, inserted terminoventrally, separated from prostomium by faint line or continuous with prostomium (as in *Halosydna*). Tentaculophores of first segment lateral to prostomium, each with small acicular lobe on inner side, without setae, and pair of dorsal and ventral tentacular cirri. Second or buccal segment with first pair of elytriphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth. Biramous parapodia with smaller notopodia and larger neuropodia, both rami with projecting acicular lobes; presetal acicular lobe of neuropodium longer, notched distally, with supraacicular process; postsetal lobe shorter, rounded. Notosetae more slender than neurosetae, finely spinose, all tapering to slender capillary tips, except on segments 2 and 3, shorter ones with blunt tips. Neurosetae with spinose regions and variable tips: slender, pointed; entire, blunt; or bifid. Dorsal cirri on nonelytrigerous segments, with cylindrical cirrophores and long styles; dorsal tubercles nodular; ventral cirri short. Pygidium with pair of anal cirri.

ETYMOLOGY.—The genus is named for the late François Rullier, in recognition of his many contributions to the biology of polychaetes.

COMPARISONS.—Among the genera of Harmothoinae, *Rullieriella* differs by having the elytra each with a large central recurved boss or tubercle; lateral antennae with indistinct ceratophores inserted terminoventrally, resembling *Halosydna*; notosetae more slender than neurosetae, finely serrated, all tapering to capillary tips (except on segments 2 and 3, some with blunt tips); and variable neurosetae with either tips tapering to slender pointed tips, entire blunt tips, or some with bifid tips.

The genus is established for a single species, *Rullieriella monoechinata* (Rullier, 1965), new combination.

Rullieriella monoechinata (Rullier, 1965), new combination

FIGURES 51–53

Malmgrenia monoechinata Rullier, 1965:166, fig. 1A–J.—Kudenov, 1977:95 [under incertae sedis, "probably represents a new genus"].—Day and Hutchings, 1979:9.—Hanley, 1987:161, fig. 3C [under incertae sedis, includes *Parahalosydna chrysostichtus* in synonymy].

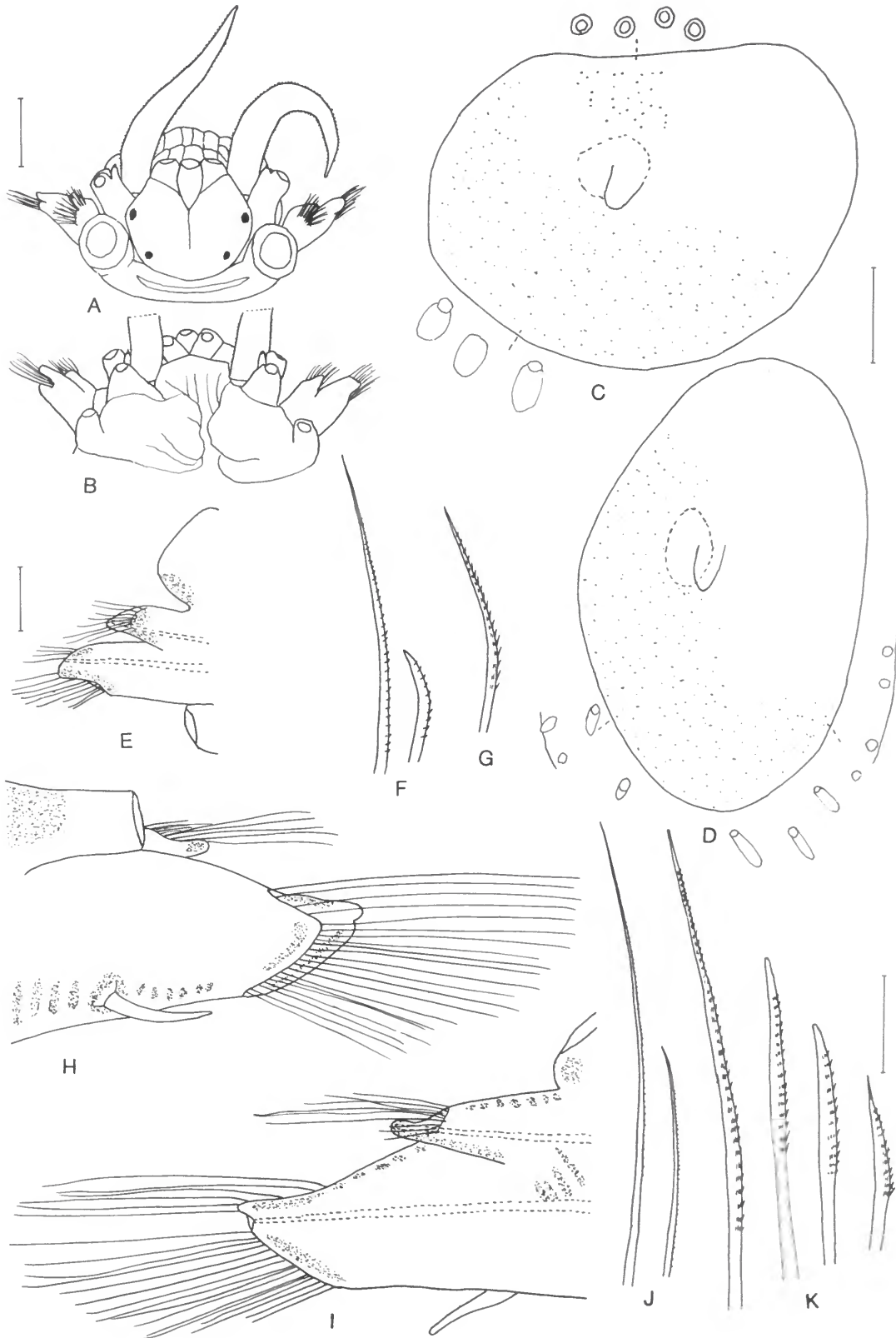
Parahalosydna chrysostichtus Hutchings and Rainer, 1979:746, fig. 1A–D; 1980:36.—Hutchings, 1982:188; 1984:49, fig. 66a–c.—Hutchings and Murray, 1984:15.

MATERIAL EXAMINED.—SOUTH PACIFIC OCEAN: Australia: Queensland, Dunwich, Stradbroke Island, Moreton Bay, midshore in *Zostera*, 3 May 1962, F.C.V., collector, holotype of *Malmgrenia monoechinata* (AMS W3792). New South Wales, types of *Parahalosydna chrysostichtus*: Careel Bay, Pittwater, 33°37'S, 151°20'E, 16 Apr 1972, sheltered estuary area with *Zostera*, holotype (AMS W10570); paratype (AMS W10571). Port Hacking, Mainbar, N.S.W. State Fisheries sta 1051, 4 Nov 1975, *Posidonia* core, paratype (BMNH ZB1977:110).

TYPE MATERIAL.—Holotype of *Malmgrenia monoechinata* with 43 segments, last one very small, 18 mm long and 6 mm wide including setae; all prostomial appendages, except palps, tentacular and dorsal cirri missing; only 2 elytra remaining in vial. Holotype of *Parahalosydna chrysostichtus* in 2 pieces, with 34 segments, last 3 small, regenerating, 23 mm long and 9 mm wide including setae; paratype (AMS W10571) with anterior 15 segments missing, posterior fragment of 29 segments (segments 16–44), 13 mm long and 9 mm wide; paratype (BMNH ZB1977:110) with 38 segments, posterior 8 segments smaller, regenerating, 20 mm long and 7 mm wide.

DESCRIPTION.—Body flattened dorsoventrally, tapering posteriorly, with parapodia as long as body width; scattered brownish or light yellow pigmentation on prostomium, body, and parapodia. Elytra 15 pairs, on usual segments, large, oval, imbricated, covering dorsum, except for posterior 5–6 segments; large erect conical tubercle or boss near place of attachment to elytriphore, indistinct basally and directed posteriorly; group of microtubercles on anterior region (absent

FIGURE 51 (opposite page).—*Rullieriella monoechinata*, holotype of *Malmgrenia monoechinata* (AMS W-3792): A, dorsal view of anterior end, styles of median and lateral antennae, right and left dorsal and ventral tentacular cirri missing; B, same, ventral view, only bases of palps shown, styles of ventral buccal cirri of segment 2 missing; C, left anterior elytron, with detail of microtubercles and globular papillae; D, left middle elytron, with detail of papillae; E, right elytrigerous parapodium from segment 2, anterior view, acicula dotted, style of ventral buccal cirrus missing; F, long and short notosetae from same; G, neurosetae from same; H, right cirriferous parapodium from segment 18, posterior view, style of dorsal cirrus missing; I, right elytrigerous parapodium from segment 19, anterior view, acicula dotted; J, long and short notosetae; K, upper, middle (2), and lower neurosetae. (Scales = 0.5 mm for A,B; 0.5 mm for C,D; 0.2 mm for E,H,I; 0.1 mm for F,G,J,K.)



