This species probably breeds throughout the year on rice rats, various subspecies of *Oryzomys palustris*. The biggest collection, from Jasper County, S. C., game refuge, contained at least 46 *Laelaps oryzomydis*. The rice-rat louse (*Hoplopleura oryzomydis* Pratt and Lane) and the following mites were also found in collections from rice rats: *Gigantolaelaps cricetidarum* Morlan, *Haemolaelaps glasgowi* (Ewing), *Haemolaelaps megaventralis* Strandtmann, *Bdellonyssus* species near *bacoti*, *Androlaelaps* species, and often hundreds of mites of the family Listrophoridae on a single rice rat. The cotton-rat flea (*Polygenis gwyni* (C. Fox)) was also found in these same collections.

The following keys to male and female *Laelaps* are modified from those of Grant (1947):

A KEY TO SOME SPECIES OF MALE NORTH AMERICAN LAELAPS

1. Dorsal plate with long, hairlike setae; sternal, genitoventral, and anal plates all united into a single holoventral plate 2
   Dorsal plate with short, spiniform setae; sternal and genitoventral plates united, but separate from anal plate 5
2. Second tarsus with some short curved spiniform setae near tips (on microtine mice) *L. alaskensis* Grant
   Second tarsus without curved spiniform setae, all straight 3
3. Peritreme tube extending to coxa II; second tarsus with slender setae only (on rice rats, genus *Oryzomys*) ..... *L. oryzomydis*, n.sp.
   Peritreme tube extending forward beyond coxa II; second tarsus with some stout setae 4
4. Larger species at least 0.9 mm long (on domestic rats, genus *Rattus*) .. *L. echidninus* Berlese
   Smaller species 0.5 to 0.8 mm long (on domestic rats, genus *Rattus*) ..... *L. nuttalli* Hirst
5. United sternal and genitoventral plate widely separated from the anal plate and with posterior border slightly concave (on microtine mice) ..... *L. kochi* Oudemans
   United sternal and genitoventral plate with posterior border proximal to the anal plate (on muskrats, genus *Ondatra*) *L. multispinosus* Banks

A KEY TO SOME SPECIES OF FEMALE NORTH AMERICAN LAELAPS

1. Anal plate contiguous with genitoventral plate and fitting into a strong concavity in genitoventral plate (on domestic rats in genus *Rattus*) ..... *L. echidninus* Berlese
   Anal plate separated from genitoventral plate, which is usually convex or straight on posterior margin, not strongly concave 2
2. Dorsal setae long and slender 3
   Dorsal setae small and short 5
3. Internal spine on forecoxa distinctly stouter than external spine (on rice rats in genus *Oryzomys*) ..... *L. oryzomydis*, n.sp.
   Internal spine on forecoxa more slender than external spine 4
4. Genitoventral plate widely separated from anal plate; anal plate with anterior margin rounded (on microtine mice) *L. alaskensis* Grant
   Genitoventral plate extending posteriorly almost to anal plate; anal plate with anterior margin truncate and definite angular anterolateral corners (on domestic rats in genus *Rattus*) ..... *L. nuttalli* Hirst
5. Anal plate subtriangular; posterior border of sternal plate deeply arched; coxal spines not greatly enlarged basally (on microtine mice) ..... *L. kochi* (Oudemans)
   Anal plate suboval; posterior border of sternal plate poorly defined, not greatly arched; coxal spines greatly enlarged basally (on muskrats of genus *Ondatra*) *L. multispinosus* Banks

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ZOOLOGY.—*Two new semiparasitic harpacticoid copepods from the coast of New Hampshire.*

ARTHUR G. HUMES, Department of Biology, Boston University. (Communicated by Fenner A. Chace, Jr.)

Two new species of semiparasitic harpacticoid copepods were found in the summer of 1952 during routine classroom study of living invertebrates at the University of New Hampshire. One, belonging to the genus *Nitocra* Boeck (Ameiridae), inhabited small pits in the exumbrellar surface of a scyphozoan medusa. The other, a memebr of the genus *Mesamphiascus* Nicholls (Diosaccidae), occurred on the first maxillipeds of the American lobster.

Nitocra medusaea, n. sp.

Approximately 1,030 individuals of this copepod were discovered on the exumbrellar surface

of a living medusa of an unidentified species of *Aurelia*, about 3 inches in diameter, collected by Dr. Mary D. Rogick on July 17, 1952, off Fort Stark, in the harbor of Portsmouth, N. H. When undisturbed, the copepods remained in flask-shaped pits in the exumbrella, the largest pit being about 1–1.5 mm deep and 1 mm in diameter. There were more than thirty pits on this medusa, each with 10–30 or more copepods. Since the bodies of the copepods massed together in the pits were opaque or slightly cream-colored, the medusa appeared to the unaided eye as though there were sand grains embedded in the jelly. One might presume that the pits resulted from the presence of the copepods, but whether or not the copepods excavate the pits is not known. When examined under intense illumination or when disturbed with a needle, the copepods became active and crawled in and out of the pits and over the exumbrellar surface, clinging tenaciously to bits of debris and jelly fragments.

The type material consists of more than 1,000 individuals, representing both sexes. The holotype female (No. 95305), allotype (No. 95306), and paratypes (300 females and 100 males, No. 95307) have been deposited in the United States National Museum. Other paratypes are in the author's collection.

Female.—In life the body (Fig. 1) is transparent, without distinct color. The eye is bright red. The total length (measuring from the tip of the rostrum to the posterior end of the caudal rami), based on five specimens, is 0.79 mm (0.75–0.82 mm). The ratio of length of the head (plus rostrum) and the first five leg-bearing thoracic segments to the genital segment and abdomen (plus caudal rami) is 49:30. The genital segment has a slight indication of subdivision into two segments, especially visible on the dorsal side. The abdomen is 3-segmented. The actual and proportional lengths of the rostrum, body segments, and caudal rami are:

Rostrum	Head plus somite of leg 1	2	3	4	5	6	1	2	3	Caudal rami
27μ	177	79	70	71	66	109	68	54	50	23
3	22	10	9	9	8	14	9	7	6	3 = 100

The greatest body width is at the level of the first leg-bearing thoracic segment where it is 206μ. The length of the inner long seta on the caudal ramus is 419μ.

The rostrum (Fig. 2), curved slightly ventrally, narrows to a rounded point distally, and bears two small setae dorsally. The head and first four leg-bearing thoracic segments bear minute setae (Fig. 3) whose number and arrangement are difficult to discover because of the opacity of the body in preserved specimens. The fifth leg-bearing thoracic, genital, and abdominal segments are armed as indicated in Figs. 1, 3, and 4. The dorsal subdivision of the genital segment is marked by a medially interrupted transverse row of small setae as well as by the cuticular furrow. The anal operculum has a row of dentiform setae along the free edge. On either side of the operculum there is a row of spines which continues around on the ventral surface, becoming progressively smaller.

