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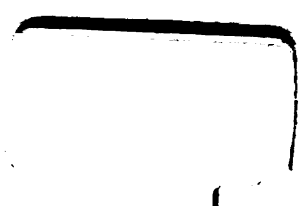

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DESCRIPTION OF SOME NEW SPECIES OF *POLYNOIDAE* FROM THE COAST OF CALIFORNIA

BY

CHRISTINE ESSENBERG

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CONTENTS

INTRODUCTION

In 1897 Dr. H. P. Johnson reported that there were thirteen species of Polynoidae on the Pacific Coast. The number of species has increased since that time to about fifty. The purpose of this paper is to add to that list some species which have not been described by any of the previous workers.

ACKNOWLEDGMENT

The work was carried on in the Zoological Laboratory of the University of California. The writer wishes to express her sincere gratitude to Professor Charles A. Kofoid for his interest and valuable criticisms of this work.

GENERAL DESCRIPTION OF THE POLYNOIDAE

The Polynoidae are widely distributed, occurring in boreal, temperate and tropical zones; in shallow waters and in depths beyond 3000 fathoms. A few species are cosmopolitan, occurring in all oceans, but for the most part each particular area harbors its characteristic species; species common around San Diego Bay are not found in San Francisco Bay, but their place is taken by other species.

The Polynoidae were classified by the early workers as a genus or several genera of Aphroditidae. The recent workers, however, with a few exceptions, are following Kinberg's (1857) plan in classifying the Polynoidae as an independent family. The Polynoidae resemble the Aphroditidae in certain characteristics. In the first place, they bear scales, or elytra, which are arranged in the same order as in Aphroditidae, occurring on segments 2, 4, 5, and on all alternate segments to segment 23. Thence posteriorly the arrangement of elytra is less regular. In the second place all elytroferous segments are devoid of dorsal cirri. The peristomal segment bears the first parapodia. On the other hand, the Polynoidae differ from the Aphroditidae in some essential characteristics. The shape of the body of the Polynoidae is more oblong than that of Aphroditidae, varying in length in different species. The lateral and the felt fibers are absent in Polynoidae. The parapodia are biramous and distinct from the main body. The prostomium is bilobed and convex. The facial caruncle is absent. The eyes, instead of being borne on peduncles, are placed farther posteriad on the prostomial lobe. The base of the median tentacle is inserted in the anterior fissure of the prostomial lobe. Two additional lateral tentacles are present. The proboscis is muscular and exsertile with a chitinous armature. The chitinous jaws are strongly developed. The setae are of two or more kinds and are more complex than those of the Aphroditidae. The nephridial papillae open ventrally at the base of the parapodia.

The shape, size, and color of the body of the Polynoidae may vary according to the conditions and the environment in which the individuals live. Hence these characteristics do not always furnish a reliable basis for classification. The following may serve as an illustration. While at the Scripps Institution for Biological Research at La Jolla, I had opportunity to compare specimens of *Polynoë pulchra* which had been taken from different hosts. The specimens that came

from a holothurian, *Stichopus californicus,* were brown in color, while the specimens found on the key-hole limpet *Lucapina crenulata* were dark, with conspicuous black rings on the elytra. At certain times the body of the worm may be filled with ova and greatly expanded, giving the worm a different appearance. The elytra do not extend far enough in that case to cover the entire dorsum.

However, some characteristics are constant, furnishing a reliable basis for classification. Among these are the shape and the relative size of the prostomium, the size and location of the eyes, the relative length and structure of the cirri and of the palpi, the structure of the setae, the shape and relative size of the corresponding parapodia, and to some extent the number and structure of the elytra. The last characteristic may not be true of long worms, such as *Lepidosthenia gigas.* The number of elytra may vary in this case in different individuals.

The Polynoidae are voracious feeders, attacking one another when in captivity. The writer had a number of specimens of *Polynoë californica* in an aquarium, where the food supply was scarce. The worms attacked one another with their strongly developed jaws, displacing the elytra or removing entire posterior segments of their companions.