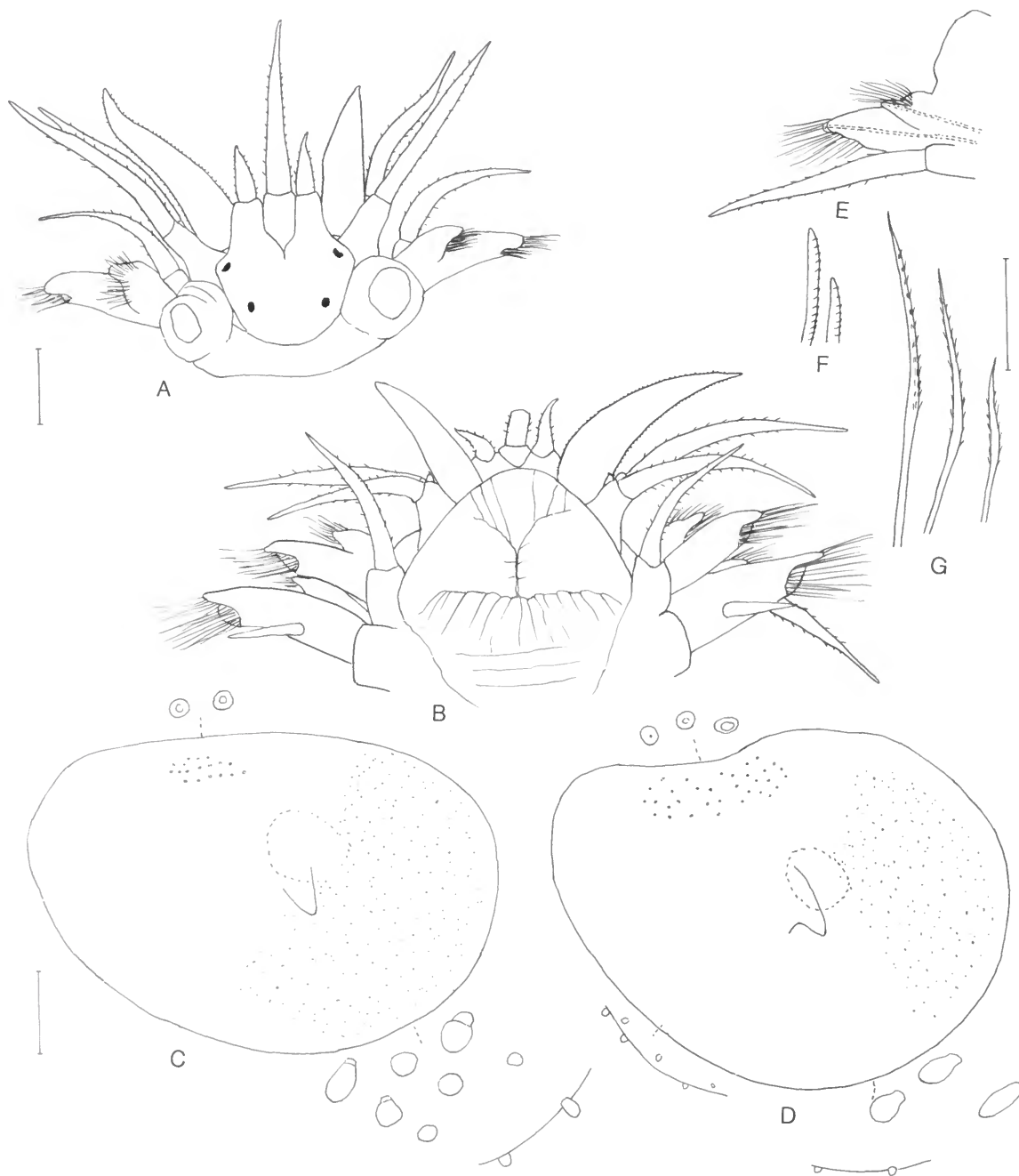


FIGURE 52.—*Rullieriella monoechinata*, holotype of *Parahalosydna chrysostichtus* (AMS W-10570): A, dorsal view of anterior end, right palp smaller, regenerating; B, ventral view of anterior end, median antenna bent dorsally; C, right 5th elytron from segment 9, with detail of microtubercles and papillae; D, right elytron from posterior fragment, with detail of microtubercles and papillae; E, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; F, shorter notosetae from same; G, upper, middle, and lower neurosetae from same. (Scales = 0.5 mm for A,B; 0.5 mm for C-E; 0.1 mm for F,G.)

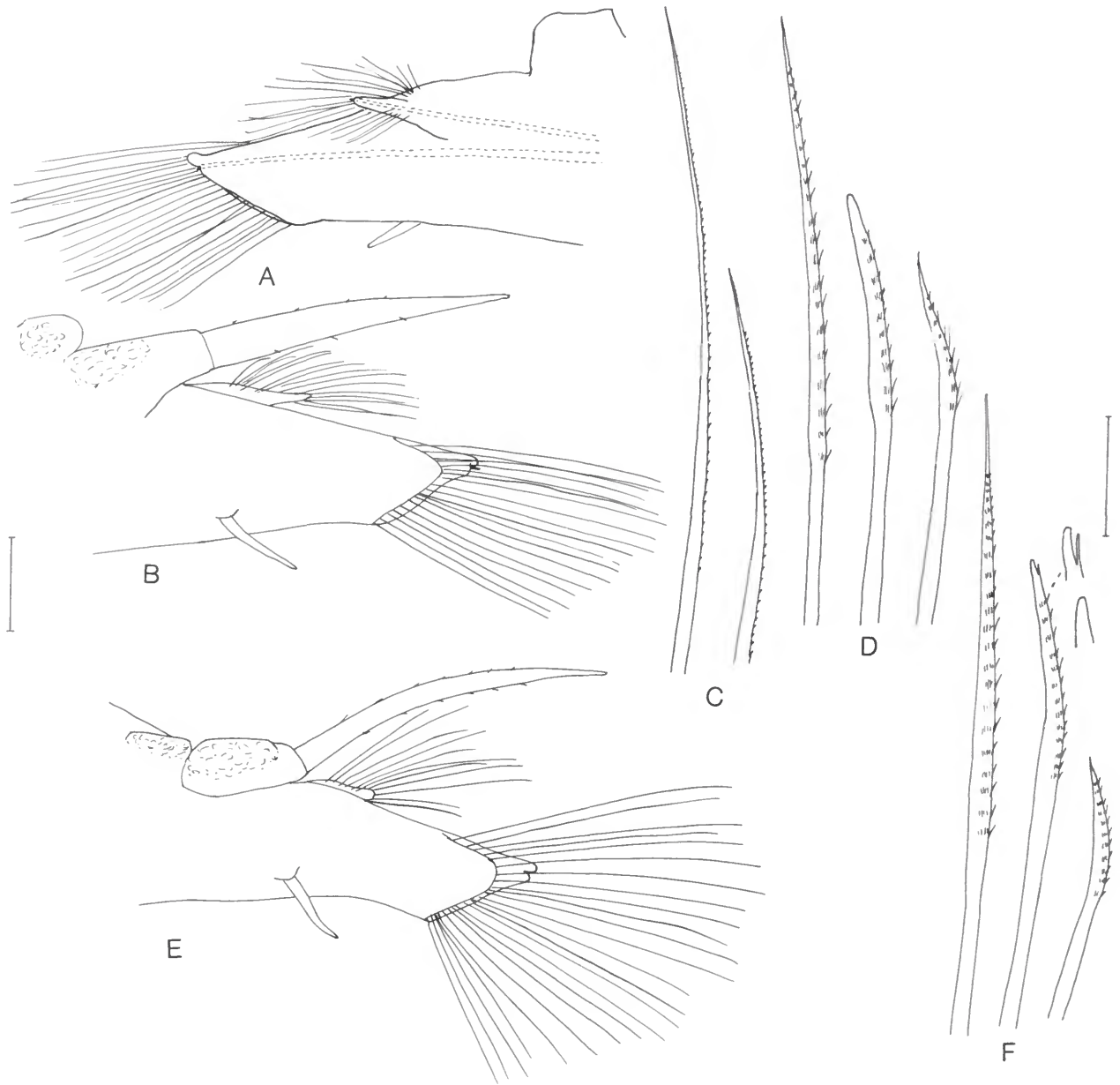


FIGURE 53.—*Rullieriella monoechinata*, holotype of *Parahalosydna chrysostichtus* (AMS W-10570): A, right elytrigerous parapodium from segment 15, anterior view, acicula dotted; B, right cirriferous parapodium from segment 16, posterior view; C, long and short notosetae from same; D, upper, middle, and lower neurosetae from same; E, right cirriferous parapodium from posterior fragment, posterior view; F, upper, middle, and lower neurosetae from same. (Scales = 0.5 mm for A,B,E; 0.1 mm for C,D,F.)

on first and some posterior elytra); globular papillae on lateral and posterior areas (Figures 51C,D, 52C,D; Rullier, 1965, fig. 1A–D; Hutchings and Rainer, 1979, fig. 1a).

Bilobed prostomium with anterior lobes without distinct peaks; ceratophore of median antenna in anterior notch, with style longer than prostomium; ceratophores of lateral antennae inserted terminoventrally, separated from prostomium dorsally by faint line (Figure 51A,B; Rullier, 1965, fig. 1A) or continuous with prostomium, as in *Halosydna* (Figure 52A,B; Hutchings and Rainer, 1979, fig. 1a); styles of lateral antennae short, subulate; palps stout, tapered, minutely papillate; eyes rather small, anterolateral pair in region of greatest width of prostomium, slightly larger than posterodorsal pair; tentaculophores lateral to prostomium, each with small acicular lobe on inner side, without setae, and pair of dorsal and ventral tentacular cirri, similar to median antenna; antennae and tentacular cirri with scattered micropapillae (Figures 51A,B, 52A,B; Rullier, 1965, fig. 1A; Hutchings and Rainer, 1979, fig. 1a; Hanley, 1987, fig. 3C). Segment 2 with first pair of large elytraphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth, similar to tentacular cirri (Figures 51A,B,E, 52A,B,E; Hutchings and Rainer, 1979, fig. 1a); notosetae of 2 types: shorter ones with blunt tips and longer ones tapering to fine tips (Figures 51F, 52F); neurosetae all tapering to slender sharp tips (Figures 51G, 52G).

