

THE CRUSTACEA OF THE ORDER CUMACEA IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM.

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INTRODUCTION.

Some seven years ago Dr. Richard Rathbun was good enough to entrust to me for examination the entire collection of unidentified Cumacea belonging to the United States National Museum. The working out of the collection was unavoidably delayed, and meanwhile additional consignments were sent to me as they were received at the National Museum, until a total of 292 bottles and tubes was reached—one of the largest collections of Cumacea, if not the very largest, that has ever been in the hands of a single investigator. Even now the interest of the material is far from being exhausted, for, to my regret, lack of time has prevented me from utilizing fully the opportunities it offers for studying the variations of several of the commoner species.

The examination of this collection has been carried out in the zoological department of the British Museum, and the results are published here by permission of the trustees of that institution. The authorities of the United States National Museum have courteously allowed a selection of duplicate specimens, including paratypes of many of the new species, to be retained for the British Museum.

The bulk of the material consists of specimens dredged by the *Albatross* and other vessels of the United States Bureau of Fisheries off the New England coast and in Alaskan waters, together with the rich Alaskan collections of Dr. W. H. Dall. The remainder includes specimens from other localities on the coasts of North and South America and a few from Greenland and Japan.

In all, 49 species have been recognized, including 17 that appear to be new to science, and one new genus has been established. A small number of specimens have been set aside which may possibly represent new species but do not afford adequate material for proper description.

The figures accompanying this paper have been drawn by Miss Gertrude M. Woodward.

LIST OF SPECIES IN THE UNITED STATES NATIONAL MUSEUM.

Miss M. J. Rathbun has kindly prepared for me a list of the named Cumacea in the Museum collection. Most of these I have not seen, but I have no reason to doubt the correctness of the identifications, and I have therefore included them (with some minor changes in nomenclature) in the following list, distinguishing them by enclosing the names of the species or localities within square brackets.

The regions from which the specimens in the collection have been obtained are indicated by the letters standing after the name. More precise details regarding the distribution of the species examined by me will be found in a later part of this paper.

- A. Coasts of northern Europe.
- B. West Greenland and Labrador.
- C. Atlantic coast of North America south of Labrador.
- D. Gulf of Mexico.
- E. Atlantic coast of South America.
- F. Pacific coast of South America.
- G. Pacific coast of North America south of Puget Sound.
- H. Alaskan area, including Aleutian Islands, and the Pacific coast of North America north of Puget Sound.
- I. Sea of Okhotsk.
- J. Japan.

BODOTRIIDÆ.

- [*Bodotria scorpioides* (Montagu). A.]
- Bodotria* sp. J.
- Cyclaspis longicaudata* G. O. Sars. C.
- Cyclaspis varians*, new species. C.
- [*Iphinoë trispinosa* (Goodsir). A.]
- [*Vauntomponia cristata* Sp. Bate. A.]
- Heterocuma sarsi* var. *granulata* Miers. J.
- Heterocuma diomedex*, new species. J.
- Bathycuma* (?) *longicaudata*, new species. G.
- Leptocuma kinbergii* G. O. Sars. E.
- Leptocuma minor*, new species. C.

LEUCONIDÆ.

- Leucon nasica* (Krøyer). [A], C.
- Leucon nasicoides* Lilljeborg. C.
- Leucon longirostris* G. O. Sars. C.
- Eudorella emarginata* (Krøyer). [A], B, C.
- Eudorella truncatula* (Sp. Bate). C.
- Eudorella hispida* G. O. Sars. C.
- Eudorella monodon*, new species. D.
- Eudorellopsis deformis* (Krøyer). C.
- Eudorellopsis integra* (S. I. Smith). B, C, H.
- Eudorellopsis bispicata*, new species. C.

NANNASTACIDÆ.

- [*Cumella pygmaea* G. O. Sars. A.]
- Cumella carinata* (Hansen). C.

NANNASTACIDÆ—Continued.

Cumella sp. H.

[*Nannastacus unguiculatus* Sp. Bate. A.]

[*Procampylaspis armata* Bonnier. A.]

Campylaspis rubicunda (Lilljeborg). C.

[*Campylaspis verrucosa* G. O. Sars. A.]

Campylaspis horrida G. O. Sars. C, J. (?)

Campylaspis affinis G. O. Sars (?). C.

[*Campylaspis sulcata* G. O. Sars. A.]

Campylaspis vitrea Calman (?). C.

LAMPROPIDÆ.

Lamprops fuscata G. O. Sars. H.

Lamprops quadriplicata S. I. Smith. C.

Lamprops (?) *beringi*, new species. H.

[*Hemilamprops cristata* (G. O. Sars). A.]

[*Hemilamprops uniplicata* (G. O. Sars). A.]

Paralamprops orbicularis (Calman). C.

DIASTYLIDÆ.

Diastylis scorpioides (Lepechin). B, C.

Diastylis dalli, new species. H, I.

Diastylis bidentata, new species. H.

Diastylis alaskensis, new species. H.

Diastylis planifrons, new species. E.

Diastylis nucella, new species. H.

Diastylis aspera, new species. H, I.

Diastylis argentata, new species. F.

Diastylis rathkii (Krøyer). [A], B, C, H.

Diastylis sulcata, new species. H.

Diastylis polita S. I. Smith. C.

Diastylis sculpta G. O. Sars. C.

[*Diastylis rugosa* G. O. Sars. A.]

Diastylis quadrispinosa G. O. Sars. C.

[*Diastylis cornuta* (Boeck). A.]

[*Diastylis abbreviata* G. O. Sars. C.]

Diastylis stygia G. O. Sars. C.

Diastylis lucifera (Krøyer). [A], C.

Diastylis goodsiri (Bell). [A], C.

[*Diastylis spinulosa* Heller. A.]

[*Diastylis josephinæ* G. O. Sars. A.]

[*Diastylis rostrata* (Goodsir). A.]

[*Diastylis tumida* (Lilljeborg). A.]

[*Diastylodes biplicata* (G. O. Sars). A.]

[*Diastylodes serrata* (G. O. Sars). A.]

Diastylopsis dawsoni S. I. Smith. G, H.

Diastylopsis rcsima (Krøyer). C.

[*Leptostylis longimana* (G. O. Sars). C.]

[*Leptostylis ampullacea* (Lilljeborg). C.]

[*Leptostylis macrura* G. O. Sars. A.]

Oxyrostylis smithi, new genus and species. C, D.

Colurostylis (?) *occidentalis*, new species. G.

PSEUDOCUMIDÆ.

[*Pseudocuma longicornis* (Sp. Bate). A.]

Petalosarsia declivis (G. O. Sars). C.

REMARKS ON GEOGRAPHICAL DISTRIBUTION.

It is necessary once more to insist on the fact that our knowledge of the Cumacea, except in one or two narrow areas, is far too fragmentary to admit of any profitable discussion of the subject of geographical distribution. Even the rich collections from the New England and Alaskan coasts now examined present, in all probability, only an incomplete and one-sided picture of the Cumacean fauna of these regions. The employment of other methods of collecting, specially adapted for obtaining the more minute organisms of the sea bottom, would no doubt add very largely to the lists of species and materially alter the aspect of the fauna as compared with that of better known regions. Nevertheless, while no importance can be attached to the negative features of the lists here given, there are one or two positive features which seem to be of sufficient interest and importance to merit further consideration. These are concerned with the relations between (1) the North Pacific fauna and those of the Arctic and Atlantic Oceans, and (2) the relations between the faunas of the eastern and western coasts of the Atlantic.

As regards the first point, the following species¹ are recorded below from both the Pacific and Atlantic coasts:

Leucon nasica.

Eudorellopsis integra.

Diastylis rathkii.

Of these, *D. rathkii* is known to have practically a circumpolar range in Arctic seas, the only considerable gap being in the unexplored waters of the Arctic-American archipelago, between Wellington Channel and Point Franklin, Alaska. *Leucon nasica* may also be found to have a circumpolar distribution, since it is already known from west Greenland eastward to the mouth of the Yenisei. The remaining species, *Eudorellopsis integra*, is especially interesting since it is known only from Bering Sea, west Greenland, and the northern part of the Atlantic coast of America. It is very undesirable to press too far the evidence from a single case of this kind, more especially when it concerns a minute bottom-living species, whose apparent absence in many localities may be due to imperfect collecting, but it is at all events suggestive that a similarly limited range is recorded for several species of decapod crustacea. The crab *Chionæetes opilio* and the shrimps *Nectocranion lar* and *Spirontocaris grænlandica* may be mentioned as examples.² These and other similar instances seem

¹ Excluding, for the present, *Campylaspis horrida* and *Lamprops fuscata*, the identification of which in the Pacific is doubtful.

² Ortmann, Bronn's Thierreich, Crustacea, Abth. 2, 1900, p. 1265. See also Rathbun, Harriman Alaska Exped., vol. 10, 1904, pp. 61, 137, and 174; and Hansen, Danish Ingolf-Exped., vol. 3, Crust. Malacostraca, I, 1908, pp. 12, 59, and 64.

to point to the existence of an Arctic-American (but *not* circumpolar) fauna, extending into the boreal regions on both sides of the American continent. I learn from Dr. W. H. Dall that there is some evidence pointing in the same direction to be obtained from the Mollusca, among which, however, there are some species common to the east and west boreal regions that are not known from the Arctic seas.

As regards the relation between the faunas of the American and European coasts of the Atlantic, the list given above includes a considerable number of species that are common to both. The great majority of these are species that range into the Arctic region and have a continuous distribution in the colder waters of the north. A few, like *Cyclaspis longicaudata* and *Paralamprops orbicularis*, are deep-water species, for which we may suppose a similar continuity in the deeper levels. There remain a small number of forms, of which *Eudorella truncatula* is an example, which are neither truly Arctic nor deep-water species. These appear to exist in separate colonies on the two sides of the Atlantic, and, as in the similar case of the European and American lobsters (*Homarus gammarus* and *H. americanus*), we should expect to find at least the beginnings of specific differentiation between the forms inhabiting the two areas. In the case of *E. truncatula* I have discussed the relation of the American form described by Sars as *E. pusilla* to the European species, and, failing to find any trustworthy characters on which to separate them, I have united them under one specific name. It is by no means unlikely, however, that some future student may be more successful in distinguishing the two forms, which will then appear as representative species on the two sides of the Atlantic, bearing to each other the same relation that *Lamprops quadriplicata* bears to *L. fasciata*, or *Diastylis quadrispinosa* to *D. cornuta*.

In all these cases, however, we need more evidence as to the range of variation within the species, and there is abundant work still to be done in comparing minutely and carefully the specimens from various localities.

Another element in the Cumacean fauna of the Atlantic coast of North America is represented by *Leptocuma minor* and *Oxyurostylis smithi*. These appear to be southern types which reach their northern limit on the New England coast. *O. smithi* is recorded also from the Gulf of Mexico, while the only other species of the genus *Leptocuma* occurs on the east coast of South America.

Finally, there are a few species peculiar, so far as is yet known, to the New England coast and adjacent waters and not obviously related to species occurring elsewhere. To this group belong *Diastylis sculpta* and *D. polita*.

CLASSIFICATION.

None of the new species contained in this collection can be said to throw much new light on the problems of Cumacean classification. In *Oxyrostylis smithi* the simply pointed apex of the telson, without apical spines, calls attention once more to the impossibility of basing the distinction between the families Diastylidæ and Lampropidæ on the presence in the former of a pair, and in the latter of three or more, apical spines. The species described as *Colurostylis* (?) *occidentalis* presents several remarkable characters, and, whether it is rightly assigned to the genus *Colurostylis* or not, it joins with the type of that genus in breaking down the barrier between the Diastylidæ and Pseudocumidæ. The discovery that the male of *Leptocuma* has only three pairs of pleopods perhaps points the way toward a union of the Bodotriidæ (including Vauntomponiidæ) and the Leuconidæ. It is of course possible, as I have elsewhere pointed out,¹ to base on facts such as these an argument for the opposite course of action, and, instead of reducing the number of families, to increase it very greatly. A step in this direction has recently been taken by Mr. Stebbing² in establishing a new family Dicidæ. In the paper quoted above, which had passed out of my hands before I saw that of Mr. Stebbing, although it was not actually published until later, I have described species that divide among them some of the chief characters used to define the genus *Dic* and the family Dicidæ. Thus *Diastylis fistularis* has a similar form of telson, and the species of *Gynodiastylis* have no pleopods in the male sex; while Doctor Zimmer had previously figured, in *Leptostylis thileniusi*,³ a form of third maxilliped which, in the great expansion of the ischial, or third, segment, resembles that of *Dic* more than that of any other Cumacean. Whether or not the family Dicidæ may afterwards find a place in the classification, its acceptance at present would require to be balanced by the creation of a considerable number of additional families for genera now included in the Diastylidæ, and for this, it seems to me, the time is not yet ripe. Every extensive collection of Cumacea recently examined from tropical and southern seas has yielded species presenting novel and unexpected combinations of characters, and there is no reason to believe that the supply is approaching exhaustion. For the present, therefore, it seems advisable to avoid, as far as possible, establishing new systematic divisions.

SYSTEMATIC NOTES AND DESCRIPTIONS OF NEW SPECIES.

In the following descriptions "total length" is to be understood as including the telson (when distinct), but not the uropods. The "post-anal" region of the telson is measured from the upper posterior mar-

¹ Trans. Zool. Soc., vol. 18, 1911, p. 343.

² Ann. South African Mus., vol. 6, 1910, p. 415.

³ Zool. Jahrb., Abth. Syst., vol. 17, 1902, p. 462, fig. Q.

gin of the anal valves to the apex of the telson. The distance from the same point to the base of the telson may be conveniently, if not quite accurately, called "pre-anal."

The bibliographical data under each species include, as a rule, references to (1) the first description of the species, (2) the fullest description hitherto published, and (3) the chief records of its occurrence in American waters. No attempt is made to give the full synonymy for each species.

Following the practice of the United States National Museum, a single individual has been selected and labeled as the "holotype" of each of the new species here described. It will be readily understood, however, that this specimen is not in all cases that from which the drawings have been prepared or that to which the dimensions recorded in the description apply. The drawings often combine features taken from several more or less imperfect specimens, while the descriptions are based chiefly on specimens selected for dissection and partly or completely destroyed in the process.

BODOTRIA, ? species.

A single female specimen of an undescribed species of this genus is in the collection from Japan, but, as it lacks the uropods and is otherwise imperfect, it can not be fully described. It has a strongly marked lateral ridge on the carapace as well as on the thoracic somites, differing in this from *B. pulex* Zimmer, the only species hitherto recorded from Japan. It is also distinguished from all the known species of the genus by having the carpus of the first legs expanded and about one and one-half times as broad as the merus.

Locality.—*Albatross* station 3730, off Omai Zaki Light, Honshu Island, Japan; surface tow-net, surface temperature, 64° F.; U.S.N.M. 43096; 1 female.

CYCLASPIS LONGICAUDATA G. O. Sars.

Cyclaspis longicaudata G. O. Sars, Forh. Vidensk. Selsk. Christiania, 1864 (1865), p. 207; Crust. Norway, vol. 3, 1899, p. 16, pls. 7 and 8.

This species has not hitherto been recorded from the western side of the North Atlantic, although, as an inhabitant of the deeper waters, its occurrence there is not surprising. It may not be without significance that at all the stations off the American coast the depth exceeds the maximum (1,450 fathoms) hitherto recorded for the species off the European coasts.

Localities.—*Albatross* station 2570; lat. 39° 54' 00'' N.; long. 67° 05' 30'' W.; 1,813 fathoms; bottom temperature, 36.8° F.; U.S.N.M. 44013; 1 female.

Albatross station 2221; lat. 39° 05' 30'' N.; long. 70° 44' 30'' W.; 1,525 fathoms; bottom temperature, 36.9° F.; U.S.N.M. 8505; 13, male and female.

Albatross station 2711; lat. $38^{\circ} 59' 00''$ N.; long. $70^{\circ} 07' 00''$ W.; 1,544 fathoms; U.S.N.M. 44014; 2 females.

Albatross station 2714; lat. $38^{\circ} 22' 00''$ N.; long. $70^{\circ} 17' 30''$ W.; 1,825 fathoms; U.S.N.M. 11998, 44011, and 44012; 5, male and female.

CYCLASPIS VARIANS, new species.

Ovigerous female.—Total length, 3.4 mm.

Carapace slightly more than two-sevenths of total length, compressed, its vertical height a little more than half its length. The dorsal edge is distinctly keeled and the anterior part just behind the ocular lobe is, in many specimens, cut into a number of fine

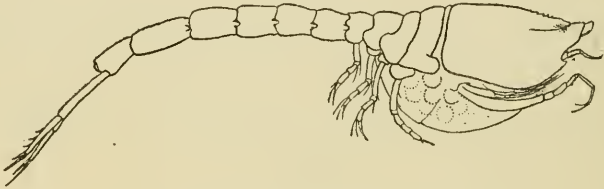


FIG. 1.—CYCLASPIS VARIANS, FEMALE, FROM THE SIDE.

teeth; in some specimens, however, the dorsal edge is quite smooth. The pseudorostrum is of moderate length, acute, the lateral plates meeting in front of the ocular lobe for a distance equal to half the length of the lobe. The antennal notch is rather widely open and the antennal tooth acute. The ocular lobe is slightly prominent on the dorsal surface and the eye is pigmented. The surface of the carapace is quite smooth.

The first leg-bearing somite is exposed both dorsally and at the sides. The dorsal keel is not very marked on any of the thoracic somites. The abdomen is about equal in length to the cephalothoracic region. The first five somites have lateral articular processes.

Antennules of moderate length, the last segment of the peduncle longer than the preceding. First legs short,

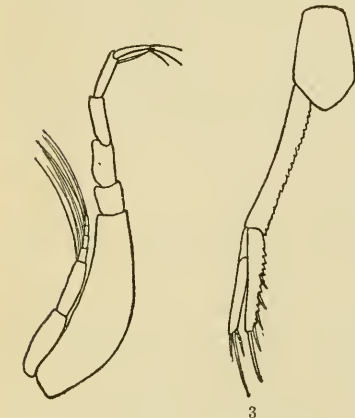


FIG. 2-3.—CYCLASPIS VARIANS, FEMALE. 2, FIRST LEG; 3, LAST SOMITE AND UROPOD.

extending beyond the tip of the pseudorostrum by about one-fourth of the length of the carapace. The basis is not shorter than the distal segments together, without a tooth or plumose setae at the distal end. The dactylus is a little shorter than either the propodus or the carpus.

The peduncle of the uropods is longer by one-half than the last somite and its inner edge is serrated. The rami are subequal and more than two-thirds as long as the peduncle. The endopod has

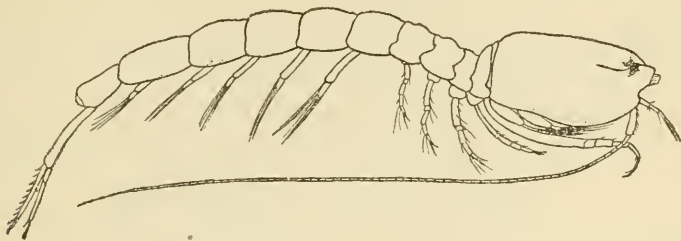


FIG. 4.—CYCLASPIS VARIANS, MALE, FROM THE SIDE.

the inner edge serrated, with four spines, and has a rather slender apical spine; the exopod has three unequal apical spines.

Adult male.—Total length, 4.3 mm.

Differing from the female in the usual characters. The dorsal edge of the carapace is quite smooth. The pseudorostrum is more truncated than in the female and the antennal angle is rounded.

The peduncle of the uropods is nearly twice as long as the last somite and its inner edge is clothed with plumose hairs. The endopod is less than two-thirds as long as the peduncle and a little shorter than the exopod; it has about ten spines on its inner edge. The exopod has plumose setæ on its inner edge.

The integument in both sexes is rather thin and slightly calcified, and there is a good deal of irregularly distributed pigment, especially in the female.

Remarks.—The occasional presence of serrations on the dorsal crest gives this species something of the aspect of an *Iphinoë*, from which genus, however, it is at once distinguished by the unsegmented endopod of the uropods, the lateral articular processes of the abdominal somites, and other characters. On the other hand it is closely related to some of the members of the genus *Cycloaspis*. In the key which I have given to the species of that genus¹ it would find its place next to *C. levis* Thomson. From that species it is distinguished by its much smaller size, by the fact that the ocular lobe does not reach to the tip of the pseudorostrum, by the presence of an apical spine on the endopod of the uropods, and by a number of other small characters mentioned in the description.



FIG. 5.—CYCLASPIS VARIANS, MALE, LAST SOMITE AND UROPOD.

¹ Trans. Zool. Soc., vol. 18, pt. 1, 1907, p. 6.

All the specimens are labeled as having been taken at the surface, and in some of the tubes they are accompanied by copepods, zoeæ, and other plankton organisms.

Localities.—Vineyard Sound, surface; U. S. F. C., 1875; U.S.N.M. 34890–34894; 20, male and female.

Vineyard Sound, surface; U. S. F. C., 1881; U.S.N.M. 34301, 34309, 34315, 34316, 44015; many, male and female.

Woods Hole, surface; U. S. F. C., 1882 and 1885; U.S.N.M. 35249, 44016, 44017; 14, male and female, including holotype (44016).

HETEROCUMA SARSI, var. GRANULATA Miers.

Heterocuma sarsi, var. *granulata* MIERS, Proc. Zool. Soc., 1879, p. 58.—CALMAN, Ann. Mag. Nat. Hist., ser. 8, vol. 6, 1910, p. 614.

The 15 immature specimens of both sexes show the well-marked ridges of the abdomen characteristic of the variety *granulata*, but there is considerable variation among them in the degree of granulation of the carapace. I can find no evidence, however, on which to separate the variety as a distinct species.

Locality.—Albatross stations 4894 and 4895; off Goto Island, Korea Strait; 95 fathoms; U.S.N.M. 44127, 44128; 15, male and female.

HETEROCUMA DIOMEDEÆ, new species.

Immature female.—Total length, 14.3 mm.

Carapace a little more than one-fifth of total length, its vertical height a little more than, and its transverse width about equal to,

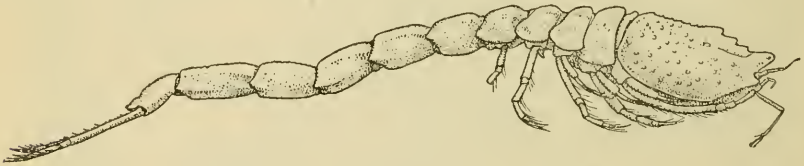


FIG. 6.—HETEROCUMA DIOMEDEÆ, IMMATURE FEMALE, FROM THE SIDE.

one-half of its length. On the anterior half of the dorsal surface (on the frontal lobe) is a sharp crest cut into three large teeth; on the posterior half is a pair of tuberculated ridges set close together. The long and narrow ocular lobe reaches quite to the extremity of the pseudorostrum and bears a pigmented eye. The antennal notch is deep and angular. The antero-lateral angle is bluntly pointed and does not extend as far forward as the tip of the pseudorostrum. The lower edge is serrated anteriorly. The sides of the carapace are dotted with rather widely spaced rounded tubercles.

The first free thoracic somite is overlapped at the sides by the second. A pair of dorsal ridges closely approximated on the second somite diverge somewhat on the succeeding somites, and a pair of

dorso-lateral ridges first become apparent on the third somite. These two pairs of ridges are continued on the abdominal somites, becoming less distinct toward the last somite; a more obscure lateral ridge is visible on the penultimate somite. The penultimate thoracic somite has a procurved median ventral tooth.

Basis of third maxillipeds produced distally into an acute lobe; merus only slightly produced externally; carpus not expanded.

The first legs have the propodus not twice as long as the carpus and nearly one-third longer than the dactylus.

