A Restudy of the Amphiatlantic Ostracode *Philomedes brenda* (Baird, 1850) (Myodocopina)

LOUIS S. KORNICKER

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 358

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ABSTRACT

Kornicker, Louis S. A Restudy of the Amphiatlantic Ostracode *Philomedes brenda* (Baird, 1850) (Myodocopina). *Smithsonian Contributions to Zoology*, number 358, 28 pages, 9 figures, 1 table, 1982.—A supplementary description of *Philomedes brenda* (Baird, 1850), the type-species of *Philomedes*, is given based on specimens from Norway, Greenland, and the northwest Atlantic. The findings are compatible with the conclusions of others that the species is amphiatlantic in distribution. Its southernmost distribution in the western Atlantic is about 44°N, and in the eastern Atlantic in the vicinity of England about 54°N, possibly 50°N. The species appears to be the only circumpolar member of the superfamily Cypridinacea, but may not be present in the deeper waters of the Arctic Ocean. *Philomedes albatross*, a new species previously referred to *P. brenda*, from the northwest Atlantic is described and illustrated.

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Contents

A Restudy of the Amphiatlantic Ostracode *Philomedes brenda* (Baird, 1850) (Myodocopina)

Louis S. Kornicker

Introduction

A study of specimens of *Philomedes brenda*, the type-species of the genus *Philomedes*, from western Norway and Greenland became necessary when I found that the excellent description of the species by Skogsberg (1920:391) erred in a small but significant detail (see "Remarks Concerning Pegs Opposite Comb of 7th Limb," p. 9). Then, in samples from off Nova Scotia and Newfoundland from which Hulings (1967:311) had tentatively identified *P. brenda*, I found 2 outwardly similar species of *Philomedes*—one of these being *P. brenda*, the other a new species, *P. albatross*, described herein. This discovery made it necessary to reexamine specimens in Smithsonian collections from Greenland that were listed by Elofson (1941:234) as *P. brenda* (or as its junior synonym *P. globosus*), and additional specimens from Greenland and the Foxe Basin, Northwest Territories, that had been identified by Willard Tressler as *P. brenda* but not published; I concur with their identifications. Also reexamined and referred to *P. brenda* is a specimen from Grand Manan, Nova Scotia, described by Stimpson (1854:39) as *Cypridina excisa*.

ACKNOWLEDGMENTS.—I wish to thank Ms. Joan Ellis, The British Museum (Natural History), for a specimen from Grand Manan, Dr. Lars Wallin, Zoological Museum, Uppsala University, Sweden, for specimens from Greenland, Norway, and Sweden, Drs. Stephen Campbell, Douglas Markle, and D.B. Yurick, The Huntsman Marine Laboratory, St. Andrews, New Brunswick, Canada, for specimens from off Nova Scotia, and members of the Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York, for specimens from off Newfoundland and Cape Breton Island. My thanks also to Mrs. Carolyn Bartlett Gast for rendering the shaded drawing on Figure 5, and to Dr. I. Gregory Sohn and Mrs. Anne C. Cohen for reviewing the manuscript. My appreciation also to Jack Korytowski, Smithsonian Institution Press, for editing and preparing the manuscript for publication.

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Station Data with Specimens Collected

The Smithsonian collections contain specimens in alcohol that had been collected by Captain R.A. Bartlett in the vicinity of Greenland and Foxe Basin, Northwest Territories. All had previously been identified as *Philomedes globosus* either by Dr. Olof Elofson or Dr. W.R. Tressler. All the specimens studied by Elofson were from either Murchison Sound or Inglefield Gulf (Elofson, 1941:237; 1969:15). The specimens identified by

Tressler are unpublished, but his name appears on the museum labels. I reexamined the specimens and refer them herein to *Philomedes brenda*. Because Elofson omitted from his publication details of the station data, I include below the specimens previously studied by Elofson as well as those studied by Tressler. Specimens with USNM numbers beginning with 7 are those identified by Elofson, those beginning with 8 by Tressler. Determinations of sex and maturity are mine.

Sta 134; 7 Aug 1938; walrus grounds, Murchison Sound, N.W. Greenland, about 77°42′N; collected in otter trawl.
Philomedes brenda: 1 adult male (USNM 77792A), 3 specimens (USNM 77792B).

Sta 135; same data as sta 134.
Philomedes brenda: 5 specimens (USNM 77793).

Sta 136; same data as sta 134.
Philomedes brenda: 1 adult female (USNM 77794).

No sta no.; 20 Aug 1926; Murchison Sound; dredge.
Philomedes brenda: 1 juvenile (USNM 77790).

Sta 97, 1 Aug 1938; Inglefield Gulf, N.W. Greenland, just off "Karnah," 77°28′N, 69°W; washed from shells brought up in dredge.
Philomedes brenda: 2 specimens (USNM 77791).

Sta 14; date unknown; N.E. Greenland.
Philomedes brenda: 1 ovigerous female (USNM 81640A), 1 adult female (USNM 81640B).

No sta no.; 18–19 Jul 1926; Duck Island, Melville Bay, N.W. Greenland; net out 18 hours.
Philomedes brenda: 2 adult males (USNM 81638A,B).

No sta no.; 16 Aug 1926; Northumberland Island, N.W. Greenland.
Philomedes brenda: 5 specimens (USNM 81635).

No sta no.; 20 Aug 1926; Murchison Sound, N.W. Greenland; dredge.
Philomedes brenda: 1 juvenile (USNM 81636).

No sta no.; 21 Aug 1926; Murchison Sound, N.W. Greenland, 37 m; net down 1 hour while ship drifting with current.
Philomedes brenda: 1 juvenile (USNM 81637).

No sta no.; 30 Aug 1930; Angmagssalik, east Greenland; dredge.
Philomedes brenda: 1 early instar (USNM 81641).

No sta no.; 12 Aug 1927; Foxe Basin, south part, 66°43′N, 80°07′W; 58.5–67.7 m; dredge.
Philomedes brenda: 1 ovigerous female (USNM 81642A), 1 adult male (USNM 81642B), 12 specimens (USNM 81642C); 2 specimens (USNM 81642D).

No sta no.; 13 Aug 1927; Foxe Basin, southeast corner, 66°46′N, 79°15′W; 62.2–67.7 m; dredge down 16 hours.
Philomedes brenda: 1 ovigerous female (USNM 81643A), 10 specimens (USNM 81643B). A note in the vial states that Snodgrass was given 2 specimens on 19 Apr 1948, and 1 additional specimen on 4 May 1948. These most likely are specimens of "*Philomedes globosa*" and "*Philomedes globosus*" discussed and illustrated in Snodgrass (1950:9, fig. 2F,G; 1951:11, 14, fig. 3; 1956:20, fig. 5C,F,G).

R/V *Vema*; Collected by personnel of the Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York. All samples collected with small bottom trawl.

Cruise 16

Sta V-16-45; 15 Aug 1960; off Newfoundland, 50°53′N, 52°26′W; 265 m.
Philomedes brenda: 2 ovigerous females (USNM 157951A, B); 35 specimens (USNM 157952).

Sta V-16-58; 1 Sep 1960; off Labrador, 55°26′N, 58°0.9′W; 95–95 m.
Philomedes albatross: 1 ovigerous female (USNM 157949); 18 specimens (USNM 157950).

Sta V-16-59; 1 Sep 1960; off Labrador, 55°00′N, 57°57′W; 91–91 m.
Philomedes albatross: 2 A-1 males (USNM 157943A, B); 5 early instars (USNM 157943C).

Sta V-16-63; 6 Sep 1960; off Newfoundland, 51°09′N, 57°23′W; 91–91 m.
Philomedes albatross: 2 ovigerous females, 1 adult female (USNM 157944, 157945, 157948); 110 specimens (USNM 157946).

Sta V-16-64; 8 Sep 1960; off Cape Breton Island, 46°53′N, 58°31′W; 448–448 m.
Philomedes brenda: 1 ovigerous female, 1 A-1 male (USNM 157941A, B).
Philomedes albatross: 2 ovigerous females (USNM 157942A, C); 1 juvenile (USNM 157942B).
Philomedes species (juveniles of *P. brenda* and *P. albatross*): 56 specimens (USNM 157947). These specimens not listed in descriptions of species herein or indicated on maps.

Cruise 17

Sta V-17-114; 23 Aug 1961; off Cape Breton Island, 46°39′N, 58°40′W, 412–408 m.
Philomedes brenda: 1 ovigerous female (USNM 157953).

U.S. Fish Commission Steamer *Albatross*, off Nova Scotia.

Sta 2466; 3 Jul 1885; 45°29′00″N, 55°29′00W; 122.5 m; surface temperature 11.7°C, bottom temperature −1.1°C; ship dredge with mud box.
Philomedes brenda: 1 A-1 female (USNM 158229), 12 specimens (USNM 157940).

Sta 2490; 6 Jul 1885; 45°27′30″N, 58°27′45″W; 91.4 m; dredge.

Philomedes albatross: 1 adult female (USNM 158030).

M/V *Canso Condor*, Cruise CCO1, sta 111, set 96; 7 Mar 1977; off Nova Scotia, 44°00′N, 63°30′W; surface tow with meter net, mesh 0.471 mm.; bottom depth 173.7 m; received from Stephen Campbell, Douglas Markle, and D.B. Yurick, The Huntsman Marine Laboratory, St. Andrews, New Brunswick, Canada.

Philomedes brenda: 2 adult males (USNM 157873, 157932).

Grand Manan (island at the mouth of the Bay of Fundy); collected by William Stimpson in summer of 1852; water depth 7–9 m.

Philomedes brenda: 1 ovigerous female (British Museum, Natural History, number 1857.118: labeled *Cypridina excisa*).

Off Hopedale, Labrador; date unknown; about 55°30′N, 59°W; water depth 18 m; collected by A.S. Packard.

Philomedes albatross: 1 ovigerous female (USNM 119445-466).

Philomedes Liljeborg, 1853

Philomedes Liljeborg, 1853:175.
Bradycinetus Sars, 1866:109 [preprint 1865].

TYPE-SPECIES.—*Philomedes longicornis* Liljeborg, 1853:176 [=*Cypridina Brenda* Baird, 1850].

Philomedes brenda (Baird, 1850)

FIGURES 2–4

Cypridina Brenda Baird, 1850a:181, pl. 23.—Sutherland, 1852: 203.
Cypridina globosa Liljeborg, 1853:171, pl. 17: figs. 2–10; pl. 18: figs. 1–3, 7.—Grube, 1859:322, pl. 12, fig. 1; 1861:93, pl. 5: fig. 1.—Sars, 1863:252.—Lönnberg: 1903:51.
Philomedes longicornis Liljeborg, 1853:176, pl. 22: figs. 4–6, 14–16.—Baird, 1860:202, pl. 71: figs. 5a-c.—Sars: 1866:107 [preprint 1865].
Cypridina excisa Stimpson, 1854:39, fig. 28.—Whiteaves, 1901:217.
Asterope Groenlandica Fischer, 1855:660, pl. 20: figs. 26–34.
Cypridina isabella Baird, 1860:202 [manuscript name].
Bradycinetus globosus.—Sars, 1866:110 [preprint 1865].
Bradycinetus Brenda.—Brady, 1868a:128.—Brady and Robertson, 1876:187.—Norman, 1877:206.
Bradycinetus brenda.—Brady, 1868b:466, pls. 33: figs. 1–5, 41: fig. 5; 1880:153, 159 [excluding Bay of Biscay].—Brady and Robertson, 1872:70.
Philomedes globosus.—Sars, 1869:355; 1922:12, pl. 5–7.—Lilljeborg, 1876:3.—Hansen, 1887:255.—Aurivillius, 1896: 195, 211.—Stephensen, 1912:551; 1929:1, 5; 1936:18; 1938:2, 17, 18.—Broch, 1927:9.—Klie, 1929:2, 3, figs. 1, 2.—Blake, 1933:230 [questionable identification].—Akatova, 1957:428.—Elofsson, 1966:54, 55, 57, 63, 64.—Hulings, 1967:311 [part].—Bossanyi, 1967:43.—Perkins, 1974:225.
Philomedes brenda.—Sars, 1872:280; 1886:74; 1890:15; 1909:40.—Norman, 1891:119, 121.—Brady and Norman, 1896:654. pl. 51: figs. 1–3, pl. 56: figs. 1–3.—Vanhöffen, 1897:285, 291, pl. 1: fig. 3.—Müller, 1898:40, figs. 1–3; 1901:10, figs. 18, 19; 1912:32 [part]; 1931:23.—Scott, 1899:89; 1901:349; 1905:228.—Brady, 1903:99.–Conseil Permanent International pour l'Exploration de la Mer, 1903: pt. B 200, 206, pt. D 255–257, 276, 277, 303, 305; 1904: pt. B 62, 80–82, pt. C 4, pt. D 26, 27, 58, 120, 121, 144, 156, 157, 162, 163, 226, 236; 1905: pt. B 101, pt. D 148, 149, 183. 1906: 97. 1909:114.—Schmitt, 1904:255.—Nordgaard, 1905:40.—Linko, 1907:195, 220.—Sharpe, 1908:428, pl. 65: figs. 1, 2.—Norman and Brady, 1909:359.—Paulsen, 1909:38.—Deryugin, 1915:147.—Stephensen, 1917a [1913 appears on title page]:353; 1917b [preprint 1916]:306.—Ostenfeld, 1931:641.—Sylvester-Bradley, 1950:777.—Iles, 1963:111.—Neale, 1965:259, 268.—Puri, 1971:165.
Philonedes brenda.–Conseil Permanent International pour l'Exploration de la Mer, 1903: pt. B 207, 208, pt. D 244, 245, 302, 303.
Philomedes Brenda.—Apstein, 1911:168, pl. 23: map 4.
Philomedes (Philomedes) globosa.—Skogsberg, 1920:381, figs. 66–69.
Philomedes globosa.—Soot-Ryen, 1927:18.—Fage, 1934:251, 255–258, 260.—Granata and Caporiacco, 1949:8, 38 [part], 44, 49, 50, pl. 1: fig. 4, pl. 4: figs. 1–6.—Poulsen, 1962:346.
Cypridina norvegica.—Spärck, 1937:26 [ident. by Stephensen, 1938:2 as *P. globosus*].
Philomedes (Philomedes) globosus.—Elofson, 1941:234; 1943:2, 3; 1969:12.—Hagerman, 1965:49, 52, 53, 65, 66.
Philomeeds globosus.—Neale, 1965:259.