Biramous parapodium with notopodium much shorter than neuropodium, subconical, with projecting digitiform acicular lobe on lower side; larger neuropodium subconical, with presetal acicular lobe notched distally and slightly longer supraacicular process; postsetal lobe shorter, rounded (Figures 51E,H,I, 52E, 53A,B,E; Rullier, 1965, fig. 1E; Hutchings and Rainer, 1979, fig. 1b). Notosetae moderate in number, more slender than neurosetae, finely spinose, short and longer, all tapering to slender capillary tips (Figures 51J, 53C; Rullier, 1965, fig. 1F), except on segments 2 and 3, with shorter notosetae ending in blunt tips (Figures 51F, 52F). Neurosetae numerous, forming fan-shape bundle, of 2–3 types, upper ones with long spinose regions, tapering to slender pointed tips; middle ones with shorter spinose regions and entire blunt tips, some with slight indication of secondary tooth, and some with distinct secondary tooth; lowest ones with slender sharp tip (Figures 51K, 53D,F; Rullier, 1965, fig. 1G–I; Hutchings and Rainer, 1979, fig. 1c,d). Dorsal cirri with cylindrical cirrophores, inflated basally, and long tapered styles extending to near tips of neurosetae, with scattered micropapillae; dorsal tubercles nodular; ventral cirri short, tapered (Figures 51H, 53B,E; Rullier, 1965, fig. 1E; Hutchings and Rainer, 1979, fig. 1b). Pygidium small lobe with dorsal anus and pair of long anal cirri.

DISTRIBUTION.—South Pacific Ocean, Australia.

Wilsoniella, new genus

TYPE SPECIES: *Malmgrenia furcosetosa* Loshamn, 1981.
Gender: feminine.

DIAGNOSIS.—Segments up to 42. Elytra and elytraphores 15

pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, and 32. Elytra with or without anterior group of microtubercles and micropapillae. Prostomium bilobed, without cephalic peaks, with 3 antennae, 2 palps, and 2 pairs of eyes; ceratophore of median antenna in anterior notch; ceratophores of lateral antennae distinct, inserted terminoventrally. Tentaculophores of first segment lateral to prostomium, each with small acicular lobe on inner side, 0–2 setae, and pair of dorsal and ventral tentacular cirri. Second or buccal segment with first pair of elytraphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth. Biramous parapodia with smaller notopodia and larger neuropodia, both with projecting acicular lobes; presetal acicular lobe of neuropodium longer, with large subtriangular supraacicular process; postsetal lobe shorter, rounded. Notosetae slightly stouter than neurosetae, with numerous spinose rows, of 2 types: shorter with blunt tips and longer, tapering to slender bifid split tip. Neurosetae with spinose regions and bifid hooked tips or lower ones entire. Dorsal cirri on nonelytrigerous segments, with cylindrical cirrophores and long styles; dorsal tubercles nodular; ventral cirri short. Pygidium with pair of anal cirri.

ETYMOLOGY.—The genus is named for Douglas P. Wilson, in recognition of his many contributions in the study of polychaetes including descriptions of numerous polychaete species.

COMPARISONS.—Among the genera of Harmothoinae, *Wilsoniella* differs by having notosetae of two types: shorter ones with blunt tips and long ones tapering to slender split tips. The general characters of the prostomium, parapodia, and elytra agree with *Malmgreniella*.

The genus is established for a single species, *Wilsoniella furcosetosa* (Loshamn, 1981), new combination, from the west coast of Sweden and the Plymouth area, England.

Wilsoniella furcosetosa (Loshamn, 1981), new combination

FIGURES 54, 55

Harmothoe lunulata.—Orton, 1923:861 [part; large specimens with *Amphitrite edwardsii*]. [Not Delle Chiaje, 1830.]

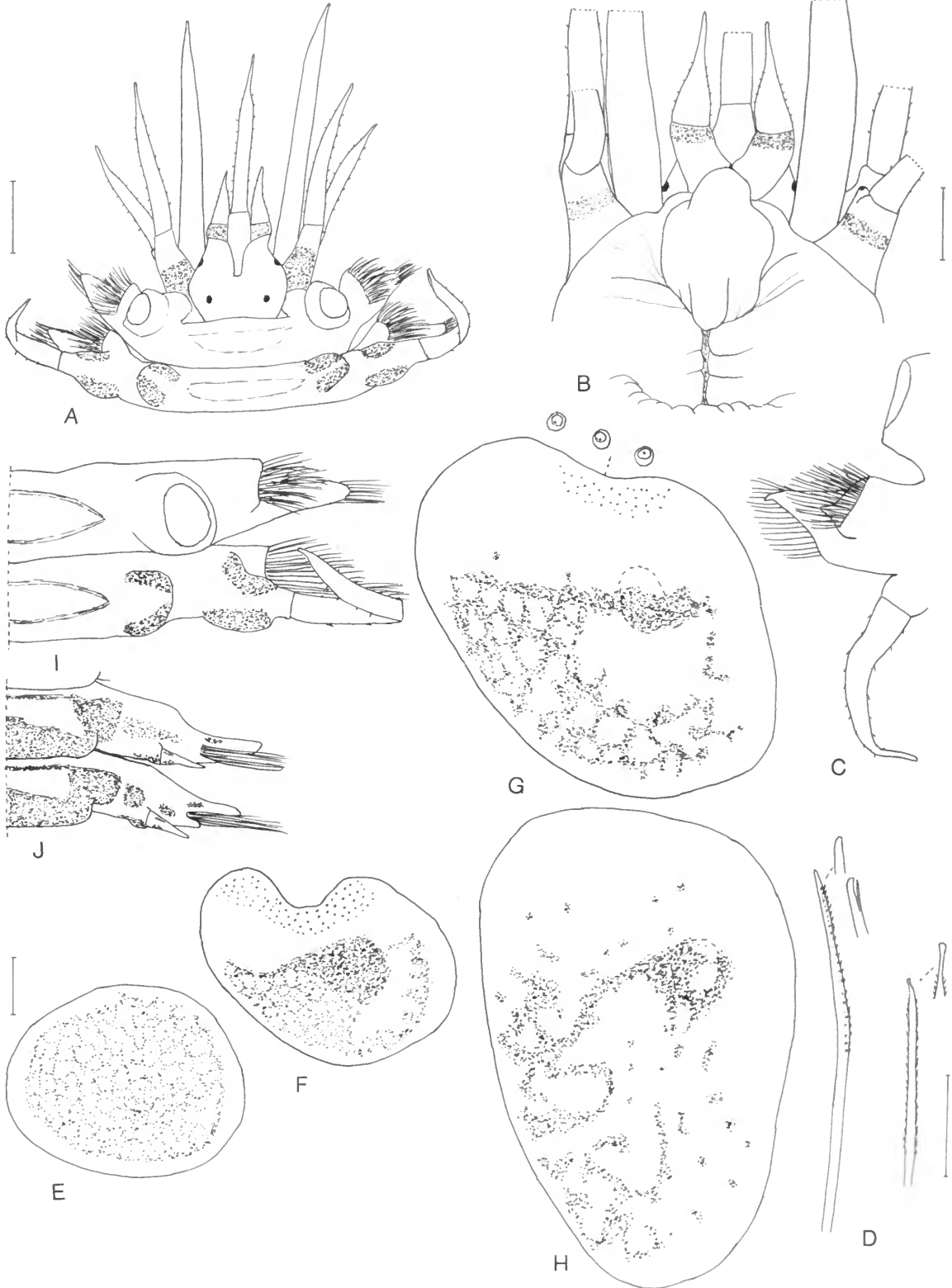
Harmothoe sp. nov.—G.M. Spooner, in Plymouth Marine Fauna, 1957:xxxvi, 112 [with *Amphitrite edwardsii*].

Malmgrenia furcosetosa Loshamn, 1981:5, fig. 1A–I.

Harmothoe furcosetosa.—Tebble and Chambers, 1982:42, fig. 1c, 13a–c, 39.—Hanley, 1987:151, fig. 3G.

MATERIAL EXAMINED.—NORTH ATLANTIC OCEAN:

FIGURE 54 (opposite page).—*Wilsoniella furcosetosa*, specimen from Plymouth (USNM 55053): A, dorsal view of anterior end; B, ventral view of anterior end, only bases of median antenna, palps, and tentacular cirri shown; C, right elytrigerous parapodium from segment 2, anterior view, acicula dotted; D, upper and lower neurosetae from same, with detail of tips; E, right 1st elytron from segment 2; F, right 2nd elytron from segment 4; G, right 10th elytron from segment 19, with detail of microtubercles; H, right 15th elytron from segment 32; I, dorsal view of right side of segments 13 and 14, dorsal cirrus flattened and curled dorsally; J, ventral view of left side of 2 segments near posterior end. (Scales = 1.0 mm for A,I,J; 0.5 mm for B,C; 0.1 mm for D; 1.0 mm for E–H.)