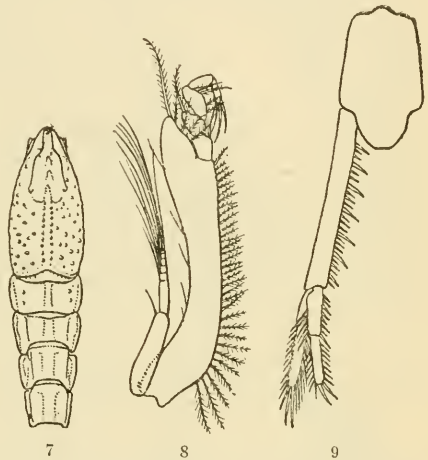
The second and third legs carry well-developed exopods, divided into basal portion and flagellum, that of the third a little smaller than that of the second.

The peduncle of the uropods is longer, by about one-third, than the last somite, and bears on its inner edge about seven strong spines with smaller spines between. The exopod is a little more than half as long as the peduncle, its proximal segment half as long (on the outer edge) as the distal; the endopod is a little shorter than the exopod, its two segments about equal in length. The inner edge of the endopod carries spines and its outer edge setæ; both edges of the exopod are setose distally.

Immature male.—(Incomplete.) Resembling the female, but with the abdomen stouter and its crests more distinct. Five pairs of pleopods are present. The third and fourth thoracic somites have each a ventral spine, and the pleural plates of the fourth are produced forward in a narrow lobe.

Remarks.—In having the exopods of the second and third legs well developed and consisting of an expanded peduncle and a segmented flagellum, this species agrees with the male which I described under the name of *H. weberi*.¹ From *H. weberi* the new species is distinguished by the tuberculation and by the serrated dorsal crest of the carapace.

Locality.—Albatross station 3708; off Ose Zaki, Honshu Island, Japan; 60–70 fathoms; 1 male (U.S.N.M. 44125), 1 female (holotype, U.S.N.M. 44126).



FIGS. 7-9.—*HETEROCUMA DIOMEDEE*, IMMATURE FEMALE. 7, ANTERIOR PART OF BODY FROM ABOVE; 8, THIRD MAXILLIPED; 9, LAST SOMITE AND UROPOD.

¹ Cumacea of *Siboga* Exped., 1905, p. 6, pl. 1, figs. 7-12.

BATHYCUMA (?) LONGICAUDATA, new species.

Immature female.—Total length, 18.5 mm.

Carapace a little more than one-fourth of total length, its height a little greater than its transverse width and about three-fifths of its length; its dorsal edge arched and keeled, at least in its anterior half, where it bears a double series of fine serrations, for the most part

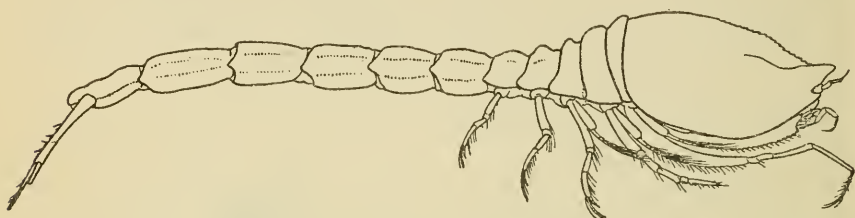
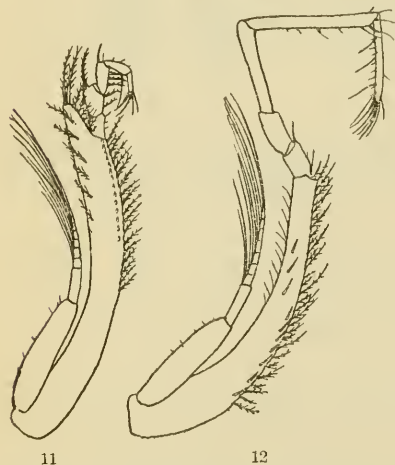


FIG. 10.—BATHYCUMA (?) LONGICAUDATA, IMMATURE FEMALE, FROM THE SIDE.

alternating. The pseudorostrum is short, pointed, and slightly upturned. There is a well-marked, angular, antennal notch defined below by a bluntly pointed antennal tooth, the lower margin of which is obscurely serrated. There is no distinct eye, and the ocular lobe is reduced to a narrow process carrying the serrated dorsal crest for a little way between the plates of the pseudorostrum. The free thoracic somites diminish rapidly in height; the dorsal surface in the third and fourth is raised in a transverse ridge. The abdomen exceeds, by more than one-fourth, the length of the cephalothoracic region, and is very slender, the vertical height of the anterior somites being little more than a third of that of the carapace. All the somites except the last have a pair of dorsal and a pair of dorso-lateral ridges, while a pair of less sharply marked ventro-lateral ridges on the anterior somites become more pronounced and lateral in position on the last two somites. The last somite is produced, as a prominent rounded lobe, between the bases of the uropods.



FIGS. 11-12.—BATHYCUMA (?) LONGICAUDATA, IMMATURE FEMALE. 11, THIRD MAXILLIPED; 12, FIRST LEG.

The second and third segments of the antennule are subequal and much more slender than the first. The third maxillipeds have the

The second and third segments of the antennule are subequal and much more slender than the first. The third maxillipeds have the

basis not increasing in width distally, produced into a lobe which nearly reaches the end of the merus. The lower surface of the basis carries a row of teeth toward the distal end.

The first legs are longer by one-half than the carapace; the basis is armed with spines on its lower surface and is about equal in length to the distal segments together. The dactylus is about equal to the carpus and two-thirds as long as the propodus. The second legs have the ischium distinct; the dactylus is longer than the two preceding segments together. The last pair of legs is distinctly shorter than the preceding and has the carpus about equal in length to the basis.

The peduncle of the uropods is about equal in length to the last somite and bears a series of spines of varying length on its inner edge. The tip of the endopod is broken in the type-specimen, but probably it did not greatly exceed four-fifths of the length of the peduncle. The proximal segment is longer by one-half than what remains of the distal. The exopod is broken.

Remarks.—Zimmer has lately cast doubt on the distinctness of the genus *Bathycuma*, pointing out that the three species referred to it have no common character which they do not share with some species of *Vauntomponia* except the lack of the eye. While there is much to commend this view, I retain the name provisionally in the present case to indicate that the immediate affinities of the new species seem to be with the three species hitherto referred to *Bathycuma*. From these species¹ it is distinguished by the ridges of the abdominal somites as well as by its much greater size and by various differences of proportion noted in the description given above.

Locality.—*Albatross* station 4382; off San Diego, California; 642–666 fathoms; U.S.N.M. 43095; 1 female (holotype).

Genus LEPTOCUMA G. O. Sars.

The characters of this genus have hitherto been very incompletely known, and the occurrence of a new species represented by numerous individuals of both sexes throws some welcome light on its affinities. Most of the new characters described below, the form of the mandibles and maxillulæ for example, are quite in accordance with Sars' suggestion² that *Leptocuma* should be referred to the family Vauntomponiidae. I have recently³ supported Hansen's suggestion that this



FIG. 13.—*BATHYCUMA* (?)
LONGICAUDATA, IMMATURE FEMALE, SECOND LEG.

¹ See Calman, Fisheries, Ireland, Sci. Invest., 1904, No. 1 (1905), p. 18, and Cumacea of *Siboga* Exp. (1905), p. 10.

² Arch. Math. Naturvid., vol. 4, 1879, p. 12.

³ Ann. Mag. Nat. Hist., ser. 8, vol. 6, 1910, p. 615.

family ought to be united with the Bodotriidæ, and the new species now described brings a little additional evidence for this by having male pleopods that, in the form of the endopod, resemble those of *Cumopsis* more than those of *Vauntompsonia* and by the number and form of its branchial lobules. The most surprising feature of the new species, however, is the fact that only three pairs of pleopods are present in the male instead of the five pairs that are universal throughout the extended family Bodotriidæ. This character helps to diminish the distance separating this family from the Leuconidæ, in which only two pairs of male pleopods are present. Possibly the three-segmented antenna of the female may point in the same direction, for this character is found in some species, at least, of the genus *Leucon*.¹

LEPTOCUMA KINBERGII G. O. Sars.

Leptocuma kinbergii G. O. Sars, Kgl. Svenska Vet. Akad. Handl., vol. 11, No. 5, 1873, p. 24, pl. 6.—CALMAN, Trans. Zool. Soc., vol. 18, 1907, p. 30.

The specimen is a female with embryos in the marsupium. It measures 17 mm. in length of body and is thus intermediate in size between the two previously recorded. In most points it agrees with the large specimen which I have described from the Copenhagen Museum rather than with that of Sars. The second legs, however, fall considerably short of the anterior margin of the carapace. The peduncle of the uropods is slightly shorter than the last somite; the exopod is equal to, and the endopod a little longer than, the peduncle. Of the two segments of the endopodite the second is about two-thirds the length of the first, as in Sars' figure. The basis of the third maxilliped is not produced distally and the distal segments are not expanded.

The *Albatross* specimen was taken in the type-locality of the species, off the mouth of the Rio de la Plata. I have already recorded the occurrence of the species in the Straits of Magellan.

Locality.—*Albatross* station 2765; lat. 36° 43' 00'' S.; long. 56° 23' 00'' W.; 10½ fathoms; U.S.N.M. 44134; 1 female.

LEPTOCUMA MINOR, new species.

Ovigerous female.—Total length, 7.5 mm.

Carapace slightly more than one-fifth of total length, its vertical height less than three-fourths of its length, moderately compressed. The pseudorostrum is short and truncated, but the lateral plates meet in front of the ocular lobe for a distance about equal to one-half the length of the lobe. The eye is pigmented. The antennal notch is more open than in *L. kinbergii*. The first leg-bearing somite is only exposed on the dorsal surface; the second and third have the

¹ Sars, Arch. Math. Naturvid., vol. 4, pp. 24, 27, pl. 28, fig. 3.

pleural plates greatly expanded. The abdomen is stout and longer by about one-fifth than the cephalothoracic region.

The antennules rather short and stout, the first segment of the peduncle longer than the second or third, which are subequal; the outer flagellum has two segments and is hardly longer than the last segment of the peduncle; the inner flagellum is unsegmented and

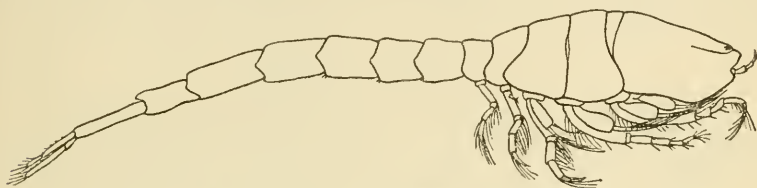


FIG. 14.—LEPTOCUMA MINOR, FEMALE, FROM THE SIDE.

half as long as the first segment of the outer. The antennæ consist of three segments, the terminal one bluntly conical and twice as long as it is wide at the base. The mandibles are of normal form, the portion proximal to the molar process being nearly twice as long as that distal to it; there are only about six spines, and there is a *lacinia mobilis* on the left mandible. The palp of the maxillula has two setæ. The branchial apparatus has about seven broad, flattened, marginal lobules arranged in a straight row, and a very large reflexed lobule. The third maxilliped has the basis slightly produced at its outer distal corner.

The first legs are short; the basis is a little longer than the distal segments together; the propodus is equal to the carpus and longer than the dactylus; there is a group of long setæ at the distal end of the inner edge of the propodus. The second legs have the basis a little shorter than the distal segments together; the carpus is a very little longer than the merus; the propodus is a little longer than the dactylus and together with it a little longer than the carpus. The third legs have a well-developed exopod. The fourth legs have a vestigial exopod of two segments, the distal one very minute.

The peduncle of the uropods is nearly $1\frac{1}{2}$ times as long as the last somite and bears a series of unequal spinules on the inner edge. The endopod is about four-fifths as long as the peduncle, its proximal seg-



FIG. 15-16.—LEPTOCUMA MINOR, FEMALE. 15, THIRD MAXILLIPED; 16, FIRST LEG.

ment more than twice as long as the distal, with the inner margin spined; the distal segment is four times as long as wide. The exopod is a little longer than the endopod and has slender spines or setæ on the inner edge and terminally but not on the outer edge.

Adult male.—Total length, 6.4 mm.

Carapace more than one-fifth of total length, the pseudorostrum still shorter than in the female, the antennal notch shallower, and the antero-lateral angle more broadly rounded. The thoracic somites present no conspicuous differences from those of the female and the abdominal somites are only a little stouter. The antennular peduncle is not dilated and has no conspicuous distal brush of hairs. The thoracic limbs present no marked differences from those of the female except that large exopods are present on the first four pairs of legs.

There are only three pairs of pleopods; the endopod of each has a narrow process on its outer margin.

The uropods are similar to those of the female, but the

spines on the inner edge of the peduncle and endopod are more numerous.

Remarks.—This species resembles very closely the type of the genus, but all the specimens examined differ from it in the following characters—the size of adult female specimens is less than



FIGS. 17-19.—LEPTOCUMA MINOR, FEMALE. 17, SECOND LEG; 18, FOURTH LEG; 19, LAST SOMITE AND UROPOD.

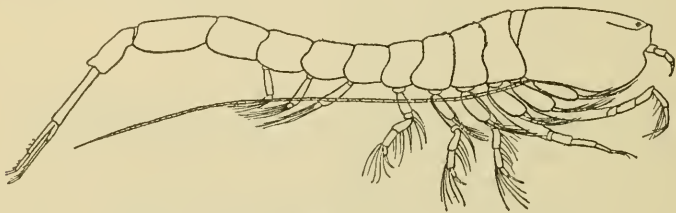


FIG. 20.—LEPTOCUMA MINOR, MALE, FROM THE SIDE.

half that of adult females of *L. kinbergii*; the lateral plates of the pseudorostrum meet in front of the ocular lobe; the basis of the third maxillipeds is distinctly produced at the distal outer corner; the propodus of the first legs is not longer than the carpus; the peduncle of the uropods is distinctly longer than either the last

somite or the rami; the rami are much more slender and the outer edge of the exopod is without setæ.

Localities.—U. S. F. C. station 141 (1878); Gloucester Harbor; 8½ fathoms; U.S.N.M. 34857, 44135; 3 males.

U. S. F. C. station 145 (1878); Gloucester Harbor; 8 fathoms; U.S.N.M. 34858, 34859, 36646, 44136, 44138; many, male and female (including holotype, 34858).

Vicinity of Woods Hole; U. S. F. C.; U.S.N.M. Acc. 11306; 1 female.

LEUCON NASICA (Krøyer).

Cuma nasica KRØYER, Naturh. Tidsskr., vol. 3, 1841, p. 524, pl. 6, figs. 31–33.

Leucon nasica KRØYER, Naturh. Tidsskr., ser. 2, vol. 2, 1846, p. 189, pl. 2, figs. 5a–b.

Leucon nasicus WHITEAVES, Amer. Journ. Sci., vol. 7, 1874, p. 214; Rep. dredging operations in Gulf of St. Lawrence, 1874, p. 16.—S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 114.—G. O. SARS, Crust. Norway, vol. 3, 1900, p. 30, pls. 21, 22.

So far as I know, this species has not hitherto been recorded from the Pacific side of America. The specimens from the south coast of Alaska seem to agree exactly with those from Labrador and with Sars' figures. The species has been recorded from the Gulf of St. Lawrence by Whiteaves and by Smith.

Localities.—Off Beachy Island, between Flint Island and Cape Mugford, Labrador; 80 fathoms; Owen Bryant, August 22, 1908; U.S.N.M. 44143; 1 female.

Albatross station 4272; Afognak Bay, Afognak Island, Alaska; 12–17 fathoms; U.S.N.M. 44141; 1 female.

Off Round Island, Coal Harbor, Unga, 6–8 fathoms; W. G. Hall; Dall collection; U.S.N.M. 44142; 1 female.

LEUCON NASICOIDES Lilljeborg.

Leucon nasicoides LILLJEBORG, Oefvers. Kgl. Vet. Akad. Förh., vol. 12, 1855, p. 122.—S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 115.—G. O. SARS, Crust. Norway, vol. 3, 1900, p. 31, pl. 23.

This species has been recorded from Eastport, Maine, and from the Gulf of St. Lawrence, by S. I. Smith.

Locality.—Albatross station 2466; lat. 45° 29' 00" N.; long. 55° 24' 00" W.; 67 fathoms; bottom temperature 30° F.; U.S.N.M. 44144; 18, male and female.

LEUCON LONGIROSTRIS G. O. Sars.

Leucon longirostris G. O. SARS, Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, p. 42, fig. 75.—CALMAN, Mitth. Zool. Stat. Neapel, vol. 17, 1906, p. 414, pl. 27, figs. 1–8.

This species, to which a very young specimen in the collection appears to belong, has been recorded from Davis Straits (1,750 fathoms) by Norman.

Locality.—Albatross station 2084; lat. 40° 16' 50" N.; long. 67° 05' 15" W.; 1,290 fathoms; bottom temperature 40° F.; U.S.N.M. 44140; 1 young.

EUDORELLA EMARGINATA (Krøyer).

Leucon emarginatus KRØYER, Naturh Tidsskr., ser. 2, vol. 2, 1846, p. 181, pl. 1, fig. 7, pl. 2, figs. 3a-h.

Eudorella emarginata S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 115.—G. O. SARS, Crust. Norway, vol. 3, 1900, p. 36, pls. 27, 28.

This well-marked species does not seem to have been recorded hitherto south of Halifax on the American coast.

Localities.—Egg Harbor, Labrador; 7 fathoms; Owen Bryant, August 10, 1908; U.S.N.M. 44106; 1 female.

Twenty miles ESE. of Cape Sable, N. S.; 70 fathoms; Owen Bryant, October 7, 1908; U.S.N.M. 44105; 1 female.

Albatross station 2497; lat. 45° 04' 00" N.; long. 59° 36' 45" W.; 57 fathoms; bottom temperature 33° F.; U.S.N.M. 38207; 12, female and young.

U. S. F. C. station 311; off Cape Cod; 16 fathoms; bottom temperature 49° F.; U.S.N.M. 34873; 1 male.

U. S. F. C. station 992; off Marthas Vineyard; 36 fathoms; bottom temperature 48° F.; U.S.N.M. 44104; 1 male.

EUDORELLA TRUNCATULA (Spence Bate).

Eudora truncatula SP. BATE, Ann. Mag. Nat. Hist., ser. 2, vol. 17, 1856, p. 457, pl. 14, fig. 3.

Eudorella truncatula G. O. SARS, Arch. Math. Naturvid., vol. 4, 1879, p. 34, pls. 30-32; Crust. Norway, vol. 3, 1900, p. 37, pl. 29.

Eudorella pusilla G. O. SARS, Oefvers. Kgl. Vet. Akad. Förh., 1871, p. 79; Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, p. 46, pls. 16, 17.—S. I. SMITH, Rep. U. S. Comm. Fisheries, pt. 1, 1874, p. 554; Trans. Conn. Acad., vol. 5, 1879, p. 116.

The American form which has been distinguished by G. O. Sars and S. I. Smith, under the name of *E. pusilla*, from the European *E. truncatula*, does not seem to me to deserve specific rank. At all events, a somewhat close examination of the series from American localities in the present collection has only revealed one trifling character which might possibly prove to be distinctive, namely, the shortness of the exopod of the uropods. In the American specimens (females) this seems to be always a little shorter than the first segment of the endopod, while in the few European specimens at hand for comparison, as in Sars' figures of *E. truncatula*, it is a little longer than that segment. Further research is required to ascertain whether this difference is constant and whether it is accompanied by any others, but for the present it does not seem adequate for the separation of the species. Another character presented by some of the specimens in this collection is the possession of a small anteriorly curved tooth on the dorsal surface of the carapace close to the hinder margin of the respiratory opening. This tooth is easily overlooked, and it is possible that it may be found in some European specimens. In any case, it can not be regarded as a specific character, since, in a

number of adult females from one gathering, absolutely indistinguishable by any other character, it was present in some and absent in others. A similar tooth in a slightly different position is found in the specimens of *E. monodon* described below.

Localities.—U. S. F. C. stations 133–134 (1878); Massachusetts Bay; 26–33 fathoms; U.S.N.M. 44113; 1 female.

U. S. F. C. station 154 (1878); Massachusetts Bay; 38 fathoms; bottom temperature, 41° F.; U.S.N.M. 34852; 1 female.

U. S. F. C. station 160 (1878); Massachusetts Bay; 54 fathoms; bottom temperature, 39° F.; U.S.N.M. 44114; 1 female.

U. S. F. C. station 337; off Plymouth; 16 fathoms; bottom temperature, 47° F.; U.S.N.M. 34875; 1 female.

U. S. F. C. station 992; off Marthas Vineyard; 36 fathoms; bottom temperature, 48° F.; U.S.N.M. 34300; 2 females.

U. S. F. C. station 1231; Vineyard Sound; 16 fathoms; bottom temperature, 62° F.; U.S.N.M. 12697, 12698; many, female and young.

U. S. F. C. station 811; off Block Island; 19½ fathoms; bottom temperature, 60° F.; U.S.N.M. 44112; 1 female.

U. S. F. C. station 1240; Block Island Sound; 18½ fathoms; U.S.N.M. 12699, 12700; many females.

EUDORELLA HISPIDA G. O. Sars.

Eudorella hispida G. O. Sars, Oefvers. Kgl. Vet. Akad. Förh., 1871, p. 80; Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, p. 49, pl. 18, figs. 95–97.—S. I. SMITH, Rep. U. S. Comm. Fisheries, pt. 1, 1874, p. 555; Trans. Conn. Acad., vol. 5, 1879, p. 115.

This species is by no means always so easily distinguished from the preceding as might be gathered from Sars' description and figures, and I have had a good deal of hesitation in deciding as to the position of individual specimens. All those determined as *E. hispida* possess the following characters: (1) The antero-lateral tooth of the carapace is strong and more or less horizontal; (2) the carpus of the second leg is a good deal longer (at least 1¼) than the merus; (3) the exopod of the uropods reaches at least to the middle of the second segment of the endopod. In each of these characters, however, there is some variation, while among the specimens referred to *E. truncatula* (1) the antero-lateral tooth may be much stronger than in any of Sars' figures; (2) the carpus of the second leg may be a little longer than the merus, and (3) the exopod of the uropods, in European specimens at least, may be longer than the first segment of the endopod. At all events there can be no question that the outline of the anterior margin of the carapace does not possess the constancy attributed to it by Sars.

None of the specimens referred to *E. hispida* possess a dorsal tooth on the carapace.

Localities.—Twenty miles ESE. of Cape Sable, Nova Scotia; 70 fathoms; Owen Bryant, Oct. 7, 1908; U.S.N.M. 44109; 1 female.

U. S. F. C. station 18 (1877); Massachusetts Bay; 45 fathoms; U.S.N.M. 37836; 2 females.

Casco Bay; U. S. F. C., 1873; U.S.N.M. 34308, 34965, 44107; many males and females.

U. S. F. C. station 296; off Cape Cod; 26 fathoms; bottom temperature, 39° F.; U.S.N.M. 34864; 1 female.

U. S. F. C. station 301; off Cape Cod; 27 fathoms; bottom temperature, 42° F.; U.S.N.M. 34871; 1 female.

U. S. F. C. station 310; off Cape Cod; 21 fathoms; bottom temperature, 47° F.; U.S.N.M. 44108; 2 females.

U. S. F. C. station 311; off Cape Cod; 16 fathoms; bottom temperature, 49° F.; U.S.N.M. 34869; 1 female.

U. S. F. C. station 350; off Cape Cod; 31 fathoms; bottom temperature, 43° F.; U.S.N.M. 34872; 1 female.

U. S. F. C. station 993; off Marthas Vineyard; 39 fathoms; bottom temperature, 46° F.; U.S.N.M. 44110; 1 male.

EUDORELLA MONODON, new species.

Ovigerous female.—Total length, 4.7 mm.