LECTOTYPE.—Dried and broken carapace, in British Museum (Natural History), B.M. no. 1945.9.26 91; by subsequent designation (Sylvester-Bradley, 1950:777).

TYPE-LOCALITY.—20 mi [32.19 km] east of Noss, Shetland Islands, depth 146–164 m.

MATERIAL.—Through the courtesy of Dr. Lars Wallin, Zoological Museum, Uppsala University, Sweden, I received a vial with 4 specimens in alcohol and containing 2 labels: 1, "Uppsala Univ. Zool. Mus. Typsamlingen, nr 469," and 2, "*Cypridina globosa*, Grönland, U. Kröyer dedit., No. 3501." According to Dr. Wallin the specimens are syntypes of *Philomedes globosus* (Liljeborg, 1853). He also stated (in litt., 1979) that no specimens from Scandinavia that can be referred to Lilljeborg's paper of 1853 are in the museum's collection. I examined 1 adult female from this vial and made 2 slides of the mandibles and 7th limbs. The specimen is designated UUZM 3501, number 1, herein briefly described. All specimens have been returned to Uppsala.

I also received from Dr. Wallin, a vial containing numerous specimens in alcohol and 3 labels: 1, "Uppsala Univ. Zool. Mus.," 2, "Lilljeb. saml., No. 3499," and 3, "*Cypridina globosa* Bergen i Norge. 1858, Lillj. No. 3499." I examined 2 adult females and designated them UUZM 3499, numbers 1 and 2, and briefly describe them herein. Some of the appendages were mounted on 4 slides. All the specimens have been returned to Uppsala. According to Dr. Wallin (in litt. 1979) these specimens had been examined by Lilljeborg. Also received were vials containing specimens of *Philomedes globosus* from the Skagarrack worked on by Elofson (1941). The 7th limbs of 2 of these specimens were examined and found to conform with those from Norway and Greenland, but are not described further herein.

Greenland and Foxe Bay, Northwest Territories (collected by Captain R.A. Bartlett): USNM 77792A, 1 adult male, USNM 77792B, 3 specimens, sta 134; USNM 77793, 5 specimens, sta 135; USNM 77794, 1 adult female, sta 136; USNM 77790, 1 juvenile, Murchison Sound; USNM 77791, 2 specimens, sta 97; USNM 81640A, 1 ovigerous female, USNM 81640B, 1 adult female, N.E. Greenland; USNM 81638A, B, 2 adult males, Melville Bay; USNM 81635, 5 specimens, Northumberland Island; USNM 81636, 1 juvenile, Murchison Sound; USNM 81637, 1 juvenile, Murchison Sound; USNM 81641, 1 early instar, Angmagssalik; USNM 81642A, 1 ovigerous female, USNM 81642B, 1 adult male, USNM 81642C, 12 specimens, USNM 81642D, 2 specimens, Foxe Basin; USNM 81643A, 1 ovigerous female, USNM 81643B, 10 specimens, Foxe Basin.

Nova Scotia: USNM 158229, 1 A-1 female, USNM 157940, 12 specimens, U.S. Fish Commission Albatross, sta 2466; USNM 157873, 157932, 2 adult males, M/V *Canso Condor*, sta 111. Cape Breton Island and Newfoundland, R/V *Vema*: USNM 157951A, B, 2 ovigerous females, USNM 157952, 35 specimens, sta V-16-45; USNM 157941A, B, 1 ovigerous female, 1 A-1 male, sta V-16-64; USNM 157953, 1 ovigerous female, sta V-17-114.

Grand Manan: British Museum (Natural History) number 1857.118, 1 ovigerous female. This specimen had been identified as *Cypridina excisa* Stimpson by Stimpson (1854:39).

REMARKS CONCERNING SYNONYMY.—The argument by Skogsberg (1920:396) for not considering *Philomedes globosa* (Liljeborg, 1853) to be a junior synonym of *Philomedes brenda* (Baird, 1850a), because the description and illustrations of Baird (1850a:181, pl. 23) indicate that the species are not conspecific, became moot when Sylvester-Bradley (1950:777) selected a lectotype for *P. brenda*. Unfortunately, the lectotype is a "dried and broken carapace" so that despite the assurances of Sylvester-Bradley that *P. brenda* and *P. globosa* are conspecific, doubt will remain. Nevertheless, I have accepted Sylvester-Bradley's conclusion that *P. globosa* is a junior synonym of *P. brenda*.

Hulings (1967:311) tentatively identified as *Philomedes globosus* specimens collected at 6 R/V *Vema* stations off Newfoundland and Labrador. His identified specimens could not be located; however, the Smithsonian collections contain samples collected at 4 of the 6 stations listed by Hulings. One of the samples (from sta V-16-64) contains *Philomedes brenda* plus a new species of *Philomedes*, but the remaining 3 samples contain only the new species. Therefore, in the above

synonymy of *P. brenda* I have listed Hulings' identifications as "part."

I concur with most referrals in the synonymy of *Philomedes globosa* of Skogsberg (1920:381, 382). An exception is *Philomedes brenda* identified by Sharp (1908) from the Gulf of St. Lawrence, which was excluded by Skogsberg because the shell illustrated by Sharp differs in shape from that of *P. brenda.* I include Sharp's identification in the synonymy because of finding in the present study only 2 species of *Philomedes* in the general area, and the large size of Sharp's specimen suggest that it is *P. brenda.* I have assumed that the shell was not accurately drawn by Sharp. Sharp's specimen could not be located for examination. I include in the synonymy *Cypridina excisa* Stimpson (1854:39), from Grand Manan, although Skogsberg (1920:398) omitted the species because Stimpson's illustration does not resemble *Philomedes.* I do so because the shape and size of an ovigerous female of the type-series at the British Museum is similar to that of *P. brenda*; its shape does not closely resemble that illustrated by Stimpson. Additional specimens studied by Stimpson could not be located. I question Blake's (1933:230) identification of *Philomedes globosus* from Maine. I have been unable to locate these specimens.

Brady (1871:292) identified specimens from the Bay of Biscay as *Bradycinetus brenda* but later Brady and Norman (1896:650) referred them to *Cypridina mediterranea* Costa, 1845. Both Skogsberg (1920:399) and Fage (1934:255) agree that the specimens are not members of *Philomedes.* Later references to *Philomedes brenda* in the Bay of Biscay are apparently based on the original misidentification of Brady (1871:292). These are Brady (1872:53–59) as *Bradycinetus Brenda*, Brady (1879:213) as *Philomedes Groenlandica* and *Bradycinetus Brenda*, and McKenzie et al. (1979:8) as *Philomedes brenda.* Müller (1912:32) included Brady's (1871:292) specimens of *Bradycinetus brenda* from the Bay of Biscay in the synonomy of *Philomedes brenda*, but he (p. 11) also included the same specimens in the synonomy of *Cypridina mediterranea.* Müller (1912:32) questionably included Brady's (1879:213) specimens of *Philomedes groenlandica* (Fischer, 1855:660) in the synonomy of *Philomedes brenda.* I hereby refer these identifications to Cypridininae genus and species indeterminate, because the information is inadequate to refer them to a particular genus.

I am referring both *?Philomedes interpuncta* (Baird, 1850b:257) and *Bradycinetus* species identified by Brady (1870:450) from the Gulf of St. Lawrence to *Philomedes* species indeterminate, because *P. interpuncta* has not been subsequently identified from that vicinity, and *Bradycinetus* is a junior synonym of *Philomedes.*

Granata and Caporiacco (1949:38) list *Philomedes globosa* as having been collected at station 1101 (43°02′N, 8°42′15″E) which is in the Mediterranean Sea. On page 8 of the same paper, however, where the species is discussed, station 1101 is not one of the stations listed, and the Mediterranean is not given as one of the localities. Because of the discrepancy, and because *P. brenda* has not been reported from the Mediterranean by others, I hereby refer the specimens collected at station 1101 to *Philomedes* species indeterminate, and do not recognize *P. brenda* occurring in the Mediterranean. In the synonomy of *P. brenda* presented herein the specimens of Granata and Caporiacco are listed as "part."

The species *Philomedes brenda* is recorded in the literature more than any other member of the Cypridinacea. In a card file being prepared for publication of the Cypridinacea in *Crustaceorum Catalogus*, the species name in one of its forms appears on 175 cards (Cohen and Kornicker, in prep.). Many of the older references, which contain identifications made at a time when anatomical details of the Cypridinacea were not well known, as well as references merely noting that the species has been collected in geographic areas where it has previously been reported, and also references that are not based on new collections or identifications, are omitted from the synonomy. On the other hand, some of the references included in the synonomy are based on the species having been listed in the literature without adequate documentation as to the correctness of the

identification and, therefore, are subject to change should the original material be restudied.

