



I take this opportunity to express my sincere thanks to Dr. Thomas E. Bowman and the authorities of the United States National Museum who made this study possible.

Genus **Bomolochus** Nordmann

Vervoort, 1962, p. 9.

**Bomolochus albidus** Wilson

Figs. I-II

*Bomolochus albidus* Wilson, 1932, p. 382, pl. 23, figs. C-J ; Stock, 1953, p. 12, figs. 45-47 ; Vervoort, 1962, p. 13.

*Material examined:* Three females collected from the gill chamber of *Lophius piscatorius* Linn. at Woods Hole, Massachusetts, on 7-5-1923. Identified by C. B. Wilson. U.S. National Museum Catalogue Number 59770.

*Female.* Cephalothorax is nearly one and a half times as broad as long. Frontal plate is roughly squarish and projecting beyond the base of the antennules. Second thoracic segment is transversely oblong and only about half the width of the cephalothorax, its lateral borders are perfectly rounded. Third thoracic segment is narrower than second but longer since its postero-median part is produced backwards over the fourth segment. Fourth segment is only half as broad as the third. Fifth segment is roughly equal in length and width and subequal to the genital segment in size. Genital segment is barrel-shaped and not swollen. Abdomen is long and three-segmented and nearly as long as the cephalothorax, segments become successively shorter backwards. Caudal furca are slightly diverging, nearly twice as long as broad and narrowing distalwards, each is armed with six setae, two of the apical setae are long, the inner of the two is twice as long as the outer.

The antennules do not reach beyond the lateral borders of the cephalothorax. They are comparatively slender, with indistinctly three-segmented peduncle carrying fifteen plumose setae, two modified simple setae and four ventral setae. There are no chitinous plates fusing with the setae. Flagellum is three-segmented.

The basal segment of the antenna is as long as the third, with a long distal seta, second segment carries a short seta. The ventral surface of the third segment is roughened with longitudinal rows of denticles. From its distal part originates a long spiny finger-shaped process and a short hook which are rather sub-apical in position and a bunch of four stout claws and a seta. The fourth segment<sup>1</sup> is a long stout process completely fused with the third and the longitudinal rows of denticles extend on to the fourth segment.

Maxilliped is three-segmented, the basal segment is narrow and without spines or setae, the second segment is roughly rectangular with two rather short setae at

<sup>1</sup> The antenna is often described as four-jointed. The finger-shaped process at the tip of the third segment is counted as the fourth joint. In all the species described here this process is so completely fused with the third segment that the appendage is only three-segmented. The rows of spines present on the third segment are continued on to this supposed fourth segment.



the middle of its inner border, third segment or hook is longer than the second segment and sickle-shaped, it carries a basal seta but no accessory process. The mandible is slender, with a short unarmed blade and an apically curved accessory