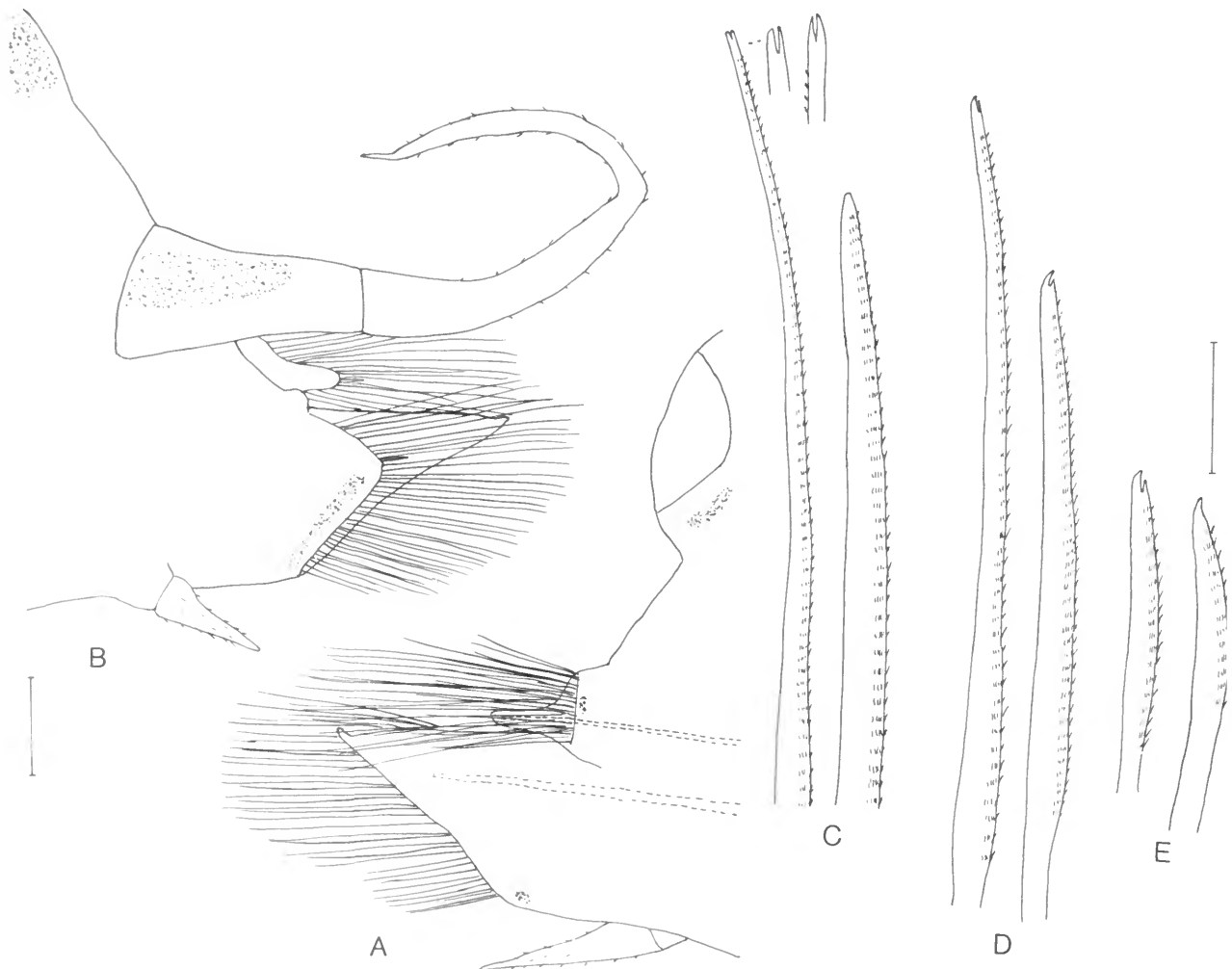


FIGURE 55.—*Wilsoniella furcosetosa*, specimen from Plymouth (USNM 55053): A, right elytrigerous parapodium from segment 19, anterior view, acicula dotted; B, right cirriferous parapodium from segment 20, posterior view; C, long and short notosetae, with detail of tips; D, upper and lower supraacicular neurosetae, with detail of tips; E, upper and lower subacicular neurosetae. (Scales = 0.5 mm for A,B; 0.1 mm for C-E.)

England: Salcombe Estuary near Plymouth, in burrows of *Amphitrite edwardsii* (Quatrefages), 29 Jul 1956, 26 Mar 1959, 18 Mar 1961, G.M. Spooner, collector, 4 specimens (LCHP S-18-20; USNM 55053). Salcombe, west side, 27 Mar 1971, P.E. Gibbs, collector, 3 specimens (LCHP G-1; USNM 55054).
Sweden: Boluslän, Säcken, Tränsholmen, 125 m, L. Almkvist, collector, 6 Apr 1974, holotype of *Malmgrenia furcosetosa* (NRS 3173). Skagerrak, 58°21'N, 09°11'E, 366 m, clay, Gunnild Expedition sta 14, 1879, paratype of *M. furcosetosa* (NRS 3174).

TYPE MATERIAL.—Holotype, male with sperm, in 3 pieces, with 39 segments, 38 mm long and 10 mm wide including

setae. Paratype, female with eggs, in 3 pieces, with 38 segments, 36 mm long and 9 mm wide. Specimens from Plymouth area with 40–42 segments, 46–56 mm long and 11–13 mm wide.

DESCRIPTION.—Body elongate, flattened ventrally, arched dorsally, tapering slightly anteriorly and more so posteriorly. Body showing brownish pigmentation on posterior regions: dorsally in form of spindle-shape bands between dorsal tubercles and additional smaller intersegmental spots; ventrally in form of narrow anterior transverse bands and wide posterior transverse bands, joining laterally and extending onto parapodia, with spots on cirrophores and styles of ventral cirri (Figure

54J). Elytra 15 pairs, on usual segments, large, covering dorsum, except for posterior 5 or so segments; round, subreniform, and elongate oval, with mottled pigmentation, tending to be darker near place of attachment to elytriphore and large area posterior to it without color; also colorless on anterior part; wide band of microtubercles on anterior part of elytra; except for first pair and some posterior elytra; without papillae, except for some scattered micropapillae (Figure 54E-H; Loshamn, 1981, fig. 1I,J; Tebble and Chambers, 1982, fig. 39).

Bilobed prostomium with anterior lobes without distinct peaks; ceratophore of median antenna large, cylindrical, in anterior notch, with style about 1.5 times length of prostomium; ceratophores of lateral antennae inserted terminoventrally, with styles about half as long as median antenna; eyes rather small, anterior pair anterolateral, barely visible dorsally, slightly larger than posterodorsal pair; palps long, tapered, longer than median antenna; tentaculophores lateral to prostomium, each with small acicular lobe and 0-2 setae on inner side; dorsal and ventral tentacular cirri similar to median antenna; antennae and tentacular cirri with minute papillae; facial tubercle bulbous (Figure 54A,B; Loshamn, 1981, fig. 1A,L; Tebble and Chambers, 1982, fig. 1c; Hanley, 1987, fig. 3G). Segment 2 with first pair of large elytriphores, biramous parapodia, and long ventral buccal cirri lateral to ventral mouth, similar to tentacular cirri (Figure 54A-C); notosetae similar to following segments, only few longer ones tapering to slender tips; neurosetae more slender than following, lower ones with bulbous entire tips, some upper ones with slender secondary tooth (Figure 54D); extended pharynx with 9 pairs of border papillae and 2 pairs of hooked jaws.

Biramous parapodium with notopodium much shorter than neuropodium, rounded, with projecting acicular lobe on lower side; neuropodium with longer subconical presetal acicular lobe, with prominent subtriangular supraacicular process, and shorter rounded postsetal lobe (Figure 55A,B; Loshamn, 1981, fig. 1K). Notosetae very numerous, slightly stouter than neurosetae, with numerous spinose rows, of 2 types: shorter ones, of 3 lengths, tapering to blunt tips; longer ones, extending almost to tips of neurosetae, tapering distally to slender bifid tips, one tooth slightly larger than other, or some with tips entire (Figure 55C; Loshamn, 1981, fig. 1B-D,H; Tebble and Chambers, 1982, fig. 13a-c). Neurosetae very numerous, supraacicular ones with longer spinose regions and bifid tips; upper few with longer secondary tooth (Figure 55D; Loshamn, 1981, fig. 1E); subacicular neurosetae with shorter spinose

regions and bifid hooked tips, lower few with entire hooked tips (Figure 55E; Loshamn, 1981, fig. 1F,G). Cirrophores of dorsal cirri cylindrical, bulbous basally, with anterior and posterior orange colored glandular areas, with styles flattened dorsoventrally, tending to curl dorsally and extending beyond neurosetae, with scattered micropapillae; dorsal tubercles nodular, with orange colored glandular areas; ventral cirri short, subulate, with scattered micropapillae (Figures 54A,I, 55B). Pygidium with anus medial to last pair of parapodia, with pair of long anal cirri.

BIOLOGY.—*Wilsoniella furcosetosa* was collected by G.M. Spooner and P.E. Gibbs in the Plymouth area in the burrows of the terebellid polychaete *Amphitrite edwardsii* (Quatrefages).

DISTRIBUTION.—North Atlantic Ocean, Great Britain and west coast of Sweden, up to 366 meters.

Genus *Lobopelma* Hanley, 1987

Lobopelma microscala (Kudenov, 1977)

Malmgrenia microscala Kudenov, 1977:90, pl. 2a-m.

Lobopelma microscala.—Hanley, 1987:157, figs. 3J, 4A-H.