DISTRIBUTION.—Based only on published reports that may be viewed with some degree of confidence, the southern limit of *P. brenda* in the eastern Atlantic and North Sea appears to be about 54°N (Figure 1). On the Atlantic side of England, the southernmost locality is the Isle of Man (about 54°N) (Iles, 1963:111). In addition to many earlier reports of *P. brenda* at 54°–56°N in the North Sea off England is that of Bossanyi (1967:43), who collected a specimen on the bottom of Cambois Bay (about 55°10′N). Earlier reports include Norman (1863:266; 1865:26), Brady (1868b:467; 1903:90, 99, 100), Brady and Robertson (1876:187), Brady and Norman (1896:655), Norman and Brady (1909:359), Apstein (1911:168, pl. 23: fig. 4). Some reports suggest that *P. brenda* may at times be collected farther south than 54°N—to about 50°N. For

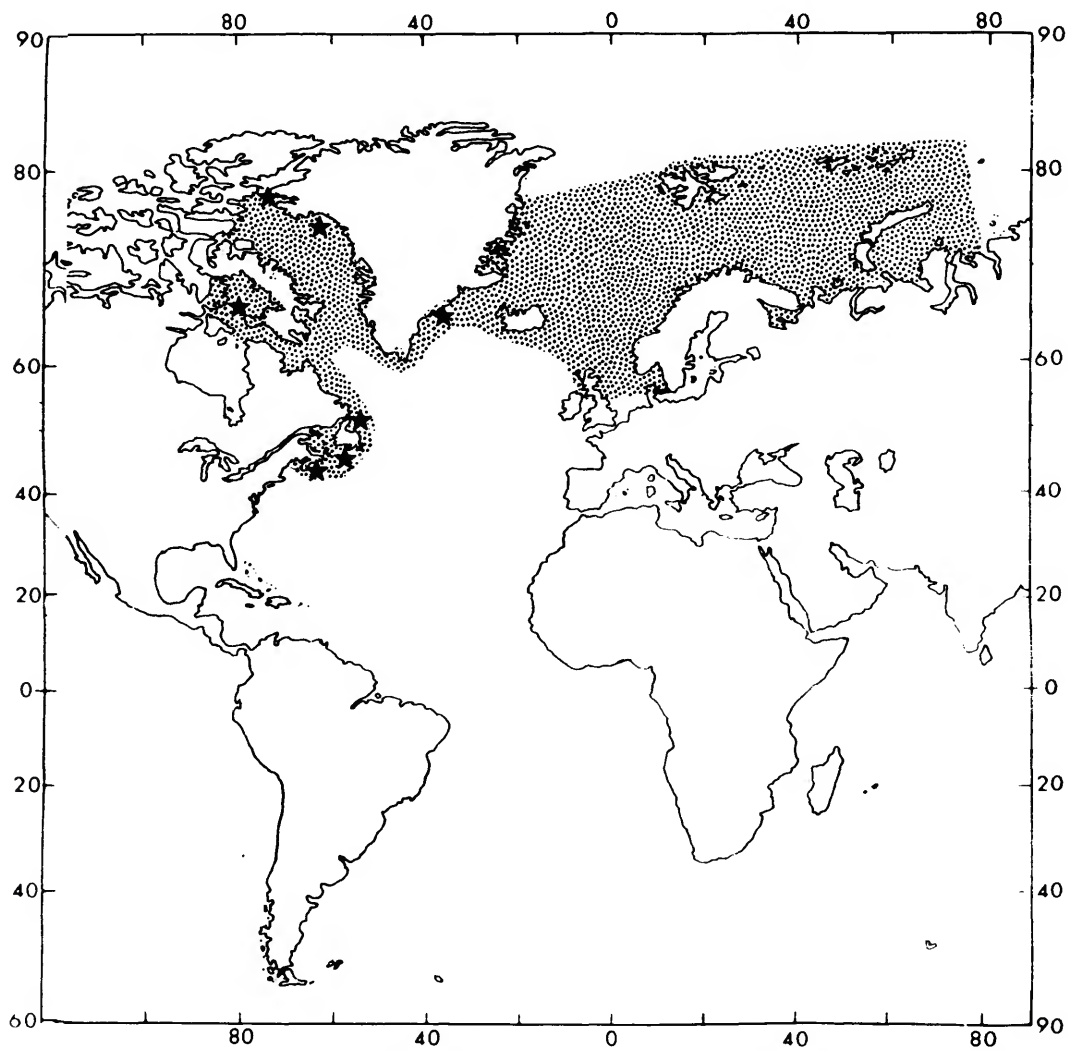

FIGURE 1.—Distribution of *Philomedes brenda* (stars = new data).

example, Stephensen (1938:3) states that *P. brenda* extends south to the Sound, Great Britain; if the "Sound" refers to Plymouth Sound, the range is extended to about 50°20'N. Klie (1944:4) reports *P. brenda* in both the southern and northern parts of the North Sea, but I know of no data supporting the occurrence of the species in the North Sea south of about 54°N. According to Bate (in litt., 1981), the specimen of *P. brenda* sectioned for a study of the ostracode carapace (Bate and East, 1972:189) came from the Scilly Isles, which are just south of 50°N, southwest of Lands End, England.

In the western Atlantic the southernmost locality at which the species has been collected is off Nova Scotia (44°00'N, 63°30'W) in a surface net. But bottom specimens have been collected off Nova Scotia only north of about 44°40'N (Grand Manan, N.S.). Blake's (1933:230) bottom specimens, whose identity requires confirmation, were collected off the Mount Desert Region, Maine, at a latitude of about 44°N. Benthic collections probably more accurately record where populations normally live, because when the adults rise to the surface during breeding season, currents may sweep them into unfavorable environments.

The species has been reported from the northern coast of Russia as far west as the vicinity of Novaya Zemlya and the Kara Sea, and from many subarctic and arctic islands (Elofson, 1969:14, 15, fig. 7). The approximate known range of the species is shown in Figure 1. In addition, but not shown on Figure 1, the species occurs in the Beaufort Sea (Kornicker and Cohen, in prep). As suggested by Elofson (1969:15) the species is probably circumpolar. It may be restricted, however, to the shelf and upper slope of seas bordering the Arctic Ocean because no specimens were collected in plankton from 3 drifting Arctic ice islands, (ARLIS-I, ARLIS-II, and T-3 (Fletcher's Island)) (Leung, 1975:45). Bottom samples are required to confirm the distribution of the species in the Arctic Ocean, because *P. brenda* is seldom encountered in plankton, even in areas where it is abundant in the benthos (see discussion by Skogsberg, 1920:364).

Elofson (1969:15) observed that in Arctic waters *P. brenda* had been collected at depths of 3–300 m, and probably as deep as 500 m, and in boreal regions (Skagerrack) at depths of 13–358 m. He (p. 15) considered the rarity of this species in the Skagerrack above depths of 40–50 m to be the result of boreal submergence. In the new localities reported herein, where depth is known, *P. brenda* was collected on the bottom in the vicinity of Greenland at a single station at 37 m; and in the Foxe Basin, Northwest Territories, at 2 stations at depths of 58.5–67.7 m. At 1 station in the vicinity of Newfoundland the species was collected on the bottom at 265 m. At 3 stations in the vicinity of Nova Scotia, the species was collected on the bottom at depths of 122.5–448 m. Two adult males were captured in a surface tow off Nova Scotia where the bottom depth is 173.7 m. Blake (1933:230) reported the species on the bottom in 13.7–18.3 m off Maine, but the identification requires confirmation. Stimpson reported the species (as *Cypridina excisa*) at a water depth of 7–9 m off Grand Manan, Nova Scotia. Schmitt (1904:255) reported the species in 2 bays of Anticosti Island in the Gulf of St. Lawrence. He did not mention either collecting depths, or sex and stage of maturity of specimens, and his identifications require confirmation. The known depth range of the species in the vicinity of Maine, Nova Scotia, and Newfoundland is 7–448 m, more-or-less shelf to upper slope depths.

Norman (1891:108) collected *Philomedes brenda* in several fiords along the eastern edge of "East Finmark" [Finnmark], Norway, which forms a small part of the western boundary of the Barents Sea. Elofson (1941:237) referred to the locality as "Ostfinmarken," but on page 14 in the 1969 English translation of Elofson's publication, the locality was mistranslated as "eastern Finland." A similar error apparently was made by Müller (1901:10) as previously noted by others (Apstein, 1911:168; Skogsberg, 1920:402). The species is not known to occur in the vicinity of Finland.

The locality MacKenziebucht (Elofson,

1941:237), which appears as Mackenzie Bay in the 1969 English translation (p. 15), is on the eastern coast of Greenland (73°25'N, 21°30'W), and should not be confused with MacKenzie Bay on the Beaufort Sea, which was not visited by the Swedish Arctic Expedition, 1900. The name used by the U.S. Board on Geographic Names for the Greenland bay is MacKenzie Bugt ["bugt" being the local term for bay] (Dr. R. Randall, U.S. Board on Geographic Names, pers. comm.).

VARIABILITY IN SIZE.—Skogsberg (1920:382) recorded the length of the female carapace as 2.3–3.1 mm, but observed that specimens are larger at high latitudes. Specimens from the Skagerrak averaged about 2.4–2.6 mm in length, whereas specimens from Greenland and Spitzbergen had carapaces as long as 2.9–3.1 mm. In the present study the 2 measured females from off Bergen, Norway (about 60°23'N) have lengths of 2.55 mm and 2.63 mm (Table 1). The 5 females from Greenland and the Northwest Territories (66°43'–77°42'N) have lengths of 2.70–2.87 mm. The lengths of the 5 females from off Nova Scotia and Newfoundland (44°40'–50°53'N) have lengths of 2.77–2.85 mm. Thus, the increase in size at higher latitudes does not appear to take place in the western Atlantic. Although the data are few, the lengths of adult males apparently are also unaffected by latitude in the western Atlantic (Table 1). Perkins (1974:225) attributed the larger size of *P. brenda* in the vicinity of Greenland to the waters there being colder than in the North Sea and Skagerrak. That hypothesis is not upset by the large size of the specimens off Nova Scotia and Newfoundland where water temperatures, because of the southward moving Labrador Current, are lower than in the vicinity of Scandinavian countries bathed by the relatively warm Norwegian Current (see Hazel, 1970:E3–E11; Briggs, 1974:254). Although it is probable that the difference in size between the Scandinavian and colder water populations is the result of temperature, the possibility of genetic differences between the populations should not be discounted. Because the species is abundant in seas around Sweden and Norway, as well as around Greenland, it may be an ideal subject for comparative studies of chemistry and chromosomes. Breeding experiments, behavioral studies, and more detailed morphological analyses may also be in order. If size should be found to reflect genetic differences, it may be concluded that the western Atlantic population is more closely related to the cold-water Greenland and Spitsbergen populations than to the Scandinavian population.

TABLE 1.—Lengths of adult males and females at localities studied herein (n.d. = no data)

Locality	*Latitude (N)*	*Depth (m)*	*Carapace length (mm)*	
			Females	*Males*
Greenland, NW Territories and Western Atlantic				
Greenland	n.d.	n.d.	2.73	n.d.
N.W. Greenland	77°42'	n.d.	2.84	2.77
N.W. Greenland	74°01'	n.d.	n.d.	2.73, 2.82
N.E. Greenland	n.d.	n.d.	2.85	n.d.
Foxe Basin	66°46'	62.2–67.7	2.70	n.d.
Foxe Basin	66°43'	58.5–67.7	2.87	2.87
Newfoundland	50°53'	265	2.77, 2.79	n.d.
Nova Scotia	46°53'	448	2.85	n.d.
Nova Scotia	46°39'	408–412	2.84	n.d.
Grand Manan	44°40'	7–9	2.81	n.d.
Nova Scotia	44°00'	surface	n.d.	2.78, 2.97
Eastern Atlantic				
Bergen, Norway	~60°23'	45	2.55, 2.63	n.d.

REMARKS CONCERNING PEGS OPPOSITE COMB OF 7TH LIMB.—Skogsberg (1920:391, fig. 69: 16) described the pegs opposite the comb of the female 7th limb as follows: "Dorsally of the end comb there are a number (seven to nine, in most cases eight) of rather low, smooth, chitinous pegs, in most cases arranged in two irregular parallel rows running longitudinally." His figure of the pegs agrees with the description.

The specimens of *P. brenda* that I initially studied had been collected in the northwestern Atlantic in the vicinity of Nova Scotia and Newfoundland. These differed slightly from Skogsberg's description. One of the pegs opposite the comb of the 7th limb differed from the remaining pegs, generally in being narrower and in bearing a more rounded tip. On some specimens the narrow peg was slightly longer than the others and appeared more strongly sclerotized (based on its being slightly amber in color, rather than colorless like the others). A study of pegs of the 7th limbs of specimens from the localities studied by Skogsberg revealed that, contrary to Skogberg's description, one of the pegs differed from the others in a way similar to pegs of the specimens from the northwest Atlantic.

DESCRIPTION OF ADULT MALE FROM NOVA SCOTIA (Figure 2*a-i*).—Shape of carapace and ornamentation approximately similar to that described and illustrated by Skogsberg (1920:392, fig. 66: 1,2 and shown herein, Figure 2*a,h*).

Infold: Rostral infold with about 23 bristles; 1 small bristle present at inner end of incisur; anteroventral infold with about 9 bristles forming row along list; posterior infold with numerous bristles along list forming groups of 1–6 bristles (Figure 2*b*); 4 small bristles between list and posteroventral corner of valve (caudal process) (Figure 2*b*); 1 fairly long bristle on list near middle of posterior valve margin; no "pocket" on infold of caudal process.

Selvage: About 10 stout hairs with bases on lateral side near middle present along anteroventral selvage; no hairs with bases on medial side as on female *Philomedes dentata* Poulsen, 1962 (fig. 152c).

Central Adductor Muscle Attachments (Figure 2*i*): Consisting of elongate and oval scars.