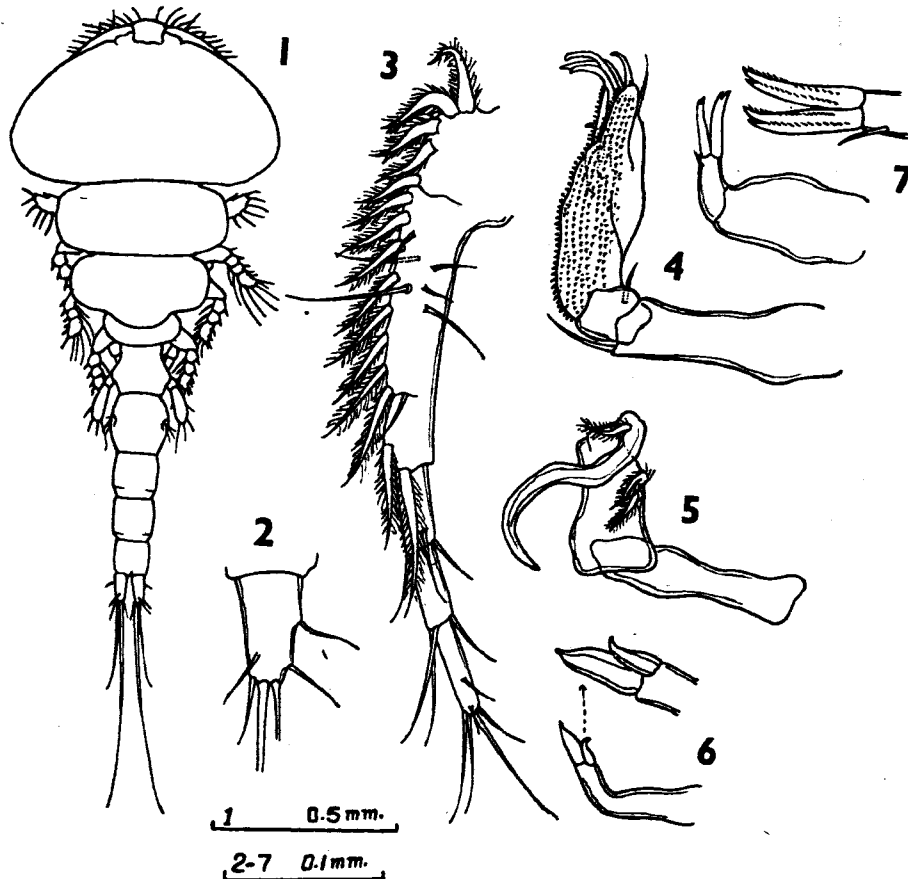


FIG. 1. *Bomolochus albidus* Wilson. 1. female, dorsal view; 2. caudal furca; 3. antennule; 4. antenna; 5. maxilliped; 6. mandible; 7. maxilla.

blade. Maxilla has a fairly stout basal segment, the short distal segment remains at right angles to the basal and carries a short spine and two subsimilar long blades with bifid apex.

The rami of the first leg are clearly three-segmented and only moderately flattened. First exopod segment has an outer spine, second has an outer spine and inner seta and the third three outer spines and five setae. Each of the first two endopod segments carries an inner seta and the third five setae. Inner border of the first exopod segment and the outer border of all the endopod segments is hairy.

Rami of the second leg are comparatively broad but narrower than those of the first leg. First exopod segment has an outer spine, second an outer spine and

inner seta and the third four spines and five setae. Inner border of the first segment is hairy. First segment of the endopod has one inner seta, second two inner setae and the third three setae and two spines, outer border of the segments is hairy. All the spines on the exopod, except the last, have barbed borders and a forked tip housing a setule, the last spine has barbs on the outer and setae on the inner side.

Third leg is much similar to the second in shape and armature except that the third exopod segment carries only three spines and the third endopod segment carries only two setae. The inner border of the first exopod segment is not hairy.