REMARKS.—Harmothoinae with up to 38 segments, 16-18 pairs of elytra (15 pairs on usual segments, and 1-3 posterior pairs variable, on segments 35-38). The type material from Port Phillip Bay, Victoria, Australia, in 2-10 meters (NMV, AMS) was not examined but is well described by Kudenov (1977) and Hanley (1987). *Lobopelma microscala* agrees with the general characters of *Malmgreniella*, except for the more numerous pairs of elytra and the unique character on the ventral side of the parapodia: a tripalmate lobe and small cylindrical lobe between the ventral cirri and nephridial papillae (Kudenov, 1977, pl. 2b; Hanley, 1987, fig. 4C,D).

Malmgrenia perspicua Intes and Le Loeuff, 1975, incertae sedis

Malmgrenia perspicua Intes and Le Loeuff, 1975:271-273, fig. 1j-q.

REMARKS.—Harmothoinae, with 36 segments and 15 pairs of elytra. The species, described from material from the Ivory Coast, was not available for study. Based on the original description and figures, it differs from the genera covered herein. The attachment of the lateral antennae on the prostomium is not clear (said to be subterminal); notosetae are stout and smooth; neurosetae are slender with entire tips, the lower ones with capillary tips.

Literature Cited

- Alaejos y Sanz, L.
1905. Estudio descriptivo de algunas especies de Polinoios de las costas de Santander. *Memorias de la Real Sociedad Española de Historia Natural, Madrid*, 3:5-76, 12 plates.
- Allen, E.J.
1915. Polychaeta of Plymouth and the South Devon Coast Including a List of the Archannelida. *Journal of the Marine Biological Association, Plymouth*, new series, 10:592-646.
- Amanieu, M., and C. Cazaux
1963. Nouveaux animaux observés dans le région d'Arcachon en 1962-1963. *Procès-Verbaux de la Société Linnéenne de Bordeaux*, 100:163-173.
- Amoureux, L.
1977. Annélides Polychètes profondes de Madagascar; Description de deux nouvelles espèces (Collections Crosnier et Jouannie). *Bulletin du Muséum National d'Histoire Naturelle*, series 3, 495:1093-1109, 5 figures.
- Amoureux, L., F. Rullier, and L. Fishelson
1978. Systématique et écologie d'annelides polychètes de la presqu'île du Sinai. *Israel Journal of Ecology*, 27:57-163, 16 figures.
- Augener, H.
1918. Polychaeta. In *Beiträge zur Kenntnis des Meeresfauna West-Afrikas*, 2(2):67-625, plates 2-7, 11 text figures. Hamburg: M. Michaelsen.
1922. Ueber litorale Polychaeten von Westindien. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin*, 1922:38-53.
1925. Zoologische Ergebnisse der ersten Lehr-Expedition der Dr. P. Schottländer'schen Jubiläums-Stiftung, 111: Polychaeta. *Mitteilungen aus dem Zoologischen Museum zu Berlin*, 12:105-116, 2 figures.
1927. Polychaeten von Curaçao. *Bijdragen tot de Dierkunde, Amsterdam*, 25:39-82, figures 1-9.
1928. Die Polychäten von Spitzbergen. *Fauna Artica*, 5(3):649-834, plate 11.
- Averincev, V.C.
1978. [The Polychaetous Annelids of the Aphroditiformia of the Shelf and Upper Bathyal of Australian and New Zealand Region and of Macquarie Island on the Base Data of 16th Cruise of R/V "Dimtry Mendeleev."] *Trudy Instituta Okeanologii im P.P. Shirshova*, 113:51-72, 8 figures. [In Russian.]
- Bailey-Brock, J., and O. Hartman
1987. Phylum Annelida. In D.M. Devaney, L.G. Eldredge, editors, *Reef and Shore Fauna of Hawaii*, section 3, chapter 2:213-454, 216 figures. [Bishop Museum Special Publication 64 (2 and 3).] Honolulu, Hawaii: Bishop Museum Press.
- Balinsky, J.B.
1957. The Ophiuroidea of Inhaca Island. *Annals of the Natal Museum*, 14(1):1-32.
- Banse, K., K.D. Hobson, and F.H. Nichols
1968. Appendix II: Annotated List of Polychaetes. In U. Lie, A Quantitative Study of Benthic In-fauna in Puget Sound, Washington, U.S.A., in 1963-1964. *Fiskeridirektoratets Skrifter Serie Havundersøkelser*, 14(5):521-548, figures 66-70.
- Barel, C.D.N., and P.G.N. Kramers
1977. A Survey of the Echinoderm Associates of the North-East Atlantic Area. *Zoologische Verhandelingen Leiden*, 156:1-159.
- Behre, E.H.
1950. Annotated List of the Fauna of the Grand Isle Region 1928-1946. *Occasional Papers of the Marine Laboratory, Louisiana State University, Baton Rouge*, 6:1-66.
- Bellan, G.
1960. Résultats scientifiques de la Campagne du N.R.P. "FAIAL" dans les eaux côtières du Portugal (1957), II: Annélides polychètes. In *Gabinete de Estudos das Pescas, Lisboa*, pages 1-31.
1962. Contribution a l'étude des Annélides polychètes de la région de Luc-Sur-Mer. *Bulletin de la Société Linnéenne de Normandie*, series 10, 2(1961):87-100.
1964. Contribution a l'étude systématique, bionomique et écologique des Annélides polychètes de la Méditerranée. *Recueil de Travaux de la Station Marine d'Endoume*, 33:1-371, 13 figures.
- Berkeley, E.
1923. Polychaetous Annelids from the Nanaimo District, I: Syllidae to Sigalionidae. *Contributions to Canadian Biology*, new series, 1:203-218, 1 plate.
1924. On a New Case of Commensalism between Echinoderm and Annelid. *Canadian Field-Naturalist*, 38(1):193.
- Berkeley, E., and C. Berkeley
1941. On a Collection of Polychaeta from Southern California. *Bulletin of the Southern California Academy of Science*, 40:16-60, plate 5.
1942. North Pacific Polychaeta, Chiefly from the West Coast of Vancouver Island, Alaska, and Bering Sea. *Canadian Journal of Research*, section D, 20:183-208, 6 figures.
1945. Notes on Polychaeta from the Coast of Western Canada, III: Further Notes on Syllidae and Some Observations on Other Polychaeta Errantia. *Annals and Magazine of Natural History, London*, series 11, 12:316-335, 6 figures.
1948. Annelida: Polychaeta Errantia. In *Canadian Pacific Fauna*, 9b(1):1-100, 160 figures. Toronto: Fisheries Research Board of Canada.
- Boesch, D.F.
1977. A New Look at the Zonation of Benthos Along the Estuarine Gradient. In B.C. Coull, editor, *Ecology of Marine Benthos. The Belle W. Baruch Library in Marine Science*, 6:245-266.
- Cairns, S.D.
1983. Antarctic and Subantarctic Stylasterina (Coelenterata: Hydrozoa). In L. Kornicker, editor, *Biology of the Antarctic Seas 13. Antarctic Research Series*, 38(2):61-164.
- Campoy, A.
1982. Fauna de España: Fauna de Anélidos poliquetos de la Péninsula Ibérica. *Publicaciones de Biología de la Universidad de Navarra, Série Zoologica*, 7(1):1-463, 66 plates.
- Cazaux, C.
1968. Étude morphologique du développement larvaire d'annelides polychètes (Bassin d'Arcachon), I: Aphroditidae, Chrysopetalidae. *Archives de Zoologie Expérimentale et Générale*, 109(3):477-543, 19 figures.
- Claparède, E.
1868. Les Annélides Chétopodes du Golfe de Naples. *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève*, 19(2):313-584, 16 plates.
- Cuénot, L.
1912. Contributions à la faune du Bassin d'Arcachon, V: Échinodermes. *Bulletin de la Station Biologique d'Arcachon*, 14:17-116, 26 figures.
- Darboux, J.G.
1900. Recherches sur les Aphroditiens. *Bulletin Scientifique de la France*