Body slender, its surface sparsely beset with inconspicuous setæ. Carapace about one-fifth of total length, its depth nearly four-fifths

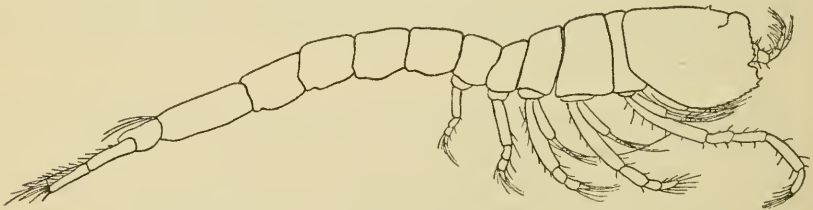


FIG. 21.—EUDORELLA MONODON, FEMALE, FROM THE SIDE.

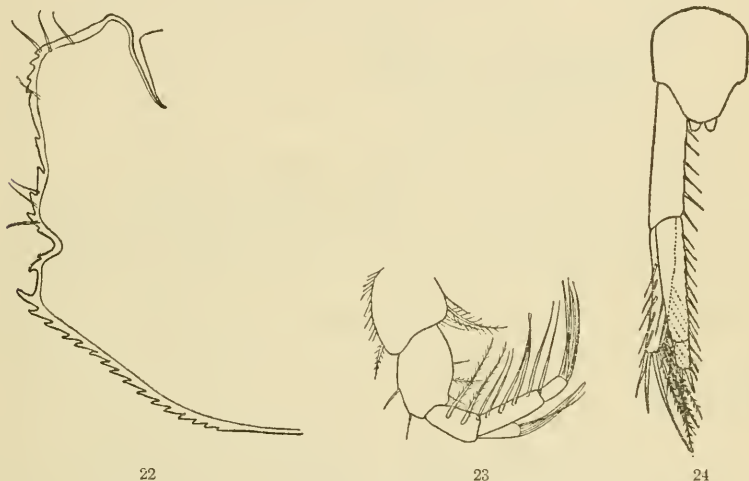
of its length. Anterior margin most nearly resembling that of *E. hirsuta* Sars, but the antero-lateral tooth is more prominent and the serrations on the upper part of the margin (anterior margin of the pseudorostral plate) point downward. On the upper surface of the carapace about one-third of its length from the front margin is a small, anteriorly curved tooth.

The antennules have the second segment of the peduncle dilated, its width about two-thirds of its length. The inner flagellum does not nearly reach to the end of the first segment of the outer.

The first legs have the propodus distinctly longer than the carpus and more than twice as long as the dactylus. The second legs have the carpus about equal to the merus and hardly longer than the propodus and dactylus together.

The peduncle of the uropods is longer by about one-fifth than the last somite and has six long spines on its inner edge. The endopod is equal to the peduncle, its proximal segment four times as long as the distal, with about 15 spines on its inner edge, a well-defined apical spine, and setæ on the outer edge. The exopod is shorter than the endopod, with long setæ on the outer and inner margins.

Remarks.—The variability of the dorsal spine of the carapace in *E. truncatula*, as described above, throws doubt upon its value as a specific character in this case. Apart from this, however, the specimens differ from Sars' figures of *E. hirsuta* in so many other characters, the dilated second segment and short inner flagellum of the antennule



FIGS. 22-24.—EUDORELLA MONODON, FEMALE. 22, ANTERIOR EDGE OF CARAPACE FROM THE SIDE; 23, ANTENNULE; 24, LAST SOMITE AND UROPOD.

being perhaps the most conspicuous, that I hesitate to identify them with that species, which is only known from the Norwegian coast.

Locality.—Beach near Calcasieu Pass, Louisiana; M. H. Spaulding, collector; U.S.N.M. 44111; 2 females.

EUDORELLOPSIS DEFORMIS (Krøyer).

Leucon deformis KRØYER, Naturh. Tidsskr., ser. 2, vol. 2, 1846, p. 194, pl. 2, fig. 4.

Eudorella deformis G. O. SARS, Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, p. 50, figs. 101-118.—S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 116.

Eudorellopsis deformis G. O. SARS, Crust. Norway, vol. 3, 1900, p. 40, pls. 31-32.

Recorded from off Long Island and from Gloucester, Mass., by Sars and by Smith.

Localities.—Albatross station 2497; off Nova Scotia; lat. 45° 04' 00" N.; long. 59° 36' 45" W.; 57 fathoms; bottom temperature, 33° F., U.S.N.M. 44119; 1 female.

U. S. F. C. station 145 (1878); Gloucester Harbor; 8 fathoms; bottom temperature, 51° F.; U.S.N.M. 44118; 1 male.

U. S. F. C. station 1231; off Vineyard Sound Lightship; 16 fathoms; bottom temperature, 62° F.; U.S.N.M. 44120; 1 female.

EUDORELLOPSIS INTEGRATA (S. I. Smith).

Eudorella integra S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 116.

Eudorellopsis integra H. J. HANSEN, Vidensk. Medd. Kjøbenhavn, 1887 (1888), p. 201, pl. 7, figs. 3-3d.

Four specimens from Bering Sea are in the collection and appear to agree perfectly with specimens from the Atlantic coast. Many of the latter have, on the dorsal surface of the carapace, a minute denticle placed at about one-third of the distance from the pseudorostrum to the posterior margin of the carapace.

The species has been recorded from West Greenland (up to lat. 69° 58' N.) (Hansen), Gulf of St. Lawrence, and Halifax (S. I. Smith), at depths of from 15-280 fathoms.

Localities.—1 mile north of Battle Harbor, Labrador; 50 fathoms; Owen Bryant, September 14, 1908; U.S.N.M. 44122; 1 female.

Albatross station 2458; lat. 46° 48' 30'' N.; long. 52° 34' 00'' W.; 89 fathoms; bottom temperature, 29.5° F.; U.S.N.M. 35247; many, male and female.

Albatross station 2497; lat. 45° 04' 00'' N.; long. 59° 36' 45'' W.; 57 fathoms; bottom temperature, 33° F.; U.S.N.M. 10909; many, male and female.

U. S. F. C. station 100 (1877); off Halifax, Nova Scotia; 42 fathoms; bottom temperature, 34° F.; U.S.N.M. 34297, 34878; 3 females.

U. S. F. C. station 101 (1877); off Halifax, Nova Scotia; 42 fathoms; U.S.N.M. 34318, 34854, 44153, 44156; 13, male and female.

U. S. F. C. stations 106-108 (1877); off Halifax, Nova Scotia; 110 fathoms; bottom temperature, 36° F.; U.S.N.M. 34328; 1 female.

U. S. F. C. station 112 (1877); off Halifax, Nova Scotia; 52 fathoms; bottom temperature, 35° F.; U.S.N.M. 34880; 2 females.

U. S. F. C. stations 112-118 (1877); off Halifax, Nova Scotia; 52 fathoms; bottom temperature, 35° F.; U.S.N.M. 34879, 34900; 20, male and female.

U. S. F. C. station 39 (1877); Gulf of Maine; lat. 42° 44' 00'' N.; long. 66° 27' 00'' W.; 75 fathoms; bottom temperature, 39° F.; U.S.N.M. 44121; 1 female.

Albatross station 3252; Bering Sea; lat. 57° 22' 20'' N.; long. 164° 24' 40'' W.; 29 fathoms; bottom temperature, 44° F.; U.S.N.M. 44123; 4, male and female.

Albatross station 3253; Bering Sea; lat. 57° 05' 50'' N.; long. 164° 27' 15'' W.; 36 fathoms; bottom temperature, 35° F.; U.S.N.M. 44124; 1 female.

EUDORELLOPSIS BIPLICATA, new species.

Ovigerous female.—Total length, 5.5 mm.

Carapace more than one-fourth of total length, only a little longer than deep. Anterior margin shaped as in *E. integra*, but more sinuous, with a strong convexity at the base of the pseudorostrum; with a few inconspicuous serrations in its upper part, interspersed with longish setæ. Pseudorostrum nearly vertical, acute, anterior margin concave. On the side of the carapace are two oblique curved ridges.

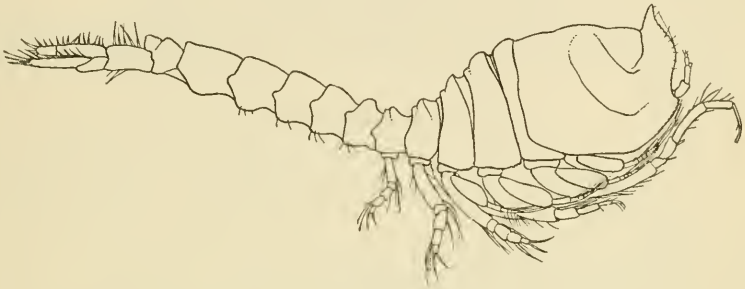


FIG. 25.—EUDORELLOPSIS BIPLICATA, FEMALE, FROM THE SIDE.

The first leg-bearing somite is firmly united to the posterior edge of the carapace. The abdomen is about four-fifths as long as the cephalothoracic region. The last somite is crossed by a very distinct transverse groove and its posterior edge is broadly rounded, as seen from above.

The antennules resemble those of *E. integra*, and the spines which they carry are comparatively few and inconspicuous. The mouth parts do not differ greatly from those of *E. deformis*, but the basis of the third maxillipeds, measured along its inner edge, is nearly twice as long as the distal segments together. The first legs are rather longer than in *E. deformis*, and the three distal segments diminish successively in length.

Peduncle of uropods about equal in length to the last somite; width, as seen from above, about half its length. Exopod more than one and one-half times as long as the peduncle, narrowed at the tip and curved outward, with rather long setæ on the inner edge and at the tip; outer edge serrated distally and with a group of setæ about the middle of its length. Endopod shorter than the exopod, its stout terminal spine reaching about to the apex of the latter, with about 13 spines on the inner and some small spines on the outer edge.

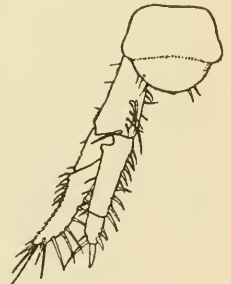


FIG. 26.—EUDORELLOPSIS BIPLICATA, FEMALE, LAST SOMITE AND UROPOD.

Remarks.—From the three known species of the genus this new form is at once distinguished by the two oblique ridges on the side of the

carapace. In its other characters it approaches most closely to *E. integra* S. I. Smith, but it is distinguished by a difference in the outline of the anterior part of the carapace, by the marked transverse groove of the last somite (hardly indicated in *E. integra*), by the more nearly equal rami of the uropods, and by a number of other small characters.

Localities.—*Albatross* station 2466; lat. $45^{\circ} 29' 00''$ N.; long. $55^{\circ} 24' 00''$ W.; 67 fathoms; bottom temperature, 30° F.; U.S.N.M. 44116, 44117; 2 females (including holotype, 44117).

Albatross station 2497; lat. $45^{\circ} 04' 00''$ N.; long. $59^{\circ} 36' 45''$ W.; 57 fathoms; bottom temperature, 33° F.; U.S.N.M. 44115; 12, female and young.

CUMELLA (?) CARINATA (Hansen).

Campylaspis carinata HANSEN, Vidensk. Medd. Kjøbenhavn, 1887 (1888), p. 207, pl. 7, figs. 4, 4a. — CALMAN, Fisheries, Ireland, Sci. Invest., 1904, No. 1 (1905), p. 28.

The specimens examined agree very well as regards external characters with Hansen's excellent figures.

I have previously discussed the systematic position of this peculiar species and have suggested that it might possibly belong to the genus *Cumellopsis*. A renewed examination of the mouth parts, however, leaves no doubt in my mind that the species is most nearly related to the genus *Cumella*. In the third maxillipeds the basis is slightly produced at its distal outer corner and the merus projects externally. The second maxilliped resembles very closely that of *Nannastacus unguiculatus* as figured by Sars, and is very different from that of *Cumellopsis*, the protuberance on the outer side of the merus being especially well-marked. The terminal segment of the first maxillipeds is distinctly broadened and sub-discoidal, much as in Sars' figure of *Cumella pygmaea*. An even more important indication of affinity is given by the branchial apparatus, on which I can discover no trace of lobules. The remaining mouth-parts differ only in trivial characters from those of *Cumella* and *Nannastacus*, the maxilla, which I was unable to examine previously, being of normal type, with two movable endites. The palp of the maxillula has two setæ.

The only character which could at present be regarded as excluding the species from the genus *Cumella*, apart from the strongly calcified and brittle integument and the tuberculated carapace, is the presence of a distinct ischium in the second maxilliped. This, however, is a character somewhat difficult to observe, and it is by no means certain that it is absent in all the species referred to *Cumella*. In any case it would not, by itself, justify the establishment of a new genus.

Only two specimens of this species have hitherto been recorded. That described by Hansen was from Disco, Greenland, while that in the Museum of University College, Dundee, is from the coast of Labrador.

Localities.—*Albatross* station 2458; lat. $46^{\circ} 48' 30''$ N.; long. $52^{\circ} 34' 00''$ W.; 89 fathoms; bottom temperature, 29.5° F.; U.S.N.M. 44006; 1 female.

Albatross station 2466; lat. $45^{\circ} 29' 00''$ N.; long. $55^{\circ} 24' 00''$ W.; 67 fathoms; bottom temperature, 30° F.; U.S.N.M. 44007; 4 females.

CUMELLA, ? species.

The specimens, which are all males, belong to a species closely allied to *C. pygmæa* G. O. Sars, but apparently distinct from it. The most noticeable difference is that in these Alaskan specimens the last three thoracic and the first three abdominal somites are each elevated dorsally into a transverse ridge, appearing in side view as a prominent angular tooth. It is to be noted, however, that in male specimens of *C. pygmæa* from the west of Ireland the dorsal outline of these segments is more uneven than in Sars' figures. Further, in the Alaskan specimens the pseudorostrum is a little longer and the antero-lateral angle of the carapace slightly more produced than in *C. pygmæa*; the peduncle of the uropods is much stouter and shorter (only a little longer than the last somite, while in *C. pygmæa* it is twice as long), with strong serrations, but only two spines on its inner edge; the endopod is also stouter and has only four spines on the inner edge.

As this species comes so near to *C. pygmæa* it is desirable to await the discovery of the female before describing it under a new name.

Localities.—Old Harbor, Kodiak Island; *Albatross*, August, 1888; U.S.N.M. 44004; about 8 males.

Kodiak, Alaska, surface, electric light; *Albatross*, 1888; U.S.N.M. 44003; many males.

CAMPYLASPIS RUBICUNDA (Lilljeborg).

Cuma rubicunda LILLJEBORG, Oefvers. Kgl. Vet. Akad. Förh., vol. 12, 1855, p. 121.

Campylaspis rubicunda S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 120.—

G. O. SARS, Crust. Norway, vol. 3, 1900, p. 84, pls. 56, 57.

Localities.—U. S. F. C. station 165 (1878); Gulf of Maine; 35 fathoms; bottom temperature, 41.5° F.; U.S.N.M. 34886; 1 female.

U. S. F. C. station 992; off Marthas Vineyard; 36 fathoms; bottom temperature, 48° F.; U.S.N.M. 44002; 1 female.

CAMPYLASPIS HORRIDA G. O. Sars (?).

Campylaspis horrida G. O. SARS, Forh. Vidensk. Selsk. Christiania, 1869 (1870), p. 162.—Crust. Norway, vol. 3, 1900, p. 89, pl. 62.

Two specimens are referred to this species, with some doubt in both cases. One, a young female from the Atlantic, has been dried and is very much broken. From what remains, however, it would appear that the sculpturing of the carapace was in general agreement with the figures of Sars.

The Japanese specimen is an immature male (total length, 7.7 mm.), and it differs somewhat from Sars' figures of the adult female. The

tubercles on the carapace are slightly smaller and more acutely conical, and they show less tendency to run together into continuous ridges. The distal segments of the third maxillipeds and first and second legs are noticeably more slender than in Sars' figures.

It is possible that the examination of further material may show this Japanese form to be distinct from that found in the Atlantic.

Localities.—*Albatross* station 2212; lat. $39^{\circ} 59' 30''$ N.; long. $70^{\circ} 30' 45''$ W.; 428 fathoms; bottom temperature, 40° F.; U.S.N.M. 44000; 1 female.

Albatross station 5087; Sagami Bay; 614 fathoms; bottom temperature, 37.5° F.; U.S.N.M. 44001: 1 male.

CAMPYLASPIS AFFINIS G. O. Sars (?).

Campylaspis affinis G. O. Sars, Forh. Vidensk. Selsk. Christiania, 1869 (1870), p. 160.—Crust. Norway, vol. 3, 1900, p. 91, pl. 64.

Five specimens, including two subadult females, are referred with considerable doubt to this species. They differ from Sars' account of it chiefly in having on each side of the carapace a shallow oblique depression in the same position as that present in *C. sulcata* but much less extensive and less sharply defined. From the last-named species they are also distinguished by the much less strongly vaulted carapace and by other characters. As I have no typical specimens of *C. affinis* for comparison, I am uncertain what value to attach to these differences.

Locality.—U. S. F. C. stations 992 and 993; off Marthas Vineyard; 36–39 fathoms; bottom temperature, 46.5° – 48° F.; U.S.N.M. 43098, 43099; 5, male and female.

CAMPYLASPIS VITREA Calman (?).

Campylaspis vitrea CALMAN, Mitth. Zool. Stat. Neapel, vol. 17, 1906, p. 425, pl. 28, figs. 28–34.

An immature male specimen is referred with some doubt to this species, with which it agrees in general form. It differs, however, from the type-specimens in the following characters: (1) It is considerably larger (7.2 mm. as against 4.7 mm. for an immature female); (2) the integument is much less pellucid; (3) the ridges on the carapace are blunter and less elevated; (4) the two connecting ridges between the upper and lower oblique ridges are much less conspicuous; (5) there is a median posterior connecting ridge between the transverse ridges crossing the postero-dorsal part of the carapace (this median connecting ridge, however, is traceable in one of the types, although not indicated in the figure); (6) the crests on the abdominal somites are much less prominent, although arranged in the same way.

Locality.—*Albatross* station 2048; lat. $40^{\circ} 02' 00''$ N.; long. $68^{\circ} 50' 30''$ W.; 547 fathoms; bottom temperature, 29° F.; U.S.N.M. 12576; 1 male.

LAMPROPS FUSCATA G. O. Sars.

Lamprops fuscata G. O. Sars, Forh. Vidensk. Selsk. Christiania, 1864 (1865), p. 192.—Crust. Norway, vol. 3, 1900, p. 20, pl. 11.

A small and immature specimen is referred, without much doubt, to this species, which is known from Greenland, Franz-Joseph Land, Nova Zembla, and the north of Norway.

Locality.—Albatross station 2466; off Newfoundland; 67 fathoms; U.S.N.M. 44129.

With this species I also associate provisionally four ovigerous female specimens from Alaska. They differ from Sars' account of the species in the following characters: (1) The size is much greater—about 8.7 mm. total length; (2) the pseudorostrum is shorter, the lateral plates only meeting for a very short distance in front of the ocular lobe; (3) the dorsal crest on the anterior part of the carapace is very strongly marked; (4) the first legs are shorter, not extending beyond the pseudorostrum, but the relative lengths of the segments are much as in Sars' figures; (5) the last two segments of the second legs are shorter, together equaling the length of the carpus; (6) the peduncle of the uropods is a little longer than the telson. As I have not been able to compare the specimens with an adequate series of the Atlantic and Arctic form, it would be hazardous to regard these differences as specific.

Localities.—Shahafka Cove, Kodiak Island, Alaska; W. H. Dall, July 10, 1880; U.S.N.M. 44130.

Chiniak Bay, Kodiak, Alaska; W. H. Dall, July 12, 1880; U.S.N.M. 44131.

LAMPROPS QUADRIPLICATA S. I. Smith.

Lamprops quadriplicata S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 118.

It is doubtful whether this species is entitled to rank as distinct from the *L. fasciata* of European coasts. The first of the four oblique ridges on the carapace varies in distinctness and is by no means altogether absent in European specimens, in some of which it is nearly as well marked as in those from America. All the European specimens I have seen, however, agree with Sars' figures in having only one pair of lateral spines on the telson, while in American specimens, as in Smith's description, there are at least two pairs. There are also some small differences, which may be constant, in the spinulation and proportions of the uropods.

Localities.—Albatross station 2438; off Newfoundland; lat. 43° 36' 00'' N.; long. 50° 03' 30'' W.; 37 fathoms; bottom temperature 36.8° F.; U.S.N.M. 10499; 1 female.

Caseo Bay; U. S. F. C., 1873; U.S.N.M. 34885; 1 female.

U. S. F. C. station 141 (1878); Gloucester Harbor; 8½ fathoms; bottom temperature 44.5° F.; U.S.N.M. 44132; 1 female.

U. S. F. C. station 311; Cape Cod Bay; 16 fathoms; bottom temperature 49° F.; U.S.N.M. 44133; 1 male.

U. S. F. C. station 352; Cape Cod Bay; 10½ fathoms; bottom temperature 62° F.; U.S.N.M. 34874; 1 male.

U. S. F. C., November 22, 1879; U.S.N.M. 36639; 1 male.

LAMPROPS (?) BERINGI, new species.

Ovigerous female.—Total length, 12.7 mm.

Carapace about one-fifth of total length, its dorsal surface keeled in front, flattened or faintly sulcate behind. A single oblique ridge

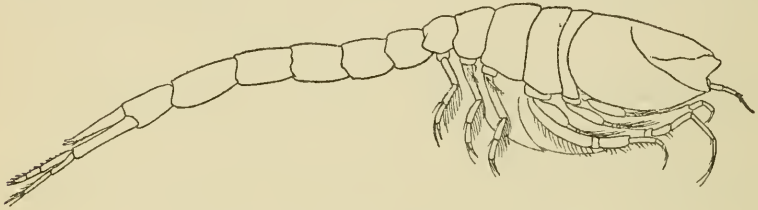


FIG. 27.—LAMPROPS (?) BERINGI, FEMALE, FROM THE SIDE.

on each side of the carapace ends below on the antero-lateral tooth and meets its fellow of the opposite side on the dorsal surface a little behind the middle of the carapace. The pseudorostrum is very short and blunt; the antennal notch is well-marked and rounded; the antero-lateral corner projects as far forward as the pseudorostrum and is sharply pointed.

In the first legs the three distal segments are subequal in length and the distal end of the carpus extends slightly beyond the pseudorostrum in the natural position. The second legs have the two distal segments subequal and together equal to the carpus.

The telson is nearly one and a half times as long as the last somite, with five or six lateral spines on each side (not symmetrically placed) and three apical spines of which the median is the longest.

Peduncle of uropods about equal in length to the telson, with rather slender spines on its inner edge. Endopod nearly as long as peduncle, exopod slightly shorter; second and third segments of endopod subequal and together about three-fifths of length of first segment.



FIG. 28.—LAMPROPS (?) BERINGI, FEMALE, LAST SOMITE, TELSON, AND UROPOD.

Remarks.—In the absence of the male it can not be decided whether this species should be placed in *Lamprops* or in *Hemilamprops*, although the presence of a well-marked antennal notch in the front margin of the carapace suggests the former of these genera. In hav-

ing a single lateral ridge on the carapace it resembles *H. uniplicata* G. O. Sars, but it is distinguished by the antennal notch, the much shorter first legs, and the different proportions of the uropods.

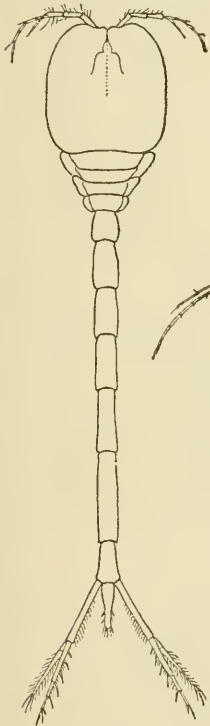
Locality.—Bering Island; N. Grebnitzky; U.S.N.M. 13678; 1 female.

PARALAMPROPS ORBICULARIS (Calman).