The material used in this work was from the annelid collection of the Zoological Museum of the University of California at Berkeley. In the material of that collection some species were found that had not been mentioned previously in Treadwell's (1914) summary of the polychaetous annelids of the Pacific Coast. These were: *Polynoë complanata* Johnson, which I found labelled *Harmothoë imbricata,* and a number of specimens of *Halosydna lagunae* Hamilton, which were labelled as *Lepidonotus caelorus. Halosydna carinata* Moore, reported by A. Treadwell (1914) as being in the collection, was not there; some specimens labelled *Harmothoë carinata* did not agree with the characteristics of *Harmothoë carinata.* The writer had the opportunity of comparing a specimen of *Harmothoë carinata,* which Dr. J. P. Moore had the kindness to send to us, with the specimens labelled *Harmothoë carinata* Moore, in the Zoological Museum at Berkeley. Some *Eunoe barbata* were found labelled as *Harmothoë crassicirrata.*

DESCRIPTION OF NEW SPECIES

The species of Polynoidae in these collections were mostly well known or previously described. The following species, *Harmothoë bonitensis, Harmothoë johnsoni,* and *Halosydna macrocephala,* are new.

Harmothoë bonitensis sp. nov.

Pl. 2, figs. 1–11

Description.—A rather small-sized polynoid; the 32 anterior segments measuring 25 mm. in length, and the width at the widest part of the body, between the tenth and twelfth segments, is 5 mm. The dorso-ventral diameter is 1 mm. The worm is very much flattened dorso-ventrally and rounded at both ends. The anterior parapodia are shorter than those toward the central portion of the body. Thus the anterior end appears narrower, increasing in width up to the twelfth segment, where the maximum width is reached. The width decreases then gradually toward the posterior end. The color of the body is yellowish gray. There are only 32 anterior segments. The extreme posterior segments are missing.

The prostomium (pl. 2, fig. 1) is deeply fissured, with prominent acuminated peaks. The length of the prostomium is two-thirds of the width. The four pairs of eyes are comparatively large. The anterior eyes are situated in the widest part of the prostomium near the dorso-lateral margin. They are pointed anteriorly and laterally. The posterior eyes are smaller and are situated near the posterior end of the prostomium. They are closer together medially, and look posteriorly and upward. The cirratophore of the median tentacle is prominent, inserted between the prostomial lobes. The style of the median tentacle is missing. In this specimen the short lateral tentacles arise from short cirratophores, ventrad and mediad of the acuminated peaks. Their length is about two-thirds that of the prostomium. The palpi are white, stout at the base, decreasing in diameter very gradually and terminating in fine tips. Their length is nearly five times the length of the prostomium. They are densely covered with club-shaped sensory cilia, which are arranged spirally. The cirratophores of the peristomial cirri are long, equal in length to the prostomium, but the styles are missing. The dorsal cirri of the other segments (pl. 2, fig. 5) are white, of medium length, their tips extending to

the tips of the longest setae, covered with short, club-shaped papillae. The ventral cirri are short and fusiform.

The parapodia (pl. 2, fig. 5) are biramous. Each ramus is supported by an aciculum. The ventral ramus is by far the more prominent, forming a triangle and ending in a narrow projection. The dorsal ramus or notopodium is less prominent, ending in a long, finger-like projection, through which the aciculum projects.

The neurosetae are very numerous, 40 to 50, varying in size and structure. The ventral-most setae (pl. 2, figs. 9 and 10) are the shortest, about one-half the length of the long setae, with less conspicuous serrations. The setae increase in length and complexity toward the dorsum. The long neurosetae (pl. 2, fig. 11) are slender and the serrations are conspicuous. The ventral setae have a strong subterminal tooth, and curved, pointed tips. The dorsal setae are also very numerous (about 50 or more). In their arrangement they give the appearance of a fan. They are arranged in six or more rows. The ventral setae are the longest, being about three times the length of the long notosetae, decreasing in length dorso-anteriorly. The setae are curved, ending bluntly, their distal ends, except the extreme tips, being covered with fine serrations, which are more pronounced on the convex side. The postero-ventral setae (pl. 2, figs. 6 and 7) are long and stout, about one-half the width of the body. The extreme dorso-anterior notosetae (pl. 2, fig. 8) are very short, strongly curved, with but a few serrations on the convex side. Between these extreme dorsal and ventral setae all gradations of size occur. The color of the setae is golden yellow. Their arrangement is such that in each succeeding row the setae curve in opposite directions. This arrangement may be of some service as a protection for the animal.