Size: USNM 157873, length 2.78 mm, height 1.63 mm; USNM 156932, length 2.97 mm, height 1.71 mm.

First Antenna: Similar to 1st antenna described by Skogsberg (1920:392, fig. 67: 8,9) with following exceptions: dorsal bristle of 4th joint extending just past distal margin of 8th joint rather than just past distal end of 6th joint; sensory bristle of 5th joint with 5 rather than 4 terminal filaments (Skogsberg, p. 392, describes 4 distal filaments, but shows 5 on illustration (fig. 67: 9)), b-bristle of 7th joint with 2nd filament closer to tip of bristle, and tip with 4 (Figure 2*c*) rather than 5 terminal filaments (Skogsberg, p. 392, describes 4 distal filaments, but shows 5 on illustration (fig. 67: 9)).

Second Antenna: Similar to that described by Skogsberg (1920:392, fig. 67: 10,11).

Mandible: Similar to that described by Skogsberg (1920:393, fig. 68: 13). Exopodite: On USNM 157873 distal bristle 83–100 percent, of length of exopodite, and proximal bristle 119–125 percent, both bristles bare (Figure 2*d,e*). 3rd endopodial joint: all three claws with fine teeth forming short rows on both medial and lateral sides of claws except near tip (Figure 2*f*).

Maxilla: Limb similar to that described by Skogsberg, 1920:394), also with only 4 beta-bristles on 1st endopodial joint. (Endite bristles not counted.)

Fifth Limb: Similar to that described by Skogsberg (1920:394, fig. 68: 15). Epipodial appendage with 54 bristles (USNM 157873).

Sixth Limb: The number of bristles on endites I-IV similar to that of the female described by Skogsberg (1920:390). End joint of USNM 157873 with 18–21 bristles, and 3 bristles in place of epipodial appendage.

Seventh Limb: With total of 28–31 bristles: 16 on peg side (dorsal), and 12–15 on comb side (ventral); each bristle with up to 7 bells and generally without marginal spines. Terminus with comb bearing 6–7 teeth, some alate proximally and spinous distally; 4 pegs opposite comb,

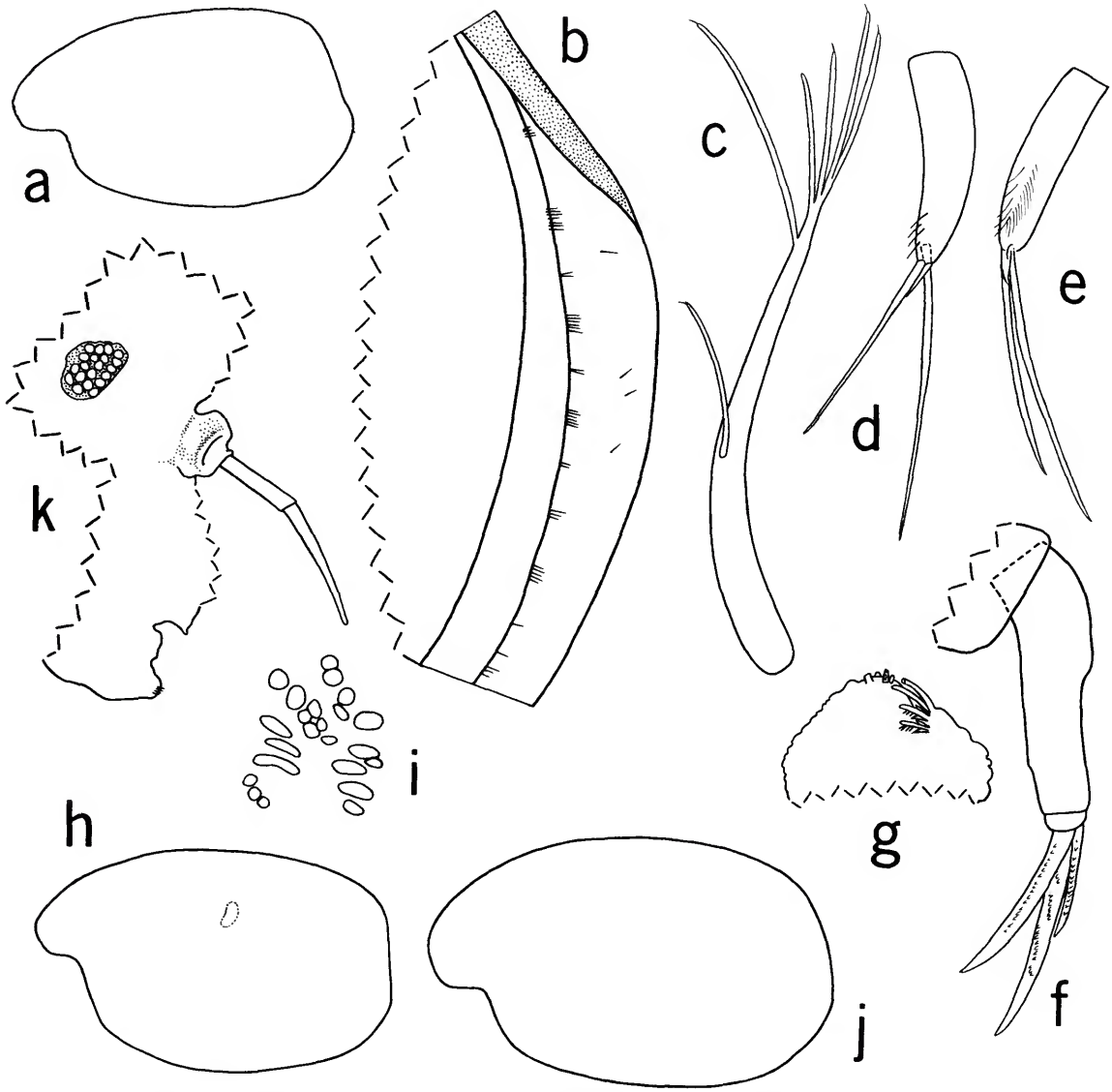

FIGURE 2.—*Philomedes brenda*, adult males. USNM 157873, from Nova Scotia: *a*, lateral outline of complete carapace, length 2.78 mm; *b*, posterior of right valve, from inside; *c*, b-bristle of 7th joint of right 1st antenna, medial view, anterior towards left; *d*, *e* left and right exopodites of mandibles, medial view; *f*, endopodite of left mandible showing terminal claws with both medial and lateral teeth (bristles not shown); *g*, tip of 7th limb showing pegs and comb teeth. USNM 157932, from Nova Scotia: *h*, lateral outline of complete carapace showing dotted outline of left lateral eye, length 2.97 mm; *i*, central adductor muscle attachments of left valve viewed from outside; *j*, USNM 77792A, from Greenland, lateral outline of complete valve, length 2.77 mm; *k*, USNM 157873, from Nova Scotia: anterior of body.

one of these slightly longer and appearing to be more sclerotized than others (Figure 2*g*).

Furca: Each lamella with 9 claws. Furca similar to that described by Skogsberg (1920:396, fig. 66: 7).

Bellonci Organ (Figure 2*k*): Differs from that illustrated by Skogsberg (1920, fig. 66: 5) in being slightly broader in middle than at proximal end and in having well-defined suture just proximal to middle; tip rounded.

Eyes (Figure 2*k*): Medial eye bare, pigmented brown in preserved specimen. Lateral eye about same size as medial eye, pigmented brown in preserved specimen, with 20 ommatidia.

Upper Lip (Figure 2*k*): Typical for genus, with minute anterior processes.

Y-*Sclerite:* Typical for genus.

Posterior of Body: Long hairs present on lower part of posterior of body near furca; short spines on posterodorsal corner just dorsal to girdle (girdle is sclerite connected to dorsal socket of Y-sclerite).

Parasites: A cryptoniscid isopod attached to dorsal part of body of USNM 157873 just posterior to heart region was loaned to Dr. Jarl-Ove Strömberg for further study.

Description of Adult Male from N.W. Greenland.—Carapace shape and ornamentation similar to that of adult male from Nova Scotia (Figure 2*j*).

Size: USNM 81638A, length 2.82 mm, height 1.70 mm; USNM 81638B, length 2.73 mm, height 1.57 mm; USNM 77792A, length 2.77 mm, height 1.64 mm.

Description of Adult Male from Foxe Basin, Northwest Territories.—Carapace shape and ornamentation similar to adult males from other localities.

Size: USNM 81642B, length 2.87 mm, height 1.75 mm.

Description of A-1 Female from Nova Scotia (Figure 3).—Carapace in lateral view similar to that of adult female described by Skogsberg (1920:382, fig. 66: 3) (Figure 3*a*).

Ornamentation: Surface with abundant short and few long bristles similar to those illustrated by Skogsberg (1920: fig. 66: 4). Minute process at tip of ventral corner of rostrum; broad process at anteroventral corner of valve (Figure 3*b*).

Infold: Rostral infold with 16 or 17 long bristles forming row; infold near inner end of incisur with 1 small bristle; anteroventral infold striated, with 8–14 bristles along list; posteroventral corner including narrow caudal process with numerous bristles forming groups of 1–6 bristles along list; 6–7 small bristles present between list and edge of valve (Figure 3*c,d*).

Selvage: Hairs along edge of lamellar prolongation of selvage along rostrum and anteroventral valve margin ventral to incisur long, about same width as lamellar prolongation; no hairs on medial side of lamellar prolongation, but some on lateral side. Lamellar prolongation just ventral to caudal process area narrowing and without fringe; prolongation not observed along caudal process.

Size: USNM 158229, length 2.44 mm, height 1.74 mm.

First Antenna: 1st joint with lateral hairs forming rows near distal dorsal margin. 2nd joint with 3 spinous distal bristles (dorsal bristle reaching to middle of 4th joint, ventral bristle reaching just past distal end of 4th joint, lateral bristle about same length as dorsal bristle). 3rd joint with 3 spinous bristles (1 ventral, 2 dorsal). 4th joint with 4 spinous bristles (1 dorsal, 3 ventral). Bristle of 5th joint with 5 proximal and 4–5 terminal filaments. 6th joint with spinous medial bristle. 7th joint: a-bristle spinous; b-bristle with 1 filament near middle and 3 terminal filaments; c-bristle with 4 proximal and 5 terminal filaments. 8th joint: d- and e-bristles bare with blunt tips; f-bristle with 4 proximal and 4–5 terminal filaments; g-bristle with 3 proximal and 4–5 terminal filaments. b- and f-bristles about 4/5 length of sensory bristle of 5th joint, remaining bristles about same length as sensory bristle. (Limb quite similar to that of adult female described by Skogsberg, 1920:384.)