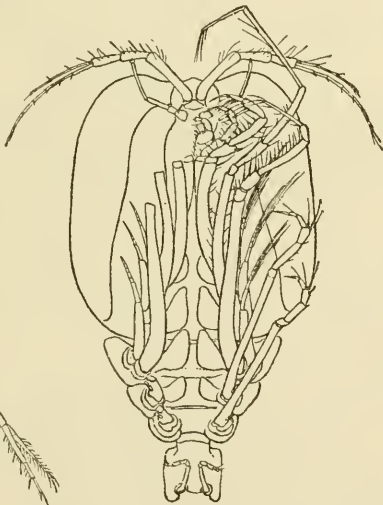
Platyaspis orbicularis CALMAN, Fisheries, Ireland, Sci. Invest., 1904, No. 1 (1905), p. 43, pl. 5, figs. 77-81.

Immature female (with developing oöstegites).—Total length, 16 mm. A less perfect ovigerous female is about the same size.

Carapace, viewed from above, roughly square in outline, with broadly rounded corners, the lateral margins very slightly convergent anteriorly; the anterior margin is concave, with a slight pseudorostral projection in the middle. The greatest transverse width is a little less than the length measured in the middle line. On the dorsal surface a median serrated ridge, or rather a row of minute teeth, runs backward from the small ocular lobe to a little past the middle



29



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FIGS. 29-30.—PARALAMPROPS ORBICULARIS, IMMATURE FEMALE. 29, FROM ABOVE; 30, ANTERIOR PART OF BODY FROM BELOW.

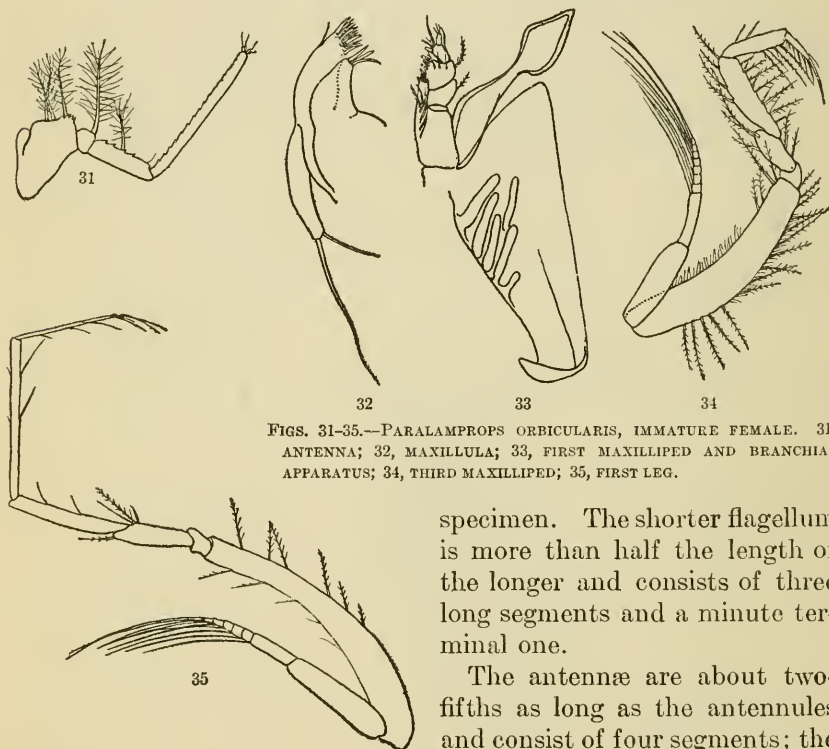
of the length of the carapace; there are no paired ridges on the posterior part of the dorsal surface. The under surface of each wing of the carapace is divided into two by a somewhat sinuous longitudinal ridge.

The first leg-bearing somite is larger than those that follow it, but its pleural plates are completely overlapped by those of the second somite. The last thoracic somite is similar to, but shorter than, the first abdominal somite.

The abdomen, including the telson, is about $1\frac{3}{4}$ times as long as the cephalothoracic region, and is very slender; the fifth somite is more than four times as long as wide and twice as long as the last somite. The telson is a little longer than the last somite; not much narrowed

at the tip, which is rounded and bears five spines; there are two pairs of lateral spines.

The antennules measured to the tip of the longer flagellum are only a little shorter than the carapace, the peduncle forming about half their length. The first segment of the peduncle is about equal to the other two together and the three are beset with rather numerous setæ, apparently of considerable length, although nearly all of them are broken off in the specimens examined. The longer flagellum has six long segments and a minute terminal one in two of the specimens, but only five segments and a terminal one in another



FIGS. 31-35.—*PARALAMPROPS ORBICULARIS*, IMMATURE FEMALE. 31, ANTENNA; 32, MAXILLULA; 33, FIRST MAXILLIPED AND BRANCHIAL APPARATUS; 34, THIRD MAXILLIPED; 35, FIRST LEG.

specimen. The shorter flagellum is more than half the length of the longer and consists of three long segments and a minute terminal one.

The antennæ are about two-fifths as long as the antennules and consist of four segments; the first segment is stout and carries three (perhaps four) plumose setæ; the other segments are slender, the second one-fourth as long as the third, which again is less than half as long as the fourth; the second and third have each a single seta, and the third an apical group of very minute setæ.

The mandibles and maxillæ are of normal type. The maxillulæ have a well-developed palp, carrying two setæ.

The first maxilliped and its branchial apparatus resemble closely those of *Paralamprops serratocostata* as figured by Sars.

The third maxillipeds have the basis slender and shorter than the distal segments together. The first legs are about equal in length to the whole cephalothoracic region; the basis is about three-fifths of the length of the distal segments together; the very slender dactylus is about equal to the carpus and two-thirds as long as the propodus.

The second legs are also long and slender, considerably longer than the carapace; the basis is about equal to the distal segments together; the carpus has a row of unequal spines along the inner edge and is about equal to the last two segments together; the slender dactylus is nearly four times as long as the propodus; there is a well-developed exopod.

The third and fourth pairs of legs are similar to one another, only a little shorter than the carapace, and each having a minute exopod of two segments; the basis is longer by one-half than the distal segments together.

The fifth legs are very small, less than one-fourth of the length of the preceding pair; the basis is shorter than the distal segments together.

The peduncle of the uropods is longer by about one-half than the last somite, and has a row of unequal spines on the inner edge. The endopod is about equal in length to the peduncle, of three segments, the first about three times as long as either the second or the third, spinose on the inner edge. The exopod is a little longer than the first two segments of the endopod and has setæ on both edges.

Remarks.—The specific identity of this form with that to which I gave the name *Platyaspis orbicularis* is not beyond doubt. The type specimen from the west of Ireland is, however, very incomplete, lacking the abdomen and most of the thoracic somites. Its carapace is only about half as long as that of the specimen described above and it shows no trace of oostegites. It is therefore quite probable that the differences in the outline of the carapace and the absence of the paired ridges on its dorsal surface in the larger specimens may be due to the difference in age.



FIG. 37.—PARALAMPROPS ORBICULARIS, IMMATURE FEMALE, THIRD LEG.



FIG. 36.—PARALAMPROPS ORBICULARIS, IMMATURE FEMALE, SECOND LEG.

The Irish specimen was referred to the genus *Platyaspis* chiefly on account of the general shape of the carapace. The more complete

specimens now described show, however, that the species can not belong to that genus, since it has well-developed exopods on the second pair of legs and vestigial exopods on the third and fourth pairs in the female sex. In these and in many other respects it agrees much more closely with the type of the genus *Paralamprops* (*P. serratocostata*) described by Sars from Kerguelen. I have, therefore, placed it for the present in that genus, although it differs in one character so important and unexpected that it might almost justify the creation of a new genus. This character is the possession of a normal maxillular palp.



FIG. 38.—PARALAMPROPS ORBICULARIS, IMMATURE FEMALE, FIFTH LEG.

The only Cumacea in which this palp is lacking are *Platyaspis typica* and *Paralamprops serratocostata*, and this common character has been used by Zimmer as an argument against the separation of the Platyaspidæ from the Lampropidæ. In other respects, however, the case against this separation is strengthened by the characters of the species described above, which unites the greatly expanded carapace of *Platyaspis* with the arrangement of exopods characteristic of *Paralamprops*.

Localities.—Albatross station 2547; lat. $39^{\circ} 54' 30''$ N.; long. $70^{\circ} 20' 00''$ W.; 390 fathoms; bottom temperature, 39.6° F.; U.S.N.M. 38210.

Albatross station 2680; lat. $39^{\circ} 50' 00''$ N.; long. $70^{\circ} 26' 00''$ W.; 555 fathoms; U.S.N.M. 44148.

U. S. F. C. station 891; lat. $39^{\circ} 46' 00''$ N.; long. $71^{\circ} 10' 00''$ W.; 480 (?) fathoms; U.S.N.M. 34306.

U. S. F. C. station 997; lat. $39^{\circ} 42' 00''$ N.; long. $71^{\circ} 32' 00''$ W.; 335 fathoms; bottom temperature, 40° F.; U.S.N.M. 34304.

DIASTYLIS SCORPIOIDES (Lepechin).

Oniscus scorpioides LEPECHIN, Acta Acad. Sci. Petropol., 1778, pt. 1 (1780), p. 248, pl. 8, fig. 2.

Diastylis scorpioides G. O. SARS, Crust. Norway, vol. 3, 1900, p. 58, pl. 44.

This species was found by Stuxberg on the voyage of the *Vega* as far east as the Liakhov Islands.¹

Localities.—Upernavik Harbor, Greenland; 13 fathoms; Ensign C. S. McClain, U. S. S. *Alert*, June 14, 1884; U.S.N.M. 13769; 1 female.

Greenland (?); Ensign C. S. McClain, U. S. S. *Alert*, 1884; U.S.N.M. 14766; 1 female.



FIG. 39.—PARALAMPROPS ORBICULARIS, IMMATURE FEMALE, LAST SOMITE, TELSON, AND UROPOD.

¹ Bihang Kgl. Svenska Vet. Akad. Handl., vol. 5, 1880, No. 22, p. 26, and *Vega* Exped. Vetensk. Iakttagelser, vol. 1, 1882, p. 710, as *D. edwardsi*.

Shoal Tickle, near Nain, Labrador; Owen Bryant, August 15, 1908; U.S.N.M. 44088; 1 female.

Albatross station 2697; off Newfoundland; lat. $47^{\circ} 40' 00''$ N.; long. $47^{\circ} 35' 30''$ W.; 206 fathoms; U.S.N.M. 44089; 2 females.

DIASTYLIS DALLI, new species.

Adult female (with empty brood-pouch).—Total length, 24 mm.

Resembling *D. scorpioides* (Lepechin) in general appearance; surface of carapace much smoother and the ridges not crenulated. There are only four oblique ridges on each side of the carapace; the first is rather obscure and runs forward on the side of the pseudorostrum; the others are very bold and prominent; the second and third run, without uniting, to the lower edge of the carapace, while the fourth approaches or actually joins the third near its lower end. The longitudinal ridges uniting the upper ends of the three posterior oblique ridges on the dorsal surface are very prominent and the area between them is grooved in the middle line. The pseudorostrum is very short,



FIG. 40.—DIASTYLIS DALLI, IMMATURE FEMALE, FROM THE SIDE.

its upper edge sloping slightly downward and the lateral plates meeting only for a distance not greater than the length of the ocular lobe. The ocular lobe is as long as broad.

The pleural plates of the second free thoracic somite are pointed in front. The abdomen (excluding the telson) is about as long as the cephalothoracic region.

The telson is longer by one-third than the last somite and nearly equal in length to the peduncle of the uropods; it tapers from the base and the post-anal portion is longer by one-half than the pre-anal. There are about 11 pairs of lateral spines which are considerably smaller than the apical pair.

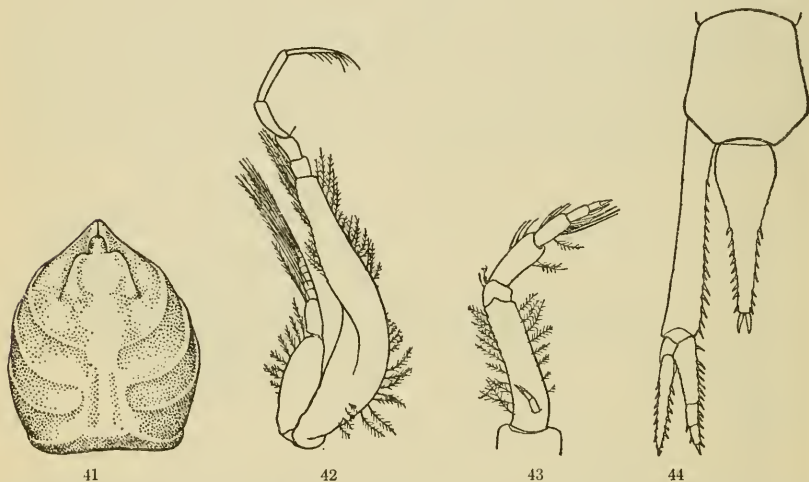
Peduncle of antennule with last segment longer and much more slender than the second, first longer than second and third together. Penultimate segment of antenna elongated.

Third maxilliped not expanded distally; its length along the inner edge more than eight times its width; ischium large, longer than merus as seen from below; merus expanded externally but not broader than ischium.

The first pair of legs have the basis about half as long again as the distal segments together, and not distinctly spinous; the propodus is a little longer than the carpus and about equal to the dactylus. In the legs of the second pair the carpus is only a little longer than the last two segments together.

The legs of the third and fourth pairs bear each a vestigial exopod of two segments.

The peduncle of the uropods has a row of small spines on the inner edge. The endopod is about half as long as the peduncle and slightly longer than the exopod; its three segments well defined, the first much longer than the other two together. The inner edges of both rami



FIGS. 41-44.—*DIASTYLIS DALLI*, IMMATURE FEMALE. 41, CARAPACE FROM ABOVE; 42, FIRST LEG; 43, THIRD LEG; 44, LAST SOMITE, TELSON, AND UROPOD.

bear series of short spines; the terminal spines are broken off in all the full-grown specimens examined, but in younger specimens they are quite short.

Remarks.—Although bearing a striking general resemblance to *D. scorpioides*, this species is at once distinguished from it by having only four in place of five oblique ridges on the carapace. The presence of vestigial exopods on the third and fourth legs, while they are absent in the closely allied *D. scorpioides*, shows that this character can no longer be regarded as of generic value.

It seems likely that this species or the next is that referred to by Stuxberg as “en vackert röd- och gulfärgad *Diastylis* (lik *Diast. scorpioides*),” taken by the *Vega* at East Cape.¹

¹ Bihang Kgl. Svenska Vet. Akad. Handling., vol. 5, 1880, No. 22, p. 29, and *Vega* Exped. Vetensk. Iakttagelser, vol. 1, 1882, p. 715.

This fine species, one of the largest of the Cumacea, may be appropriately associated with a name famous in the history of the scientific exploration of Alaska, that of Dr. W. H. Dall.

Localities.—Bering Strait; W. H. Dall, 1880; U.S.N.M. 13379; 1 female (holotype).

Off Cape Sabine; 13 fathoms; W. H. Dall; U.S.N.M. 44046; 5, female and young.

Off Cape Sabine; 13 fathoms; W. H. Dall, August 24, 1880; U.S.N.M. 44044; about 10, female and young.

Off Point Hope, Alaska; 25 fathoms; U. S. R. S. *Corwin*, Capt. M. A. Healy, 1884; U.S.N.M. 44049; about 20, female and young male.

Albatross station 2841; lat. $54^{\circ} 18' 00''$ N.; long. $165^{\circ} 55' 00''$ W.; 56 fathoms, U.S.N.M. 44045; 1 immature male.

Ridge, Captains Harbor, Alaska; 80 fathoms; W. H. Dall, 1874; U.S.N.M. 13364; 1 immature male.

Alaska; W. H. Dall; 1 immature female.

Albatross station 5023; off Cape Patience, Sakhalin Island; 75 fathoms; bottom temperature 30.9° F.; U.S.N.M. 44048.

DIASTYLIS BIDENTATA, new species.

Adult female (with empty brood-pouch).—Total length, 11.5 mm.

Resembling *D. scorpoides* (Lepechin) in general appearance; surface of carapace smoother, the ridges very finely crenulated. There

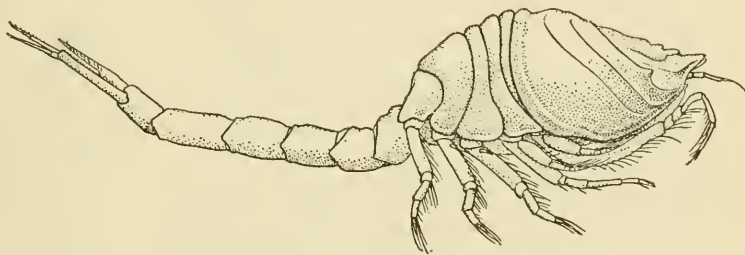


FIG. 45.—DIASTYLIS BIDENTATA, IMMATURE FEMALE, FROM THE SIDE.

are only four oblique ridges on each side of the carapace; the first is short and runs forward on the side of the pseudorostrum; the others are very strong and run from the dorsal surface to the lower margin parallel to each other; just at the lower margin the fourth ridge curves forward to meet the third. The second ridge is produced, a little way from its lower end, into a strong acute tooth directed outward and forward. The longitudinal ridges uniting the upper ends of the three posterior oblique ridges on the dorsal surface are distinct but not very prominent and approach each other anteriorly. The pseudorostrum is much as in *D. scorpoides*, the lateral plates meeting for

a distance much greater than the length of the ocular lobe. The ocular lobe is slightly broader than long and bears a few small denticles; just behind it, on the frontal lobe, are two short transverse denticulated ridges.

The pleural plates of the second free thoracic somite are pointed anteriorly and almost or entirely conceal those of the first somite.

The dorsal part of the fourth somite is strongly produced backwards in the middle line.

The telson is longer by about one-half than the last somite and longer than the peduncles of the uropods; it is slightly expanded at the base and then contracts rapidly to a narrow distal part; the post-anal division is $1\frac{1}{2}$ times as long as the pre-anal. There are about 10 pairs of lateral spines and a pair of somewhat larger apical spines.

Peduncle of antennule with last segment slender, nearly half as long again as the second, first shorter than second and third together. Penultimate segment of antenna elongated.

Third maxilliped not expanded distally; its length along the inner edge nearly eight times its greatest

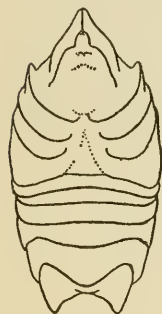


FIG. 46.—DIASTYLIS BIDENTATA, IMMATURE FEMALE, ANTERIOR PART OF BODY FROM ABOVE.

width; merus expanded externally, broader than ischium.

The first pair of legs have the basis about one-third longer than the distal segments together, with some small teeth on the lower surface and inner edge; the last three segments are subequal. In the legs of the second pair the carpus is only a little longer than the last two segments together. The legs of the third and fourth pairs have each a minute exopod of two segments.

The peduncle of the uropods is spinous on the inner edge. The endopod is about three-fourths as long as the peduncle and very slightly longer than the exopod; its three segments are well defined, the first only a little less than twice as long as the other two together. The inner edges of both rami are spined. The terminal spine of the endopod is short, well defined at the base; the exopod has two apical spines, one of them long and slender.

Adult male.—Total length, 12mm.

Differing from the female in the usual characters, the body being more slender and the carapace less arched. The ridges of the carapace are strongly marked and arranged as in the female, but the tooth of the second ridge is represented only by a slight angulation of the ridge not projecting from the surface, and the transverse



FIG. 47.—DIASTYLIS BIDENTATA, IMMATURE FEMALE, FIRST LEG.

ridges behind the ocular lobe are less pronounced. The pseudorostrum is longer and more acute than in the male of *D. scorpioides*. The penultimate thoracic somite is produced backward dorsally as in the female. The lateral processes of the last thoracic somite are more produced than in the female, though still blunt.

There is a stout median ventral spine, followed by a small tubercle, on the first abdominal somite, and two median tubercles on the second. The telson is about two and a half times as long as the last somite; the distance from its base to the dorsal protuberance is less than half that from the protuberance to the tip; the lateral spines are longer and more numerous than in the female.

The antennal flagellum is about as long as the body. The uropods, as usual, are much longer and more slender than in the female, though the peduncle is shorter than the telson, and have very numerous serrate spines on the inner edges of peduncle and endopod.

Young males, in which the pleopods are not furnished with natatory setæ, resemble the females in general form and have a large lateral spine on the carapace.

Remarks.—This species has a considerable resemblance to *D. dalli*, but it differs conspicuously in the large lateral teeth of the carapace.

There is a certain amount of variation in some characters. A number of specimens from Point Franklin (No. 7928, U.S.N.M.), the most northerly locality from which the species has been obtained, reach a much greater size than the holotype, an ovigerous female having the carapace 4.75 mm. in length, indicating a probable total body length of about 16.5 mm. when complete. The carapace is more inflated, the pseudorostrum more obtuse, the ridges on the carapace less prominent, and the tooth of the second ridge much more blunt than in the typical form. On the other hand, specimens from *Albatross* station 2841 (near Unalaska) of about the average size, with the ridges of the carapace relatively inconspicuous, have the tooth very large and more acute than in the specimen figured.



FIG. 49.—*DIASTYLIS BIDENTATA*, IMMATURE FEMALE, LAST SOMITE, TELSON, AND UROPOD.



FIG. 48.—*DIASTYLIS BIDENTATA*, IMMATURE FEMALE, THIRD LEG.

Localities.—Near Point Belcher, Arctic Ocean; 9 fathoms; sand; W. H. Dall; U.S.N.M. 13382.

Ten miles west of Point Franklin, Alaska; 13½ fathoms; sand; Point Barrow Expedition, August 31, 1883; U.S.N.M. 7928; 10 females (very large).

Off Cape Sabine; 13 fathoms; W. H. Dall, August, 1880; U.S.N.M. 44033; 1 female.

Albatross station 3637; lat. $57^{\circ} 06' 30''$ N.; long. $170^{\circ} 28' 00''$ W.; 32 fathoms; bottom temperature, 39° F.; U.S.N.M. 44041; 3 females.

Albatross station 3600; lat. $55^{\circ} 06' 00''$ N.; long. $163^{\circ} 28' 00''$ W.; 9 fathoms; bottom temperature, 40° F.; U.S.N.M. 44040; about 15, male and female.

Albatross station 3548; lat. $54^{\circ} 44' 00''$ N.; long. $165^{\circ} 42' 00''$ W.; 91 fathoms; bottom temperature, 39.5° F.; U.S.N.M. 44039; 1 female.

Albatross station 2841; lat. $54^{\circ} 18' 00''$ N.; long. $165^{\circ} 55' 00''$ W.; 56 fathoms; bottom temperature, 41° F.; U.S.N.M. 44036; 1 female.

Nazan Bay, Atka Island; W. H. Dall; U.S.N.M. 44043; 6 females.

Bay of Islands, Adak, Alaska; 9–16 fathoms; mud, sand; W. H. Dall, 1873; U.S.N.M. 13373; 1 male, 1 female.

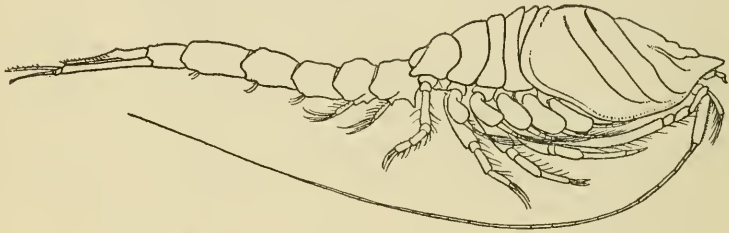


FIG. 50.—*DIASTYLIS BIDENTATA*, MALE, FROM THE SIDE.

Kiska Harbor, Aleutians; 10 fathoms; W. H. Dall; U.S.N.M. 44151; 1 male.

Kiska Harbor; 14–9 fathoms; sandy; W. H. Dall, July, 1873; U.S.N.M. 14276; 3 males.

Kiska Harbor; 9–12 fathoms; sand, mud; W. H. Dall, 1873; U.S.N.M. 13369; 3 males.

Kiska Harbor; 14–9 fathoms; sandy; W. H. Dall, July, 1873; U.S.N.M. 14272; 2 males, 5 females.