- et de la Belgique*, 33:1-274, 83 figures.
- Dauer, D.M.
1980. Population Dynamics of the Polychaetous Annelids of an Intertidal Habitat in Upper Old Tampa Bay, Florida. *Internationale Revue der Gesamten Hydrobiologie*, 65(4):461-487, 13 figures.
- Davenport, D.
1953. Studies in the Physiology of Commensalism, IV: The Polynoid Genera *Polynoe*, *Lepidasthenia* and *Harmothoe*. *Journal of the Marine Biological Association of the United Kingdom*, 32:273-288.
- Day, J.H.
1934. On a Collection of South African Polychaeta, with a Catalogue of the Species Recorded from South Africa, Angola, Mosambique, and Madagascar. *Journal of the Linnean Society of London*, 39(263): 15-82, 16 figures.
1957. The Polychaet Fauna of South Africa, Part 4: New Species and Records from Natal and Mocambique. *Annals of the Natal Museum*, 14(1):59-129, 8 figures.
1960. The Polychaet Fauna of South Africa, Part 5: Errant Species Dredged off Cape Coasts. *Annals of the South African Museum*, 45:261-373, 14 figures.
1962. Polychaeta from Several Localities in the Western Indian Ocean. *Proceedings of the Zoological Society, London*, 139(4):627-656, 5 figures.
1967. A Monograph on the Polychaeta of Southern Africa, Part I: Errantia. *Publication of the British Museum (Natural History)*, 656:1-458, 108 figures.
- Day, J.H., and P.A. Hutchings
1979. An Annotated Check-list of Australian and New Zealand Polychaeta, Archiannelida and Myzostomida. *Records of the Australian Museum*, 32(3):80-161.
- Delle Chiaje, S.
1830 ("1822"). *Memorie sulla storia e notomia degli animali senza vertebre del Regno di Napoli, Naples. Atlas*, plates 70-109. [Date on title page is 1822. Actually published in 1830.]
1841. *Descrizione e notomia degli animali invertebrati della Sicilia citeriore osservati vivi negli anni 1822-1830*, 3:1-142, plates 1-173.
- Devaney, D.M.
1967. An Ectocommensal Polynoid Associated with Indo-Pacific Echinoderms, Primarily Ophiuroids. *Occasional Papers of Bernice P. Bishop Museum*, 23(13):287-304, 5 figures.
1974a. Shallow-water Echinoderms from British Honduras, with a Description of a New Species of *Ophiocoma* (Ophiuroidea). *Bulletin of Marine Science*, 24(1):122-164, 16 figures.
1974b. Shallow-water Asterozoans of Southeastern Polynesia, II: Ophiuroidea. *Micronesica*, 10(1):105-204.
- Devaney, D.M., and J.H. Bailey-Brock
1987. Polychaetes of Enewetak Atoll. In D.M. Devaney, E.S. Reese, B.L. Burch, and P. Helfrich, editors, *The Natural History of Enewetak Atoll, II: Biogeography and Systematics*, 13:97-103. Oakridge, Tennessee: U.S. Department of Energy, Office of Scientific and Technical Information.
- Ditlevsen, H.
1917. Annelides, I. In *The Danish Ingolf-Expedition Copenhagen*, 4(4):1-71, 6 plates. Copenhagen: Bianco Luno.
1929. Polychaeta. *Zoology of the Faroes, Copenhagen*, 16:1-83.
- Ehlers, E.
1864. *Die Borstenwürmer (Annelida Chaetopoda) nach systematischen und anatomischen Untersuchungen, Ersten Band*. Pages 1-268, 11 plates. Leipzig: Wilhelm Engelmann.
- Fauchald, K.
1977. Polychaetes from Intertidal Areas in Panama, with a Review of Previous Shallow-water Records. *Smithsonian Contributions to Zoology*, 221:1-81, 13 figures.
- Fauchald, K., and A.A. Reimer
1975. Clave de Poliquetos Panamenos con la inclusion de una clave para todas la Familias del Mundo. *Boletin del Instituto Oceanografico*, 14(1):71-94, 9 figures.
- Fauvel, P.
1913. Quatrième note préliminaire sur les polychètes provenant des campagnes de l'*Hirondelle* et de la *Princesse-Alice*, ou déposées dans le Musée Océanographique de Monaco. *Bulletin de l'Institut Océanographique de Monaco*, 270:1-80, 13 figures.
1914. Annelides polychètes non pélagiques provenant des campagnes de l'*Hirondelle* et de la *Princesse-Alice* (1885-1910). *Résultats des Campagnes Scientifiques Accomplies par le Prince Albert I, Monaco*, 46:1-432, 31 plates.
1923. Polychètes Errantes. *Faune de France*, 5:1-488, 181 figures.
1927. Polychètes sédentaires; Addenda aux Errantes, Archiannelides, Myzostomaires. *Faune de France*, 16:1-494, 152 figures.
1953. Annelida Polychaeta. In K.B. Seymour Sewell, editor, *The Fauna of India Including Pakistan, Ceylon, Burma and Malaya*. 507 pages, 250 figures. Allahabad: The Indian Press.
- Fox, R.S., and E.E. Ruppert
1985. Shallow-water Marine Benthic Macroinvertebrates of South Carolina, Species Identification, Community Composition and Symbiotic Associations. *The Belle W. Baruch Library in Marine Science*, 14:1-330.
- Gardiner, S.L.
1976 ("1975"). Errant Polychaete Annelids from North Carolina. *Journal of the Elisha Mitchell Scientific Society*, 91(3):77-220, 29 figures. [Date on title page is 1975. Actually published in 1976.]
- Giard, A.
1886. Sur quelques Polynoidiens. *Bulletin Biologique de la France et de la Belgique*, series 2, 9:1-18, 6 figures.
- Gibbs, P.E.
1969. Aspects of Polychaete Ecology with Particular Reference to Commensalism. *Philosophical Transactions of the Royal Society of London*, B255:443-459, figures 130-138, plates 69, 70.
1971. The Polychaete Fauna of the Solomon Islands. *Bulletin of the British Museum (Natural History)*, *Zoology*, 21(5):99-211, 17 figures.
1972. Polychaete Annelids from the Cook Islands. *Journal of Zoology, London*, 168:199-220, 8 figures.
- Grube, A.-E.
1856. Annulata Örstediana: Enumeratio Annulorum, quae in itinere per Indiam occidentalem et Americam centralem annis 1845-1848 suscepto legit cl. A.S. Örsted, adjectis speciebus nonnullis a cl. H. Krøyer in itinere ad Americam meridionalem collectis. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjøbenhavn*, 1856:44-62.
- Guille, A.
1965. Contribution à l'étude de la systématique et de l'écologie d'*Ophiothrix quinque maculata* d.Ch. *Vie et Milieu*, 15:243-308, 6 plates.
- Hamond, R.
1966. The Polychaeta of the Coast of Norfolk. *Cahiers de Biologie Marine*, 7:383-436.
- Hanley, J.R.
1987. Taxonomic Status of Some Species Formerly Referred to *Malmgrenia* MacIntosh 1874, with the Description of a New Genus *Lobopelma* (Polychaeta: Polynoidae). *The Beagle, Records of the Northern Territory Museum of Arts and Sciences*, 4(1):147-163, 4 figures.
- Hartman, O.
1939. The Polychaetous Annelids Collected by the Presidential Cruise of 1938. *Smithsonian Miscellaneous Collections*, 98:1-22, 3 figures.
1944. Polychaetous Annelids from California Including the Descriptions

- of Two New Genera and Nine New Species. *Allan Hancock Pacific Expeditions*, 10:239–307, plates 19–26.
1955. Quantitative Survey of the Benthos of San Pedro Basin, Southern California, Part I: Preliminary Results. *Allan Hancock Foundation Pacific Expeditions*, 19:1–185, 7 plates, 2 charts.
1956. Polychaetous Annelids Erected by Treadwell, 1891 to 1948, Together with a Brief Chronology. *Bulletin of the American Museum of Natural History*, 109(2):243–310, plate 2.
1959. Catalogue of the Polychaetous Annelids of the World, Part 1. *Allan Hancock Foundation Publications Occasional Paper*, 23:1–353.
1961. Polychaetous Annelids from California. *Allan Hancock Pacific Expeditions*, 25:1–226, 34 plates.
1966. Quantitative Survey of the Benthos of San Pedro Basin, Southern California, Part II: Final Results and Conclusions. *Allan Hancock Pacific Expeditions*, 19:187–456, 13 plates.
1967. Polychaetous Annelids Collected by the USNS *Eltanin* and *Staten Island* Cruises, Chiefly from Antarctic Seas. *Allan Hancock Monographs in Marine Biology*, 2:1–387, 51 plates.
1968. *Atlas of the Errantiate Polychaetous Annelids from California*. 828 pages. Los Angeles, California: Allan Hancock Foundation University of Southern California.
- Hartmann-Schröder, G.
1971. Annelida, Borstenwürmer, Polychaeta. *Die Tierwelt Deutschlands und der Angrenzenden Meeressteile*, 58:1–594, 191 figures.
1977. Polychaeten aus dem Sublitoral und Bathyal vor der portugiesischen und marokkanischen Küste Auswertung der Fahrt 8 (1967) von F.S. "Meteor." "Meteor" *Forschungsergebnisse*, Reihe D, 26:65–99, 83 figures, 1 plate.
1984. Zwei neue kommensalische Polychaeten der Gattung *Hololepidella* Willey (Polynoidae) von der Philippine. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, 81:63–70, 17 figures.
- Hendler, G., and D.L. Meyer
1982. An Association of a Polychaete, *Branchiosyllis exilis* with an Ophiuroid, *Ophiocoma echinata*, in Panama. *Bulletin of Marine Science*, 32(3):736–744, 3 figures.
- Hornell, J.
1891. Report on the Polychaetous Annelids of the L.M.B.C. District. *Proceedings of the Liverpool Biological Society*, 5:223–268, plates 13–15.
- Horst, R.
1915. On New and Little-known Species of Polynoinae from the Netherlands' East Indies. *Zoologische Mededeelingen, Leiden*, 1:2–30.
1917. Polychaeta Errantia of the Siboga-Expedition, Part 2: Aphroditidae and Chrysopetalidae. *Siboga-Expeditie* (Leiden), 24b:1–140, 5 figures, plates 11–29.
1922. On Some Polychaetous Annelids from Curaçao. *Bijdragen tot de Dierkunde* (Amsterdam), Feest-nummer:193–201.
- Hutchings, P.
- 1982 ("1981"). The Fauna of Australian Seagrass Beds. *Proceedings of the Linnean Society of New South Wales*, 106(2):181–200. [Date on title page is 1981. Actually published in 1982.]
1984. *An Illustrated Guide to the Estuarine Polychaete Worms of New South Wales*. 160 pages, 155 figures. Sydney: Coast and Wetlands Society, Sydney South 2000.
- Hutchings, P., and A. Murray
1984. Taxonomy of Polychaetes from the Hawkesbury River and the Southern Estuaries of New South Wales, Australia. *Records of the Australian Museum*, 36(3):1–118, 32 figures.
- Hutchings, P., and S. Rainer
1979. The Polychaete Fauna of Careel Bay, Pittwater, New South Wales, Australia. *Journal of Natural History*, 13(6):745–796, 10 figures.
- 1980 ("1979"). A Key to Estuarine Polychaetes in New South Wales. *Proceedings of the Linnean Society of New South Wales*, 104(1):35–48. [Date on title page is 1979. Actually published in 1980.]
- Intes, A., and P. Le Loeuff
1975. Les Annélides polychètes de Côte d'Ivoire, I: Polychètes Errantes—Compte rendu systématique. *Cahiers de l'Office de la Recherche Scientifique et Technique Outre-Mer, série Océanographie*, 13(4):267–321, 13 figures.
- Katzmann, W.
1983. Bemerkungen zur Systematik, Ökologie und Tiergeographie der mitteladriatischen Weichbodenpolychaeten. *Annalen des Naturhistorischen (Hof) Museums, Wien*, 84/B:87–122, 2 figures, 1 plate.
- Kinberg, J.G.H.
- 1856 ("1855"). Nya släkten och arter af Annelider. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar, Stockholm*, 12:381–388. [Date on title page is 1855. Actually published in 1856.]
- Kirkegaard, J.B.
1969. A Quantitative Investigation of the Central North Sea Polychaeta. *Spolia Zoologica Musei Hauniensis*, 29:1–285, 11 figures.
1983. The Polychaeta of West Africa, Part II: Errant Species, I: Aphroditidae to Nereididae. *Atlantide Report*, 13:181–240.
- Knox, G.A., and D.B. Cameron
1971. Port Phillip Bay Survey Part 2, 4: Polychaeta. *Memoirs of the National Museum of Victoria*, 32:21–41, 35 figures.
- Koehler, R.
1894. Echinodermes recueillis à La Ciotat pendant l'été 1894. *Mémoires de la Société Zoologique de France*, 7:405–426.
- Kudenov, J.D.
- 1975a. The Occurrence of the Polynoid *Harmothoe cf. lunulata* from the Tube of the Maldanid *Axiobella rubrocincta* (Polychaeta). *Bulletin of the Southern California Academy of Sciences*, 74(1):42–43, 1 figure.
- 1975b. Two New Species of Errant Polychaetes from the Gulf of California, Mexico. *Bulletin of the Southern California Academy of Sciences*, 74(2):75–80, 2 figures.
1977. Polychaeta from Southeastern Australia, 2: *Malmgrenia* spp. (Polynoidae) from Port Phillip Bay, Victoria. In D.J. Reish and K. Fauchald, editors, *Essays on Polychaetous Annelids in Memory of Dr. Olga Hartman*, pages 85–102, plates 1, 2. Los Angeles, California: Allan Hancock Foundation, University of Southern California.
- Lie, U.
1968. A Quantitative Study of Benthic Infauna in Puget Sound, Washington, U.S.A., in 1963–1964, with a Section on Polychaetes by Karl Banse, Katharine D. Hobson, and Frederic H. Nichols. *Fiskeridirektoratets Skrifter, serie Havundersøkelser*, 14(5):230–556, 70 figures.
- Loi, T.
1980. Catalogue of the Types of Polychaete Species Erected by J. Percy Moore. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 132:121–149.
- Loshamn, A.-A.
1981. Descriptions of Five Polynoid Species (Polychaeta) from the Coasts of Norway and Sweden, Including Three New Species, One New Genus and One New Generic Name. *Zoologica Scripta*, 10(1):5–13, 3 figures.
- MacGinitie, G.E., and N. MacGinitie
1949. *Natural History of Marine Animals*. 473 pages, 282 figures. New York: McGraw-Hill Book Company, Inc.
- Macnae, W., and M. Kalk
1962. The Fauna and Flora of Sand Flats at Inhaca Island, Moçambique. *The Journal of Animal Ecology*, 31:93–128, 5 figures.
- Malaquin, A.
1890. Les Annélides polychètes des côtes du Boulonnais. *Revue Biologique du Nord de la France, Lille*, 2(1b):275–285.