There are fifteen pairs of elytra (pl. 2, figs. 2 and 3) covering the greater part of the dorsum, except the narrow median line, which is partly exposed. They occur on segments 2, 4, 5, and on all alternate segments to 25; then on 26, 29 and 32. The first pair of elytra (pl. 2, fig. 2) are nearly orbicular; the rest are reniform. They are densely covered with brown, spinous protuberances (pl. 2, fig. 4). These protuberances are club-shaped and covered with secondary projections. Numerous soft, white projections are scattered over the elytra. These projections are of the same shape as the marginal fringes, many exceeding the latter in length. The marginal fringes are confined to the postero-lateral margin only. A few large, soft tubercles are found near the lateral margin of the elytra.

Comparison.—A single example of this species is in the Zoological Museum of the University of California. It bears some resemblance to *Harmothoë triannulata* Moore (1910). Especially the shape and structure of the elytra, as far as can be judged from figures and descriptions of J. P. Moore, have a great resemblance. There is also some similarity in the setae of the two species. There are, however, some characteristic differences in the general shape of the body, the shape of the prostomium, of the cirri, and of other structures. The body of *Harmothoë triannulata,* according to Moore's description, is deep, while in *Harmothoë bonitensis* it is very much flattened and thin dorso-ventrally. The palpi are comparatively short and smooth in *Harmothoë triannulata,* approximately less than three times the length of the prostomium; in *Harmothoë bonitensis* the palpi are long (about five times the length of the prostomium) and are covered with spirally arranged rows of spines. The dorsal cirri of *Harmothoë triannulata* are covered with more conspicuous spines resembling more the cirri of *Harmothoë hirsuta,* while in *Harmothoë bonitensis* the spines are inconspicuous. In *Harmothoë triannulata* the notosetae are "moderate in number, forming an inconspicuous, depressed whorl"; in *Harmothoë bonitensis,* they are very numerous, forming a conspicuous whorl (see pl. 2, fig. 3). The setae are somewhat similar in shape in both *Harmothoë triannulata* and *H. bonitensis,* except the short, strongly curved notosetae of *Harmothoë bonitensis* (pl. 2, fig. 8) have no representatives in the figures for *Harmothoë triannulata* given by Moore. The distal ends of the neurosetae of *Harmothoë triannulata* are more slender and uniform in diameter, while those of *Harmothoë bonitensis* decrease in diameter gradually toward the tips.

Occurrence.—The specimen was found near Bonita Point at Station D 5846 at lat. 89° N, in a depth of 45–50 fathoms in the collection of the Survey of San Francisco Bay, made by the United States Bureau of Fisheries, April 7, 1913. This description is published by the kind permission of the Commission of the United States Bureau of Fisheries.

Harmothoë johnsoni sp. nov.

Pl. 2, figs. 12–17; pl. 3, figs. 18–21

Description.—The worm is flattened, but comparatively deep dorso-ventrally, the depth of the body being 4 mm. The color in the alcoholic specimen is gray. The dorsum is covered with large,

widely overlapping elytra. The dorsal and ventral surfaces are convex and the thirty-seven segments are well marked. The length of the body is 35 mm., and the width, including the setae is 14 mm. in the widest part of the body between segments 15 and 16. From these segments the body alternates very gradually towards both ends, more strongly towards the posterior end. The width of the body, excluding the setae and parapodia, is about one-third of the entire width, the length of each parapodium including setae being equal to the width of the body, or the parapodia and setae make up two-thirds of the entire width of the body.