Second Antenna: Protopodite bare. Endopodite 2-jointed: 1st joint with 5 bare bristles (4 proximal, 1 slightly distal); 2nd joint elongate with 1

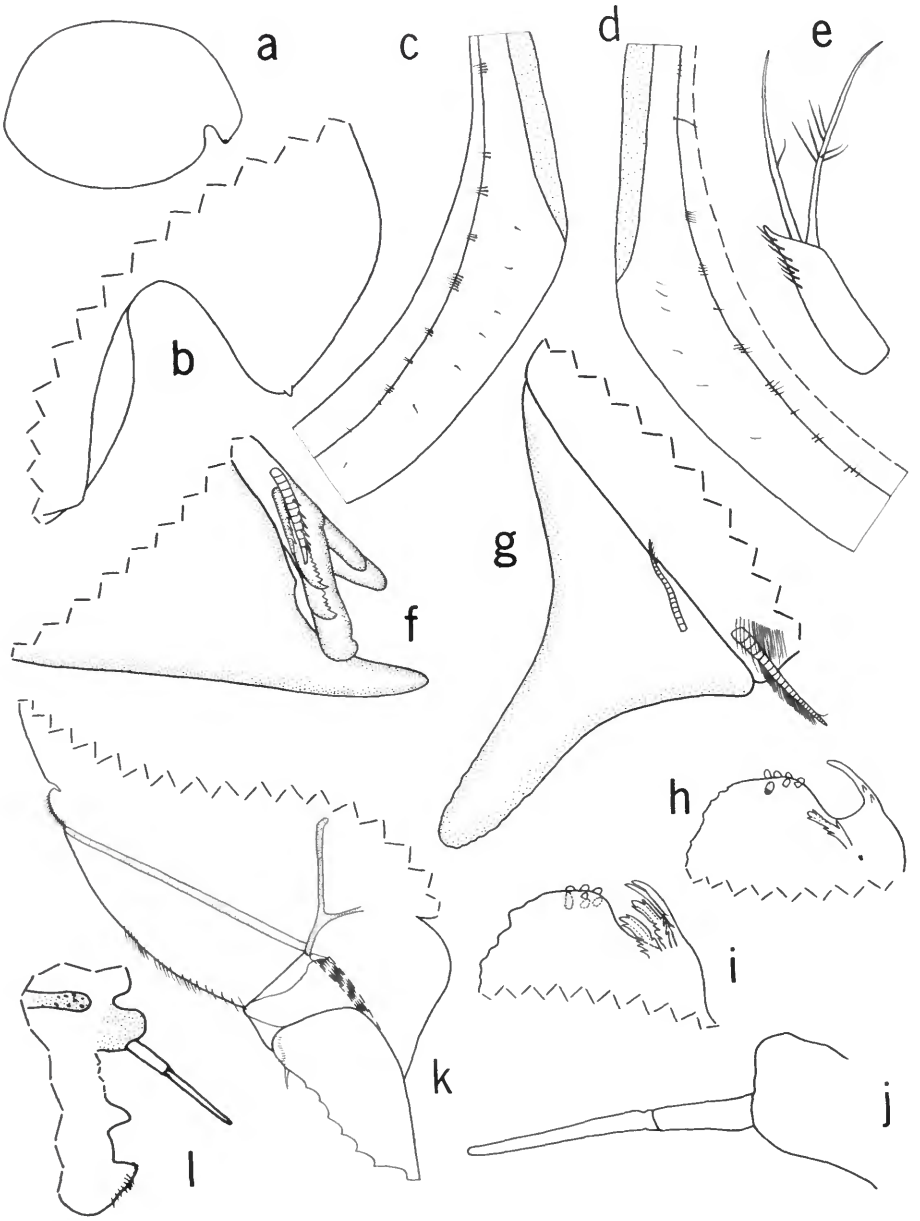

FIGURE 3.—*Philomedes brenda*, A-1 female from Nova Scotia, USNM 158229: *a*, lateral outline of complete carapace, length 2.44 mm; *b*, outline of rostrum and incisur of right valve showing minute spine at tip of rostrum; *c*, *d*, posterior of right and left valves, from inside; *e*, exopodite of left mandible, medial view; *f*, part of 1st and 2nd exopodial joints of 5th limb, posterior view; *g*, 2nd exopodial joint of 5th limb, anterior view; *h*, *i*, tips of 7th limbs; *j*, medial eye and bellonci organ; *k*, posterior of animal showing Y-sclerite and posterior girdle (both stippled), and part of right furcal lamella; *l* anterior of animal showing bellonci organ, right lateral eye, and upper lip.

long, spinous, ventral bristle proximal to middle, and 1 bare terminal bristle; except for having 5 instead of 6 bristles on 1st joint, endopodite similar to that of adult female described by Skogsberg (1920:385, fig. 67: 12). Exopodite: bristles of joints 2–8 short, bare; 9th joint with 6 bristles (shortest 2 of these with short marginal spines, others bare or with few ventral spines).

Mandible: Exopodite of USNM 158229 with distal bristle 108 percent and proximal bristle 117 percent of stem (Figure 3*e*). Limb similar to that of adult female described by Skogsberg (1920:385). Ventral (posterior) margin of 2nd endopodial joint with bristles forming 2 distal groups, each with 3 bristles. All 3 claws of 3rd endopodial joint with few medial and lateral teeth near middle. Skogsberg (1920:386) states that the distal bristle of the exopodite is slightly longer than the proximal bristle. This must be an inadvertant error, because the reverse is true; e.g., measurements given by Poulsen, 1962:352, and personal observation of specimen from Norway.

Maxilla: In general similar to that of adult female described by Skogsberg (1920:386, fig. 68: 14) but left limb of USNM 158229 apparently aberrant in having 2 alpha-bristles on 1st endopodial joint, both bristles with 2 or 3 short spines; right limb with single alpha-bristle with wreaths of long spines.

Fifth Limb: Similar to that of adult female described by Skogsberg (1920:388). Small teeth not developed, or only slightly developed along inner margin of large tooth forming 2nd exopodial joint of USNM 158229 (Figure 3*f,g*). (Although small teeth were not mentioned in description of Skogsberg, they are present on a specimen that I examined from Norway; Figure 4*h,i*).

Sixth Limb: Similar to that of adult female described by Skogsberg (1920:390).

Seventh Limb (Figure 3*h,i*): One limb with 41 bristles (23 on peg side, 18 on comb side), other limb with 24 bristles on peg side, but most bristles broken off comb side. Bristles strongly tapering (juvenile character) and without marginal spines; each bristle with 2–5 bells. One limb with 7 comb teeth opposite 7 short pegs (Figure 3*i*); other limb with same number of pegs but with only 4 comb teeth (aberrant) (Figure 3*h*); one of the pegs appearing slightly more sclerotized than others. (Differences between the 7th limbs of USNM 158229 and limbs of adult female described by Skogsberg, (1920:390, fig. 69: 16) mostly attributable to relative growth stage of specimens.)

Furca: (Figure 3*k*) Claw 1 of right lamella anterior to claw 1 of left lamella; each lamella with 9 claws; claws 1–6 with hairs forming cluster on claws near base; claw 7–9 without these hairs; claw 1 with teeth forming row along lateral and medial posterior edges; claws 2–5 with single row of teeth along posterior edge; claws 6–9 with slender teeth and spines forming rows along anterior and posterior edges; anterior edge of lamella and medial side near claw 1 with long and short hairs; lamella following claws with short hairs.

Bellonci Organ (Figure 3*j,l*): Elongate, tapering from medial eye to slight indentation near center, then tapering slightly to rounded tip; suture present just proximal to middle indenture.

Eyes: Lateral eye minute, unpigmented, elongate with several small cells (ommatidia?) (Figure 3*l*). Medial eye unpigmented bare (Figure 3*j,l*).

Upper Lip (Figure 3*l*): Projecting anteriorly, with minute processes at tip, hirsute ventrally.

Anterior of Body (Figure 3*l*): Single sclerotized anterior process between medial eye and upper lip.

Posterior of Body (Figure 3*k*): Hirsute dorsal to furca. Small spinous process just dorsal to sclerotized girdle.

Y-*Sclerite* (Figure 3*k*): Typical for genus.

Gut Content: Foraminifera, crustacean fragments, debris.

Epizoa: Stalked vaselike protistans present on appendages.

DESCRIPTION OF A-1 MALE FROM CAPE BRETON ISLAND.—Carapace similar in shape to that of A-1 female described herein.

Size: USNM 157941B, length 2.48 mm, height 1.72 mm.

DESCRIPTION OF ADULT FEMALE FROM BERGEN,

NORWAY (Figure 4*a-o*).—Shape of carapace similar to that described and illustrated by Skogsberg (1920:382, fig. 66: 3) (Figure 4*a*). Anteroventral process digitate (Figure 4*b*). Posterior edge of valve in vicinity of caudal process without digitations.

Ornamentation: Ornamentation similar to that described and illustrated by Skogsberg (1920:382, fig. 66: 4).

Infold: Rostral infold with 20–21 bristles forming row along ventral and anterior margins; 1 small bristle present near inner end of incisur; anteroventral infold with about 12 ridges; anteroventral list with 17–19 bristles; posterior list with numerous small bristles forming groups of 1–6 bristles (Figure 4*c*); about 8 small bristles between posterior list and valve margin (Figure 4*c*).

Selvage: Without medial hairs on anteroventral lamellar prolongation.

Size: UUZM 3499, specimen number 1, length 2.63 mm, height 1.87 mm; UUZM 3499, specimen number 2, length 2.55 mm, height 1.75 mm.

First Antenna: Medial side of 1st joint with scattered spines and hairs forming rows. 2nd joint with abundant hairs and spines. Shorter of dorsal bristles of 3rd joint without long hairs. 4th joint with 5 bristles, (1 dorsal, 4 ventral).

Second Antenna: UUZM 3499, specimen number 1: Exopodite: 1st joint with minute distal medial bristle; right limb without basal spine on 6th joint; left limb without basal spine on 7th joint. Endopodite: left limb aberrant with 2nd joint bearing 1 long ventral bristle and elongate terminal process bearing short bristle (Figure 4*d*); right limb with 2 ventral (1 long, 1 short) and 1 terminal bristle on 2nd joint. UUZM 3499, specimen number 2: Exopodite with basal spines on joints 2–8. Endopodite: left limb with 2 bristles on 2nd joint, right limb with 3. Both specimens with bristles of joints 6–8, and long bristles of joint 9 broken.

Mandible: Exopodite of right limb of UUZM 3499, specimen number 1, with distal bristle 96 percent and proximal bristle 164 percent of stem (Figure 4*e*); left limb with distal bristle 157 percent and proximal bristle 178 percent of stem (Figure 4*f*). Lateral side of longest claw (lateral claw) with few faint teeth proximal to middle (Figure 4*g*).

Fifth Limb: Large tooth of 2nd exopodial joint with 2 small teeth along inner margin (Figure 4*h,i*).

Seventh Limb (Figure 4*m-o*): Tips of UUZM 3499, specimen number 2, with 8 or 9 claws opposite 8 or 9 pegs; most pegs short with squarish tips, but 1 more slender than others and with rounded tip; latter peg appearing slightly more sclerotized than others.

Furca (Figure 4*j,k*): Each lamella with 10 claws; claws decrease in length along lamella; claws 1–5 without numerous spines along anterior margin present on claws 6–10; medial teeth near middle of claw 1 larger than teeth along lateral edge of claw; claw 2 with few faint distal medial teeth as well as teeth forming row along lateral edge.

Bellonci Organ (Figure 4*l*): Organs on both specimens examined appearing to have suture proximal to middle. [Skogsberg (1920:392) did not observe a suture.]

Eyes (Figure 4*l*): Lateral eye elongate, with numerous minute cells scattered throughout, and without pigment. Medial eye brown.

Upper Lip (Figure 4*l*): Typical for genus, with minute processes at anterior tip, and hirsute ventrally.

Anterior of Body (Figure 4*l*): With single sclerotized, rounded process between medial eye and upper lip.

Posterior of Body (Figure 4*j,k*): Spinous.

Y-*Sclerite* (Figure 4*j*): Typical for genus.

Parasites: Cyproniscus cypridinae Sars, 1899: 1 adult and 2 juvenile females on UUZM 3499, specimen number 1; 2 juvenile females on UUZM 3499, specimen number 2.

DESCRIPTION OF ADULT FEMALE FROM GREENLAND (UUZM 3501, Specimen Number 1).—Carapace shape, ornamentation, infold, and selvage similar to that of specimen from Bergen, Norway.

Size: Length 2.73 mm, height 1.94 mm.