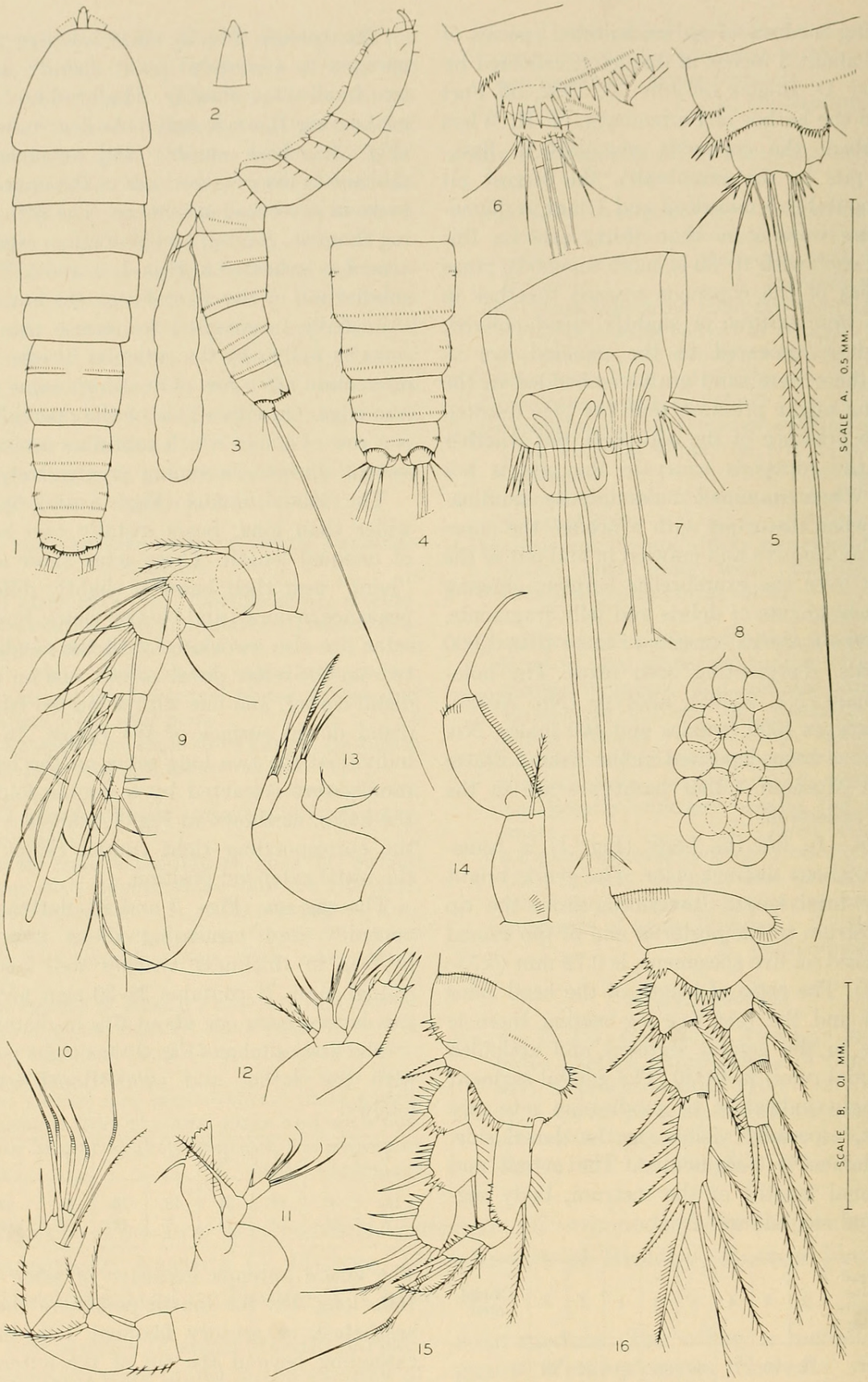
The caudal ramus (Figs. 5 and 6), slightly wider than long, bears distally two long setae of unequal length. These setae show a distinct "joint" near their bases of slightly different appearance in dorsal and ventral views. Four shorter setae are also associated with the caudal ramus, two on the outer distal corner, one on the inner distal corner. and one with a jointed base on the distal dorsal surface of the ramus. In a single individual the two long setae on the left caudal ramus were retracted by a double folding near the bases, as shown in Fig. 7, while the setae on the corresponding right caudal ramus were in the usual extended position.

The egg sac (Figs. 3 and 8), flattened dorsoventrally and measuring about 262 x 157μ, by 85μ in thickness, reaches well beyond the caudal rami. It contains 28–30 eggs arranged in two layers, each egg about 51μ in diameter.

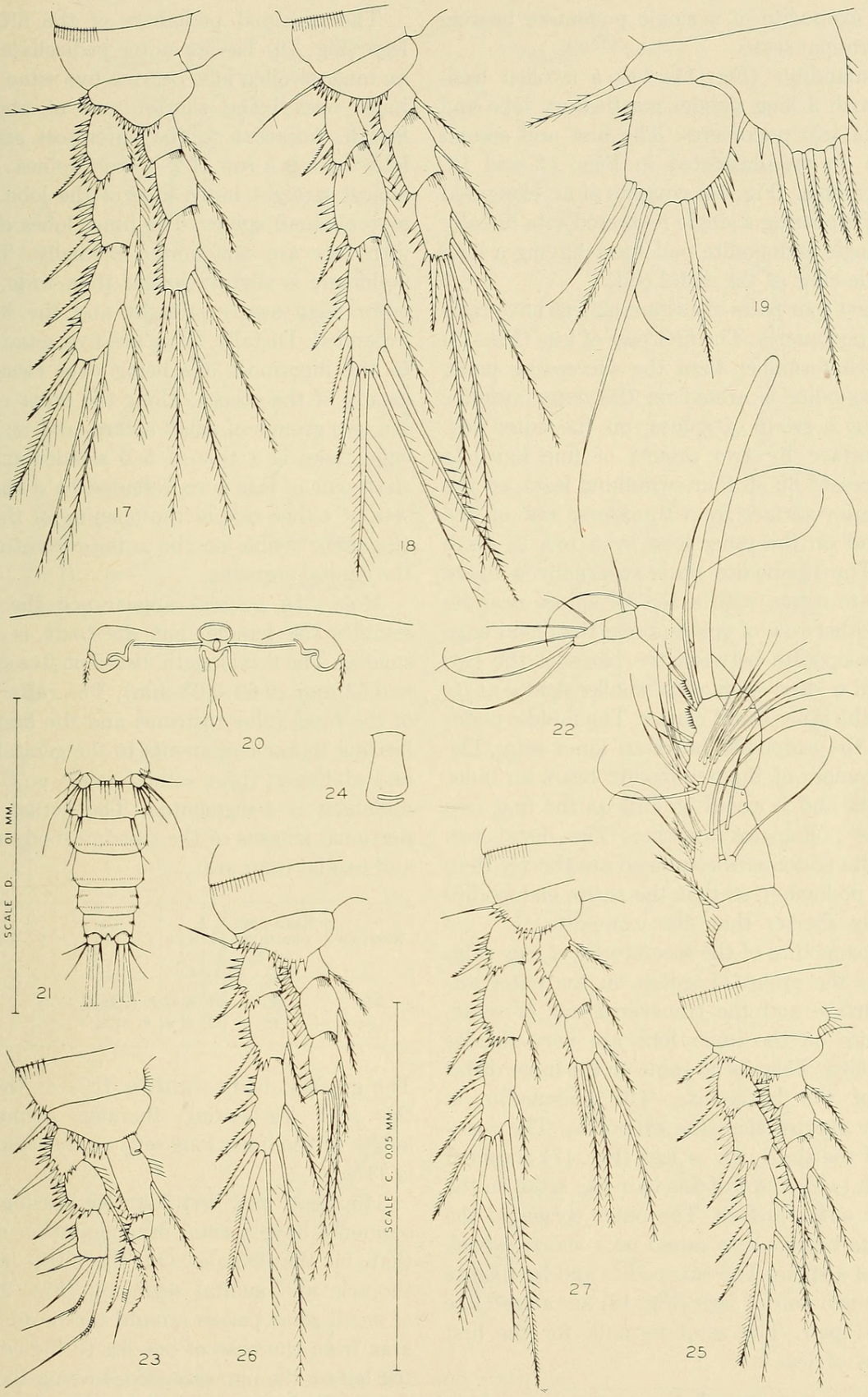
The first antenna (Fig. 9) has eight podomeres with the actual and proportional lengths as follows:

1	2	3	4	5	6	7	8
19μ	33	18	24	13	16	13	22
12	21	12	15	8	10	8	14 = 100

The entire antenna exclusive of setae is about 160μ long. On the fourth podomere there is an aesthetask or sensory filament 110μ in length, extending beyond the tip of the antenna. The first podomere bears a longitudinal row of small slender spines and a feathered seta at the inner distal corner. There is a small feathered seta about midway on the inner edge of the second podomere. The second antenna (Fig. 10) has a short basipodite, an endopodite of two podomeres,



FIGS. 1–16.—*Nitocra medusaea*, n. sp., female: 1, Body segments, dorsal view; 2, rostrum, dorsal view; 3, lateral view of body, thoracic and head appendages omitted; 4, genital segment and abdomen, ventral view; 5, caudal ramus, ventral view; 6, caudal ramus, dorsal view; 7, caudal ramus with retracted setae, ventral view; 8, egg sac; 9, first antenna; 10, second antenna; 11, mandible; 12, first maxilla; 13, second maxilla; 14, maxilliped; 15, first swimming leg, anterior view; 16, second swimming leg, anterior view. (All figures were drawn with the aid of a camera lucida. Scale A applies to Figs. 1, 3, 4, and 21; scale B to Figs. 2, 5, 6, 9, 15–18, 23, 25–27, and 42–46.)



FIGS. 17–27.—*Nitocra medusaea*, n. sp., female: 17, Third swimming leg, anterior view; 18, fourth swimming leg, anterior view; 19, fifth leg; 20, sixth legs and opening of reproductive system on ventral surface of genital segment. Same, male: 21, fifth legs, genital segment, and abdomen, ventral view; 22, first antenna; 23, first swimming leg, anterior view; 24, spine on inner distal corner of basipodite of first swimming leg; 25, second swimming leg, anterior view; 26, third swimming leg, anterior view; 27, fourth swimming leg, anterior view. (Scale C applies to Figs. 7, 24, and 31; scale D to Figs. 10–14, 19, 20, 22, 28, 36, 37, 60, and 62.)

and an exopodite of a single podomere bearing three terminal setae.

The mandible (Fig. 11) has a swollen basipodite with a long slender masticatory lobe and a palp of two podomeres. The first and second maxillae are as illustrated in Figs. 12 and 13. The maxilliped (Fig. 14) consists of an elongated basipodite bearing a single feathered seta distally and a single endopodite podomere having a long prehensile claw at the distal end.

The first four pairs of swimming legs have rami of three podomeres. The first pair of legs (Fig. 15) is somewhat smaller than the succeeding pairs. The coxopodite is armed on the outer anterior surface by a group of spines, on the outer posterior surface by two groups of fine hair-like setae (present on all four swimming legs), on the mid-anterior surface by a transverse row of fine setae, and on the inner lobe by a row of small spines. The basipodite bears externally a finely denticulate spine, with a row of spines near its base, another row of spines along the distal edge of the basipodite between the bases of the two rami, and a large spine with smaller spines at its base on the inner distal corner. The middle podomere of the exopodite bears an inner seta. The first podomere of the endopodite bears an inner distal seta and is about as long as the first two exopodite podomeres together. The distal two endopodite podomeres combined are shorter than the first podomere, so that the entire endopodite is slightly shorter than the exopodite.

The coxopodite of the second pair of legs (Fig. 16) lacks the group of spines on the outer anterior surface and the transverse row of setae. The spines on the inner lobe are very slender and hair-like. There is no spine on the inner distal corner of the basipodite. The endopodite is distinctly shorter than the exopodite. The coxopodite of the third pair of legs (Fig. 17) is armed only with two groups of fine hair-like setae on the posterior outer surface. The outer corner of the basipodite bears a seta raised on a short pedicel, instead of a spine. The coxopodite and basipodite of the fourth pair of legs (Fig. 18) are armed like the third pair. The setal formula for the first our pairs of legs is:

	Leg 1		Leg 2		Leg 3		Leg 4	
	Exp.	End	Exp.	End	Exp.	End	Exp.	End
1st podomere	1:0	0:1	1:0	0:1	1:0	0:1	1:0	0:1
2d podomere	1:1	0:1	1:1	0:1	1:1	0:1	1:1	0:1
3d podomere	5	3	7	4	7	5	7	5

The proximal podomere of the fifth pair of legs (Fig. 19) has an outer pedicellate seta and an inner swollen lobe bearing five setae, the three inner ones being shorter and of about equal length. Adjacent to the outermost seta on the lobe there is a row of 2–4 short spines. Along the almost straight inner edge of the lobe there are several small spines. The inner lobes of the two fifth legs are not united medially. The distal podomere is slightly longer than wide, with the outer edge nearly straight and the inner edge expanded. Distally there are five setae, the next to the innermost one being over twice as long as any of the others. Along the outer edge there are two groups of small spines, and on the inner edge there is a row of 5–6 slender spines. The sixth pair of legs is represented by a single small seta at either side of the opening of the oviduct (Fig. 20), visible on the anterior ventral part of the genital segment.

Male.—In general appearance the male resembles the female, but the body is distinctly smaller. The total length, based on five specimens, is 0.62 mm (0.60–0.64 mm). The ratio of length of the head (plus rostrum) and the first five leg-bearing thoracic segments to the genital segment and abdomen (plus caudal rami) is 37:25. The abdomen is 4-segmented. The actual and proportional lengths of the rostrum, body segments, and caudal rami are:

Rostrum	Head plus somite of leg 1	2	3	4	5	6	1	2	3	4	Caudal rami
22μ	140	57	50	52	49	53	52	48	43	38	18
3	23	9	8	8	8	9	8	8	7	6	3 = 100

The greatest body width is 157μ at the level of the first leg-bearing thoracic segment. The length of the inner long seta on the caudal ramus is 337μ.