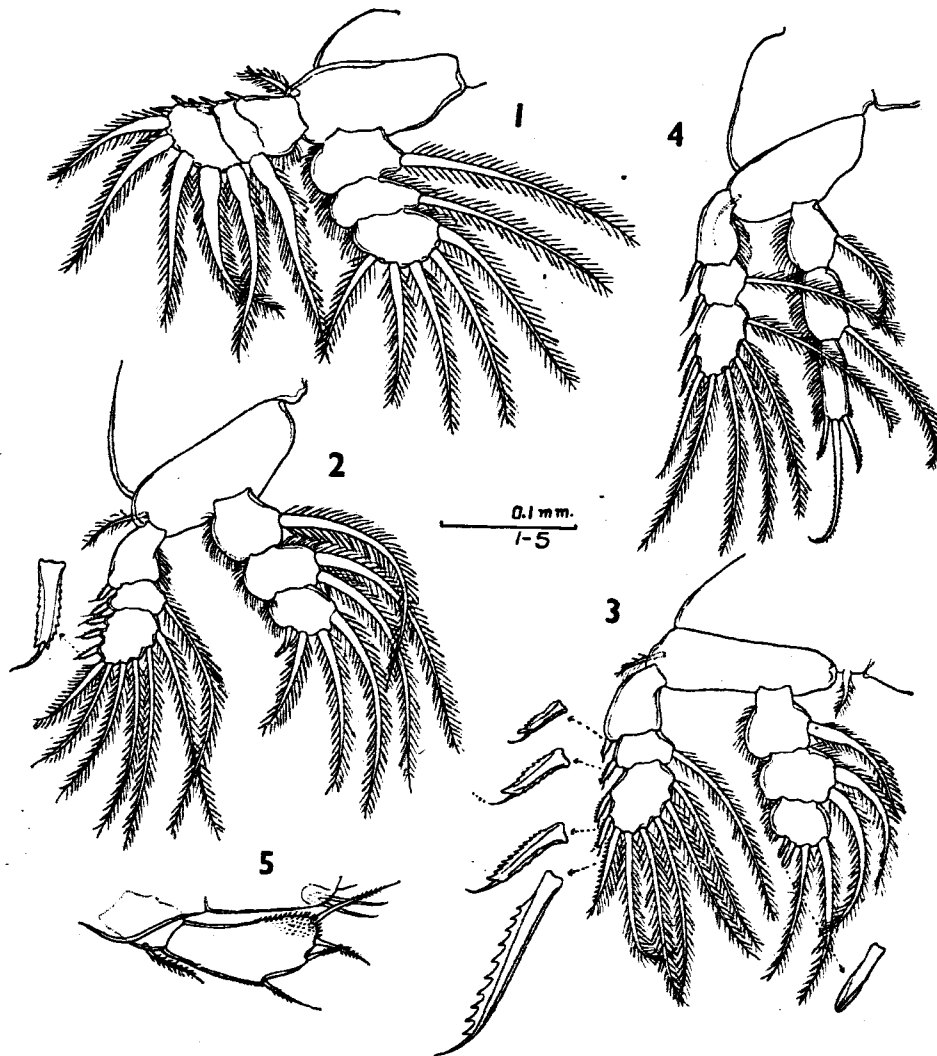


FIG. II. *Bomolochus albidus* Wilson. 1. leg 1; 2. leg 2; 3. leg 3; 4. leg 4; 5. leg 5.

Fourth leg is different from the others with the rami slender. The armature of the exopod is similar to that of the third leg. Endopod is narrow and each of

the first two segments carries an inner seta, third segment has three apical pectinate spine setae, the middle one is very long and the inner is slightly longer than the outer.

Fifth leg is two-segmented, basal segment has one seta and the distal four pectinate spine setae, one is outer and three apical, the inner apical seta is the longest. Inner distal part of the second segment is spiny.

Sixth leg is formed of two simple setae.

Length 1.9 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, III+5	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+2, II+2
Leg 4	I+0, I+1, III+5	0+1, 0+1, III+0

*Remarks*: In his illustration of the whole animal Wilson has shown neither the rostral lobe of the cephalothorax nor the posterior bulging of the third thoracic segment. Wilson has shown the antennule distinctly six-segmented but the peduncular segments are actually very indistinct. The second segment of the maxilliped has two setae and not a hairy knob as stated by Wilson. The mandible has an accessory blade not shown by Wilson. Wilson has stated that the endopod of the third and fourth legs is quite slender with elongate terminal segments. But the endopod of the third leg is moderately flattened like that of the second and quite unlike that of the fourth. Wilson described the fifth leg as three-segmented, but I was able to find only two segments. Stock (1953) correctly figured the first, third and fifth legs but as observed by Vervoort (1962, p. 14) the description and figures of legs one and three were interchanged.

#### *Bomolochus palleucus* (Wilson)

Figs. III-IV

*Artacolax palleucus* Wilson, 1913, p. 200, pls. 22, 23.