Kiska Harbor; 9–12 fathoms; sandy mud; W. H. Dall; U.S.N.M. 14266, 44034, 44035; many, male and female (including holotype, 14266).

Kiska Harbor; 9–12 fathoms; sandy mud; W. H. Dall; U.S.N.M. 44042; 2 females.

Kiska Harbor; 9–12 fathoms; sandy mud; W. H. Dall, 1873; U.S.N.M. 13368; 4, male and female.

Kiska Harbor; 6–8 fathoms; sand; W. H. Dall; U.S.N.M. 14263 about 10, male and female.

Albatross station 2872; lat. $48^{\circ} 17' 00''$ N.; long. $124^{\circ} 52' 00''$ W.; 38 fathoms; bottom temperature, 45.5° F.; U.S.N.M. 44038; 5 females, 1 adult male.

DIASTYLIS ALASKENSIS, new species.

Ovigerous female.—Total length, 13.5 mm.

Carapace less inflated than in *D. scorpioides*, its greatest height about half of its length, narrowing forwards from the hind margin as seen from above; with six transverse ridges more or less completely encircling it and with the hind margin strongly everted. Pseudo-



FIG. 51.—DIASTYLIS ALASKENSIS, FEMALE, FROM THE SIDE.

rostrum rather long and acute, the lateral plates meeting for a distance equal to twice the length of the ocular lobe. The ocular lobe is a little longer than broad and its anterior end forms the dorsal part of the first transverse ridge.

The pleural plates of the second free thoracic somite are rounded anteriorly and hardly overlap the somite in front. The dorsal part of the fourth somite is not conspicuously produced backwards. The abdomen (excluding the telson) is a little shorter than the cephalothoracic region.

The telson is very slightly longer than the last somite and reaches to about the distal third of the uropod peduncles. It narrows slightly from the base to a rather sudden constriction about the middle of its length; the post-anal division is about three-fourths as long as the pre-anal. There are about six pairs of lateral spines and a pair of somewhat larger apical spines closely approximated.

Peduncle of antennule with last segment slender, longer than second, first much shorter than the other two together. Penultimate segment of antenna elongated.

Third maxilliped with basis expanded distally; its length along the inner edge about four and one-half times its greatest width, merus not expanded externally, narrower than ischium.

First pair of legs with basis about as long as the distal segments together, without conspicuous teeth; propodus longer than either carpus or dactylus. In the second pair the carpus is longer by one-

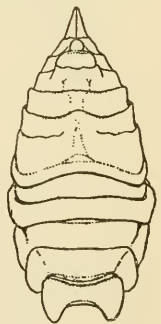


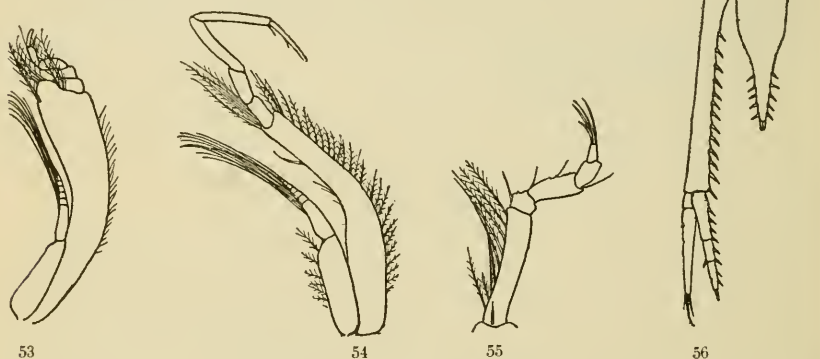
FIG. 52.—DIASTYLIS ALASKENSIS, FEMALE, ANTERIOR PART OF BODY FROM ABOVE.

half than the last two segments together. The legs of the third and fourth pairs have each a minute exopod of two segments.

The peduncle of the uropods is spinous on the inner edge. The exopod is a little less than half as long as the peduncle and very slightly longer than the endopod; the three segments of the latter are well defined, the first equal to or shorter than the other two together; the inner edge of the endopod is spined, and the short, stout apical spine is well defined at the base.

Adult male.—Total length, 10.6 mm.

Sculpture of carapace resembling that of female, but with only five conspicuous transverse ridges, that corresponding to the hindmost ridge of the female being barely traceable; in addition, a horizontal ridge on each side runs forward from the hind margin to the last transverse ridge a little way above the lower edge of the carapace. The pleural plates of the third free thoracic somite overlap those of the somite in front; the lateral processes of the last thoracic somite are short



FIGS. 53-56.—*DIASTYLIS ALASKENSIS*, FEMALE. 53, THIRD MAXILLIPED; 54, FIRST LEG; 55, THIRD LEG; 56, LAST SOMITE, TELSON, AND UROPOD.

and blunt. The first two abdominal somites have each a small median ventral spine. The telson is about one and a half times as long as the last somite; the dorsal protuberance is at about the middle of its length. The antennal flagellum is about as long as the body.

Remarks.—This species is evidently allied to the two preceding, but it differs from them in the greater number of ridges on the carapace, which give it an annulated appearance. With the possible exception of *D. bidentata* it would seem to be the most abundant Cumacean in Alaskan waters.

Localities.—Lat. $63^{\circ} 37' 00''$ N.; long. $165^{\circ} 19' 00''$ W.; 12 fathoms; G. M. Stoney, June, 1884; U.S.N.M. 44019; 1 male.

Albatross station 3600; Bering Sea; lat. $55^{\circ} 06' 00''$ N.; long. $163^{\circ} 28' 00''$ W.; 9 fathoms; bottom temperature, 40° F.; U.S.N.M. 44020, 44021; many, male and female (including holotype, 44020).

Port Levashef, Unalaska; 20–30 fathoms; W. H. Dall; U.S.N.M. 44026; 1 female.

Eider village anchorage, Captains Bay, Unalaska; W. H. Dall, 1873; U.S.N.M. 13372; 8, male and female.

Ridge, Port Levashef, Unalaska; W. H. Dall, 1880; U.S.N.M. 13365; about 12 females.

Off Round Island, Coal Harbor, Unga; 8–9 fathoms; sand, stones; W. G. Hall; Dall's collection; U.S.N.M. 44024; 1 female.

Coal Harbor, Unga Island, Alaska; 8–9 fathoms; sand, stones; W. G. Hall, 1872; Dall's collection; U.S.N.M. 13371; 2 females.

Popof Strait, Alaska, near reef; 5–7 fathoms; sand; W. H. Dall, 1872; U.S.N.M. 13370; 1 male, 2 females.

Chignik Bay; 7–18 fathoms; sand; W. H. Dall; U.S.N.M. 44027; 8 females.

Chiniak Bay, Kodiak, Alaska; W. H. Dall, July, 1880; U.S.N.M. 13378; 5, female and young male.

Shahafka Cove, Kodiak, Alaska; 12–14 fathoms; mud, sand; W. H. Dall; U.S.N.M. 14277; 1 female.



FIG. 57.—*DIASTYLIS ALASKENSIS*, MALE, FROM THE SIDE.

Shahafka Cove, Kodiak, Alaska; 12–14 fathoms; W. H. Dall, July, 1880; U.S.N.M. 13377; about 25, male and female.

Old Harbor, Kodiak; *Albatross*, August 11, 1888; U.S.N.M. 44023; 2 females.

Albatross station 4272; Afognak Island; 17–12 fathoms; bottom temperature, 54° F.; U.S.N.M. 44022; 3 females.

Chugachik Bay, Cooks Inlet, Alaska; 20–60 fathoms; sandy mud; W. H. Dall, June, 1880; U.S.N.M. 13376; 4 females.

Chiachi Islands, Alaska; 20 fathoms; mud; W. H. Dall, 1874; U.S.N.M. 13374; 1 female.

Chiachi Islands; 20 fathoms; mud; W. H. Dall; U.S.N.M. 44025; 1 female.

DIASTYLIS PLANIFRONS, new species.

Ovigerous female.—Total length, 14 mm.

Carapace inflated, its greatest height nearly two-thirds and its greatest width three-fourths of its length. A prominent, very oblique ridge on each side dies away on the side of the pseudorostrum; at about one-third of its length from the front it is joined by a curved

ridge running up from the lower edge of the carapace, and the point of junction forms a prominent blunt tooth. Posteriorly, at about one-third of the length of the carapace from its hind margin, the oblique ridges meet a pair of convergent longitudinal ridges separated by a depression of the dorsal surface. The dorsal area enclosed by the oblique ridges is flattened, with a blunt median ridge, interrupted by



FIG. 58.—*DIASTYLIS PLANIFRONS*, FEMALE, FROM THE SIDE.

two transverse grooves just behind the ocular lobe. The pseudo-rostrum is horizontal and pointed, the lateral plates meeting in front of the ocular lobe for more than twice the length of the latter. The antero-lateral angle is blunt. The ocular lobe is at least as broad as long and bears three well-marked corneal areas.

The pleural plates of the second free thoracic somite are rounded and rather small. The postero-lateral angles of the fifth somite are acute but very little produced. The abdomen (excluding the telson) is nearly equal in length to the cephalothoracic region. The telson is longer by about one-third than the last somite and about two-thirds as long as the peduncles of the uropods; it is subcylindrical for about a third of its length from the base and then narrows to the slender post-anal

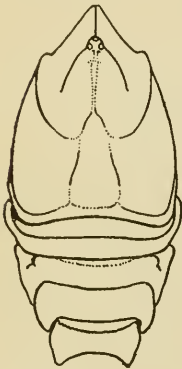


FIG. 59.—*DIASTYLIS PLANIFRONS*, FEMALE, ANTERIOR PART OF BODY FROM ABOVE.



FIG. 60.—*DIASTYLIS PLANIFRONS*, FEMALE, THIRD MAXILLIPED.

part, which, measured to the apex of the anal valves, occupies rather more than one-third of its length. There are 5 pairs of rather long lateral spines.

Third maxilliped with basis expanded distally, its length along the inner edge about four times its greatest width, its distal outer angle

produced as a narrow rounded lobe, ischium produced externally into a curved tooth, wider than merus.

The first legs are imperfect in both the specimens examined but the basis appears to have been distinctly longer than the distal segments together and the carpus is more than one-third longer than the propodus.

In the second pair of legs the carpus is nearly twice as long as the last two segments together.

In the third and fourth pairs a minute exopod of two segments is present.

The peduncle of the uropods has a row of rather slender spines on the inner edge; the exopod is half as long as the peduncle and the endopod a little shorter.

Remarks.—This species bears a somewhat vague resemblance in the sculpturing of the carapace to the form which Zimmer has figured under the name of *Leptostylis manca* G. O. Sars,¹ but it differs too widely in the shortness of the first legs and in many other characters to be identified with that species. The outline of the carapace as seen from above has a certain similarity to that of *D. bidentata*.

Localities.—Albatross station 2771; east coast of South America; lat. $51^{\circ} 34' 00''$ S.; long. $68^{\circ} 00' 00''$ W.; 50 fathoms; bottom temperature 49.4° F.; U.S.N.M. 44055; 1 female (holotype).

Albatross station 2778; Straits of Magellan; lat. $53^{\circ} 01' 00''$ S.; long. $70^{\circ} 42' 15''$ W.; 61 fathoms; bottom temperature 47.9° F.; U.S.N.M. 44054; 1 female.

DIASTYLIS NUCELLA, new species.

Ovigerous female.—Total length, 9.5 mm.

Cephalothoracic region much inflated, almost globose. Height and width of carapace subequal and about seven-eighths of its length.

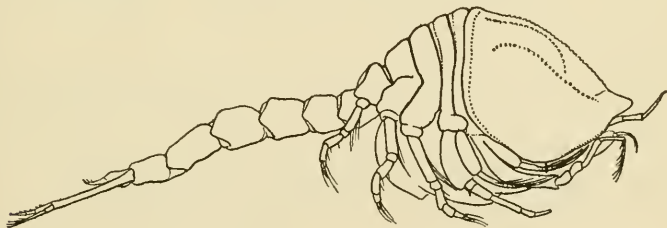


FIG. 62.—DIASTYLIS NUCELLA, FEMALE, FROM THE SIDE.



FIG. 61.—DIASTYLIS PLANIFRONS, FEMALE, LAST SOMITE, TELSON, AND UROPOD.

The surface is rough with minute granules and there are on the dorsal side three pairs of longitudinal, finely serrate ridges, or, rather, rows

¹Hamb. Magalh. Sammelreise, Cumaceen, p. 8, figs. 11-14.

of minute square-cut teeth. The pseudorostrum is short, horizontal, and deeply grooved on the dorsal surface. There is no ocular lobe. The anterior part of the lower edge of the carapace is serrated, with square-cut teeth.

The surface of the free thoracic end of the abdominal somites is finely roughened. The pleural plates of the second free somite are rounded anteriorly and hardly overlap the somite in front.

The abdomen, excluding the telson, is about as long as the cephalothoracic region.

The telson is about as long as the last somite and reaches to about the middle of the uropod peduncles; the basal part is slightly expanded; the post-anal part is about equal in length to the pre-anal; there are generally two pairs of lateral spines (sometimes two spines on one side and one or three on the other) and a pair of larger apical spines.

The peduncle of the antennule has the last segment longer than either the first or second. Penultimate segment of antenna not elongated.

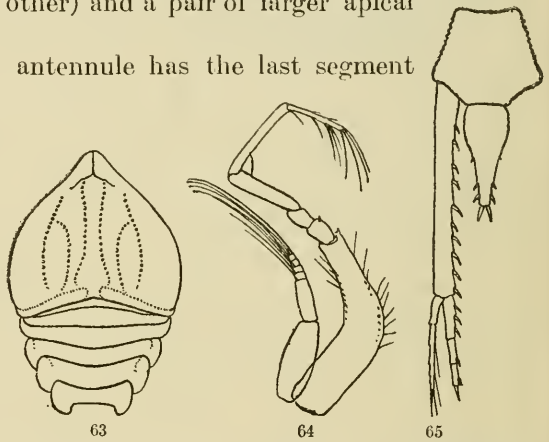
Third maxilliped with basis not expanded or produced distally. Ischium and merus of about equal width, the latter with (?) two teeth externally.

First legs with basis bent nearly to a right angle about the middle of its length; its length along the inner edge a little less than that of the distal segments together. Basis of second legs somewhat expanded internally, carpus about as long as the last two segments together. Posterior legs rather short and stout, third and fourth pairs without exopods.

The peduncle of the uropods has about ten spines on its inner edge. The exopod is less than half as long as the peduncle and longer than the endopod; the three segments of the latter are well defined, the proximal twice as long as either the second or third. Proximal segment of the exopod nearly one-half as long as the distal.

Remarks.—This pretty species is unlike any other known to me in the shape and ornamentation of its carapace, and it is not easy to suggest in what direction its immediate allies are to be sought.

Locality.—Cape Smyth, Alaska; $2\frac{1}{2}$ fathoms; Point Barrow Exped., August, 1883; U.S.N.M. 7937, 44053; 10 females, including holotype (7937).



FIGS. 63-65.—*DIASTYLIS NUCELLA*, FEMALE. 63, ANTERIOR PART OF BODY FROM ABOVE; 64, FIRST LEG; 65, LAST SOMITE, TELSON, AND UROPOD.

DIASTYLIS ASPERA, new species.

Ovigerous female.—Total length, 12.2 mm.

Carapace inflated, less than one-third of total length, its height a little more than two-thirds and its width five-sixths of its length. A very oblique (nearly horizontal) ridge on each side runs on to the side of the pseudorostrum; a little way behind the ocular lobe it is joined by a curved ridge running up from the lower edge of the carapace. The latter ridge also receives the lower end of an oblique ridge

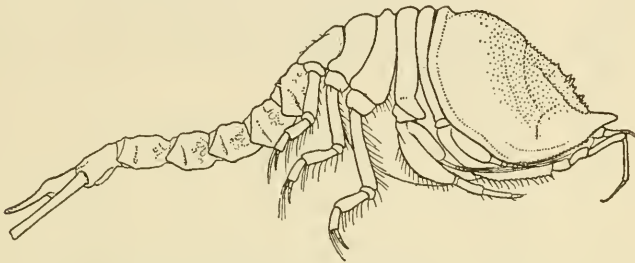


FIG. 66.—DIASTYLIS ASPERA, FEMALE, FROM THE SIDE.

forming an angle with the first and, like a much fainter parallel ridge just behind it, passing at its upper end into a prominent dorsal longitudinal ridge, which, with its fellow, bounds the deeply hollowed cardiac region. There are several other minor ridges on the surface of the carapace, the most conspicuous being two transverse folds crossing the frontal lobe behind the slightly prominent ocular lobe. The whole surface is rough with small spiniform points becoming larger anteriorly and arranged in rows along the more prominent ridges. The pseudo-rostrum is of moderate length, horizontal, and acute. The antero-lateral angle is hardly indicated. The ocular lobe is broader than long and its corneal areas are obscure.

The pleural expansions of the second free thoracic somite are small and rounded anteriorly. The dorsal surface of all the somites is smooth, but the anterior margins of first, second, and fifth are finely serrate. The postero-lateral angles of the fifth somite are rounded.

The length of the abdomen, including the telson, is slightly greater than that of the cephalothoracic region. The first somite has a pair of small dorso-lateral teeth; the posterior somites have a group of granules and some shallow depressions on each side, and the penultimate has also a pair of small postero-lateral teeth.

The telson is about twice as long as the last somite, cylindrical at the base, with the narrow post-anal part occupying about half of its length. There appear to have been about nine pairs of lateral spinules.

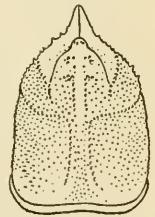


FIG. 67.—DIASTYLIS ASPERA, FEMALE, CARAPACE FROM ABOVE.

The antennules have the last segment of the peduncle more slender and a little longer than the preceding.

The third maxillipeds have the basis of nearly the same width throughout, about one-seventh of its length along the inner edge, its distal outer corner not produced; the merus is only a little narrower than the ischium and has a small tooth internally.

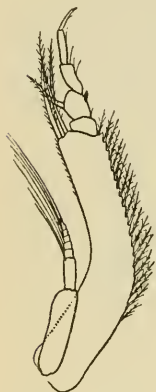


FIG. 68.—*DIASTYLIS ASPERA*, FEMALE, THIRD MAXILLIPED.

The first legs have the basal segment slightly shorter than the distal segments together and carrying a row of teeth on its lower (or outer) surface. The carpus is a little shorter than the propodus and longer than the dactylus.

In the second pair of legs the carpus is about as long as the last two segments together.

The third and fourth pairs of legs are without exopods.

The peduncle of the uropods is about as long as the telson and has a row of rather slender spines on its inner edge. The rami are wanting in the single specimen examined.

Male.—A young male specimen about 9 mm. in length differs from the female described above in having a longer pseudorostrum, the ridges on the side of the carapace much less distinct (those on the dorsal surface are well developed) and the peduncle of the uropods shorter than the telson.

Remarks.—From other species of *Diastylis* that have the surface of the carapace spinulose, this species appears to be distinguished by the arrangement of the ridges on the carapace and by the shortness of the abdomen.

Locality.—Shahafka Cove, Kodiak, Alaska; W. H. Dall, July, 1880; U.S.N.M. 44031, 44032; 1 male, 1 female, holotype (44032).

A female specimen, which, though considerably larger (15.6 mm. total length) than that described above, has only small rudiments of oöstegites visible, may provisionally be referred to the same species. It differs from the female specimen described above in the flatter dorsal surface of the anterior part of the carapace and in some details of the sculpturing; also in having the body beset with long feathered hairs, which, on the carapace, are arranged in rows along the more prominent ridges.

Locality.—*Albatross* station 5023; Okhotsk Sea, off eastern coast Sakhalin Island, vicinity of Cape Patience; 75 fathoms; bottom temperature, 30.9°; U.S.N.M. 44030; 1 female.



FIG. 69.—*DIASTYLIS ASPERA*, FEMALE, TELSON.

DIASTYLIS ARGENTATA, new species.

Ovigerous female.—Total length, 7.7 mm. (Females, apparently adult, varied from about 7.5 to about 9.5 mm. in length.)

Carapace less than one-third of total length, its height two-thirds and its breadth more than three-fourths of its length; seen from

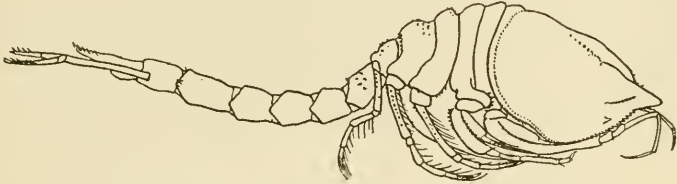


FIG. 70.—DIASTYLIS ARGENTATA, FEMALE, FROM THE SIDE.

the side, its dorsal outline is moderately arched, with a distinct notch at the base of the pseudorostrum, which is horizontal and acute. The surface of the carapace is rather coarsely pitted; there are a few denticles on the dorsal side of the base of the pseudorostrum and a curved lateral line of denticles runs backwards for a little way on each side from the pseudorostrum. Just above the lower edge of the carapace at about one-third of its length from the front is a small procurved tooth. A rounded tubercle from which a slight ridge runs forward marks the posterior end of each branch of the frontal fissure, and just internal to it is a deep pit. The ocular lobe is small, without distinct ocular elements. There is no antennal notch and the anterior part of the lower margin of the carapace is rather coarsely serrated.

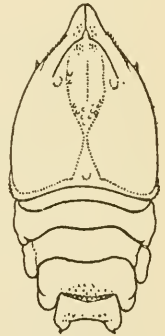


FIG. 71.—DIASTYLIS ARGENTATA, FEMALE, ANTERIOR PART OF BODY FROM ABOVE.

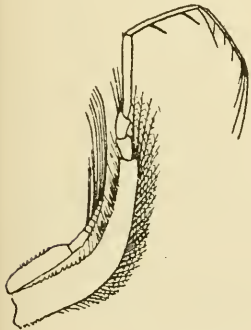


FIG. 72.—DIASTYLIS ARGENTATA, FEMALE, FIRST LEG.

The surface of the body, and especially of the carapace, has a silvery nacreous luster.

The pleural plates of the second and third free thoracic somites are rather coarsely serrate anteriorly. There are a few minute denticles on the dorsal surface of the last three thoracic somites, and the hinder edge of the fourth somite is crenated. The postero-lateral lobes

of the fifth somite are rounded, as seen from above, and each tipped with a small denticle.

The abdomen (excluding the telson) is a little shorter than the cephalothoracic region; the first somite has a pair of dorso-lateral

denticles on its posterior margin, and the fifth somite has also a few denticles posteriorly.

The telson is about twice as long as the last somite, its sides about parallel for half its length, then converging gradually. There are about six pairs of lateral spines, the distal ones at least as large as the terminal pair.



FIG. 73.—*DIASTYLIS ARGENTATA*, FEMALE, SECOND LEG.

In the peduncle of the antennules the second segment is not more than half the diameter of the first, and the third is still more slender; the third is shorter than the first and about half as long again as the second. None of the segments of the antennæ are elongated.

The basis of the third maxillipeds is not expanded or produced distally, and the ischium and merus are narrow.

The basis of the first legs is slender and has a row of strong curved teeth on the distal part of its outer edge; it is a little shorter than the distal segments together. The dactylus is about three-fourths as long as the propodus and a little shorter than the carpus.

In the second legs the basis has a row of strong spiniform teeth along its outer margin; the ischium has a curved spiniform tooth on its inner edge; the carpus is longer by one-fourth than the distal segments together.

The posterior pairs of legs have the basis serrated on the outer side. There are no exopods on the third and fourth pairs.

The peduncle of the uropods is not quite two and a half times as long as the last somite; the exopod is about two-thirds as long as the peduncle and extends beyond the terminal spine of the endopod; the endopod has only one articulation, about the middle of its length, the second and third segments being completely coalesced, and its short stout terminal spine is not defined at its base. The peduncle bears spines on the distal part of its inner edge, and the endopod has about seven spines internally.