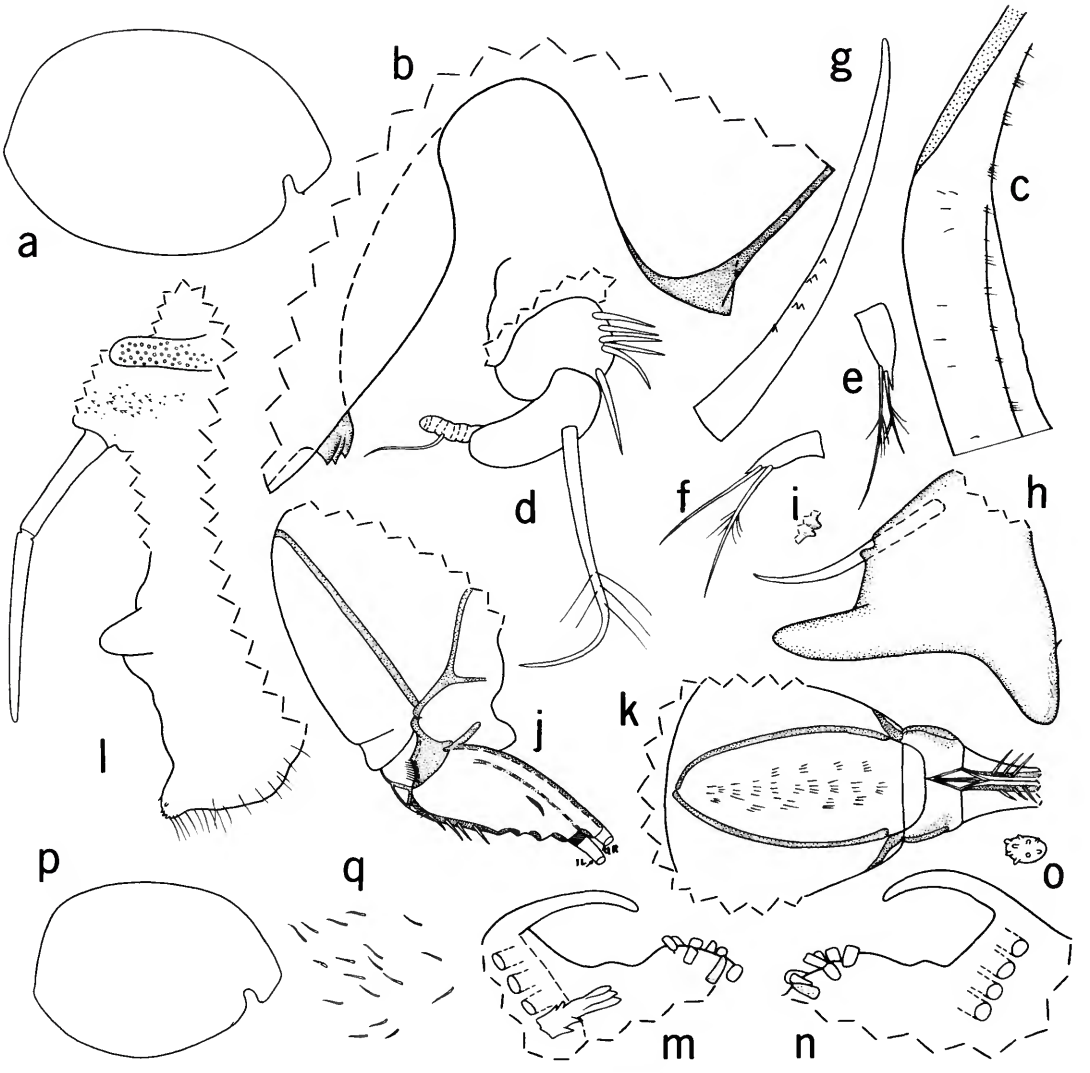

FIGURE 4.—*Philomedes brenda*, adult females. UUZM 3499, specimen number 1, from Bergen, Norway: *a*, lateral outline of complete specimen, length 2.63 mm; *b*, outline of rostrum and incisur of right valve; *c*, posterior of left valve, inside view; *d*, aberrant endopodite of left 2nd antenna, medial view; *e*, *f*, left and right exopodites of mandible; *g*, longest claw of end joint of endopodite of left mandible, lateral view showing teeth; *h*, 2nd exopodial joint of left 5th limb, anterior view; *i*, two small teeth along inner margin of large tooth forming 2nd exopodial joint of right fifth limb, anterior view; *j*, posterior of animal showing sclerotized structures (stippled) and part of furcal lamella (for clarity, part of left lamella near base of claw 1 with hachures); *k*, posterior view of posterior part of animal showing sclerotized structures (stippled) and part of furca (animal oriented in figure with left side down). UUZM 3499, number 2, from Bergen, Norway: *l*, anterior of animal; *m*, *n*, tips of 7th limbs (not all comb teeth shown); *o*, pegs of 7th limb viewed looking down at tip (limb not held down by cover slip). USNM 157941A, from Cape Breton Island: *p*, lateral view of complete specimen, length 2.85 mm; *q*, distribution of surface bristles just anterior to middle of valve.

First Antenna: Similar to that of adult female from Norway, but bristles of joints 7 and 8 not examined in detail.

Second Antenna: Endopodites with 2 bristles on 2nd joints (1 ventral, 1 terminal). Prodopodite and exopodite similar to those of adult female from Norway; joints 6–9 with broken bristles.

Mandible: Exopodite of left limb with distal bristle 131 percent and proximal bristle 173 percent of stem; exopodite of right limb with distal bristle 123 percent of stem and proximal bristle broken. Largest claw of end joint with lateral teeth forming row near ventral margin extending from near base to just past middle of claw, not forming distal row as on *Philomedes dentata* Poulsen (1962: fig. 153″).

Seventh Limb: Each limb with 8 or 9 pegs (7–8 short, 1 longer); comb with 9 teeth similar to those of adult female from Norway.

Furca: Each lamella with 10 claws.

Bellonci Organ and Eyes: Similar to those of adult female from Norway.

Posterior of Body: Hirsute, without posterodorsal process.

Description of Adult Female from Cape Breton Island.—Carapace shape and ornamentation similar to that of previously described females (Figure 4*p,q*).

Size: USNM 157953, length 2.84 mm, height 2.00 mm; USNM 157941A, length 2.85 mm, height 1.99 mm.

Eggs: USNM 157941A, 18 eggs; USNM 157593, 6 eggs.

Description of Additional Adult Female from Greenland.—Carapace shape and ornamentation similar to that of previously described adult females.

Size: USNM 81640, length 2.85 mm, height 1.97 mm; USNM 77794, length 2.84 mm, height 2.11 mm.

Description of Adult Female from Foxe Basin, Northwest Territories.—Carapace shape and ornamentation similar to that of previously described adult females.

Size: USNM 81642A, length 2.87 mm, height 1.96 mm; USNM 81643A, length 2.70 mm, height 1.91 mm.

Description of Adult Female from Newfoundland.—Carapace shape and ornamentation similar to that of previously described adult females.

Size: USNM 157951A, length 2.77 mm, height 1.91 mm; USNM 157951B, length 2.79 mm, height 1.97 mm.

Eggs: USNM 157951A, 21 eggs; USNM 157951B, 20 eggs.

Supplementary Description of Adult Female from Grand Manan (specimen identified as *Cypridina excisa* by Stimpson, 1854:39).—Shape of carapace and ornamentation fairly similar to that described and illustrated by Skogsberg (1920:392, fig. 66: 3).

Size: British Museum (Natural History) number 1857.118 (specimen preserved in alcohol) length 2.81 mm, height 1.73 mm.

Furca: Each lamella with 10 claws decreasing in length posteriorly along lamella.

Comparisons.—In addition to *P. brenda*, only *Philomedes dentata* Poulsen (1962:349), bears 6 or more short pegs on the tip of the 7th limb. Taking into account some of the morphological characters described in the present paper that expand Skogsberg's description of *P. brenda*, *P. dentata* differs from *P. brenda* in having numerous long hairs on the medial side of the anteroventral lamellar prolongation of the selvage, and in having flat teeth distally on the lateral side of the longest claw on the end joint of the mandible. Another difference may be the absence of a narrow peg with rounded tip among the short, flat-tipped pegs on the 7th limb described and illustrated by Poulsen (1962:354, fig. 153e).

Philomedes albatross, new species

Figures 5–9

Philomedes globosus.—Hulings, 1967:311 [part].

Etymology.—The specific name from the vessel from which the holotype was collected, the R/V *Albatross.*

HOLOTYPE.—USNM 158030, 1 adult female with large unextruded eggs, in alcohol and on slides.

TYPE-LOCALITY.—R/V *Albatross* sta 2490, 6 July 1885, off Nova Scotia, 45°27′30″N, 58°27′45″W, water depth 91.4 m, collected in dredge.

PARATYPES.—R/V *Vema*: USNM 157949, 1 ovigerous female; USNM 157950, 18 specimens, sta V-16-58. USNM 157943A, B, 2 A-1 males; USNM 157943C, 5 early instars, sta V-16-59. USNM 157944, 157945, 157948, 2 ovigerous females, and 1 adult female; USNM 157946, 110 specimens, sta V-16-63. USNM 157942A, C, 2 ovigerous females; USNM 157942B, 1 juvenile; USNM 119445-446, 1 ovigerous female, collected by A.S. Packard off Hopedale, Labrador.

DISTRIBUTION.—Northwest Atlantic Ocean off Labrador, New Foundland, Cape Breton Island, and Nova Scotia. Latitudinal range 45°27′30″N -55°26′N; longitudinal range 57°23′W-59°W. Depth range 18–448 m.

DESCRIPTION OF ADULT FEMALE (Figures 5–9).—Carapace ovoid in lateral view, with narrow caudal process, without dentition along margin, with broad rostrum with convex anterior margin and deep incisur; posterior end in lateral view somewhat truncate dorsal to middle (Figures 5, 6*a–e*, 7*a*).

Ornamentation (Figures 6, 7*f*): Surface with numerous short bristles (Figures 6*f*, 7*f*), and sparsely distributed longer bristles with broad, ribbed, bases (Figure 6*f*); long bristles, some without broad base, more abundant along ventral and anterior margins; ventral tip of rostrum with minute process barely extending past valve edge.

Infold (Figure 7*c–e*): Rostral infold with about 17 bristles (Figure 7*c*); anteroventral infold with small bristle near inner end of incisur followed by space without bristles, and then 17 spinous bristles forming row; 9 parallel ridges present on anteroventral infold; 2nd ridge from valve margin continuing on ventral and posterior infold as list; infold along middle of ventral margin without bristles; posteroventral and posterior infold with about 52 short slender bristles forming groups (1–4 bristles per group) along distal edge of list; infold of narrow caudal process with 9 bristles between list and valve margin (Figure 7*d*), but without "pocket."

Selvage: Broad lamella prolongation present along free margins but narrower along posteroventral and posterior margins than along anterior and anteroventral margins; outer edge of prolongation with marginal fringe of long hairs except along ventral margin anterior to caudal process; long lateral hairs with bases near proximal edge of prolongation present on selvage just ventral to incisur (Figure 7*e*).

Size: USNM 158030, length 2.49 mm, height 1.75 mm; USNM 119445-446, length 2.47 mm, height 1.79 mm; USNM 157949, length 2.56 mm, height 1.81 mm; USNM 157942A, length 2.35 mm, height 1.60 mm; USNM 157944, length 2.27 mm, height 1.56 mm; USNM 157945, length 2.26 mm, height 1.69 mm; USNM 157942C, length 2.32 mm, height 1.63 mm; USNM 157948, length 2.24 mm, height 1.64 mm.

First Antenna (Figure 8*a*): 1st joint with medial and lateral hairs and spines. 2nd joint with medial and lateral hairs and spines and 3 spinous bristles (1 ventral, 1 dorsal, 1 lateral). 3rd joint short, with few, short, lateral spines forming rows, and 3 spinous bristles (1 ventral, 2 dorsal). 4th joint with 5 bristles (4 ventral, 1 dorsal). Sensory bristle of 5th joint with 5 short marginal filaments and

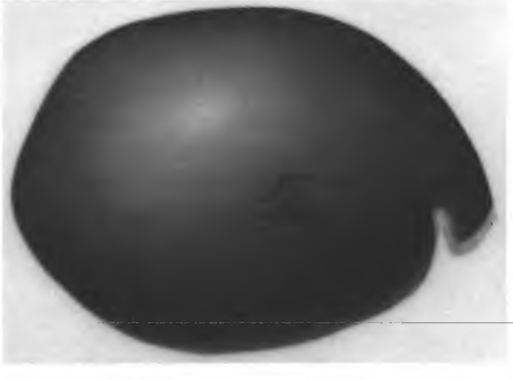

FIGURE 5.—*Philomedes albatross*, new species, adult female, USNM 158030, holotype, length 2.49 mm, complete specimen, lateral view.