*Bomolochus palleucus* Vervoort, 1962, p. 28.

*Material examined*: Two females (paratypes) collected from the gills of *Scorpaena plumieri* Bloch at Montego Bay, Jamaica, on 30-6-1910. Identified by C. B. Wilson. U.S. National Museum Catalogue number 42252.

*Female*: Body is clearly demarcated into a swollen anterior part and a slender posterior part which are subequal in length. Rostral lobe is small and not projecting. Cephalothorax has a nearly straight hind border and is less than twice as broad as long. The second thoracic segment is short but as broad as the cephalothorax, with rounded lateral borders. Third segment is very slightly longer than the second but much narrower. Fourth segment is very narrow and in dorsal view appears semicircular and slightly overlaps the fifth segment. Fifth segment is narrower than the fourth and nearly equal in length and width. Genital segment is as broad as the fifth segment and slightly longer than broad. Abdomen is long

and slender, three-segmented, the segments become successively shorter backwards. Caudal furca are only slightly shorter than the last abdominal segment, each carries six setae, the two apical setae are very long, the inner is twice as long as the outer and longer than the abdomen.

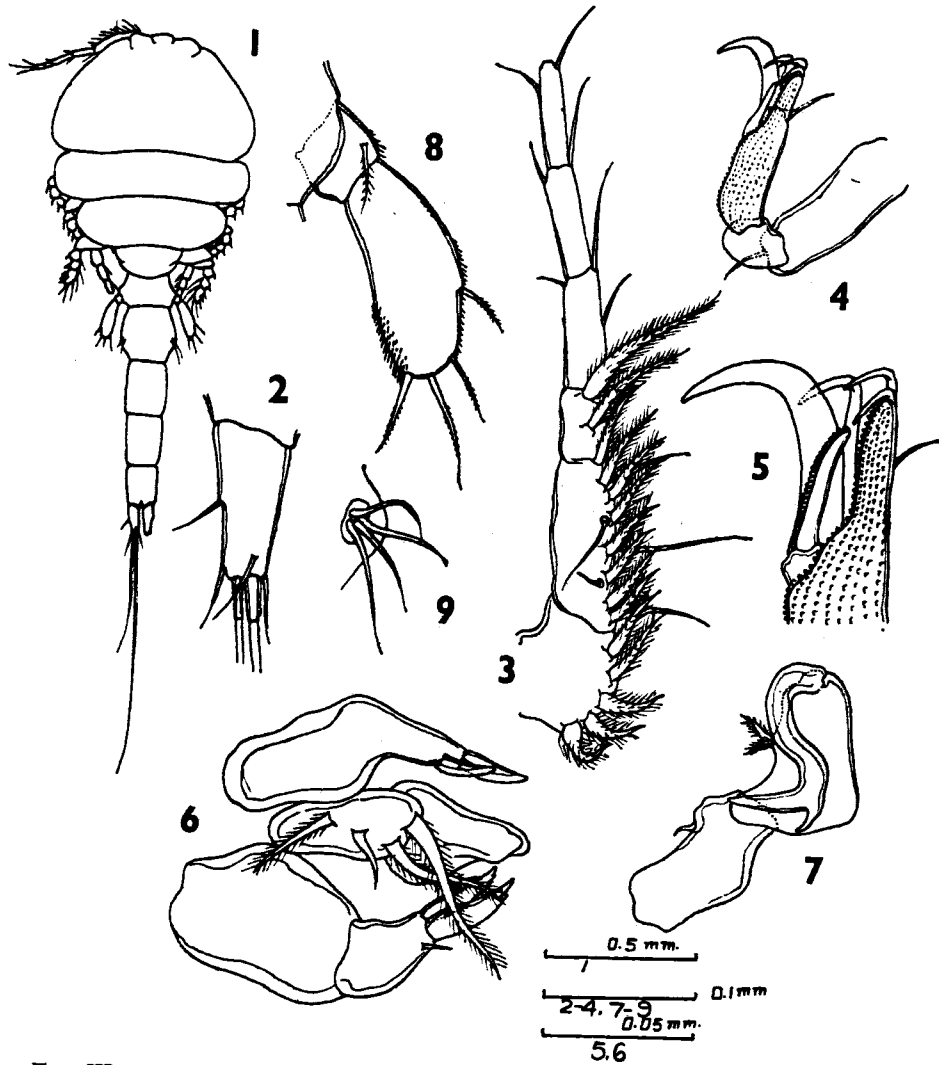


FIG. III. *Bomolochus palleucus* (Wilson). 1. female, dorsal view; 2. caudal furca; 3. antennule; 4. antenna; 5. same, tip enlarged; 6. mandible, maxillule and maxilla; 7. maxilliped; 8. leg 5; 9. leg 6.

Antennules are comparatively slender and clearly six-segmented, the three basal segments carry in all fifteen plumose setae and three simple sensory setae. The basal part of the antennule is not provided with chitinous plates.

Antenna is very characteristic, basal segment is as long as the third, latter has

its ventral surface armed with longitudinal rows of blunt tubercles. Starting from its inner distal part is a slender long process and a very stout strongly curved hook and a bunch of three curved hooks and a seta. Fourth segment is completely fused with the third so that it appears as a mere linguiform prolongation of the third segment on to which the rows of spines on the third segment are continued.

Basal segment of the maxilliped has a short, non-plumose spine seta. Second segment is roughly triangular and carries two short setae at the middle of its inner border. The claw is large and S-shaped, with a prominent accessory claw, the usual basal seta was not observed.