The head and first four leg-bearing thoracic segments have a setal ornamentation much like that in the female. On the fifth leg-bearing thoracic and genital segments (Fig. 21) a row of small setae passes around the posterior dorsal area from the base of one leg to the corresponding leg on the opposite side, leaving the area between the bases of the legs free of setae. Both first and second abdominal segments have a transverse row of setae encircling the posterior region of the somite. The third segment has a similar transverse row and in addition a short row on each side of the somite. The last abdominal

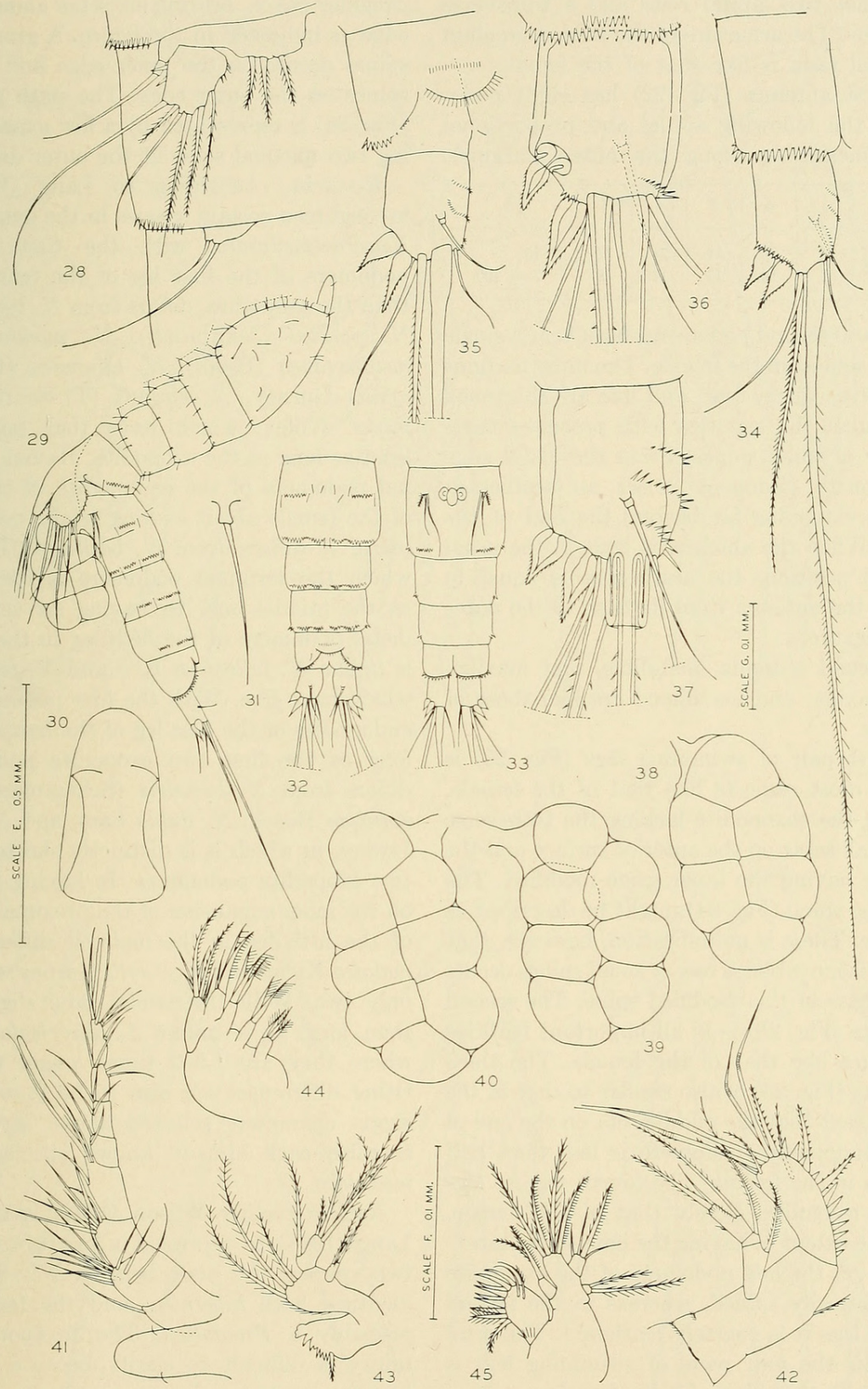


Fig. 28.—*Nitocra medusaea*, n. sp., male: fifth and sixth leg.

Figs. 29–45.—*Mesamphiascus ampullifer*, n. sp., female: 29, lateral view; 30, rostrum, dorsal view; 31, a seta from the posterior border of a thoracic segment; 32, genital segment and abdomen, dorsal view; 33, genital segment and abdomen, ventral view; 34, part of last abdominal segment and caudal ramus, ventral view; 35, part of last abdominal segment and caudal ramus, dorsal view; 36, caudal ramus, showing partly retracted flask-shaped seta, ventral view; 37, caudal ramus, showing partly retracted long terminal seta, dorsal view; 38, egg sac with 6 eggs, lateral view; 39, egg sac with 7 eggs; 40, egg sac with 8 eggs; 41, first antenna and rostrum; 42, second antenna; 43, mandible; 44, first maxilla; 45, second maxilla. (Scale E applies to Figs. 29, 32, 33, and 54–56; scale F to Figs. 34, 35, 41, 47–53, 57–59, 61, and 63; scale G to Figs. 38–40.)

segment has two lateral rows and a transverse ventral row. The armature of the anal operculum and caudal rami is like that of the female.

The first antenna (Fig. 22) has eight podomeres of the following actual and proportional lengths (measuring along the outer margins):

1	2	3	4	5	6	7	8
22μ	25	7	28	21	21	11	10
15	18	4	19	15	14	8	7 = 100

The first and second podomeres both bear a single feathered seta as in the female. The inner margins of podomeres three, four, and five are thickened and irregular, the last two with processes bearing a row of small spines. From the distal edge of the fourth podomere arises an aesthetask 118 x 6μ, extending far beyond the end of the antenna. When the antenna is bent in the usual geniculate position, the aesthetask is equal in length to the antenna from its base to the outer angle of flexure.