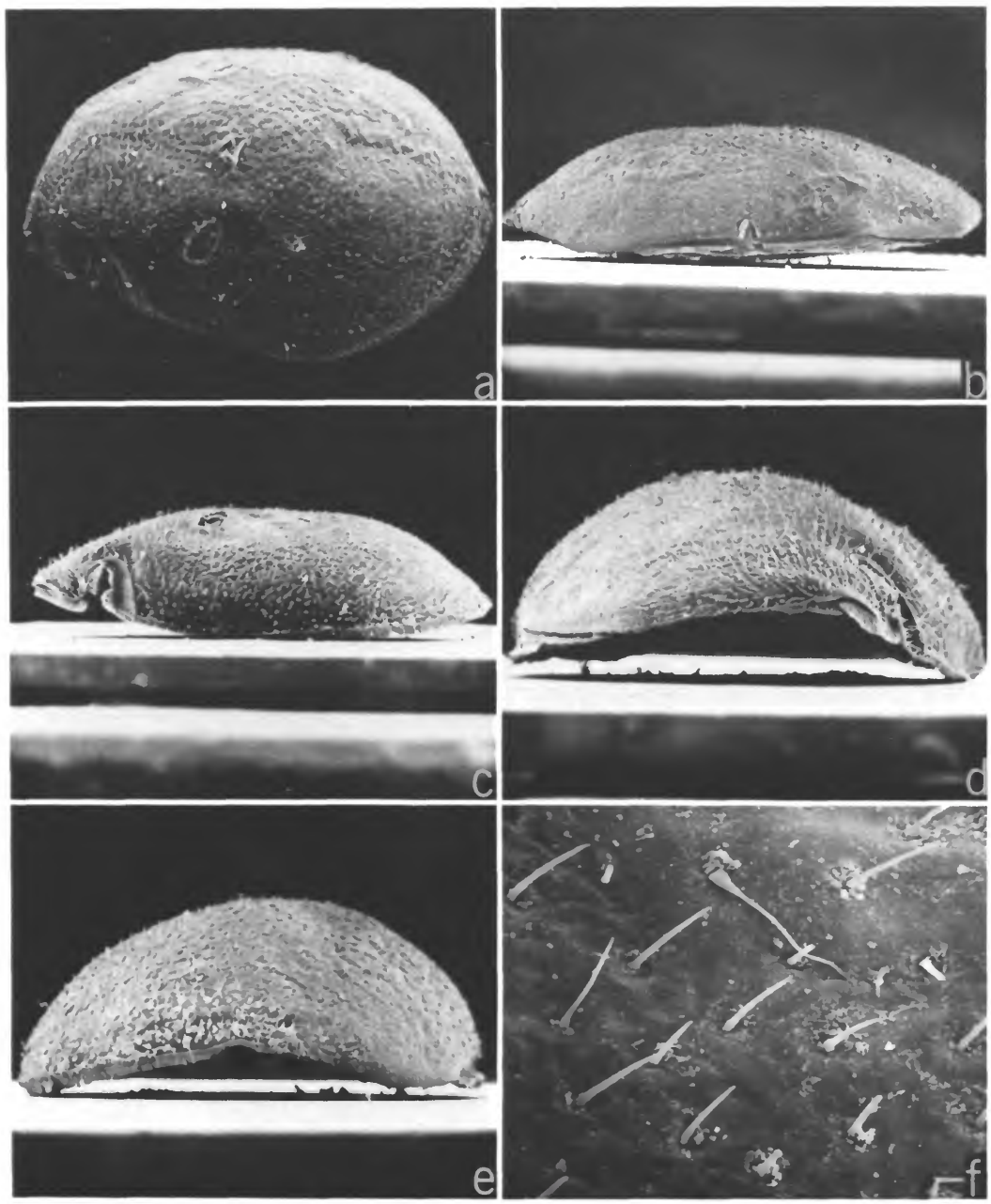

FIGURE 6.—*Philomedes albatross*, new species, adult female, USNM 158030, holotype, length 2.49 mm, outside views of left valve (valve slightly distorted during freeze-drying process): *a*, lateral view, × 45; *b*, dorsal view, × 45; *c*, ventral view, × 45; *d*, anterior view, ventral margin to right, × 72; *e*, posterior view, ventral margin to left, × 65; *f*, surface hairs, from near middle of *a*, × 389. (Micrographs reduced to 75%.)

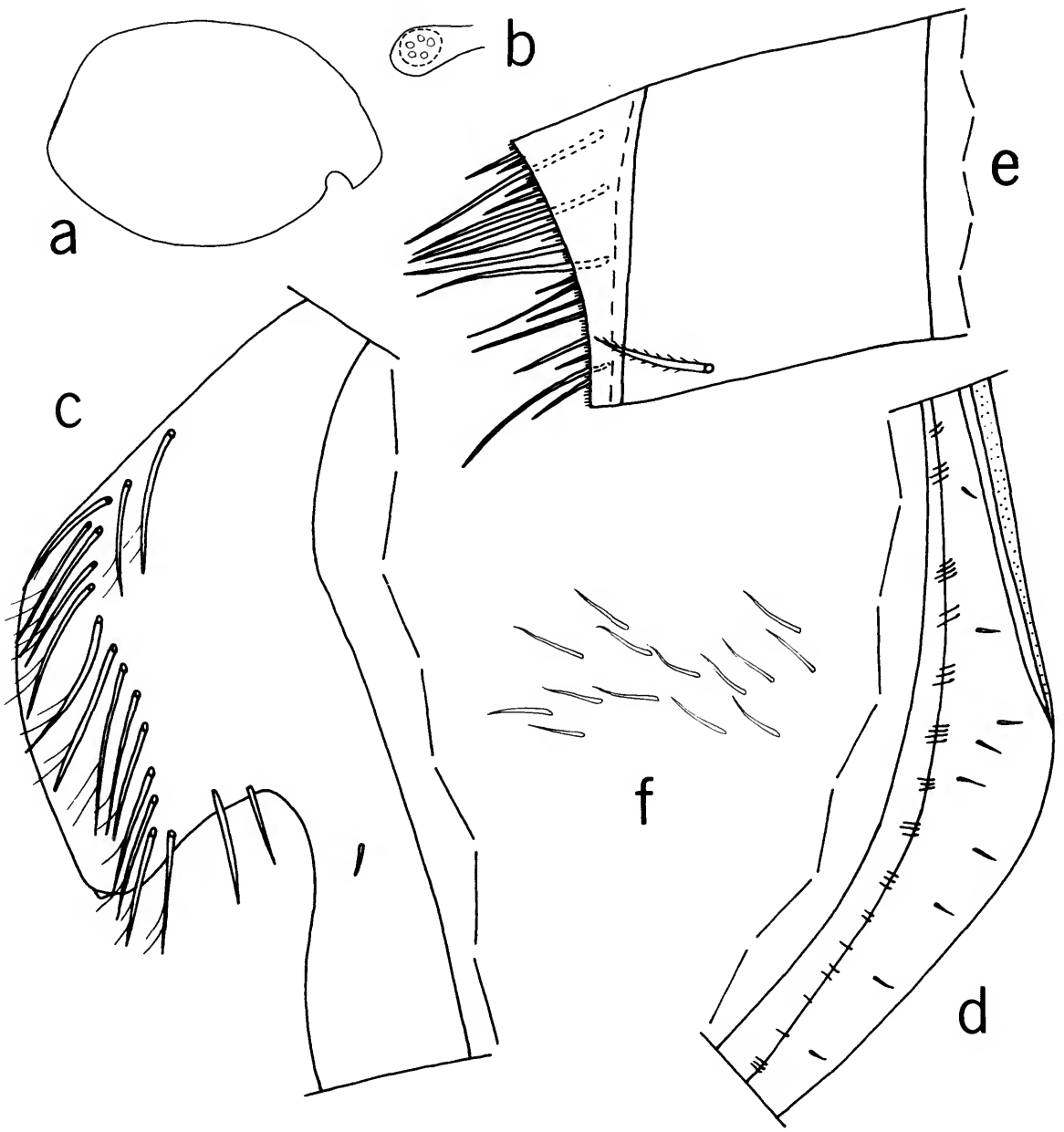

FIGURE 7.—*Philomedes albatross*, new species, adult female, USNM 157944, paratype, length 2.27 mm: *a*, outline of complete specimen; *b*, left lateral eye. Adult female, USNM 158030, holotype, length 2.49 mm: *c*, rostrum and incisur of right valve, inside view; *d*, posteroventral corner of right valve, inside view; *e*, infold and selvage of right valve just ventral to incisur, inside view; *f*, surface bristles on outside of right valve just anterior to middle.

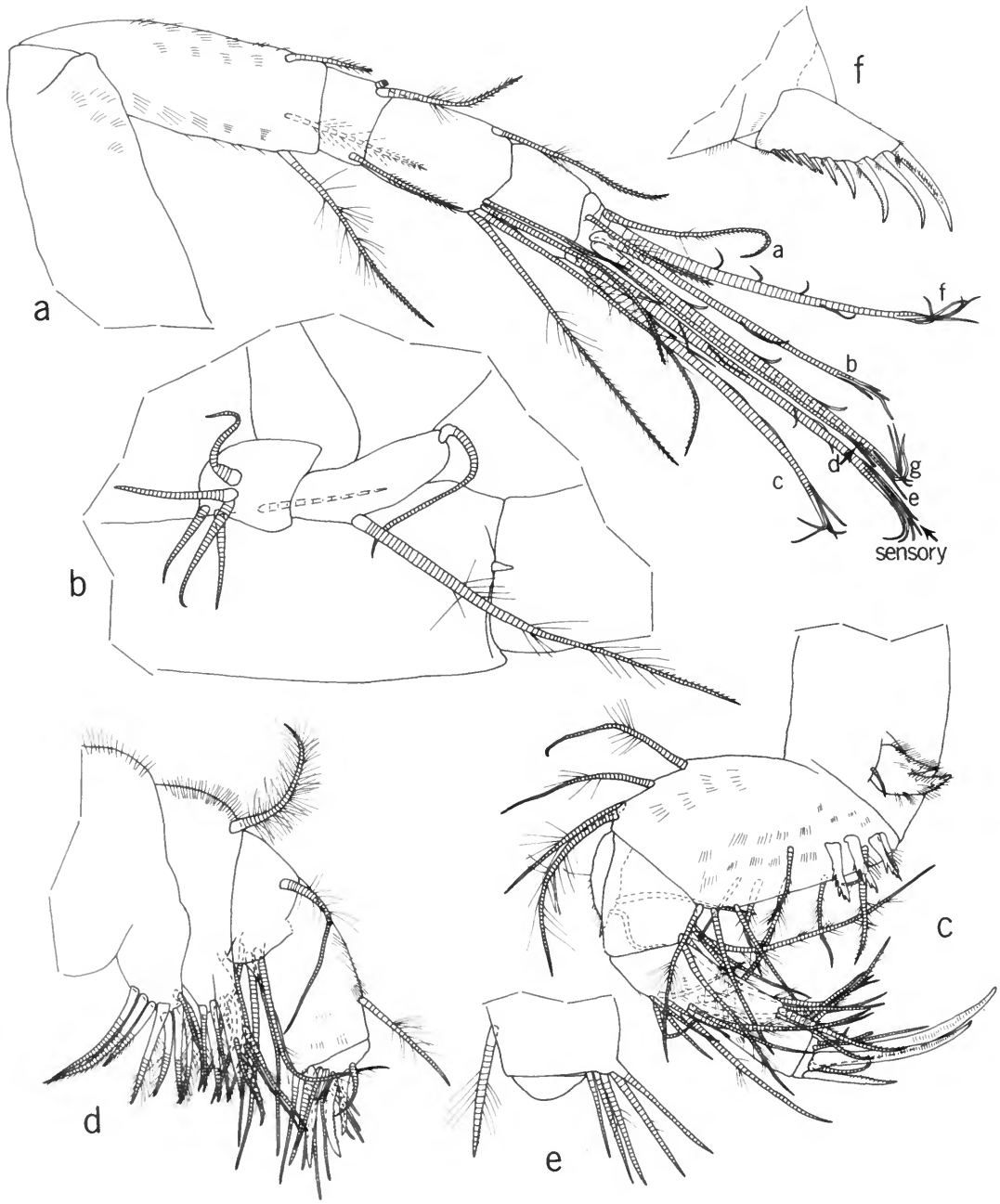

FIGURE 8.—*Philomedes albatross*, new species, adult female, USNM 158030, holotype: *a*, left 1st antenna, medial view; *b*, right 1st antenna showing distal part of protopodite, endopodite, and parts of 1st and 2nd joints of exopodite, medial view; *c*, right mandible, medial view; *d*, left maxilla, medial view; *e*, right maxilla, bristles on 2nd endopodial joint, medial view; *f*, right lamella of furca, lateral view.

5 short terminal filaments. 6th joint minute, with medial bristle bearing long proximal and short distal spines. 7th joint: a-bristle longer than bristle of 6th joint, with long proximal and short distal spines; b-bristle shorter than sensory bristle of 5th joint, with 1 short filament near middle and 4 short terminal filaments; c-bristle almost as long as bristle of 5th joint, with 5 short marginal filaments and 5 short terminal filaments. 8th joint: d- and e-bristles about same length as c-bristle, bare with blunt tips; f- and g-bristles about same length as c-bristle; f-bristle with 4 short marginal filaments and 5 short terminal filaments; g-bristle with 3 short marginal filaments and 5 short terminal filaments.