Adult male.—Total length, 9.2 mm.

Height of carapace less than half, its breadth about two-thirds, of its length; seen from the side its dorsal outline is slightly arched, with a distinct notch at the base of the pseudorostrum. There are a few denticles above on the pseudorostrum and frontal lobe and an oblique line running backwards on the side of the pseudorostrum. The



FIG. 74.—*DIASTYLIS ARGENTATA*, FEMALE, LAST SOMITE, TELSON, AND UROPOD.

usual serrated lateral keel or line of denticles is present and ends anteriorly in a strong curved tooth close to the antero-lateral margin. A number of other minute denticles are scattered over the surface of the carapace, and some are more or less distinctly arranged in longitudinal rows. The pleural plates of the free thoracic somites are margined with denticles; the dorsal surface is flattened, and on the last three somites the dorso-lateral corner is occupied by a group of denticles, not in a single row. The postero-lateral angles of the last somite are bifid. The abdominal somites carry a few denticles, of which the most conspicuous in side view are a dorso-lateral pair on each of the first two somites and on the fifth somite; the ventro-lateral edges are serrated in the fourth somite. The telson is about twice as long as the last somite; it has about ten pairs of slender lateral spines and a stronger apical pair.

The antennular peduncle is dilated distally, with a terminal brush of setæ.

The exopod of the uropods is two-thirds as long as the peduncle; the proximal segment of the endopod is much longer than the

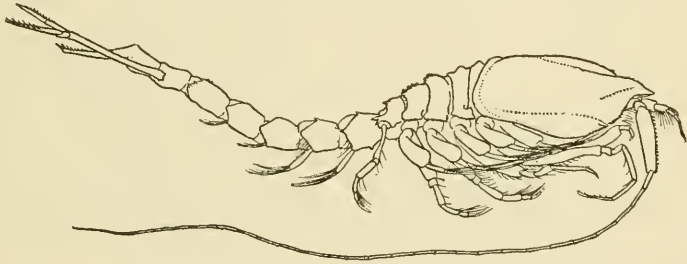


FIG. 75.—*DIASTYLIS ARGENTATA*, MALE, FROM THE SIDE.

distal; the spines on the inner edge of the endopod are long and feathered.

Remarks.—The male specimen described above resembles so closely *D. fimbriata* described by Sars from the South Atlantic (off Cape Frio) that I was at first disposed to identify it with that species. Since it differs, however, in possessing an antero-lateral tooth on the carapace and a row of spinules on the side of the pseudorostrum, as well as a bifid postero-lateral tooth on the last thoracic somite and a larger number of lateral spinules on the telson, it seems best, for the present, to record the Chilean examples under a new name.

Locality.—Albatross station 2787; off Chile; lat. $46^{\circ} 47' 30''$ S.; long. $75^{\circ} 15' 00''$ W.; 61 fathoms; bottom temperature, 53.9° F.; U.S.N.M. 44028, 44029; many, male and female (including holotype, 44029).

DIASTYLIS RATHKII (Krøyer).

- Cuma rathkii* KRØYER, Naturh. Tidsskr., vol. 3, 1841, p. 513, pls. 5, 6, figs. 17-30.
Diastylis rathkii S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 107 (with synonymy).—G. O. SARS, Crust. Norway, vol. 3, 1900, pp. 44 and 107, pls. 33, 34, 70-72.—ZIMMER, Die arktischen Cumaceen, in Römer u. Schaudinn, Fauna Arctica, vol. 1, Lief. 3, 1900, p. 423.
Diastylis rathkii, var. MURDOCH, Rep. Int. Polar Exp. Pt. Barrow, Alaska, 1885, p. 142.
Diastylis rathkii, var. *glabra* ZIMMER, Die arktischen Cumaceen, in Römer u. Schaudinn, Fauna Arctica, vol. 1, Lief. 3, 1900, p. 424.
Diastylis rathkii, var. *sarsi* NORMAN, Ann. Mag. Nat. Hist., ser. 7, vol. 10, 1902, p. 478.

A lengthy, though not exhaustive, list of references to literature is given by Zimmer.¹

The specimens which I refer to this species show a considerable range of variation, especially as regards the spinulation of the carapace, but there is no evident discontinuity to justify the separation of named varieties. It would be possible to select a series of specimens leading by small gradations from the perfectly smooth forms (var. *glabra* Zimmer) to some that are even more spinous than that figured by Sars² and named var. *sarsi* by Norman. Spiny and smooth individuals sometimes occur in the same gathering, and it is perhaps worthy of note that immature males generally, perhaps always, have the dorsal spinules conspicuously developed even when they accompany females of the smooth type. As only a very small number of adult males are in the collection I am not able to say whether noteworthy variations occur in this sex. The specimens examined do not differ perceptibly from that described by Sars and attributed to the var. *sarsi* of Norman.

This species has not hitherto been recorded from the North Pacific, although Stuxberg traced it along the northern coasts of Asia as far as the East Cape, and Murdoch has recorded specimens of the smooth type from Point Franklin on the east side of Bering Strait. The present collection contains specimens from various localities on the coast of Alaska and the Aleutian Islands and as far south as Sitka. On the Atlantic coast of North America the species does not appear to have been recorded south of Halifax, Nova Scotia. The list of localities given below carries it as far south as latitude 41° 11' N. at a depth of 499 fathoms. The species is known from a depth of 649 fathoms (Norwegian North Atlantic Expedition).

Localities.—Godhavn, Greenland; Ensign C. S. McClain, June, 1884; U.S.N.M. 13774; 1 female.

Off Battle Harbor, Labrador; 50 fathoms; Owen Bryant, September, 1908; U.S.N.M. 44086; 1 female.

¹ Fauna Arctica, vol. 1, p. 424.

² Crust. Norway, vol. 3, pls. 70-72.

- Nain, Labrador; 7 fathoms; Owen Bryant, August, 1908; U.S.N.M. 44084; 2 females.
- Port Manvers, Labrador; 30 fathoms; Owen Bryant, August, 1908; U.S.N.M. 44085; 1 male.
- Halfway from Cape Mugford to Hebron, Labrador; 60 fathoms; Owen Bryant, August, 1908; U.S.N.M. 44087; 1 female.
- Labrador; Owen Bryant, 1908; U.S.N.M. 44083; 1 female.
- U. S. F. C. station 101 (1877); off Halifax, Nova Scotia; 42 fathoms; U.S.N.M. 37834; 2 females.
- Albatross* station 2458; lat. $46^{\circ} 48' 30''$ N.; long. $52^{\circ} 34' 00''$ W.; 89 fathoms; bottom temperature, 29.5° F.; U.S.N.M. 38209; 1 female.
- Albatross* station 2466; lat. $45^{\circ} 29' 00''$ N.; long. $55^{\circ} 24' 00''$ W.; 67 fathoms; bottom temperature, 30° F.; U.S.N.M. 44074; 1 female.
- Albatross* station 2497; lat. $45^{\circ} 04' 00''$ N.; long. $59^{\circ} 36' 45''$ W.; 57 fathoms; bottom temperature 33° F.; U.S.N.M. 10504, 10910, 35053, 38261; many, male and female.
- Albatross* station 2078; lat. $41^{\circ} 11' 30''$ N.; long. $66^{\circ} 12' 20''$ W.; 499 fathoms; bottom temperature, 40° F.; U.S.N.M. 36918; 2 females.
- Near Point Belcher, Alaska; 9 fathoms; W. H. Dall; U.S.N.M. 44076; 1 male and 1 female.
- Cape Lisburne, Alaska, 5-7 fathoms; W. H. Dall, 1880; U.S.N.M. 13380; 2 males.
- Between Icy Cape and Cape Lisburne, Alaska; 15-20 fathoms; W. H. Dall; U.S.N.M. 14285; 6, male and female.
- Between Icy Cape and Cape Lisburne, Alaska; 10-15 fathoms; W. H. Dall; U.S.N.M. 14286; 8, male and female.
- Lat. $70^{\circ} 15' 10''$ N.; long. $162^{\circ} 55' 00''$ W.; 16 fathoms; U. S. R. S. *Corwin*, Capt. M. A. Healy, August, 1884; U.S.N.M. 14235; a large quantity, male and female (some adult males).
- Off Cape Sabine; 13 fathoms; W. H. Dall; U.S.N.M. 13381; 1 female.
- Lat. $63^{\circ} 37'$ N.; long. $165^{\circ} 19'$ W.; 12 fathoms; Lieut. G. M. Stoney, U. S. Navy, 1884; U.S.N.M. 13642; 11, male and female.
- Cape Etolin, Nunivak Island; W. H. Dall, 1874; U.S.N.M. 13375; 1 female.
- Nazan Bay, Atka Island; 10-16 fathoms; W. H. Dall, 1873; U.S.N.M. 13366, 13367; many, male and female (some adult males).
- Kiska Harbor, Aleutian Islands; 10 fathoms; W. H. Dall; U.S.N.M. 14273; 1 female.
- Chichagof Harbor, Attu Island; 5-7 fathoms; W. H. Dall; U.S.N.M. 44078; 17 females and 1 adult male.
- Sitka Harbor; 15 fathoms; W. H. Dall; U.S.N.M. 44081; 1 female.
- Alaska; W. H. Dall; U.S.N.M. 44082; 1 male.

DIASTYLIS SULCATA, new species.

Female (with developing oöstegites).—Total length, 13 mm.

Carapace elongated and slender, its height a little less, and its transverse width a little more, than one-half of its length. The dorsal edge, as seen from the side, is only very slightly arched. A transverse ridge crosses the dorsal surface just behind the ocular lobe, where it is very prominent and bears about six strong teeth; passing downward and slightly backward on each side, it is less strongly marked but becomes more prominent again as it curves sharply backward to run parallel to and a little distance above the lower edge of the carapace, from which it is separated by a deep groove; it dies out before reaching the hind margin of the carapace; along the lower part of its course it is obscurely dentated. The pseudorostrum is horizontal and acute; there is no distinct antennal notch, but the anterior part of the lower edge of the carapace is rather coarsely serrate. The ocular lobe is very small and there is no distinct eye.



FIG. 76.—DIASTYLIS SULCATA, IMMATURE FEMALE, FROM THE SIDE.

The free thoracic somites together are shorter than the carapace; the pleural plates of the second somite are narrowly rounded in front and overlap, but do not conceal those of the first; the lateral expansions of the third and fourth somites are more strongly produced backward than they are in *D. rathkii*, that of the third somite being about one-third as long as the carapace; the last thoracic somite is produced postero-laterally in a pair of stout spiniform teeth.

The abdomen, including the telson, is distinctly longer than the cephalothoracic region. The fifth somite is slightly longer than the sixth. The telson is longer by about one-third than the sixth somite, narrowing almost from the base, the post-anal portion twice as long as the pre-anal, with about nine pairs of short lateral spinules and a pair of short apical spinules.

The peduncle of the antennules has the first segment nearly three times as long as the second and twice as long as the third. The segments of the antenna are short.

The first legs have the basis nearly half as long again as the distal segments together; the last three segments are subequal. The sec-

ond legs have a conspicuous slender spine on the inner side of the ischium; the carpus is longer than the two distal segments together.

The posterior legs are very stout; the carpus of the third pair is as broad as the merus and only a little longer than broad; no exopods are present on the third and fourth pairs. The peduncle of the uropods, which does not quite reach the tip of the telson, has a row of small spines on its inner edge; the exopod is less than two-thirds, and the endopod about one-half, as long as the peduncle; of the three segments of the endopod the first is longer than the other two together; the spines on the inner edge are small.

The immature male resembles the female in general form.

Remarks.—This species is very closely allied to *D. rathkii*, but it appears to be sufficiently distinguished from that species by the more elongated form of the carapace and its less arched dorsal outline, and especially by the marked groove and ridge above the anterior part of its lower edge on each side. The slender form of the cephalothorax and the backward projection of the third and fourth free thoracic somites, resulting in a gap being left between the second and third pairs of legs, give the species a

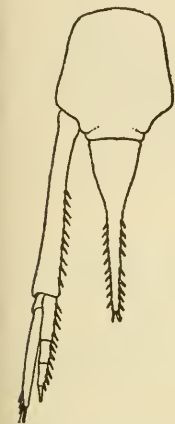


FIG. 78.—*DIASTYLIS SULCATA*, IMMATURE FEMALE, LAST SOMITE, TELSON, AND UROPOD.



FIG. 77.—*DIASTYLIS SULCATA*, IMMATURE FEMALE, ANTERIOR PART OF BODY FROM ABOVE.

certain resemblance in general form to *Diastylopsis dawsoni*. That this resemblance does not imply any close relationship between the two species, however, is shown by the absence in the present case of any antennal notch, by the large size of the last thoracic somite, the form of the antenna and third maxilliped, and by many other characters.

Locality.—Alaska, lat. 63° 37' N.; long. 165° 19' W.; 12 fathoms; G. M. Stoney, June, 1884; U.S.N.M. 44101–44103; 10, male and female (including holotype, 44103).

DIASTYLIS POLITA S. I. SMITH.

Diastylis politus S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 108.

The specimens that I have examined agree in all essential details with Professor Smith's excellent and minute description. As no figures of the species have hitherto been published, I give outline figures of both sexes to illustrate the chief differences from *D. sculpta*. In the female these differences are as follows: The areas between the ridges on the carapace are much less deeply hollowed; there are only

three instead of four oblique lateral ridges, of which the third fails to unite below with the second, while the lateral ridge of the pseudo-rostrum does not extend back to the first; the first legs are distinctly shorter; the carpus of the second legs is more than twice as long as the merus; the postero-lateral angles of the last thoracic somite are strongly produced and spiniform. The male is distinguished from that of *D. sculpta* (as figured by Sars) by possessing a strong horizontal ridge on each side of the carapace, running forward from the

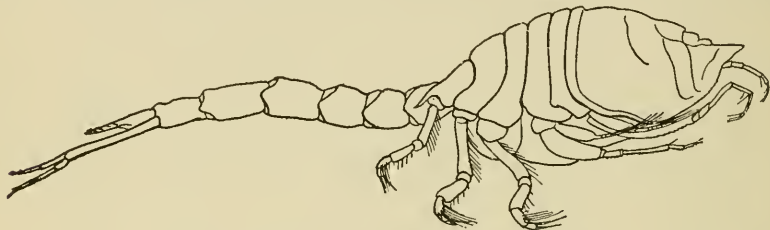


FIG. 79.—*DIASTYLIS POLITA*, FEMALE, FROM THE SIDE.

hind margin. Adult specimens of both sexes are considerably larger (male 14 mm., female 12 mm.) than those of *D. sculpta*.

The localities given for the species by Professor Smith extend from the Gulf of St. Lawrence to Vineyard Sound and from the surface to 190 fathoms.

Localities.—U. S. F. C. station 91 (1877); off Halifax, Nova Scotia; 6½ fathoms; bottom temperature, 49° F.; U.S.N.M. 38024; 1 female.

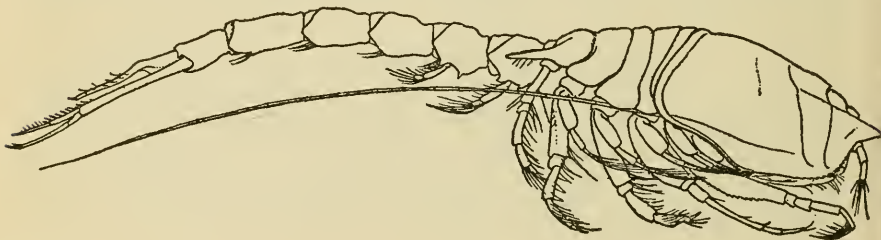


FIG. 80.—*DIASTYLIS POLITA*, MALE, FROM THE SIDE.

U. S. F. C. stations 72–73 (1877); Halifax Harbor, Nova Scotia; 18 fathoms; bottom temperature, 39.5°–41.5° F.; U.S.N.M. 44058; 1 female.

La Have Islands, Nova Scotia; 6 fathoms; in fine mud; Geol. Surv. of Canada, Aug. 7, 1910; U.S.N.M. 44062; 7 females.

U. S. F. C. station 141 (1878); Gloucester Harbor; 8½ fathoms; bottom temperature, 44.5° F.; U.S.N.M. 36647, 36648, 44061; many, male and female.

U. S. F. C. station 145 (1878); Gloucester Harbor; 8 fathoms; bottom temperature, 51° F.; U.S.N.M. 36640, 36643, 44155; many, male and female.

U. S. F. C. stations 141–146 (1878); Gloucester Harbor; 8–9 fathoms; bottom temperature, 44.5°–51° F.; U.S.N.M. 36362, 44059; many, male and female.

U. S. F. C. station 335; off Plymouth; 7 fathoms; bottom temperature, 55° F.; U.S.N.M. 34870; 4, male and female.

Woods Hole, Massachusetts; received April, 1877; U.S.N.M. 36644; 12 males.

Woods Hole; surface; February, 1888; U.S.N.M. 13100; 1 male.

Woods Hole; surface; V. N. Edwards, Bureau of Fisheries; U.S.N.M. Acc. No. 11929; 5, male and female.

U. S. F. C. stations 816–818; Narragansett Bay; 8½–10 fathoms; bottom temperature, 63°–66° F.; U.S.N.M. 44056, 44060; many, male and female.

U. S. F. C. station 1240; Block Island Sound; 18½ fathoms; bottom temperature, 60° F.; U.S.N.M. 12694; 4 males.

DIASTYLIS SCULPTA G. O. Sars.

Diastylis sculpta G. O. Sars, Oefvers. Kgl. Vet. Akad. Förh., vol. 28, 1871, p. 71; Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, p. 24, pls. 1–9, figs. 1–49.—S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 111.

Although some specimens of this species have the areas between the ridges of the carapace less deeply hollowed than in the typical form as figured by Sars, there is no difficulty in distinguishing, almost at a glance, between this species and *D. polita*.

I have not identified any adult males among the material sent to me.

The known range of this species is from the Gulf of St. Lawrence to off Long Island and from the surface to 190 fathoms. The localities of the specimens that I have examined all fall within these limits.

Localities.—U. S. F. C. stations 72–73 (1877); off Halifax, Nova Scotia; 18 fathoms; bottom temperature, 39.5°–41.5° F.; U.S.N.M. 44157; 2 females.

U. S. F. C. station 87 (1877); off Halifax, Nova Scotia; 21 fathoms; bottom temperature, 48.3°–49° F.; U.S.N.M. 34877; 1 female.

Off Halifax, Nova Scotia; U. S. F. C.; U.S.N.M. 34322; 1 female.

U. S. F. C. station 70 (1877); about 120 miles south of Halifax, Nova Scotia; 190 fathoms; bottom temperature, 38.5°–39° F.; U.S.N.M. 37833; 1 female.

U. S. F. C. stations 133–134 (1878); Massachusetts Bay, 26–33 fathoms; U.S.N.M. 44090; 1 female.

Nahant, Massachusetts; S. D. Judd, 1893; U.S.N.M. 44094; 2 females.

U. S. F. C. station 292; mouth Cape Cod Bay; 29 fathoms; bottom temperature, 41° F.; U.S.N.M. 34863, 34865; 6 females.

U. S. F. C. station 247; off Cape Cod; 34 fathoms; U.S.N.M. 38022; 1 female.

U. S. F. C. stations 987-989; off Marthas Vineyard; 28-30 fathoms; bottom temperature, 49°-49.5° F.; U.S.N.M. 44092, 44093; 9 females.

U. S. F. C. station 1025; off Marthas Vineyard; 216 fathoms; bottom temperature, 45° F.; U.S.N.M. 34313; 1 female.

Woods Hole; surface; V. N. Edwards, Bureau of Fisheries; U.S.N.M. Acc. No. 11929; 1 female.

U. S. F. C. station 811; off Newport, R. I.; 19½ fathoms; bottom temperature, 53° F.; U.S.N.M. 44091; 3 females.

U. S. F. C. station 1240; Block Island Sound; 18½ fathoms; bottom temperature, 60° F.; U.S.N.M. 44137; many, female and young.

DIASTYLIS QUADRISPINOSA G. O. Sars.

? *Cuma bispinosa* STIMPSON, Mar. Invert. Grand Manan, Smiths. Contr., vol. 6, Art. 5, 1853, p. 39.

Diastylis quadrispinosa G. O. Sars, Oefvers. Kgl. Vet. Akad. Förh., vol. 28, 1871, p. 72; Kgl. Svenska Vet. Akad. Handl., vol. 9, 1871, No. 13, p. 28, pls. 10, 11, figs. 50-61.—S. I. SMITH, Rep. U. S. Comm. Fisheries, pt. 1, 1873, p. 554, pl. 3, fig. 13; Trans. Conn. Acad., vol. 5, 1879, p. 112.

Prof. S. I. Smith, while regarding this as the species indicated rather than described by Stimpson under the name *Cuma bispinosa*, preferred to retain the name given to it by G. O. Sars, and I can perceive no advantage to be gained by departing from this precedent.

A single adult male which I believe to belong to this species is in the collection from Massachusetts Bay. Unfortunately it is much damaged and I am unable therefore to give a satisfactory figure of the entire animal. It resembles in general form the male of *D. cornuta*¹ as figured by Sars, but the lateral longitudinal ridge of the carapace dies out anteriorly and there is no ridge joining it to the lower edge. On the dorsal surface are two pairs of low tubercles answering to the teeth of the female. The antero-lateral corners are less coarsely dentate than in *D. cornuta*. The postero-lateral angles of the last thoracic somite are more produced than in the female. The first abdominal somite has a pair of small dorso-lateral teeth (sometimes visible also in the female) on its very concave hinder border. The third, fourth, and fifth abdominal somites have a median dorsal ridge, obscurely serrated, the same somites have also a pair of dorso-lateral ridges which end behind in small spines, most conspicuous in the case of the fifth somite. The telson is of the usual form, a little longer than the uropod peduncles, and with at least twelve pairs of long slender spinules. The peduncle of the uropods has spinules only on the distal half of its inner edge.

¹ I take this opportunity of noting that the specimens which I recently referred to *D. capreensis* (Bull. Mus. Hist. Nat. Paris, 1910, p. 181) seem to be only a form of *D. cornuta* Bœck. I have now examined specimens which are intermediate in many points (e. g., in having the large antero-lateral spines bifurcate) between these and the typical *D. cornuta*. In all probability, the type-specimens of *D. capreensis* (Mith. Zool. Stat. Neapel, vol. 17, 1906, p. 429), should also be referred to *D. cornuta*.

The range of this species as hitherto known extended from the Gulf of St. Lawrence to New Jersey (lat. $39^{\circ} 54' 00''$ N.). The list of localities given below extends the southern limit to latitude $35^{\circ} 42' 00''$ N., near Cape Hatteras. The known range in depth is from 2 to 190 fathoms, but I learn that there are specimens in the United States National Museum from *Albatross* station 2484 at a depth of 204 fathoms.

Localities.—*Albatross* station 2497; off Nova Scotia, lat. $45^{\circ} 04' 00''$ N.; long. $59^{\circ} 36' 45''$ W.; 57 fathoms; bottom temperature, 33° F.; U.S.N.M. 44063; 1 female.

U. S. F. C. stations 72–73 (1877); Halifax Harbor, Nova Scotia; 18 fathoms; bottom temperature, 39.5° – 41.5° F.; U.S.N.M. 34881; 1 male.

U. S. F. C. station 87 (1877); Halifax Harbor, Nova Scotia; 21 fathoms; bottom temperature, 48.3° – 49° F.; U.S.N.M. 34321, 34882, 37832; 6, male and female.

U. S. F. C. station 101 (1877); off Halifax, Nova Scotia; 42 fathoms; U.S.N.M. 34883; 1 female.

Off Nova Scotia; U. S. F. C., 1877; U.S.N.M. 37837; 1 female.

Seal Cove, Grand Manan; 8–10 fathoms; U. S. F. C., 1872; U.S.N.M. 36637; many, male and female.