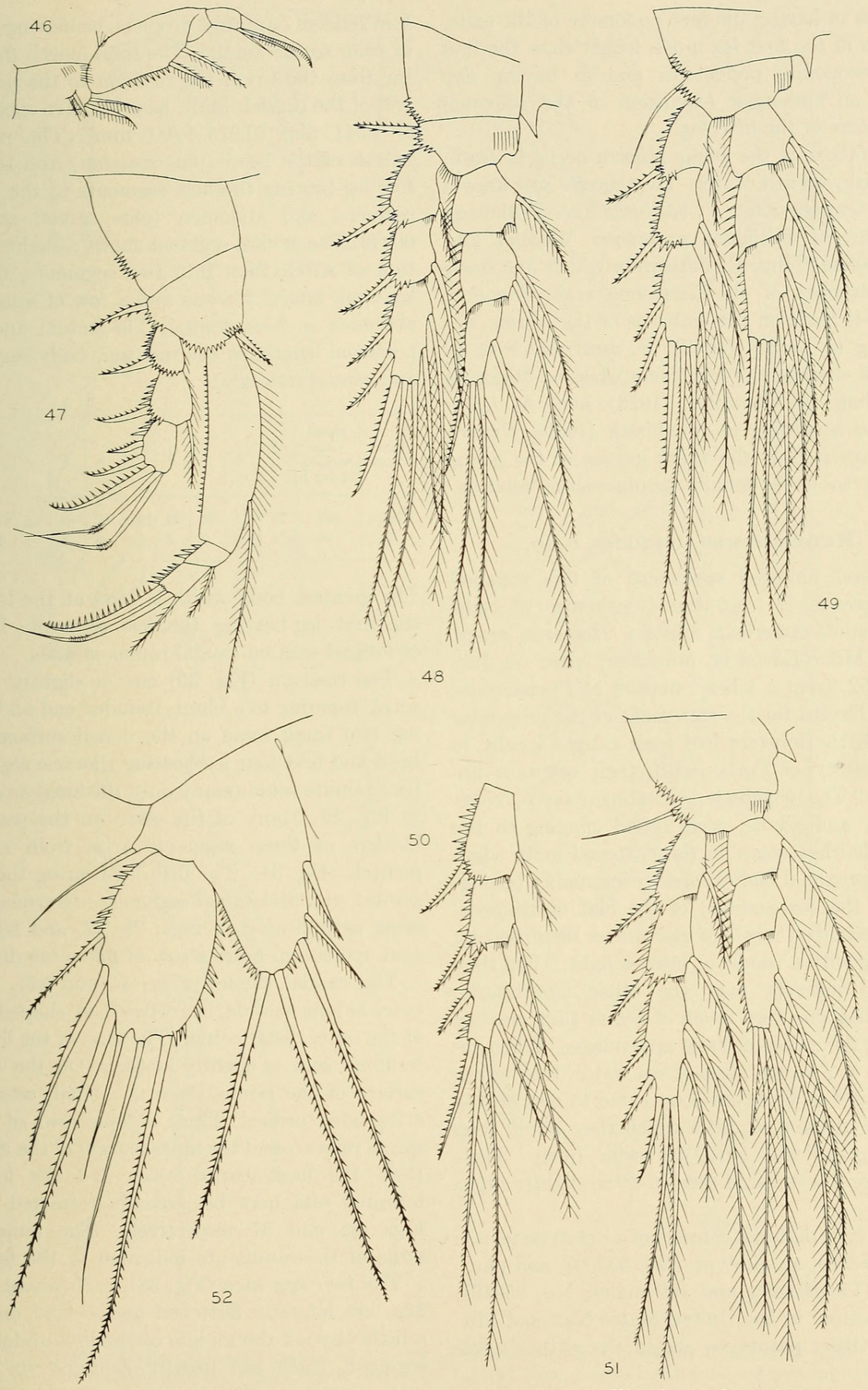
The second antenna, mandible, first maxilla, second maxilla, and maxilliped are like those of the female.

The first pair of swimming legs (Fig. 23) is armed in most respects like that of the female, except for the coxopodite lacking the transverse row of small setae on the anterior surface and the basipodite having the inner spine modified. The form of the spine (Fig. 24) might be described as subchelate. There is no indication, however, that the finger is movable. A row of small spines occurs near the base of this modified spine. The second pair of legs (Fig. 25) is in all important features of armature like that of the female. The third pair of legs (Fig. 26) is also similar to that of the female, except that the middle seta on the end of the last endopodite podomere is less than half as long as in the female. The fourth pair of legs (Fig. 27) resembles closely that of the female, even to the extent of having the next to the innermost seta on the last podomere of the exopodite characteristically spined, whereas in the second and third legs it is coarsely feathered. The setal formula for the four pairs of swimming legs is identical with that given for the female.

The proximal podomere of the fifth pair of legs (Fig. 28) bears an outer pedicellate seta and an expanded inner lobe bearing three feathered setae in a row. The inner lobes of the two fifth legs are not united medially. The distal podomere is slightly longer than wide, of a somewhat irregular shape, bearing six setae along the distal edge as indicated in the figure. A group of small spines occurs on the inner edge and two larger spines on the outer edge. The sixth pair of legs (Fig. 28) is represented by a low expansion bearing two unequal setae at the outer distal corner.

Remarks.—According to Lang (1948) there are eighteen certain species in the genus *Nitocra*. *Nitocra medusaea*, with the first endopodite podomere of the first leg of the female shorter than the exopodite, differs from *N. typica* Boeck, *N. pontica* (Jakubisiak), *N. pusilla* Sars, *N. mediterranea* (Brian), *N. hibernica* (Brady), *N. affinis* Gurney, *N. elegans* (T. Scott), and *N. minor* Willey, which have that podomere at least as long as the exopodite. Having the terminal podomere of the endopodite of the first leg of the female about as long as the middle podomere, it differs from *N. bdellurae* (Liddell), in which the terminal podomere is twice as long as the middle one. In having six setae on the distal podomere of the fifth leg in the female, it is unlike *N. fallaciosa* Klie and *N. fragilis* Sars, which have five. With the first podomere of the endopodite of the first leg of the female about as long as the first two exopodite podomeres, it differs from *N. lacustris* (Schmankevitsch), *N. spinipes* Boeck, *N. dubia* Sars, and *N. platypus* Daday, in which it is distinctly shorter than the two exopodite podomeres. In having three setae on the inner expansion of the proximal podomere of the fifth leg in the male, it differs from *N. malaica* Kiefer and *N. sewelli* Gurney, which have only two. With the caudal rami slightly wider than long, it is unlike *N. divaricata* Chappuis where they are 1.5–2 times longer than wide. Other differences are also to be found, but the single characters selected above serve to distinguish each already known species from *N. medusaea*.

Nitocra chelifer Wilson (1932) is thought by Lang (1948) to represent a mixture of at least two species, the male being a *Nitocra* perhaps identical with *hibernica*, and the female being probably a *Proameira*. The taxonomic uncertainty is difficult to clarify because of the existence of only two known specimens, a holotype male and a paratype female, both undissected, in the U. S. National Museum. The female, however, differs from *N. medusaea* in having the terminal podomere of the endopodite of the first leg narrow and more than twice as long as the middle podomere. The male differs from the new



FIGS. 46–52.—*Mesamphiascus ampullifer*, n. sp., Female: 46, maxilliped; 47, first swimming leg; 48, second swimming leg; 49, third swimming leg; 50, abnormal exopodite of third swimming leg; 51, fourth swimming leg; 52, fifth leg.

species in having the first podomere of the endopodite of the first leg much longer than the first two exopodite podomeres and in having five setae on the inner expansion of the proximal podomere of the fifth leg.

Members of the genus *Nitocra* occur in fresh, brackish, or salt water. Two species are known to be semiparasitic. *N. bdellurae* lives in the egg capsules of *Bdelloura propinqua* Wheeler and *B. candida* (Girard), flatworms which live upon the carapace of the horseshoe crab, *Limulus*. There it feeds on the embryos of the worms, according to Liddell (1912). *N. divaricata* lives in the gill chambers of crayfishes, *Astacus fluviatilis* according to Chappuis (1926) and *A. leptodactylus* according to Jakubisiak (1939). *Nitocra medusaea* is thus the third species in the genus known to have definite semiparasitic relationships.

Mesamphiascus ampullifer, n. sp.