The prostomium (pl. 2, fig. 12) is deep and broad; the length of the prostomium being only about two-thirds of the width. It is deeply fissured with acuminated anterior peaks. There are two pairs of comparatively small and equal-sized eyes. The anterior eyes are anterior to the widest part of the prostomium, while the posterior pair are near the center of the prostomium, about two-thirds of the distance from the anterior margin. The style of the median tentacle is missing. The strongly developed cirratophore is deeply inserted between the prostomial lobes. The lateral tentacles arise from prominent cirratophores. The styles are very short, being only slightly longer than the cirratophores. The length of the lateral tentacles, including the styles and cirratophores is about one-third of that of the prostomium. The palpi are stout and uniform in width near the base attenuating very gradually toward the distal ends. They are round and perfectly smooth without any papillae or cilia, slightly longer than the peristomial cirri.

The parapodia (pl. 2, fig. 14) are long, their length being equal to the width of the body, biramous, each ramus terminating in a narrow, finger-like projection, and is supported by a strong dark brown aciculum. The cirratophores of the dorsal cirri are very long, their length being about one-third of that of the style. The latter decreases very gradually in diameter toward the distal end, terminating in a fine filamentous tip. The neurocirrus occurs on all segments and consists of a strong cirratophore and a fusiform style.

The setae are numerous, from 70–100 on each parapodium. They are distinctly of three kinds, with gradations between, in size, as well as in structure. They are longest towards the center, decreasing in length ventrally and dorsally. The neurosetae (pl. 2, figs. 16 and 17) are long and slender, the longest neurosetae being equal in length to that of the parapodium and are twice the length of the stout noto-

setae. The subdistal end is covered with strong serrations, while the slender extreme distal portion and also the greater part of the proximal end is entirely smooth without any serrations. The extreme ventral neurosetae (pl. 3, fig. 21) are very much shorter than are those near the center, being about one-half or less the length of the latter. They are strongly curved, with the fine distal end slightly bent, and the convex subterminal portion strongly serrated.

The notosetae are of two distinct kinds. There are about half a dozen or more of fine dorsal setae (pl. 3, figs. 19 and 20) near the neuropodium. They are about equal in length to the long neurosetae, curved, attenuating very gradually and ending in very fine, almost capillary tips. The distal convex side is covered with spinous roughenings (pl. 3, fig. 20). The notosetae of the other kind are numerous, arranged in rows, each row consisting of 6 to 10 setae thus making a total of about 50 or more notosetae on each parapodium. The dorsalmost rows contain the shortest setae. The length of the setae increases with each succeeding row ventrad, until the maximum length is reached in the last row nearest to the neuropodium, the setae there being about twice the length of the shorter setae from the dorsal most rows. The setae are stout, perfectly smooth without any roughenings or serrations, uniform in width, tapering very abruptly towards the distal end (pl. 3, fig. 18).

There are fifteen pairs of elytra occurring on segments 2, 4, 5 and on all alternate segments to 23, then on segments 26, 29, and 32. The elytra (pl. 3, fig. 13) are kidney-shaped, large, widely overlapping, and thickly covered with chitinous tubercles (pl. 3, fig. 15). Fine venations radiate from the elytrophore in all directions.

The nephridial papillae begin with the sixth segment, occurring thence posteriorly on all segments. They are short, inconspicuous, and uniform in diameter.