- Malmgren, A.L.
1865. Nordiska Hafs-Annulater. *Översigt af Kongliga Vetenskaps-Akademiens Förhandlingar, Stockholm*, 21(1):51-110, plates 8-15.
- Markov, A.V.
1989. The Species Composition of the Genus *Brisaster* (Echinoidea). *Zoologicheskoy Zhurnal*, 68(11):86-93, 1 figure.
- McIntosh, W.C.
1868. Report on the Annelids Dredged off the Shetlands by Mr. Gwyn Jeffreys, 1867-68. *Report of the British Association for the Advancement of Sciences, for 1868*, pages 336-340.
1874a. On the Annelida of the Gulf of St. Lawrence, Canada: Family 1, Euphrosynidae, to Family 6, Sigalionidae. *Annals and Magazine of Natural History*, series 4, 13(76):261-270, plates 9, 10.
1874b. On the Invertebrate Marine Fauna and Fishes of St. Andrews: Annulata, Discophora, Oligochaeta and Polychaeta. *Annals and Magazine of Natural History*, series 4, 14:192-207.
1876a. On British Annelida, Part 1. *Transactions of the Zoological Society of London*, 9:371-394, plates 67-70.
1876b. On the Annelida of the Porcupine Expeditions of 1869-1870, Part I: Euphrosynidae, Amphinomididae, Aphroditidae, Polynoididae, Acoetidae and Sigalionidae. *Transactions of the Zoological Society of London*, 9(7):395-416, plates 71-73.
1885. Annelida Polychaeta. In *Report on the Scientific Results of the Voyage of H.M.S. Challenger ... 1873-76 ... Zoology*, 12(34):1-554, plates 1-55, 1A-39A.
1900. A Monograph of the British Annelids, Part 2: Polychaeta, Amphinomididae to Sigalionidae. *Ray Society, London*, pages 215-442, plates 24-42.
1919. Number 42, Notes from the Gatty Marine Laboratory, St. Andrews, 1: Preliminary Studies on *Filograna*; 2: On *Harmothoe watsoni* M'1., and var. *H. marphysae*, M'1. *Annals and Magazine of Natural History*, series 9, 3:125-164
1923. The British Marine Annelids, Polychaeta: Sabellidae to Serpulidae and Additional Species. *Ray Society, London*, 4(2):251-539, plates 115-117, 128-138.
- Millott, N.
1953. A Remarkable Association between *Ophioneis reticulata* (Say) and *Harmothoe lunulata* (Delle Chiaje). *Bulletin of Marine Science of the Gulf and Caribbean*, 3(2):96-99, 2 figures.
- Monro, C.C.A.
1928a. Polychaeta of the Families Polynoidae and Acoetidae from the Vicinity of the Panama Canal, Collected by Dr. C. Crossland and Dr. Th. Mortensen. *Journal of the Linnean Society, London*, 36:553-576, 30 figures.
1928b. On Some Polychaeta of the Family Polynoidae from Tahiti and the Marquesas. *Annals and Magazine of Natural History, London*, series 10, 3:467-473, 4 figures.
1930. Polychaete Worms. *Discovery Reports*, 2:1-222, 91 figures.
1937. Polychaeta. In *The John Murray Expedition 1933-34. Scientific Reports*, 4(8):243-321, 28 figures.
- Moore, J.P.
1910. The Polychaetous Annelids Dredged by the U.S.S. "Albatross" off the Coast of Southern California in 1904, II: Polynoidae, Aphroditidae and Segaleonidae. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 62:328-402, plates 28-33.
- Orton, J.H.
1923. Some New Commensals from the Plymouth District. *Nature, London*, 112:861, 1 figure.
- Pérès, J.M.
1954. Contribution à l'étude des annélides polychètes benthiques de la Méditerranée occidentale. *Recueil des Travaux de la Station Marine d'Endoume*, 8(13):83-155, 1 plate.
- Pettibone, M.H.
1953. *Some Scale-bearing Polychaetes of Puget Sound and Adjacent Waters*. 89 pages, 40 plates. Seattle: University of Washington Press.
1967. Type-specimens of Polychaetes Described by Edith and Cyril Berkeley (1923-1964). *Proceedings of the United States National Museum*, 119:1-23.
- 1969a. Review of Some Species Referred to *Scalissetosus* McIntosh (Polychaeta, Polynoidae). *Proceedings of the Biological Society of Washington*, 82:1-30, 12 figures.
1969b. The Genera *Polyeunoa* McIntosh, *Hololepidella* Willey, and Three New Genera (Polychaeta, Polynoidae). *Proceedings of the Biological Society of Washington*, 82:43-62, 6 figures.
1975. Review of the Genus *Hermenia*, with a Description of a New Species (Polychaeta: Polynoidae: Lepidonotinae). *Proceedings of the Biological Society of Washington*, 88(2):233-248, 6 figures.
1977. Review of *Halosydropsis* and Related Genera (Polychaeta Polynoidae: Lepidonotinae). In D.J. Reish and K. Fauchald, editors, *Essays on Polychaetous Annelids in Memory of Dr. Olga Hartman*, pages 39-62, 6 figures. Los Angeles, California: Allan Hancock Foundation, University of Southern California.
1989. A New Species of *Benhamipolynoe* (Polychaeta: Polynoidae: Lepidastheniinae) from Australia, Associated with the Unattached Stylasterid Coral *Conopora adeta*. *Proceedings of the Biological Society of Washington*, 102(2):300-304, 2 figures.
- Picard, J.
1965. Recherches qualitatives sur les biocoenoses marines des substrats meubles dragables de la région marseillaise. *Recueil des Travaux de la Station Marine d'Endoume*, 36(52):1-160.
- Plymouth Marine Fauna
1957. *Plymouth Marine Fauna*. Third edition, 487 pages. Plymouth, England: Marine Biological Association of the United Kingdom. [Polychaetes revised by D.P. Wilson and N. Tebble.]
- Potts, F.A.
1910. Polychaeta of the Indian Ocean, Part 2: The Palmyridae, Aphroditidae, Polynoidae, Acoetidae and Sigalionidae. *The Transactions of the Linnean Society of London*, series 2, 13:325-353, plates 18-21.
- Rullier, F.
1965. Contribution à la faune des Annélides polychètes de l'Australie. *Papers, Department of Zoology, University Queensland*, 2(9):163-201, 9 figures.
- Saint-Joseph, A. de
1888. Les Annélides polychètes de côtes de Dinard, Part 2. *Annales des Sciences Naturelles, Zoologie (Paris)*, series 7, 5:141-338, plates 6-13.
1898. Les Annélides polychètes des côtes de France (manche et océan). *Annales des Sciences Naturelles, Zoologie (Paris)*, series 8, 5:209-464, plates 13-23.
1906. Les Annélides polychètes de côtes de France (océan et côtes de Provence). *Annales des Sciences Naturelles (Paris)*, series 9, 3:145-260, plates 1-5.
- San Martín, G., O. Aquirre, and L. Baratech
1986. Anélidos poliquetos precedentes de la Expedición Cubano-Española a la Isla de la Juventud y Archipiélago de los Canarros. I: Familias Polynoidae, Sigalionidae, Pholoididae y Pisionidae. *Revista de Investigaciones Marinas*, 7(1):3-16, 7 figures.
- Sloan, N.A., A.M. Clark, and J.D. Taylor
1979. The Echinoderms of Aldabra and Their Habitats. *Bulletin of the British Museum (Natural History), Zoology*, 37(2):81-128.
- Southern, R.
1914. Clare Island Survey, Part 47: Archiannelida and Polychaeta. *Proceedings of the Royal Irish Academy*, 31(2):1-160, 15 plates.
- Spooner, G.M., D.P. Wilson, and N. Tebble
1957. Phylum Annelida. In *Plymouth Marine Fauna*, third edition, pages 109-149. Plymouth, England: Marine Biological Association of the United Kingdom.