Several hundred specimens of this copepod were recovered from the mouthparts of eight small adult American lobsters, *Homarus americanus* Milne-Edwards, purchased alive on July 30, 1952, from a lobster market at Portsmouth, N. H. Except for the statement of the proprietor that all the lobsters had been caught locally in the vicinity of Portsmouth, their origin is uncertain. The copepods, including nauplii, copepodids, and adults, were found clinging to the many hairlike setae on the flattened inner edges of the proximal endite lobes (presumably belonging to the coxopodites) of the first maxillipeds. They occurred nowhere else unless disturbed by probing with a needle or intense light. Then they crawled actively over the other mouthparts, reminding one very much of lice as they crawled among the setae of these appendages. When removed to a watch glass of sea water, they swam vigorously at first, but soon came to rest on the bottom of the dish, from which they would then only sporadically arise to swim freely. Their behavior toward light seemed to be slightly negative.

The type material consists of a holotype female (No. 95308), an allotype (No. 95309), and paratypes (150 females and 100 males, No. 95310), all deposited in the United States National Museum. Other paratypes are in the author's collection.

Female.—The body (Fig. 29), excluding the intestinal contents, is colorless except for a bright red eye. The intestine of specimens freshly removed from the host is pale yellow and may contain reddish or orange droplets, conferring a tinge of color to the animal. The total length (measuring from the tip of the rostrum to the posterior end of the caudal rami), based on five specimens, is 1.041 mm (0.975–1.081 mm). The ratio of length of the head (plus rostrum) and the first five leg-bearing thoracic segments to the genital segment and abdomen (plus caudal rami) is 60:44. The genital segment shows a slight indication of subdivision into two segments, marked by weak lateral furrows and a row of setae. The abdomen is 3-segmented. The actual and proportional lengths of the rostrum, body segments, and caudal rami are:

Rostrum	Head plus somite of leg 1	2	3	4	5	6	1	2	3	Caudal rami
73μ	268	78	79	66	34	130	97	85	65	65
7	26	8	8	6	3	13	9	8	6	6 = 100

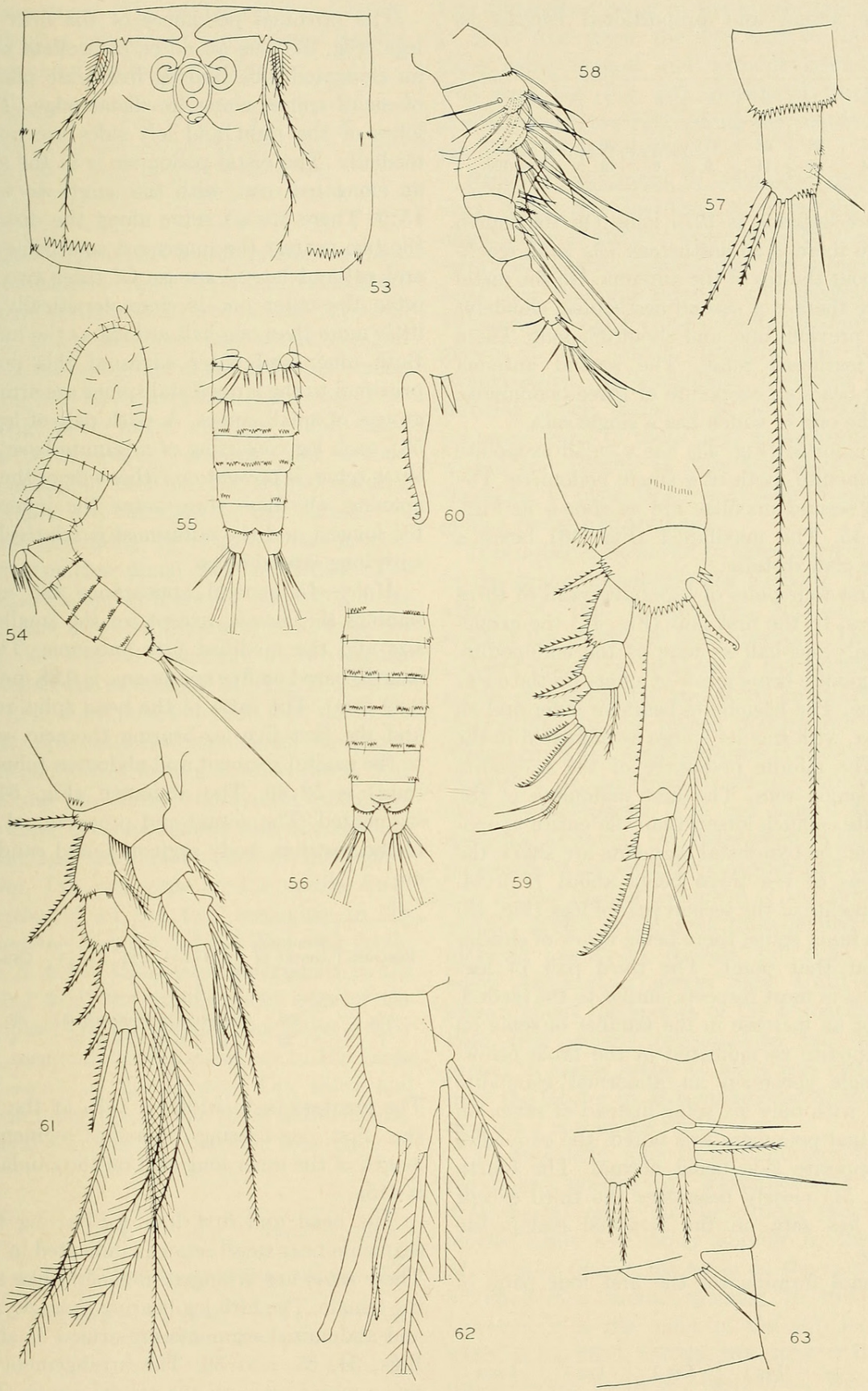
The greatest body width is 188μ at the level of the first leg-bearing thoracic segment. Length of longest seta on caudal ramus is 430μ.

The rostrum (Fig. 30) curves slightly downward, tapering to a blunt, rounded end and bearing two small setae on the dorsal surface. The head and first four leg-bearing thoracic segments bear minute setae (many only 10μ long) as shown in Fig. 29. Many of the setae on the posterior borders of these segments arise from slender pedicels (Fig. 31). The fifth leg-bearing thoracic, genital, and abdominal segments are armed with setae as indicated in Figs. 29, 32, and 33. The anal operculum bears a row of fine setae distally.

The caudal ramus (Figs. 34 and 35), about twice as long as wide, bears two flask-shaped setae at the outer distal corner. The base of the longest terminal seta is slightly swollen. On the dorsal surface of the ramus there is a small seta with a 2-jointed pedicel. Three oblique rows of small spines pass around the inner margin of the ramus. Both the flask-shaped setae and the longest terminal seta may be partially retracted as in Figs. 36 and 37 respectively. The remaining setae of the ramus are indicated in the figures.

The two egg sacs (Fig. 38), each about 47 x 32μ, are laterally flattened and extend only to a little beyond the middle of the first abdominal segment. Each sac usually contains six eggs, each egg about 50μ in diameter. Occasionally there are seven eggs (Fig. 39) or eight eggs (Fig. 40).