Comparison.—The polynoid bears some resemblance to *Harmothoë complanata* Johnson (1901), and might even be considered as a subspecies of the latter. It differs, however, from *Harmothoë complanata* in the shape, and the relative dimensions of the body, the shape and the size of the prostomium, the shape of the parapodia and in the structure of the notosetae. In *Harmothoë complanata* the breadth of the body including the setae, is two-sevenths of the length, while in *Harmothoë johnsoni* the breadth including the setae is one-third of the length. The prostomium of *Harmothoë complanata* is equal in width and length, in *Harmothoë johnsoni* the prostomium is decidedly

broader, the length being two-thirds of the width. The parapodia also differ in shape in the two species. In *Harmothoë complanata* the dorsal ramus or the notopodium is very much shorter than the neuropodium, having about less than one-half of the length of the neuropodium, while in *Harmothoë johnsoni* both rami are almost equal in length (pl. 2, fig. 14). The stout dorsal setae of *Harmothoë complanata* are serrated, those of *Harmothoë johnsoni* are perfectly smooth. The nephridial papillae in *Harmothoë complanata* have acuminated tips; they are uniform in width ending abruptly in *Harmothoë johnsoni.* The color of *Harmothoë complanata* in the alcoholic specimens is reported by Johnson (1901) to be pale brown and a specimen in the Zoological Museum of the University of California is also of a brown color, while the color of *Harmothoë johnsoni* is light gray. The color, however, is not of great importance in classification.

Occurrence.—The single specimen which is now in the Zoological Museum of the University of California, was given to the writer by Mr. H. O. Falk, who had found it December 4, 1915, at a low tide on the beach off La Jolla, near San Diego, California.

Halosydna macrocephala sp. nov.

Pl. 3, figs. 22–33

Description.—The shape of the body is flattened and uniform in width, narrowing gradually toward the posterior end, rounded at both ends. The two specimens are 40 mm. and 25 mm. long, and 10.5 and 7 mm. wide respectively, with 5 mm. between parapodia. The dorsum is covered with widely overlapping elytra.

The prostomium (pl. 3, fig. 22) is unusually broad, the width being more than twice the length. It is very convex, forming a deep median fissure and sloping down abruptly on both sides. Of the two pairs of eyes those of the anterior are considerably larger and are situated near the lateral margins in about the widest part of the prostomiums. The posterior eyes are smaller, nearer together, and are situated at the extreme posterior margin of the prostomium, so that they are partly concealed by the peristomial fold. The strongly developed cirratophore of the median tentacle is inserted between the anterior cephalic prolongations. The style of the median tentacle is lost in both specimens. The stout lateral tentacles, arising from the anterior prostomial prolongations are about one-half of the length

of the palpi. They are uniform in diameter with subterminal enlargements ending then in filamentous tips. The palpi are very stout at the base, decreasing in diameter gradually and ending abruptly in filamentous tips; they are deeply grooved and covered with rows of prominent cilia. The peristomial cirri arising from strong cirratophores are of equal length with the palpi. The styles of the peristomial cirri are long, uniform in width, with subterminal bulb from which filamentous tips project.

The biramous parapodia (pl. 3, fig. 25) are comparatively stout, bearing two dark aciculi. The neuropodium has numerous (40–60) amber-colored setae, varying in shape and size. There are about twenty supra-acicular setae (pl. 3, fig. 30) with prominent serrations and a strong subterminal tooth. The 30 to 40 subacicular setae (pl. 3, fig. 33) differ slightly from the supra-acicular in that the subterminal tooth is smaller or rudimentary. The notopodium is inconspicuous and bears two kinds of setae; about 12 to 15 short, strongly curved setae, covered with strong serrations and ending bluntly with the proximal end and the extreme distal end smooth or free from serrations (pl. 3, fig. 31), and about 20 to 30 long, fine setae, densely covered with serrations, more or less curved and terminating in a fine point (pl. 3, figs. 26 and 27).

The setae from the second parapodium differ from those of other parapodia in their shape and also by being more strongly serrated. The notosetae (pl. 3, figs. 28 and 29) are about equal in size to the neurosetae (pl. 3, fig. 32). They are also nearly alike in shape and structure.

The nephridial papillae begin on the fourth segment, being situated at the dorso-lateral margin near the base of the parapodium and occurring thence posteriorly on all segments. The first or anterior papillae are short, increasing considerably in length dorsad.