Second Antenna (Figure 8*b*): Protopodite bare. Endopodite 2-jointed: short 1st joint with 6 short bristles; elongate 2nd joint with 1 long ventral bristle and 1 recurved terminal bristle. Exopodite: elongate 1st joint with minute, straight, medial, spinelike, terminal bristle; bristles of joints 2–5 short, bare; bristles of joints 6–8 broken off proximal to natatory hairs; 9th joint with 7 bristles (4 long broken; 1 medium broken, 2 short with hairs or spines); joints 3–8 with small basal spine (longer on distal joints; spine of 8th joint about three-fourths length of 9th joint); joints 2–8 with small spines forming distal row.

Mandible (Figure 8*c*): Coxale endite bifurcate, hirsute, pectinate, with small bristle at base. Basale: dorsal margin with 4 spinous bristles (2 distal to middle, 2 terminal); medial side spinous, with 3 pectinate, unringed bristles and 2 short, ringed bristles, all in proximal ventral corner, and 1 ringed bristle near middle; ventral margin with 3 long, spinous, distal bristles; lateral side with 5 spinous bristles (proximal 2 of these with bases almost on ventral margin). Exopodite hirsute, almost reaching distal margin of 1st endopodial joint, with 2 spinous subterminal bristles. 1st endopodial joint: dorsal margin with spines forming terminal row; ventral margin with 5 spinous bristles. 2nd endopodial joint: ventral margin with bristles forming 2 distal groups (3 bristles in each group); dorsal margin with about 11 bristles near middle (some with bases on medial and lateral sides); medial surface with spines forming rows near dorsal margin. End joint with 3 claws and 4 bristles.

Maxilla (Figure 8*d,e*): Endite I with 8 spinous and pectinate bristles; endite II narrow, with about 6 bristles; endite III elongate, with about 10 bristles. Precoxale and coxale with dorsal fringe of long hairs; coxale with hirsute dorsal bristle. Basale with 3 bristles on distal margin (1 dorsal, 2 ventral). Exopodite small, with 3 bristles (2 long, 1 short; inner long bristle and outer short bristle with long proximal hairs and short distal spines, other with short spines). 1st endopodial joint hirsute, with 1 spinous alpha-bristle and 5 beta-bristles. End joint with 3 stout, unringed, pectinate, clawlike bristles, and 10 ringed bristles.

Fifth Limb (Figure 9*a–c*): Epipodial appendage with 55 bristles. Endite I with 6 bristles; endite II with about 7 bristles; endite III with 8 or more bristles. 1st exopodial joint: main tooth consisting of 4 pectinate teeth; distal tooth with stout triangular anterior part (Figure 9*c*); spinous bristle with base just proximal to proximal tooth; anterior side of joint with 2 bristles near middle of distal margin, and 1 shorter spinous bristle near outer corner. 2nd exopodial joint: inner margin of large triangular tooth with 2 small teeth with uneven surface (the proximal of these much smaller than other) (Figure 9*b*); posterior side of joint with usual 4 bristles. 3rd endopodial joint with 2 bristles on outer lobe and 3 bristles on inner lobe. 4th plus 5th joint with total of 6 bristles (illustrated left limb of USNM 158031 with suture at base of 2 bristles).

Sixth Limb (Figure 9*d*): 3 or 4 bristles in place of epipodial appendage (distal of these longer than others). Endite I with 3 bristles; endite II with 1 proximal and 3 terminal bristles; endite III with 1 proximal and 9 terminal bristles; endite IV with 1 proximal and 7 terminal bristles. End joint with 21–24 bristles; limb hirsute.

Seventh Limb: Each limb with 29–30 bristles; comb or dorsal side with 13–14 bristles (4 of these on terminal segment); peg or ventral side with 15–17 bristles (4 or 5 of these on terminal segment); each bristle with up to 6 bells and marginal spines (spines forming 2–3 clusters on distal half of bristle). Terminal comb consisting of

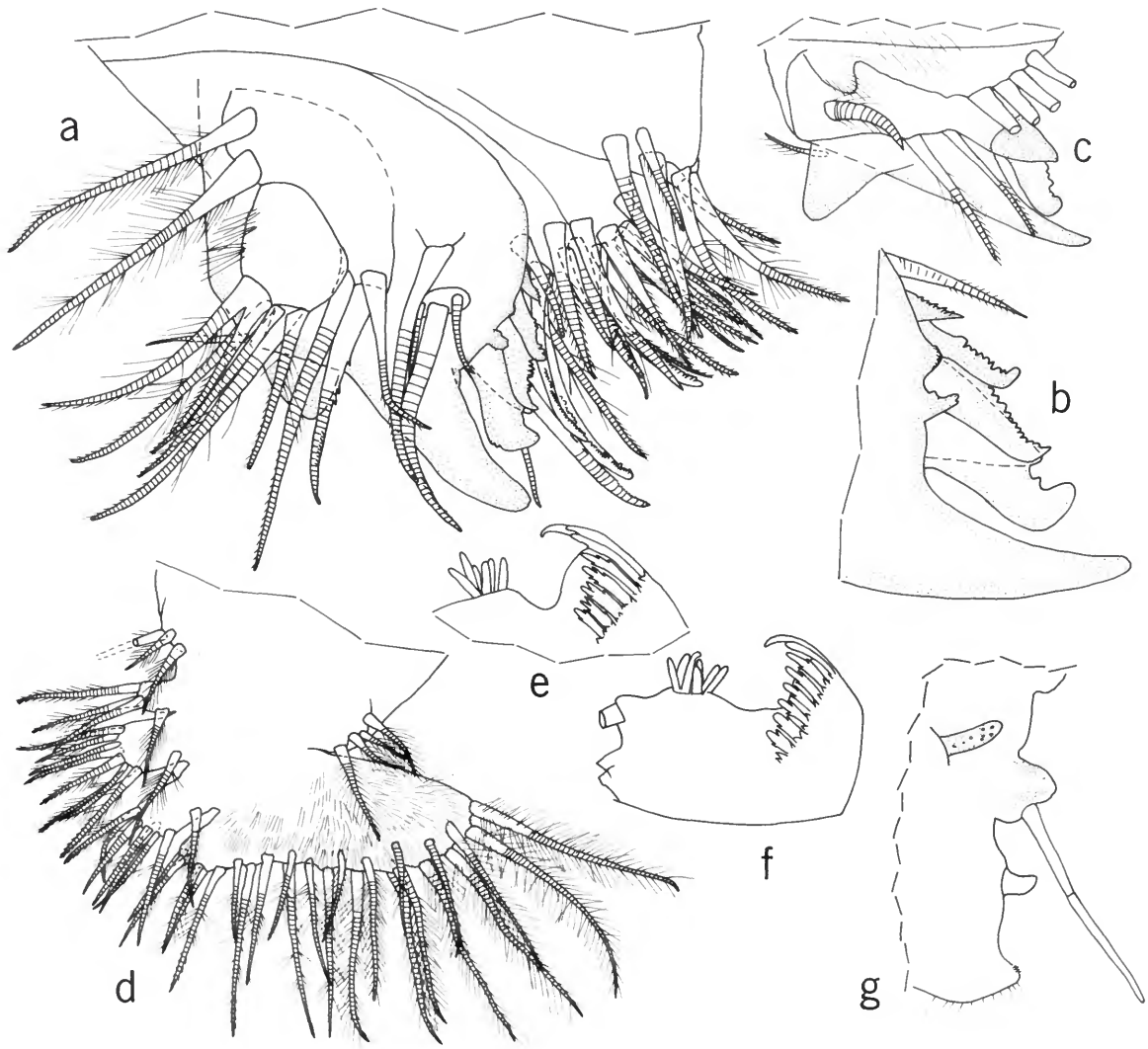

FIGURE 9.—*Philomedes albatross*, new species, adult female, USNM 158030, holotype: *a*, left 5th limb, posterior view; *b*, left 5th limb, distal ends of 1st and 2nd exopodial joints, posterior view; *c*, right 5th limb, distal end, anterior view; *d*, right 6th limb, medial view; *e*, *f*, 7th limbs, comb and pegs; *g*, anterior of body showing right lateral eye, medial eye and bellonci organ, anterior process, and upper lip.

10–15 teeth (middle tooth longer than others) (Figure 9*e*,*f*); 5–7 elongate pegs present opposite comb (1 of these longer than others, but none appearing more strongly sclerotized than others) (Figures 9*e*,*f*).

Furca (Figure 8*f*): USNM 158030 with 10 claws on right lamella, 11 on left lamella; claws decreasing in size posteriorly along lamella but claws 1–5 may be considered primary claws and claws 6–10 or 11 secondary claws; primary claws with long hairs forming medial row near base of bristle; all claws with teeth along posterior mar-

gin; claw 1 with lateral and medial row of teeth; distal 2 or 3 teeth of medial row much larger than others; faint hairs present on lamella following claws; anterior margin of lamella with few faint spines.

Bellonci Organ (Figure 9*g*): Elongate cylindrical, with suture near middle and rounded or pointed tip (see "Variability," below).

Eyes: Medial eye with light amber pigment, bare. (Figure 9*g*). Lateral eye elongate, lightly pigmented, with scattered amber cells or 5 minute ommatidia (Figures 7*b*, 9*g*).

Upper Lip (Figure 9*g*): Projecting anteriorly, hirsute, with few processes at tip.

Anterior of Body (Figure 9*g*): Elongate process present between upper lip and medial eye.

Posterior of Body (Figure 8*f*): With few hairs.

Eggs: USNM 157949, 157942C, 157944, each with 12 eggs in marsupium; USNM 157942A with 15 eggs.

VARIABILITY.—Considerable variability was observed in the tip of the Bellonci organ: USNM 158030 with rounded tip; USNM 157948 with pointed, drawn-out tip; USNM 157945 with narrowly rounded tip bearing 2 spines; USNM 157944 with rounded tip bearing several minute spines. The number of comb teeth of the 7th limb of the adult female varies from 10 to 15, and the number of pegs opposite the comb from 5 to 7. The lateral eye of USNM 158030 contains minute amber cells; the cells are better developed in the lateral eye of USNM 157944, which contains 5 minute ommatidia, and on USNM 157943A, an A-1 male, the lateral eye is about twice the size of the eye of the adult female, and contains 6 larger ommatidia.

COMPARISONS.—The new species, *Philomedes albatross*, differs from *P. brenda* mainly in having elongate rather than short pegs on the tip of the 7th limb. The number of comb teeth (10–15) on the 7th limb of *P. albatross* is greater than that of *P. brenda* (7–9). In the northwest Atlantic adult females of *P. albatross* have smaller carapaces (length 2.24–2.56) than those of *P. brenda* (length 2.70–2.87 mm). *P. albatross* differs from *P. curvata* Poulsen (1962:355) in having a convex rather than concave anterior rostral margin, in having 4 rather than 3 dorsal bristles on the mandibular basale, and in having fewer furcal claws (10–11 claws compared to 14–15).

In the key below *P. albatross* is compared with closely related species from other geographic areas.

Key to Adult Females of Certain Species of *Philomedes*

(with 5 or more elongate pegs opposite comb of 7th limb)

1. Outer edge of caudal process with minute digitations or teeth 2
   Outer edge of caudal process smooth, without teeth 3
2. Outer edge of caudal process with 6–10 minute digitations, dorsal margin of mandibular basale with 5 bristles, end joint of 6th limb with 24–25 bristles ..... ***P. bonneti***
   Outer edge of caudal process with 4 fairly large teeth, dorsal margin of mandibular basale with 6 bristles, end joint of 6th limb with 34–41 bristles ..... ***P. tetradens***
3. 7th limb with 10–11 bristles ..... ***P. lilljeborgii***
   7th limb with more than 17 bristles 4
4. 2nd joint of endopodite of 2nd antenna with 2 bristles ..... ***P. albatross,*** new species
   2nd joint of endopodite of 2nd antenna with more than 2 bristles 5
5. 2nd joint of endopodite of 2nd antenna with 5 bristles .. ***P. subantarctica***
   2nd joint of endopodite of 2nd antenna with 3 bristles 6
6. 1st joint of endopodite of 2nd antenna with 5 bristles ..... ***P. orbicularis***
   1st joint of endopodite of 2nd antenna with 6 bristles ..... ***P. curvata***

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