The first antenna (Fig. 41) has eight podomeres



Figs. 53–63.—*Mesamphiascus ampullifer*, n. sp., female: 53, Genital segment, ventral view, showing reproductive opening and sixth legs. Same, male: 54, lateral view, head and thoracic appendages omitted; 55, fifth legs, genital segment, and abdomen, ventral view; 56, genital segment and abdomen, dorsal view; 57, part of last abdominal segment and caudal ramus, ventral view; 58, first antenna; 59, first swimming leg; 60, inner basipodite spine and associated spines on first leg; 61, second swimming leg; 62, distal endopodite podomere of second leg; 63, fifth and sixth legs.

with the actual and proportional lengths as follows:

1	2	3	4	5	6	7	8
32μ	27	28	28	17	18	20	27
16	14	14	14	9	9	10	14 = 100

The entire antenna is 197μ long. On the fourth podomere there is an aesthetask 73μ long, reaching to about the tip of the antenna. On the distal podomere there is a second aesthetask, slenderer than the previous one, and about 38μ long. There are no feathered setae. The second antenna (Fig. 42) bears an exopodite of three podomeres, the middle one of which has a single seta.

The mandible (Fig. 43) has a small exopodite and endopodite, both of a single podomere. The first and second maxillae are as shown in Figs. 44 and 45. The maxilliped (Fig. 46) bears a pectinate claw distally.

The first four pairs of legs have rami of three podomeres. In the first pair (Fig. 47) the exopodite is only one-half as long as the endopodite. The coxopodite bears a row of spines on the outer distal area. The basipodite bears an inner and an outer seta, with smaller spines as indicated in the figure. The middle podomere of the exopodite bears a single seta. The first podomere of the endopodite is much longer than the entire exopodite, while the two distal segments are short, the proportions of the three being about 77:9:14. The basipodite of the second pair of legs (Fig. 48) lacks the inner spine, there being a row of slender setae near that point. The third pair of legs (Fig. 49) is in most respects similar to the second, except for an increase in the number of setae on the endopodite as indicated in the table below. In a single specimen an abnormal exopodite (Fig. 50) with only six setae instead of seven on the terminal podomere was noted, the exopodite of the opposite side being normal. The fourth leg (Fig. 51) closely resembles the third except for one less seta on the terminal endopodite podomere.

The setal formula for the first four pairs of legs is:

	Leg 1		Leg 2		Leg 3		Leg 4	
	Exp.	End	Exp.	End	Exp.	End	Exp.	End
1st podomere	1:0	0:1	1:1	0:1	1:1	0:1	1:1	0:1
2d podomere	1:1	0:1	1:1	0:2	1:1	0:1	1:1	0:1
3d podomere	5	3	7	4	7	6	7	5

The proximal podomere of the fifth pair of legs (Fig. 52) has an outer pedicellate seta and an elongated lobe bearing five setae plus a row of small spines along its distal edge. The two lobes of the right and left sides are not fused medially. The distal podomere is in the shape of an elongated oval, with the length to width as 15:9. There are six setae along the distal edge, the two nearest the innermost seta being slender and without lateral spines. Of these two slender setae the outer one is characteristically only a little more than one-half as long as the inner one. Both inner and outer edges of this podomere proximal to the large distal spines are armed with groups of small spines. A sixth pair of legs (Fig. 53), each leg consisting of a minute base bearing three setae, is present on either side of the genital opening. Of these three setae the innermost is the longest and the outermost is relatively short with long lateral hairs.

Male.—In general appearance the male resembles the female, except for the smaller body size and the modified first antennae. The total length, based on five specimens, is 0.88 mm (0.87–0.89 mm). The ratio of the head (plus rostrum) and the first five leg-bearing thoracic segments to the genital segment and abdomen (plus caudal rami) is 52:36. The abdomen (Fig. 54) is 4-segmented. The actual and proportional lengths of the rostrum, body segments, and caudal rami are:

Rostrum	Head plus somite of leg 1	2	3	4	5	6	1	2	3	4	Caudal rami
62μ	238	67	64	56	30	54	66	68	66	57	49
7	27	8	7	6	3	6	8	8	8	7	6 = 100

The greatest body width is 157μ at the level of the first leg-bearing thoracic segment. The length of the inner long seta on the caudal ramus is 415μ.

The head and first four leg-bearing thoracic segments bear small setae as indicated in Fig. 54. These setae are arranged in general like those of the female. The fifth leg-bearing thoracic, genital, and abdominal segments are armed as shown in Figs. 54, 55, and 56. The arrangement of the seven major setae on the caudal ramus (Fig. 57) is like that of the female. Instead of the two flask-shaped setae on the outer distal corner, however, there are two tapering setae with minute lateral spines.

The first antenna (Fig. 58) has eight podomeres of the following actual and proportional lengths (measuring along the outer margins):

1	2	3	4	5	6	7	8
29μ	34	39	13	29	30	13	19
14	17	19	6	14	15	6	9 = 100

On the inner edge of the fourth podomere there is a minute feathered seta. From this region there arises also an aesthetask about 77μ long. A second aesthetask much slenderer and about one-half as long is borne on the end of the distal podomere. Podomeres 3–6 have irregular chitinized processes along their inner surfaces. The third podomere is noticeably swollen. The second antenna, mandible, first maxilla, second maxilla, and maxilliped are like those of the female.

The first swimming leg (Fig. 59) has proportions and armature much like the female. The inner basipodite spine, however, is hooked at its tips and bears a row of minute spines along the edge (Fig. 60). Near its base there are two smaller spines. The second swimming leg (Fig. 61) differs from the first, third, and fourth in that the endopodite has apparently two podomeres, the second and third podomeres having become fused. The six setae on the distal endopodite podomere (Fig. 62) may be homologized with the setae of the second and third podomeres of the female endopodite. The two setae on the middle inner edge correspond to the two belonging to the second podomere in the female. The long feathered seta distal to these two corresponds to the seta arising from the middle inner edge of the third podomere of the female. The three greatly modified terminal setae correspond to the three terminal setae of the female. The third and fourth swimming legs are like those of the female.

The setal formula for the first four pairs of legs is:

	Leg 1		Leg 2		Leg 3		Leg 4	
	Exp.	End	Exp.	End	Exp.	End	Exp.	End
1st podomere	1:0	0:1	1:1	0:1	1:1	0:1	1:1	0:1
2d podomere	1:1	0:1	1:1	6	1:1	0:1	1:1	0:1
3d podomere	5	3	7		7	6	7	5

The proximal podomere of the fifth leg (Fig. 63) bears an outer pedicellate seta and an inner lobe with two setae and a row of small spines. The distal podomere is slightly wider than long, the two dimensions being in the proportion of 11:9. It bears four setae, the seta next to the outermost being longest and without lateral hairs. The sixth leg (Fig. 63) consists of three setae arising from a low ridge along the posterior margin of the genital segment.

Remarks.—Although *M. ampullifer* has certain very distinctive features, such as the sexual dimorphism of the two outer setae on the caudal rami, its generic position may be subject to at least two interpretations of the species in the Diosaccidae. Lang (1948) described sixteen new genera in the family, bringing the total to twenty-seven. *M. ampullifer* possesses characteristics which seem to be of taxonomic importance equal to those used to separate genera within the family. It does not seem possible, therefore, to place this new species in any of the genera recognized by Lang.