There are eighteen pairs of elytra (pl. 3, fig. 23) occurring on segments 2, 4, 5, and on all alternate segments to 27, then on segments 28, 30, 31 and 33. They are comparatively thin and smooth, with but a few small, scattered papillae and are mottled with dark brown or black pigment (pl. 3, fig. 24). There are no marginal cilia. Fine venations radiate from the elytrophore in all directions. The dorsal cirri are equal in size and shape to the peristomial cirri.

Comparison.—The species resembles *Halosydna carinata* Moore (1903) in some respects and this is specially true of the broad prostomium and the conspicuously grooved palpi. The chief difference

lies in the shape of the parapodia and in the number and shape of the setae. In *Halosydna carinata,* of which Dr. J. P. Moore kindly loaned to me an imperfect specimen for comparison, the notopodia are small but prominent, being distinctly differentiated, while in *Halosydna macrocephala* the notopodium is inconspicuous and hardly differentiated. The neurosetae in *Halosydna carinata* are few, 10 to 20. They are strongly serrated, the plates with the serrations extending to the tip of the subterminal tooth; in *Halosydna macrocephala* the neurosetae are more numerous, (40 to 60) the subterminal tooth is less prominent and the serrations do not extend nearly to the subterminal tooth, leaving a considerable portion of the distal end of the setae smooth. The notosetae in *Halosydna carinata* are few, only 3 to 4, short, barely reaching to the tip of the notopodium, curved and ending bluntly. In *Halosydna macrocephala* the neurosetae are numerous, (30 to 40) of two kinds, and long, reaching nearly to the tip of the neuropodium. The 12 to 15 short setae are strongly serrated, curved, and end bluntly (pl. 3, fig. 31). The twenty or more fine notosetae are covered with fine serrations and are terminating in a fine capillary tip.

The setae of *Halosydna macrocephala* resemble those of *Halosydna californica,* Johnson, but the shape and the relative size of the prostomium and the deeply grooved palpi of *Halosydna macrocephala* distinguish the species from *Halosydna californica.*

Occurrence.—The locality of the type is unknown. Two incomplete specimens, the paratypes were found July 17, 1901, off San Diego, lat. 33° 36′9 N; long. 118° 14′7 W, at a depth of 39–51 meters, on rocky bottom.

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EXPLANATION OF PLATES

PLATE 2

Harmothoë bonitensis, sp. nov.

Fig. 1. Prostomium. × 10.
Fig. 2. Fifth elytron. × 10.
Fig. 3. First elytron. × 10.
Fig. 4. Portion of elytron. × 310.
Fig. 5. Fourteenth parapodium. × 15.
Fig. 6. Tip of long notoseta. × 310.
Fig. 7. Tip of long notoseta. × 75.
Fig. 8. Tip of short notoseta. × 160.
Fig. 9. Tip of short notoseta. × 75.
Fig. 10. The same. × 310.
Fig. 11. Tip of long neuroseta. × 310.
Fig. 12. Prostomium. × 20.
Fig. 13. Fifth elytron. × 10.
Fig. 14. Eighteenth parapodium. × 10.
Fig. 15. Tubercles of elytron. × 160.
Fig. 16. Portion of long neuroseta. × 310.
Fig. 17. Tip of long neuroseta. × 75.