U. S. F. C. station 160 (1878); Gulf of Maine; 54 fathoms; bottom temperature, 39.5° F.; U.S.N.M. 44073; 1 female.

U. S. F. C. station 166 (1878); Gulf of Maine; 35 fathoms; bottom temperature, 41.5° F.; U.S.N.M. 36357, 36358; many, male and female.

U. S. F. C. station 134 (1878); Massachusetts Bay; 26 fathoms; U.S.N.M. 34939; 1 female.

U. S. F. C. stations 133–134 (1878); Massachusetts Bay; 26–33 fathoms; U.S.N.M. 36360; 7 females.

U. S. F. C. stations 135–136 (1878); Massachusetts Bay; 25–26 fathoms; bottom temperature, 40° – 40.5° F.; U.S.N.M. 36364; 5 females.

U. S. F. C. station 206; Massachusetts Bay; 42 fathoms; U.S.N.M. 38023; 4, male and female.

U. S. F. C. station 215; Massachusetts Bay; 35 fathoms; bottom temperature, 50.5° F.; U.S.N.M. 36361; 1 male (adult).

U. S. F. C. station 222; Massachusetts Bay; 40 fathoms; U.S.N.M. 36359; 1 female.

Nahant, Massachusetts; S. D. Judd, 1893; U.S.N.M. 44065; 6, male and female.

U. S. F. C. station 283; off Cape Cod (Massachusetts Bay); 31 fathoms; bottom temperature, 38.5° F.; U.S.N.M. 34866; 11 females.

U. S. F. C. station 322; off Cape Cod; 67 fathoms; bottom temperature, 40.5° F.; U.S.N.M. 34320, 34876; 2 females.

U. S. F. C. station 321; Cape Cod Bay; 29½ fathoms; bottom temperature, 44.5° F.; U.S.N.M. 34868; 2 females.

U. S. F. C. station 337; Cape Cod Bay; 16 fathoms; bottom temperature, 47.2° F.; U.S.N.M. 34861; many females.

U. S. F. C. station 784; off Newport, Rhode Island; 20 fathoms; bottom temperature, 53.5° F.; U.S.N.M. 34323, 34326; 9 females.

U. S. F. C. station 786; off Newport, Rhode Island; 19 fathoms; bottom temperature, 53.5° F.; U.S.N.M. 44066; 1 female.

U. S. F. C. station 788; off Newport, Rhode Island; 18 fathoms; bottom temperature, 54° F.; U.S.N.M. 44067; 3, male and female.

U. S. F. C. station 793; off Newport, Rhode Island; 19 fathoms; U.S.N.M. 34329; 7, male and female.

U. S. F. C. station 795; off Newport, Rhode Island; 19 fathoms; bottom temperature, 63° F.; U.S.N.M. 34295, 34324; about 17, male and female.

U. S. F. C. station 811; off Newport, Rhode Island; 19½ fathoms; bottom temperature, 53° F.; U.S.N.M. 36299, 36363; many, male and female.

U. S. F. C. station 812; off Block Island; 28½ fathoms; bottom temperature, 46° F.; U.S.N.M. 44069; 1 female.

U. S. F. C. station 860; Vineyard Sound; 17½ fathoms; bottom temperature, 64° F.; U.S.N.M. 34299; 1 male, 1 female.

U. S. F. C. station 863; Vineyard Sound; 18 fathoms; bottom temperature, 65° F.; U.S.N.M. 34327; 1 male, 1 female.

U. S. F. C. station 871; off Marthas Vineyard; 115 fathoms; bottom temperature, 49° F.; U.S.N.M. 34314; 1 female.

U. S. F. C. station 873; off Marthas Vineyard; 100 fathoms; bottom temperature, 51° F.; U.S.N.M. 34319; 1 male.

U. S. F. C. station 878; off Marthas Vineyard; 142½ fathoms; bottom temperature, 52° F.; U.S.N.M. 34312; 1 male.

U. S. F. C. station 987; off Marthas Vineyard; 28 fathoms; bottom temperature, 49° F.; U.S.N.M. 44070; 6, male and female.

U. S. F. C. stations 987-989; off Marthas Vineyard; 28-30 fathoms; bottom temperatures 49°-49.5° F.; U.S.N.M. 44071; 6 females.

U. S. F. C. station 992; off Marthas Vineyard; 36 fathoms; bottom temperature, 48° F.; U.S.N.M. 44064; 1 female.

U. S. F. C. station 993; off Marthas Vineyard; 39 fathoms; bottom temperature, 46.5° F.; U.S.N.M. 44072; 1 female.

U. S. F. C. station 2746; lat. 38° 46' 00" N.; long. 73° 5' 45" W.; 102 fathoms; bottom temperature, 51.2° F.; U.S.N.M. 33914; 1 male, 1 female.

Albatross station 2307; near Cape Hatteras, lat. 35° 42' 00" N.; long. 74° 54' 30" W.; 43 fathoms; bottom temperature, 57.3 F.; U.S.N.M. 34298; 6 females.

DIASTYLIS STYGIA G. O. Sars.

Diastylis stygia G. O. Sars, Oefvers. Kgl. Vet. Akad. Förh., vol. 28, 1871, p. 798; Kgl. Svenska Vet. Akad. Handl., vol. 11, 1873, No. 6., p. 6, pl. 2, figs. 4-7; Rep. Cumacea *Challenger*, 1886, p. 44, pls. 6-8.

This characteristically deep-water species has not hitherto been recorded from a less depth than 620 fathoms,¹ and I am inclined to suspect an error in the label which attributes one of the specimens in the present collection to U. S. F. C. station 1038, at which the depth was only 146 fathoms. The species is known to descend to 2,600 fathoms.

Localities.—*Albatross* station 2706; lat. 41° 28' 30'' N.; long. 65° 35' 30'' W.; 1,188 fathoms; U.S.N.M. 11900; 1 female.

Albatross station 2575; lat. 41° 07' 00'' N.; long. 65° 26' 30'' W.; 1,710 fathoms; bottom temperature, 37.1° F.; U.S.N.M. 11013; 8, male and female.

Albatross station 2573; lat. 40° 34' 18'' N.; long. 66° 09' 00'' W.; 1,742 fathoms; bottom temperature, 37.3° F.; U.S.N.M. 11006; many, male and female.

Albatross station 2572; lat. 40° 29' 00'' N.; long. 66° 04' 00'' W.; 1,769 fathoms; bottom temperature, 37.8° F.; U.S.N.M. 10998, 38206; many, male and female.

Albatross station 2535; lat. 40° 03' 30'' N.; long. 67° 27' 15'' W.; 1,149 fathoms; bottom temperature, 37.8° F.; U.S.N.M. 38208, 44096; 3 females.

Albatross station 2534; lat. 40° 01' 00'' N.; long. 67° 29' 15'' W.; 1,234 fathoms; bottom temperature, 37.8° F.; U.S.N.M. 10890; 3 females.

U. S. F. C. station 1038(?); lat. 39° 58' 00'' N.; long. 70° 06' 00'' W.; 146 fathoms; bottom temperature, 47° F.; U.S.N.M. 44095; 1 female.

Albatross station 2570; lat. 39° 54' 00'' N.; long. 67° 05' 30'' W.; 1,813 fathoms; bottom temperature, 36.8° F.; U.S.N.M. 10892, 11009; many, male and female.

Albatross station 2043; lat. 39° 49' 00'' N.; long. 68° 28' 30'' W.; 1,467 fathoms; bottom temperature, 38.5° F.; U.S.N.M. 44097; 1 female.

Albatross station 2221; lat. 39° 05' 30'' N.; long. 70° 44' 30'' W.; 1,525 fathoms; bottom temperature, 36.9° F.; U.S.N.M. 8506, 34302, 34303, 44098, 44099; many, male and female.

Albatross station 2711; lat. 38° 59' 00'' N.; long. 70° 07' 00'' W.; 1,544 fathoms; U.S.N.M. 11983; 4 females.

Albatross station 2228; lat. 37° 25' 00'' N.; long. 73° 06' 00'' W.; 1,582 fathoms; bottom temperature, 36.8° F.; U.S.N.M. 44100; 1 male, 1 female.

¹ Sars, Norweg. N. Atl. Exped. Crustacea, vol. 2, 1886, p. 22.

DIASTYLIS LUCIFERA (Krøyer).

Cuma lucifera KRØYER, Naturh. Tidsskr., vol. 3, 1841, p. 527, pl. 6, figs. 34-35.

Diastylis luciferus S. I. SMITH, Trans. Conn. Acad., vol. 5, 1879, p. 112.

Diastylis lucifera G. O. SARS, Crust. Norway, vol. 3, 1900, p. 48, pl. 37.

Localities.—*Albatross* station 2697; off Newfoundland; 206 fathoms; U.S.N.M. 44053; 3, male and female.

U. S. F. C. station 160 (1878); Gulf of Maine; 54 fathoms; bottom temperature, 39.5° F.; U.S.N.M. 34292; 2 females.

DIASTYLIS GOODSIRI (Bell).

Alauna goodsiri BELL, in Belcher, Last of the Arctic Voyages, vol. 2, 1855, p. 403, pl. 24, figs. 2-2*n*.

Diastylis goodsiri G. O. SARS, Crust. Norway, vol. 3, 1900, p. 54, pl. 41.

This fine species has been recorded from West Greenland (lat. 65° 35' N.) by Hansen. It had previously been recorded from the Labrador coast by Packard, but the specimens appear to have been wrongly identified.¹ The localities given below extend its range far to the southward.

Localities.—*Albatross* station 2697; lat. 47° 40' 00'' N.; long. 47° 35' 30'' W.; 206 fathoms; U.S.N.M. 11785, 44050; 7, male and female.

Albatross station 2488; lat. 44° 35' 00'' N.; long. 57° 13' 30'' W.; 150 fathoms; U.S.N.M. 10501; 1 male.

Albatross station 2471; lat. 44° 34' 00'' N.; long. 56° 41' 45'' W.; 218 fathoms; bottom temperature, 40.4° F.; U.S.N.M. 10500; 1 male.

Albatross station 2511; lat. 44° 05' 30'' N.; long. 63° 31' 30'' W.; 84 fathoms; bottom temperature, 41.6° F.; U.S.N.M. 10502; 2 females.

Twenty miles ESE. of Cape Sable, Nova Scotia; 70 fathoms; Owen Bryant; October, 1908; U.S.N.M. 44051; 2 females.

DIASTYLOPSIS DAWSONI S. I. SMITH.

Diastylopsis dawsoni S. I. SMITH, Geol. Survey Canada, Report 1878-79 (1880), p. 215*B*.

Female (with developing oostegites).—Total length, 14.5 mm. (An ovigerous female measured only about 12.5 mm. in length.)

Carapace elongated and slender, its height a little less than, and its transverse width about equal to, one-half of its length. In its anterior part it is encircled by four very fine transverse lines which converge as they approach the lower margin. In the second and third of these lines the dorsal portion crossing the frontal lobe is separated from the lateral portion which ends in front of it on the frontal suture; it appears as though this dislocation were due to the forward growth of the lateral plates of the carapace, carrying with it the lateral portions of the lines. The pseudorostrum is horizontal and acute; there is a deep, rounded, antennal notch defined by a

¹ See Smith, Trans. Conn. Acad., vol. 5 p. 107.

prominent acute antero-lateral tooth, behind which the lower edge of the carapace is finely serrated. The ocular lobe is very small and there is no distinct eye.

The free thoracic somites together are about equal in length to the carapace. The pleural plates of the second somite are rounded in

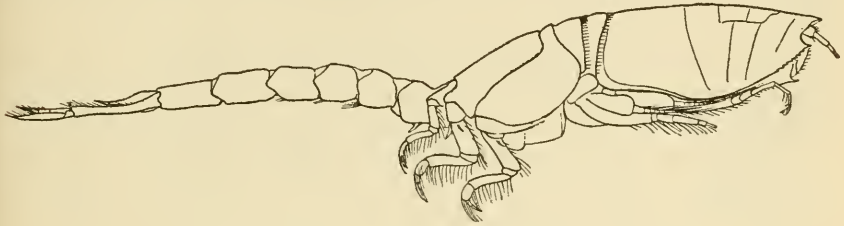
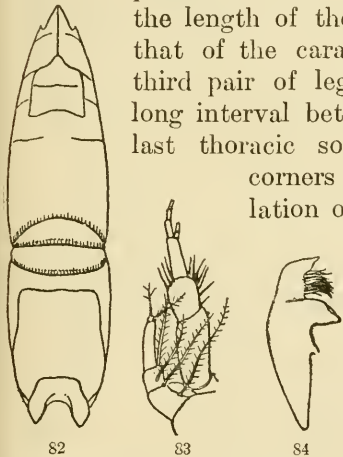


FIG. 81.—*DIASTYLOPSIS DAWSONI*, IMMATURE FEMALE, FROM THE SIDE.

front, defined above by a narrow notch, and completely conceal those of the first somite. The third and fourth somites are more firmly connected together than they are with the adjacent somites, but the line of junction is strongly marked. The third somite is very short in the middorsal line, but its pleural expansions are strongly produced backward to embrace the long fourth somite; the length of these lateral expansions is about one-half that of the carapace. The point of attachment of the third pair of legs is thus carried backward, leaving a long interval between them and the second pair. The last thoracic somite is small and its postero-lateral corners are not produced beyond the articulation of the fifth legs.



FIGS. 82-84.—*DIASTYLOPSIS DAWSONI*, IMMATURE FEMALE. 82, ANTERIOR PART OF BODY FROM ABOVE; 83, ANTENNULE AND ANTENNA; 84, MANDIBLE.

The last thoracic somite bears a pair of stout curved teeth on the sternal surface and the first abdominal a single tooth. The abdomen, including the telson, is shorter than the cephalothoracic region. The fifth somite is not longer than the sixth. The telson is about three-fourths as long as the sixth somite, swollen in its basal part. There are about four pairs of slender setiform lateral spines, and the terminal pair, though stouter, are still unusually

long and slender, being about one-third as long as the telson.

The first segment of the peduncle of the antennules is nearly as long as the second and third together; the third is about half the diameter of the second and longer than it. The shorter flagellum is about equal to the first segment of the longer and is apparently composed of only two segments. The antenna has four segments, the penultimate elongated (about four times as long as wide) and

the terminal one very minute. The mandible has both the molar and the incisor processes unusually short and stout. The maxillula and maxilla are of normal form; the palp of the former carries two setæ.

The third maxillipeds have the basis expanded distally, where its width is nearly one-fourth of its length along the inner edge; its inner distal angle is produced into a strong, acute tooth; the ischium is very wide and is produced externally into a stout tooth; the merus is not more than one-third of the width of the ischium; the terminal segments are very slender and in the specimens dissected they are doubled back behind (i. e., on the inner or upper surface of) the basis.

The first legs are unusually short, hardly extending beyond the antero-lateral angle of the carapace; the distal segments together



FIGS. 85-87.—*DIASTYLOPSIS DAWSONI*, IMMATURE FEMALE. 85, THIRD MAXILLIPED; 86, FIRST LEG; 87, SECOND LEG.

are about two-thirds as long as the basis; the last three segments successively diminish in length.

The second legs have the carpus nearly twice as long as the two distal segments together.

The third and fourth pairs of legs have each a very minute vestige of an exopod, apparently unsegmented.

The peduncle of the uropods extends for nearly half its length beyond the telson. It has a closely set series of slender spines along its inner edge; the exopod is more, and the endopod less, than half the length of the peduncle; of the three segments of the endopod the first occupies about half of its length and the third is much longer than the second; the marginal spines of both rami are slender.

Male.—Total length, about 9 mm.

In general form the carapace resembles that of the female and it is similarly marked with four transverse lines; there is, however, no antennal notch, the antero-lateral margin sloping backwards from the lower edge of the pseudorostrum with hardly an indication of

the antero-lateral tooth; the anterior part of the lower margin is finely serrated. The ocular lobe is slightly swollen, but there is no pigment and the visual elements are not distinctly visible.

The free thoracic somites together are about two-thirds as long as the carapace. The pleural plates of the second somite are concealed beneath those of the third. The pleural plates of the third and fourth somites are not so strongly produced backwards as in the female and the length of both together is just about one-half that of the carapace. There is no marked interval between the second and third pairs of legs.

The last thoracic somite probably bears a pair of short curved sternal teeth as in the female, but only one remains in the specimen examined. The first abdominal somite has a single large curved sternal tooth anteriorly and the first and second have each a lateral tooth external to the attachment of the pleopods. The telson is about as long as the last somite and dorsally humped. There are some nine pairs of setiform lateral spines.

The third segment of the peduncle of the antennule is nearly as stout as the preceding and bears a terminal brush of fine hairs. The flagella are much longer than in the female, the major flagellum having four or five segments.

The flagellum of the antenna extends to the tip of the uropods.

The legs appear not to differ greatly from those of the female except in the presence of exopods on all except the last pair. The ischium of the penultimate pair has a conspicuous tooth posteriorly.

The uropods resemble those of the female, but the spines on the inner edge of the endopod and peduncle are more numerous and pectinated.

Remarks.—Of this species, the genotype of the genus *Diastylopsis*, no figures have hitherto been published. The specimens examined agree so well with Smith's description, however, that there can be no doubt of their specific identity. Of the other species referred to the genus, *D. thileniusi* Zimmer¹ apparently comes nearest to the type, but is distinguished from it,

among many other characters, by the remarkable structure of the third maxillipeds, on which I have already commented.² A closely similar modification of the third maxillipeds is found in Mr. Stebbing's genus *Dic*.³

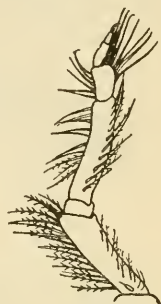


FIG. 88.—*DIASTYLOPSIS DAWSONI*, IMMATURE FEMALE, THIRD LEG.



FIG. 89.—*DIASTYLOPSIS DAWSONI*, IMMATURE FEMALE, LAST SOMITE, TELSON, AND UROPOD.

¹ Zool. Jahrb. Syst., vol. 17, 1902, p. 449, text figs.

² Ann. Mag. Nat. Hist., ser. 8, vol. 1, 1908, p. 239.

³ Ann. S. Afr. Mus., vol. 6, 1910, p. 415, pl. 47.

Localities.—Chignik Bay; 7–18 fathoms; sand; W. H. Dall; U.S.N.M. 43092; 10 females.

Albatross station 2884; off Oregon, lat. $45^{\circ} 55' N.$; long. $124^{\circ} 2' W.$; 29 fathoms; bottom temperature, $50.2^{\circ} F.$; U.S.N.M. 43091; 2 females.

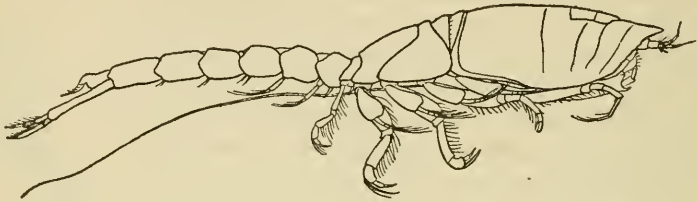


FIG. 90.—*DIASTYLOPSIS DAWSONI*, MALE, FROM THE SIDE.

Albatross station 4442; Monterey Bay, California; 26–31 fathoms; U.S.N.M. 43093; 4, male and female.

Albatross station 4564; Monterey Bay, California; 9–10 fathoms; U.S.N.M. 43094; 1 female.

DIASTYLOPSIS (?) RESIMA (Krøyer).

Cuma resima KRØYER, Naturh. Tidsskr., ser. 2, vol. 2, 1846, p. 165, pl. 2, figs. 2a–b.

Diastylopsis resima G. O. SARS, Crust. Norway, vol. 3, 1900, p. 65, pl. 47.

Sars quotes Verrill as authority for the occurrence of this species on the Atlantic coast of North America, but I have not been able to find the record to which he refers. The species occurs on the coast of South Greenland (Krøyer). As Zimmer points out,¹ the relationship of this species to *Diastylopsis dawsoni* is by no means close, and it is doubtful whether the definition of the genus can be stretched to include it along with some of the other species that have been regarded as congeneric.

Locality.—*Albatross station* 2497; off Nova Scotia, lat. $45^{\circ} 04' 00'' N.$; long. $59^{\circ} 36' 45'' W.$; 57 fathoms; bottom temperature, $33^{\circ} F.$; U.S.N.M. 44057; 6 females.

OXYUROSTYLIS, new genus.

Resembling *Diastylis* in general characters, but with the telson tapering to an acute point and without apical spines. The carapace is not elongated and has no antennal notch. The lateral portions of the third and fourth free thoracic somites are not greatly produced backwards and there is no interval between the second and third pairs of legs. The antennule has a brush of hairs in the male. The penultimate segment of the antenna is enlarged in the female. The third maxilliped has an exopod in both sexes. The third and fourth pairs of legs have exopods, vestigial in the female but well developed in the male. The male has two pairs of biramous pleopods.

¹ Cumaceen, Deutsch. Tiefsee Exped., 1908, p. 184.

Except for one character it would, I believe, be impossible to exclude the species described below from the genus *Diastylis*. That character, the structure of the apex of the telson, is, however, one that infringes the current definition of the family Diastylidæ, and on this account it seems advisable to distinguish the species by a generic name from the assemblage of unclassified Diastylidæ that form the genus *Diastylis*.

It is to be noted that the simply pointed apex of the telson shows no trace of the coalescence of a median apical spine like that of *Pseudodiastylis*. From that genus the present species differs widely in most of its characters.

Type-species.—*Oxyurostylis smithi*, new species.

OXYUROSTYLIS SMITHI, new species.

Immature female.—Total length, 6.6 mm.

Carapace rather less than one-third of total length, its depth less, and its width slightly more than two-thirds of its length. The dorsal edge, as seen from the side, is arched posteriorly, sloping in

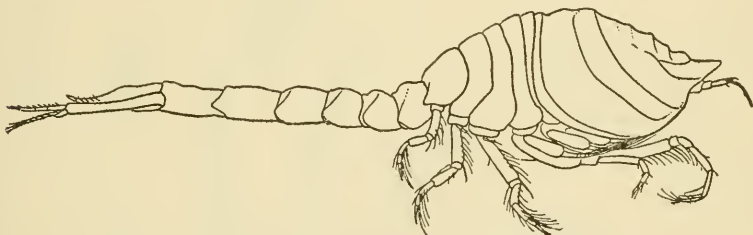


FIG. 91.—OXYUROSTYLIS SMITHI, IMMATURE FEMALE, FROM THE SIDE.

front to the short horizontal pseudorostrum. There is no antennal notch and the antero-lateral angle is hardly indicated. On each side of the carapace are two parallel oblique ridges uniting with each other on the lower edge while their upper ends are connected by a short longitudinal ridge forming one side of the depressed "cardiac" area; in front of these is a short sinuous ridge passing forward on to the side of the pseudorostrum; on the dorsal surface, the frontal lobe is crossed by two prominent transverse ridges and two others, much fainter, behind these. The ocular lobe is broader than long and about half as long as the line of junction of the lateral plates of the pseudorostrum; there is no ocular pigment and the visual elements are indistinct.

All the leg-bearing somites are distinct; the postero-lateral corners of the last thoracic somite are very slightly produced and bluntly pointed.

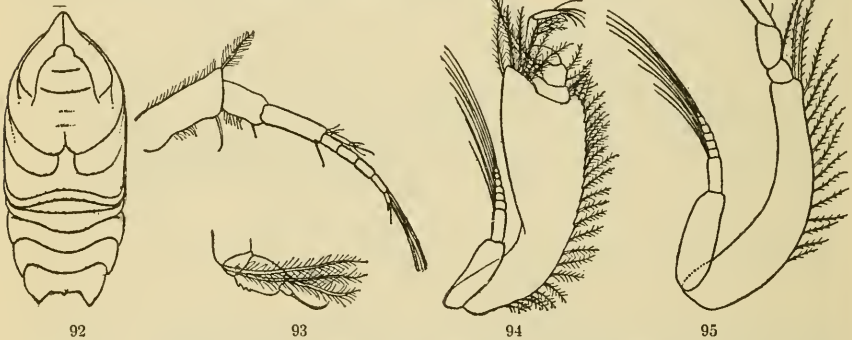
The abdomen, including the telson, is longer by about one-sixth than the cephalothoracic region and the last somite is a little shorter than the preceding. The telson is about one and one-half times

as long as the last somite, inflated at the base but very slender distally, the post-anal part about four-sevenths of its length. There are about six pairs of rather long and slender lateral spines and no apical spines at all; the telson tapers evenly from the post-anal constriction to an acute and upturned point which extends well beyond the last pair of lateral spines.