Støp-Bowitz, C.

1948. Polychaeta from the *Michael Sars* North Atlantic Deep-sea Expedition 1910. *Report on the Scientific Results of the "Michael Sars" North Atlantic Deep-sea Expedition 1910*, Bergen Museum, Norway, 5(8):1-91, 51 figures.

Taylor, J.L.

1971. Polychaetous Annelids and Benthic Environments in Tampa Bay, Florida. 1332 pages. Doctoral dissertation, University of Florida, Gainesville.

Tebble, N., and S. Chambers

1982. Polychaetes from Scottish Waters, Part I: Family Polynoidae. In *Royal Scottish Museum Studies*, 73 pages, 58 figures. Edinburgh: Royal Scottish Museum.

Treadwell, A.L.

1917. Polychaetous Annelids from Florida, Porto Rico, Bermuda, and the Bahamas. *Papers from the Department of Marine Biology of the Carnegie Institution of Washington*, 11(10)251:255-272, 3 plates.

Uchida, H.

1975. Ectocommensal Polynoids (Annelida, Polychaeta) Associated with

the Echinoderms. *Bulletin of the Marine Park Research Stations*, 1(1):19-30, 6 figures.

Wass, M.L. et al.

1972. Phylum Annelida. In A Check List of the Biota of Chesapeake Bay. *Special Scientific Report Number 65*, pages 113-119. Gloucester Point, Virginia: Virginia Institute of Marine Science.

Weston, D.

1984. Family Polynoidae Malmgren, 1867. In J.M. Uebelacker and P.G. Johnson, editors, *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico*, volume 3, chapter 21, 39 pages, 24 figures. Mobile, Alabama: Barry Vittor and Associates.

Willey, A.

1902. Polychaeta. In *Report on the Collections of Natural History Made in the Antarctic Regions during the Voyage of the "Southern Cross,"* 12:262-283, plates 41-46. London.
1905. Report on the Polychaeta Collected by Professor Herdmen, at Ceylon, in 1902. *Ceylon Pearl Oyster Fisheries*, supplemental report, 4(30):243-324, plates 1-8.

REQUIREMENTS FOR SMITHSONIAN SERIES PUBLICATION

Manuscripts intended for series publication receive substantive review (conducted by their originating Smithsonian museums or offices) and are submitted to the Smithsonian Institution Press with Form SI-36, which must show the approval of the appropriate authority designated by the sponsoring organizational unit. Requests for special treatment—use of color, foldouts, case-bound covers, etc.—require, on the same form, the added approval of the sponsoring authority.

Review of manuscripts and art by the Press for requirements of series format and style, completeness and clarity of copy, and arrangement of all material, as outlined below, will govern, within the judgment of the Press, acceptance or rejection of manuscripts and art.

Copy must be prepared on typewriter or word processor, double-spaced, on one side of standard white bond paper (not erasable), with 1¼" margins, submitted as ribbon copy (not carbon or xerox), in loose sheets (not stapled or bound), and accompanied by original art. Minimum acceptable length is 30 pages.

Front matter (preceding the text) should include: **title page** with only title and author and no other information, **abstract** page with author, title, series, etc., following the established format; table of **contents** with indents reflecting the hierarchy of heads in the paper; also, **foreword** and/or **preface**, if appropriate.

First page of text should carry the title and author at the top of the page; **second page** should have only the author's name and professional mailing address, to be used as an unnumbered footnote on the first page of printed text.

Center heads of whatever level should be typed with initial caps of major words, with extra space above and below the head, but no other preparation (such as all caps or underline, except for the underline necessary for generic and specific epithets). Run-in paragraph heads should use period/dashes or colons as necessary.

Tabulations within text (lists of data, often in parallel columns) can be typed on the text page where they occur, but they should not contain rules or numbered table captions.

Formal tables (numbered, with captions, boxheads, stubs, rules) should be submitted as carefully typed, double-spaced copy separate from the text; they will be typeset unless otherwise requested. If camera-copy use is anticipated, do not draw rules on manuscript copy.

Taxonomic keys in natural history papers should use the aligned-couplet form for zoology and may use the multi-level indent form for botany. If cross referencing is required between key and text, do not include page references within the key, but number the keyed-out taxa, using the same numbers with their corresponding heads in the text.

Synonymy in zoology must use the short form (taxon, author, year:page), with full reference at the end of the paper under "Literature Cited." For botany, the long form (taxon, author, abbreviated journal or book title, volume, page, year, with no reference in "Literature Cited") is optional.

Text-reference system (author, year:page used within the text, with full citation in "Literature Cited" at the end of the text) must be used in place of bibliographic footnotes in all Contributions Series and is strongly recommended in the Studies Series: "(Jones, 1910:122)" or "... Jones (1910:122)." If bibliographic

footnotes are required, use the short form (author, brief title, page) with the full citation in the bibliography.

Footnotes, when few in number, whether annotative or bibliographic, should be typed on separate sheets and inserted immediately after the text pages on which the references occur. Extensive notes must be gathered together and placed at the end of the text in a notes section.

Bibliography, depending upon use, is termed "Literature Cited," "References," or "Bibliography." Spell out titles of books, articles, journals, and monographic series. For book and article titles use sentence-style capitalization according to the rules of the language employed (exception: capitalize all major words in English). For journal and series titles, capitalize the initial word and all subsequent words except articles, conjunctions, and prepositions. Transliterate languages that use a non-Roman alphabet according to the Library of Congress system. Underline (for italics) titles of journals and series and titles of books that are not part of a series. Use the parentheses/colon system for volume (number): pagination: "10(2):5-9." For alignment and arrangement of elements, follow the format of recent publications in the series for which the manuscript is intended. Guidelines for preparing bibliography may be secured from Series Section, SI Press.

Legends for illustrations must be submitted at the end of the manuscript, with as many legends typed, double-spaced, to a page as convenient.

Illustrations must be submitted as original art (not copies) accompanying, but separate from, the manuscript. Guidelines for preparing art may be secured from Series Section, SI Press. All types of illustrations (photographs, line drawings, maps, etc.) may be intermixed throughout the printed text. They should be termed **Figures** and should be numbered consecutively as they will appear in the monograph. If several illustrations are treated as components of a single composite figure, they should be designated by lowercase italic letters on the illustration; also, in the legend and in text references the italic letters (underlined in copy) should be used: "Figure 9b." Illustrations that are intended to follow the printed text may be termed **Plates**, and any components should be similarly lettered and referenced: "Plate 9b." Keys to any symbols within an illustration should appear on the art rather than in the legend.

Some points of style: Do not use periods after such abbreviations as "mm, ft, USNM, NNE." Spell out numbers "one" through "nine" in expository text, but use digits in all other cases if possible. Use of the metric system of measurement is preferable; where use of the English system is unavoidable, supply metric equivalents in parentheses. Use the decimal system for precise measurements and relationships, common fractions for approximations. Use day/month/year sequence for dates: "9 April 1976." For months in tabular listings or data sections, use three-letter abbreviations with no periods: "Jan, Mar, Jun," etc. Omit space between initials of a personal name: "J.B. Jones."

Arrange and paginate sequentially every sheet of manuscript in the following order: (1) title page, (2) abstract, (3) contents, (4) foreword and/or preface, (5) text, (6) appendixes, (7) notes section, (8) glossary, (9) bibliography, (10) legends, (11) tables. Index copy may be submitted at page proof stage, but plans for an index should be indicated when manuscript is submitted.