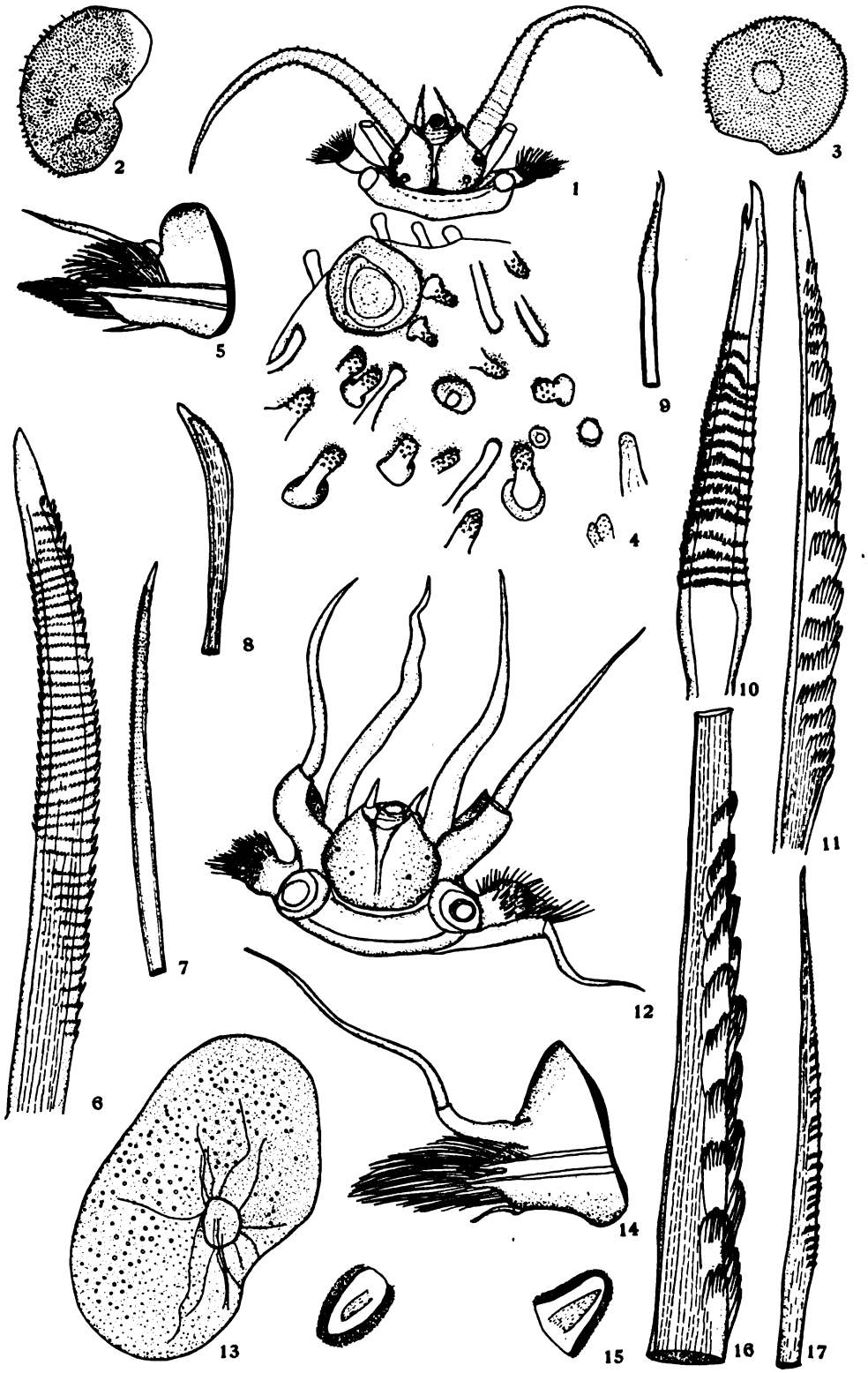


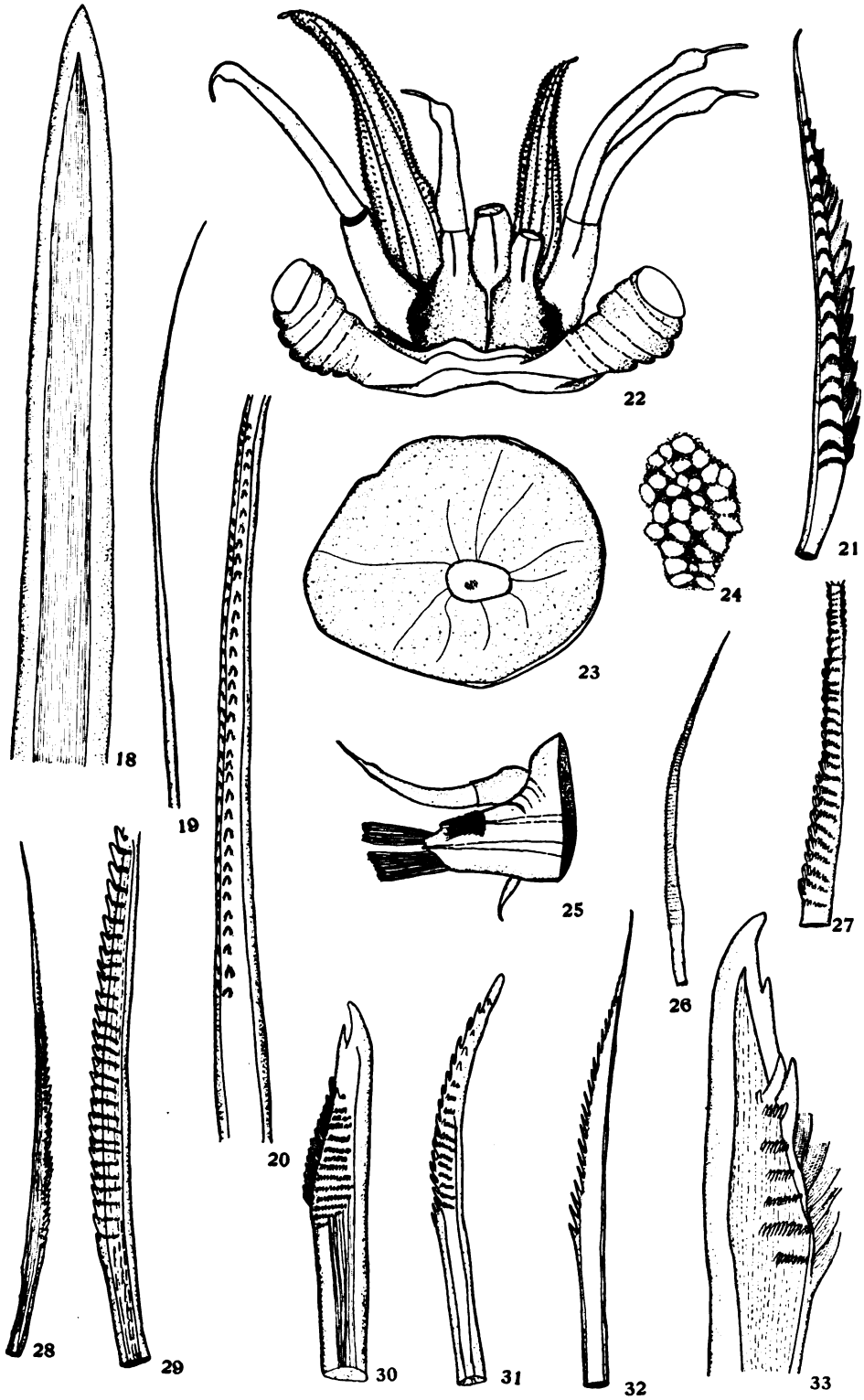
PLATE 3

Harmothoë johnsoni, sp. nov.

Fig. 18. Tip of short notoseta. × 310.
Fig. 19. Tip of fine notoseta. × 45.
Fig. 20. Portion of the same. × 310.
Fig. 21. Tip of short neuroseta. × 160.

Halosydna macrocephala, sp nov.

Fig. 22. Prostomium. × 20.
Fig. 23. Elytron. × 10.
Fig. 24. Portion of elytron. × 75.
Fig. 25. Fourteenth parapodium. × 10.
Fig. 26. Tip of long notoseta. × 75.
Fig. 27. Portion of the same. × 310.
Fig. 28. Tip of notoseta of first parapodium. × 160.
Fig. 29. Portion of the same. × 310.
Fig. 30. Tip of supra-acicular neuroseta. × 160.
Fig. 31. Tip of short notoseta. × 310.
Fig. 32. Neuroseta from first parapodium. × 160.
Fig. 33. Subacicular neuroseta. × 310.



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