It is possible, however, to place the new species in the genus *Mesamphiascus* Nicholls. In his revision of the Diosaccidae Nicholls (1941) erected the subfamily Amphiascinae, basing his concept upon the setation of the middle podomeres of the second and third endopodites. In this subfamily he placed *Robertsonia* Brady, *Schizopera* Sars, *Amphiascopsis* Gurney, *Amphiascus sens. str.*, and the new genera *Amphiascoides* and *Mesamphiascus*. The last named genus he described as having two inner setae on the middle podomere of the second endopodite and one inner seta on the middle podomere of the third endopodite. *Mesamphiascus* as thus defined by him included twenty-six species, the type selected being *Amphiascus parvus* Sars. Until more is known about the species of the Diosaccidae and their true generic relationships can be interpreted, it seems better to place this new species from the lobster in *Mesamphiascus* Nicholls than to erect a new genus for it.

M. ampullifer may be distinguished from the recognized species of *Mesamphiascus* by the flask-shaped setae on the caudal rami of the female. Only one other species in the genus *M. bulbifer* (Sars) has setae on the caudal rami modified in a similar manner. In this species, however, it is the outer of the two long setae which is modified, not the two setae at the outer distal corner as in *M. ampullifer*. Whether or not this modification is sexually dimorphic as in *M. ampullifer* is not known, since only females of *M. bulbifer* have been described. Sexual dimorphism, however, is known in a few other

harpacticoid genera, such as *Attheyella* and *Huntemannia*. Basal swelling or expansion of the setae on the caudal rami has been described in many harpacticoids, as discussed by Sewell (1940), but usually the two long setae are the ones affected and often it is not clear whether the condition is sexually dimorphic. Swollen setae on the outer distal corner of the caudal ramus are not entirely unknown in other harpacticoids, one having been described by Klie (1929) in the female of his *Paramesochra holsatica*.

M. ampullifer differs further from all other species in the genus in the character of the inner basipodite seta of the first leg of the male and in the armature of the endopodite of the second leg of the male. It seems also to be unlike most other known species in having a small aesthetask on the terminal podomere of the first antenna. This feature, however, may be common to other species. Such an aesthetask is apparently figured by Sewell (1940) in his new species *Amphiascus calcarifer*, f. *major*, though not mentioned in the text. The aesthetask is so small that in the group of terminal setae it might easily be overlooked.

The majority of the members of the Diosaccidae for which ecological information is available are free-living, in salt, brackish, or fresh water. Numerous species of marine harpacticoids have been found by Jakubisiak (1932 and 1936) among the algae and animal colonies attached to the carapace of the crab, *Maia squinado* (Herbst), among them *Diosaccus tenuicornis* (Claus), *Amphiascopsis phyllopus* (Sars), *Mesamphiascus parvus* (Sars), *Amphiascoides debilis* (Giesbrecht), and *Amphiascoides hispidus* (Norman MS, Sars). These five species of Diosaccidae also occur, however, in sand and among algae, being found normally in the latter habitat, according to Monard (1935). They probably live not as true commensals or as semiparasites but as free animals in the ecological niche provided by the thick growth on the crab carapace. Another species, *Amphiascoides commensalis* (Seiwell), lives as a commensal in the branchial chamber of the ascidian, *Amaroucium*, according to Seiwell (1928). *M. ampullifer* thus appears to be the second species in the Diosaccidae known to have definite relationships with a host animal, although its morphological modifications for clinging to the host are not highly developed.

The only other harpacticoid known from the lobster is *Unicalteutha ovalis* Wilson, 1944 (Peltidiidae). This copepod occurs commonly on lobsters in Newfoundland (Templeman and Tibbo, 1945), where it is found chiefly in restricted areas on the chelipeds.

After the above description had been completed, twelve preserved lobsters, comprising nine females and three males, were found parasitized by *M. ampullifer*. These lobsters had been used for class study for five years and their collection locality is unknown. Three of the females and two of the males had many nauplii and copepodids as well as adults. All stages of the copepods were confined to the setose flattened edges of the proximal endite lobes of the first maxillipeds.

Nine live lobsters, including four males and five females, collection locality unknown, purchased from a Boston fish market in March, 1953, were also parasitized by these copepods. Over 100 copepods, including nauplii, copepodids, and adults, were removed from each. From one female 370 adult copepods were recovered. When it is considered that the combined area of the flattened edges of the two endite lobes where they were clinging was not more than about 28 square millimeters, the heavy degree of infestation may be appreciated.

M. ampullifer seemed to be particularly hardy when removed from the host, since some individuals survived for 41 days at about 70 degrees F. in a watch glass of sea water changed weekly but without special aeration.

M. ampullifer thus appears to be a common parasite of lobsters in the New England area, since it has been found on all 29 thus far examined. This, together with the fact that it occurs in such large numbers and on such a restricted part of the host's body, would tend to support the conclusion that it normally lives upon the lobster.

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ZOOLOGY.—*A burrowing barnacle of the genus* Trypetesa (order Acrothoracica).[1]

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A previously unreported acrothoracican barnacle has been found burrowing in *Tegula* shells occupied by hermit crabs in the intertidal zone of central California. A description and certain aspects of the life history of this form are given. A more detailed morphological study is in preparation for future publication.

Subclass CIRRIPEDIA (Lam.) Burmeister, 1834

Order ACROTHORACICA Gruvel, 1905

Diagnosis.—Boring cirripeds with soft mantle without calcareous plates; cirri reduced, concentrated toward posterior end of body, one pair in vicinity of mouth ("mouth cirri"), and widely separated from other pairs, remaining pairs 2, 3, or 4 in number. Three pairs of mouth appendages. Abdomen lacking (?). Hermaphroditic or sexes separate. Males dwarf. Ovaries in a more or less flattened part of mantle ("disk"), which serves at same time to anchor it in the hole. Development always includes a cypris stage, with a nauplius stage in most of the species studied. Live buried in chiton and barnacle plates, gastropod shells, and corals.

Suborder Apygophora Berndt, 1907

Diagnosis.—Sexes separate. Female: An external chitinous mantle "sack" more or less regularly rounded or oval serving to fix the animal in a burrow in a shell; one pair of biramous mouth cirri; three pairs of quadriarticulated and uniramous thoracic cirri, the first two pairs possessing small prickly pads on second articulation; two lateral folds on inside of mantle which are perhaps ovigerous frenae; alimentary canal a sacculated system without an anus; esophagus spineless; nervous system consists of brain and one ventral ganglion.

Rudimentary (dwarf) males: Small, fixed on upper part of disk of female or grouped on cavity in shell; in the form of an elongated bag, naked and transparent; with a small opening for passage of a well-developed prosbosciform penis; only eyes, testis, seminal vesicle, and penis are developed.

Cyprid larvae with six pairs of thoracic appendages biramous and natatory; abdominal segment with two large appendages.

Family Trypetesidae Kruger 1940 (=Alcippidae Gerstäcker, 1866; Gruvel, 1905).

With the characteristics of the suborder

Genus **Trypetesa** A. M. Norman, 1903

(=*Alcippe* Hancock, 1849; Darwin, 1854; Berndt, 1903, 1907; Genthe, 1905; Kuhnert, 1935; *Alcippoides* E. Strand, 1928. *Non Alcippe* Blyth, 1844.)

Trypetesa lampas (Hancock)

"Capitulum" laterally compressed, perpendicular to surface of the shell, with "disk" or ovigerous portion dorsoventrally compressed and

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