The antennules have the first segment of the peduncle nearly as long as the second and third together, the second about two-thirds as long as the third. The outer flagellum is composed of five segments and the inner of three; the latter extends beyond the middle of the second segment of the former.

The penultimate segment of the antenna is expanded and flattened, with one or two teeth on the margin; the terminal segment is of moderate size.

The mouth-parts from the mandibles to the second maxillipeds appear to present no conspicuous divergences from the normal type of the *Diastylidæ*. The third maxillipeds have



FIGS. 92-95.—*OXYUROSTYLIS SMITHI*, IMMATURE FEMALE. 92, ANTERIOR PART OF BODY FROM ABOVE; 93, ANTENNULE AND ANTENNA; 94, THIRD MAXILLIPED; 95, FIRST LEG.

the basis much expanded distally, its greatest width being nearly one-third of its length along the inner edge; it is produced at the distal outer corner into a bluntly pointed lobe. The ischium is produced externally into a long pointed process. The merus is narrow. There is a well developed exopod.

The basis of the first leg, measured along its inner edge, is about as long as the distal segments together. The carpus and propodus are subequal and longer than the dactylus. The basis of the second legs is about as long as the distal segments together; the carpus is a trifle longer than the propodus and dactylus together.

The posterior pairs of legs are stout. The third and fourth have each a minute exopod of two segments placed unusually near the proximal end of the basis and therefore very easily overlooked.

The peduncle of the uropods falls a little short of the tip of the telson and has about ten strong spines on its inner edge. The rami are subequal, and, excluding the terminal spines, about two-thirds as long as the peduncle. The endopod has three segments, of which the first is distinctly, and the third slightly, longer than the second; there are about eight spines on the inner edge and a stout terminal spine. The exopod has a few slender spines on its outer edge.

Male.—Total length, 7.3 mm.

Carapace less than one-third of total length, its depth distinctly less than two-thirds of its length,

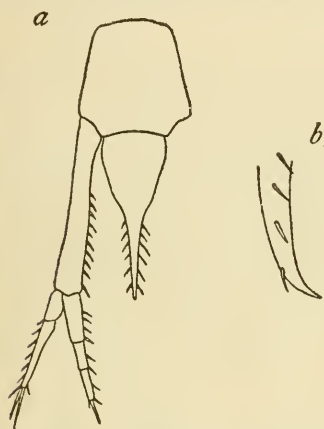


FIG. 97.—*OXYUROSTYLIS SMITHI*, IMMATURE FEMALE; *a*, LAST SOMITE, TELSON, AND UROPOD FROM ABOVE; *b*, APEX OF TELSON FROM THE SIDE, FURTHER ENLARGED.

the dorsal outline less arched than in the female. The ridges of the carapace are arranged as in the female, but there are only two transverse ridges on the frontal lobe and there is a horizontal ridge a little above the lower margin between the hinder edge and the posterior oblique ridge.

The postero-lateral angles of the last thoracic somite are strongly produced and acute. The telson is twice as long as the last somite, with about seven pairs of lateral spines. It is dorsally "humped" in the usual way and the structure of the apex is as in the female.

The antennules have the third segment of the peduncle about as wide as

the first, with a terminal brush of fine setæ. The convex area bearing the setæ is, however, distinctly defined from the body of

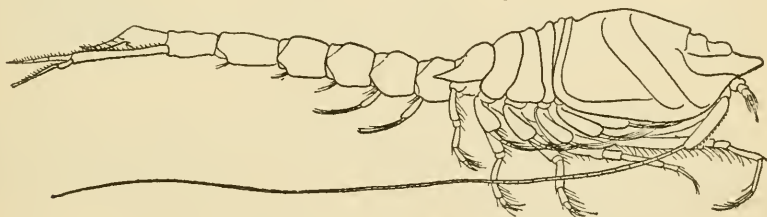


FIG. 98.—*OXYUROSTYLIS SMITHI*, MALE, FROM THE SIDE.

the segment by a line of apparent articulation, and it would seem to be in fact the enlarged proximal segment of the outer flagellum.¹

¹ I suspect that a similar arrangement will be found in all those Diastylidæ which have been described as carrying a brush of setæ on the male antennular peduncle. Compare also the structure of the male antennule in *Heterocuma weberi*. (Rep. Cumacea Siboga, p. 7, pl. 1, fig. 9.)



FIG. 96.—*OXYUROSTYLIS SMITHI*, IMMATURE FEMALE, FOURTH LEG.

Beyond this setose basal segment the flagellum has five segments. The inner flagellum is composed of four segments. The setæ on the anterior face of the antennal peduncle are relatively short; the flagellum extends back to the tip of the uropod peduncles.

Strongly developed exopods are present on all the legs except the last pair.

The first and second pairs of pleopods are biramous with the exopod of two segments.

The peduncle of the uropods extends a little beyond the tip of the telson and has about 20 spines on its inner edge. The endopod is distinctly longer than the exopod, its second and third segments subequal, and shorter than the first; there are about 20 spines on the inner edge.

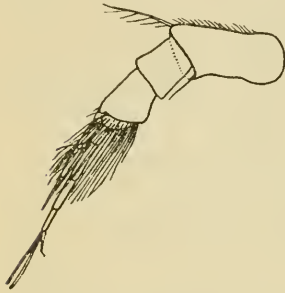


FIG. 99.—*OXYUROSTYLIS SMITHI*,
MALE, ANTENNULE.

Remarks.—Several lots of this species are labeled as having been taken at the surface. The thin and only lightly calcified integument suggests that the species is adapted for a partly pelagic life.

The specific name is chosen in recognition of my indebtedness to the writings of Prof. S. I. Smith.

Localities.—Casco Bay; U. S. F. C., 1873; U.S.N.M. 34899; 1 male. Vineyard Sound; surface; U. S. F. C., 1881; U.S.N.M. 44152, 44154; 8, male and female.

Vineyard Sound; U.S.N.M. 34897; 1 female.

Woods Hole; surface; U. S. F. C., 1882; U.S.N.M. 44145; 1 female, 2 males.

Woods Hole; surface; V. N. Edwards, Bureau of Fisheries; U.S.N.M. 44159–44165; many males and females (including holotype, 44162).

Punta Rassa, Florida; 1 fathom; H. Hemphill; U.S.N.M. 44147; 1 female.

Calcasieu Pass, Louisiana; tow, wharf; M. H. Spaulding, September, 1907; U.S.N.M. 44146; 1 male.

COLUROSTYLIS (?) *OCCIDENTALIS*, new species.

Ovigerous female.—Total length, 12 mm. (An imperfect specimen of an ovigerous female must have exceeded this length by about one-third when complete.)

The carapace is about two-sevenths of the total length, its vertical height about two-thirds of its length, and its width a little less; not inflated, with its dorsal edge as seen from the side slightly arched posteriorly then sloping downward to the short horizontal pseudo-rostrum. The antero-lateral margin below the pseudo-rostrum is

nearly straight and vertical and is defined below by a strong antero-lateral tooth. On each side of the carapace are four oblique ridges; the first ridge does not pass on to the dorsal surface above, and near its lower and anterior end it is bent upward at a right angle to pass on to the side of the pseudorostrum; the other three ridges are parallel to one another, the second ending below on the antero-lateral tooth

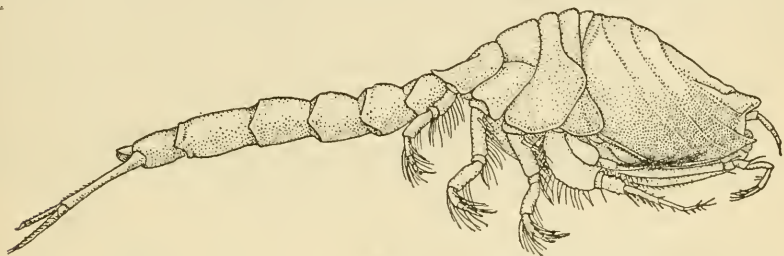
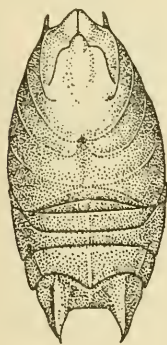
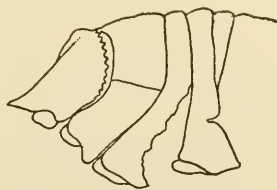


FIG. 100.—*COLUROSTYLIS* (?) *occidentalis*, FEMALE, FROM THE SIDE.

and the other two on the lower edge of the carapace; above, the second and the fourth pairs of ridges are continued across the dorsal surface, while the third pair bend forward to meet the second. The ocular lobe is small, broader than long, and shorter than the line of junction of the lateral plates of the pseudorostrum; there is no pigment, but three rather large lenticular elements can be seen.



101



102



103

FIGS. 101-103.—*COLUROSTYLIS* (?) *occidentalis*, FEMALE. 101, ANTERIOR PART OF BODY FROM ABOVE; 102, FREE THORACIC SOMITES FROM THE SIDE, PLEURAL PLATES OF THIRD SOMITE PARTLY CUT AWAY; 103, ANTENNULE.

The first free thoracic somite is only exposed on the dorsal side, its lateral portions being overlapped by the second somite. The lateral plates of the second somite are greatly expanded and are separated from the tergum by a deep narrow incision of the anterior margin. The pleural plates of the third somite are also greatly expanded, overlapping those of the second somite above and produced backward below. The third and fourth somites have a

median dorsal keel. The tergum of the fourth somite is produced backward in the middorsal line, where its length is equal to that of the three preceding somites together; its lateral plates are not expanded, but are slightly produced downward between the coxæ of the third and fourth pairs of legs; each lateral plate is defined by a suture line at about half the height of the somite. The fifth somite has its anterior margin coarsely serrate, with rather widely separated teeth; it has a pair of dorso-lateral keels which are continued into the strong, vertically compressed, slightly upturned, and acutely pointed postero-lateral teeth.

The abdomen is a little shorter than the cephalothoracic region; the last somite is about half as long as the preceding. The telson is half as long as the last somite, little longer than broad, rounded, and quite unarmed; the tip does not project beyond the anal valves.

The antennules have the second segment of the peduncle very stout, about half as long as either the first or the third; the inner flagellum has three segments and is about half as long as the first segment of the outer flagellum.

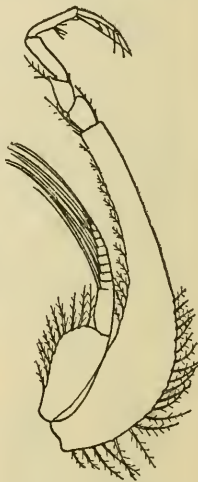
The antenna is composed of four distinct segments; the penultimate is expanded, ovate, serrated on both edges; the last segment is very minute and inserted within the margin of the preceding.



104



105



106

FIGS. 104-106.—*COLUROSTYLIS* (?) *occidentalis*, FEMALE. 104, ANTENNA; 105, THIRD MAXILLIPED; 106, FIRST LEG.

The mandible and other mouth parts are of normal form. The third maxillipeds have the basis only slightly expanded and not produced at its distal angle. The ischium bears a curious comblike row of short spines on its outer margin.

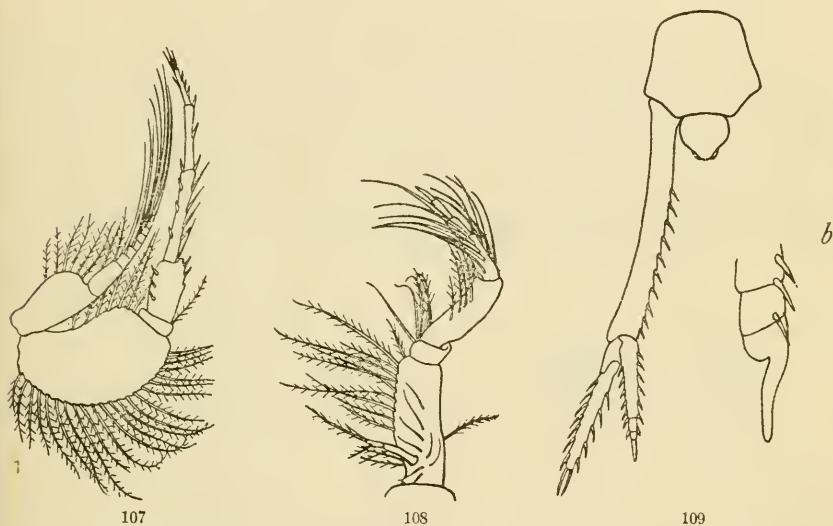
The first legs have the basis, measured along the inner edge, twice as long as the distal segments together; the carpus and propodus are subequal, the dactylus a little shorter. The second legs have the basis expanded, less than twice as long as broad, and about half as long as the distal segments together; the merus is a little more than half as long as the carpus, which is one and a half times as long as the propodus and more than twice as long as the dactylus.

The third and fourth pairs of legs each bear a conspicuous exopod of two segments.

The peduncle of the uropods is about two and a half times as long as the last somite, with a row of rather longish spines on its inner edge. The exopod is about half as long as the peduncle and the endopod about three-quarters as long as the exopod. The endopod is composed of three segments, of which the first is nearly four times as long as the other two together; the terminal segment is of very unusual form, having a strong compressed spine produced backward from its lower surface and projecting far beyond the bluntly rounded tip. Both exopod and endopod bear spines on their outer and inner edges.

Adult male.—Total length, 11.8 mm.

Resembling the female except that the general form is more slender, with the cephalothoracic region less inflated and the carapace slightly



FIGS. 107-109.—*COLUROSTYLIS (?) OCCIDENTALIS*, FEMALE. 107, SECOND LEG; 108, THIRD LEG; 109, *a*, LAST SOMITE, TELSON, AND UROPOD FROM ABOVE; *b*, TIP OF ENDOPOD FROM THE SIDE, FURTHER ENLARGED.

depressed. The ridges of the carapace are less prominent and the eye much larger and more distinct, although without pigment. There is no dorsal keel on the third free thoracic somite, but the fourth somite is as in the female. The expanded pleural plates of the third somite are somewhat swollen and are separated from the dorsal part of the somite on each side by a shallow groove in line with the pleural suture of the fourth somite. Each of the first two abdominal somites has a strong, backwardly curved tooth in the midventral line in front of the attachment of the pleopods, and each of the three following somites has a pair of articulated spines on the ventral side behind the middle of its length. The telson is longer than in the female, with the dorsal surface hollowed; its rounded distal edge

projects beyond the anal valves and bears about four setæ directed downward.

The distal segment of the antennular peduncle is not enlarged; there is a rather scanty brush of hairs springing apparently from the enlarged first segment of the outer flagellum. The antennal flagellum is as long as the body. The first four pairs of legs carry well-developed

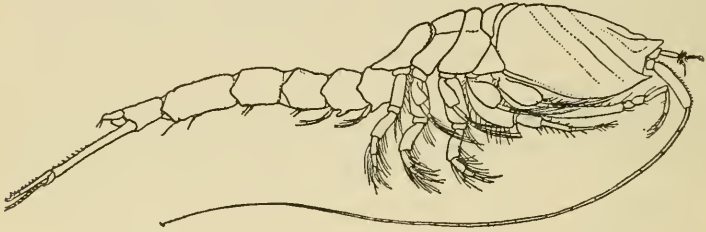
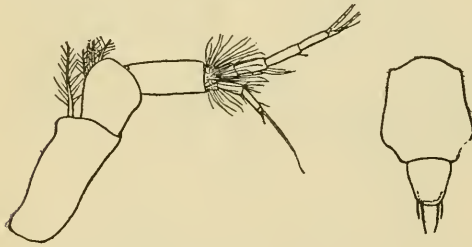


FIG. 110.—COLUROSTYLIS (?) OCCIDENTALIS, MALE, FROM THE SIDE.

exopods. Both pairs of pleopods are biramous, with the exopod in each case of two segments. The uropods resemble those of the female, but are provided with much more numerous spines.

Remarks.—This species resembles *Colurostylis pseudocuma*¹ in the small size of the telson and in the general characters of antennules, antennæ, and male pleopods. It differs, however, in many important

characters, and it is possible that some of these, especially the peculiar form of the thoracic pleural plates, the expanded penultimate segment of the female antenna, and the remarkable structure of the endopod of the uropods deserve to be recognized by making it the type of a separate genus.



111

112

FIGS. 111-112.—COLUROSTYLIS (?) OCCIDENTALIS, MALE. 111, ANTENNULE; 112, LAST SOMITE AND TELSON.

In having the endopod of the uropods of three segments it is nearer the normal type of the Diastylidæ than *C. pseudocuma*. The narrow notch on the anterior margin of the second free somite recalls that of *Diastylopsis dawsoni*.

Localities.—Albatross station 3094; off Oregon, lat. 43° 01' 00'' N.; long. 124° 30' 30'' W.; 35 fathoms; bottom temperature, 46.7° F.; U.S.N.M. 44010; 1 female (holotype).

Pacific Grove, California; J. O. Snyder, July, 1895; U.S.N.M. 44009; 4, male and female.

Albatross station 4564; Monterey Bay, California; 9 fathoms; U.S.N.M. 44008; 1 female.

¹ Calman, Trans. Zool. Soc., vol. 18, 1911, p. 377, pl. 36, figs. 23-36.

PETALOSARSIA DECLIVIS (G. O. Sars).

Petalopus declivis G. O. Sars, Forh. Vidensk. Selsk. Christiania, 1864 (1865), p. 197.

Petalosarsia declivis G. O. Sars, Crust. Norway, vol. 3, 1900, p. 77, pl. 54.

On the coasts of Europe this species is known to range from Franz-Joseph Land to Heligoland and the Irish Sea. It has not hitherto been recorded from the American coasts.

Localities.—*Albatross* station 2458; off Newfoundland; 89 fathoms; bottom temperature 29.5° F.; U.S.N.M. 44149; 1 female.

U.S.F.C. station 993; off Marthas Vineyard; 39 fathoms; bottom temperature, 46.5° F.; U.S.N.M. 44150; 1 female.

BIBLIOGRAPHY OF AMERICAN CUMACEA..

SAY, THOMAS.—An account of the Crustacea of the United States (continued).

Journ. Acad. Nat. Sci. Philadelphia, vol. 1, Nos. 11 and 12, 1818, pp. 313-319.

Diastylis arenarius described from a single male individual taken from sand in a shore-pool on the "Coast of Georgia and Florida." This species, the genotype of the extensive genus *Diastylis*, has not since been rediscovered.

NICOLET, H.—Crustaceos.

In Historia física y política de Chile, por Claudio Gay, Zoología, vol. 3. Paris, 1849. Atlas, 1854.

On p. 220 *Cuma gayi* is described, and it is figured on pl. 3 (Crustaceos), fig. 1-1b, in the Atlas. It appears to be a species of *Diastylis*, but has not since been recognised.

STIMPSON, W.—Synopsis of the marine invertebrata of Grand Manan.

Smiths. Contr., vol. 6, Art. 5, 1853, 68 pp., 3 pls.

Cuma bispinosa, new species, is described on p. 39. See remarks under *Diastylis quadrispinosa* above.

SARS, G. O.—Nya arter af Cumacea samlade under k. svenska korvetten *Josephines* Expedition i Atlantiska Oceanen år 1869 af F. A. Smitt och A. Ljungman.

Oefvers. Kgl. Vet. Akad. Förh., vol. 28, 1871, No. 1, pp. 71-81.

———.—Beskrivelse af de paa Fregatten *Josephines* Expedition fundne Cumaceer.

Kgl. Svenska Vet. Akad. Handl., vol. 9, No. 13, 1871, 57 pp., 20 pls.

In these two papers the following species are described from the Atlantic coast of North America: *Diastylis sculpta*, *D. quadrispinosa*, *D. abbreviata*, *Eudorella pusilla*, *E. hispida*, all new species, and *Eudorella* (now *Eudorellopsis*) *deformis* Krøyer.

———.—Beskrivelse af fire Vestindiske Cumaceer opdagede af Dr. A. Goës.

Oefvers. Kgl. Vet. Akad. Förh., vol. 28, 1871, No. 6, pp. 803-811.

———.—Beskrivelse af syv nye Cumaceer fra Vestindien og det Syd-Atlantiske Ocean.

Kgl. Svenska Vet. Akad. Handl., vol. 11, No. 5, 1873, 30 pp., 6 pls.

In these papers *Diastylis antillensis*, *Leucon anomalus*, *Campylaspis pulchella*, and *Stephanomma goësi* are described from the West Indies, and *Diastylis fimbriata*, *Leptostylis manca*, and *Leptocuma kinbergii* from the Atlantic coast of South America. All are new species.

SMITH, S. I.—Crustacea, in Report upon the Invertebrate animals of Vineyard Sound and the Adjacent waters.

Rep. U. S. Comm. Fisheries, 1871-1872 (1873). Cumacea, pp. 554-555.

Diastylis quadrispinosa is figured (pl. 3, fig. 13).

WHITEAVES, J. F.—On recent deep-sea dredging operations in the Gulf of St. Lawrence.

Amer. Jour. Sci., vol. 7, 1874, pp. 210-219.

———.—Report on Deep-sea dredging operations in the Gulf of St. Lawrence.

29 pp. Printed in Ottawa, 1874.

Seven species of Cumacea are recorded as identified by Prof. S. I. Smith.

SMITH, S. I.—Notes on Crustacea collected by Dr. G. M. Dawson at Vancouver and the Queen Charlotte Islands.

Geol. Survey Canada Rept. 1878-79 (1880), pp. 206B-218B.

Diastylopsis dawsoni, new genus and new species, is described from Queen Charlotte Islands. This species has been redescribed and figured above.

——.—The Stalk-eyed Crustaceans of the Atlantic Coast of North America north of Cape Cod.

Trans. Conn. Acad., vol. 5, 1879, pp. 28-138, pls. 8-12.

This is the most important paper on the Cumacea of the Atlantic coast. Seventeen species are recorded, of which three are new. With the exceptions of *Diastylis abbreviata* G. O. Sars, *Leptostylis longimana* (G. O. Sars), and *L. ampullacea* (Lilljeborg), all the species are represented in the collection now examined.

MURDOCH, JOHN.—Marine Invertebrates (exclusive of Mollusks).

Rep. International Polar Exp. Point Barrow, Alaska, 1885, pp. 136-176, 2 pls.

Diastylis rathkii var. is recorded from the north coast of Alaska.

SARS, G. O.—Report on the Cumacea.

Challenger Reports, 1886, 78 pp., 11 pls.

Eudorella abyssii, new species, and *Diastylis stygia* G. O. Sars are recorded from depths exceeding 1,000 fathoms off the Atlantic coast.

HANSEN, H. J.—Isopoden, Cumaceen u. Stomatopoden der Plankton-Expedition, 1895, 105 pp., 8 pls.

Pachystylis rotundata, new genus and new species from off the coast of Brazil, and *Nannastacus hirsutus*, new species from the Bermudas, are described in this memoir.

ZIMMER, CARL.—Cumaceen.

In Hamburger Magalhaensische Sammelreise, 1902, 18 pp., text figs.

Six new species are described from the coasts of Patagonia and the Magellan region.

CALMAN, W. T.—On new or rare Crustacea of the Order Cumacea from the collection of the Copenhagen Museum.

Part 1, Trans. Zool. Soc., vol. 18, pp. 1-39, pls. 1-9, 1907; Part 2, pp. 341-385, pls. 31-37, 1911.

Six new species are described from the West Indies and one species is recorded from the Straits of Magellan.

ZIMMER, CARL.—Die Cumaceen der Schwedischen Südpolarexpedition, 31 pp., 8 pls., 1909.

Two species are recorded from the Falkland Islands.