Mandible has two rather elongated blades, the accessory blade is inserted slightly behind the tip. The maxillule carries four plumose setae, of which the inner is the longest. Paragnath is rather large, apically broad and rounded. Maxilla has two comparatively stout segments, the second segment carries a sharp spine and two heavily chitinised blades, one with subsidiary teeth and the other with a single subapical tooth.

First leg is only moderately flattened and the rami are three-segmented. First exopod segment has a stout curved outer process, second an outer spine and inner seta and the third three spines and four setae, one of the spines is plumose and seta-like. Each of the first two endopod segments carries an inner seta, third segment has five setae.

First exopod segment of the second leg has an outer spine, second an outer spine and inner seta, third segment has four spines and five setae, each spine has a subapical spinule, the last spine is twice as long as the penultimate. Endopod is nearly as broad as that of the first leg. First segment has one inner seta and the second two inner setae, the third segment carries three setae and two spines.

The endopod of the third leg is slightly broader than that of the first two pairs and the setae are short and stumpy, first segment has one inner seta, second two inner setae and the third two setae and two spines. Exopod is similar to that of the second leg except that the third segment carries only three spines, all the spines are barbed on the outer edge and each carries a subapical setule.

Fourth leg is comparatively narrow but compared to that of other species the endopod is broad. Each of the first two endopod segments carries a short pectinate inner seta, third segment has three pectinate spines, the middle spine is long and the inner is longer than the outer. Exopod is similar to that of the third leg.

Fifth leg is two-segmented, basal segment has a seta and an outer distal row of spines. Second segment has four pectinate setae, one outer and three distal, the median distal seta is the longest, outer and inner distal borders are spiny.

Sixth leg is formed of a bunch of four setae.

Length 1.8 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, III+4	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+2, II+2
Leg 4	I+0, I+1, III+5	0+(1), 0+(1), (3) <sup>1</sup>

<sup>1</sup> The parentheses indicate that it is neither a spine nor a seta. They are pectinate spine setae.



*Remarks:* According to Wilson (1913, p. 200) the second, third and fourth thoracic segments are partially fused with the cephalothorax. In the specimens I

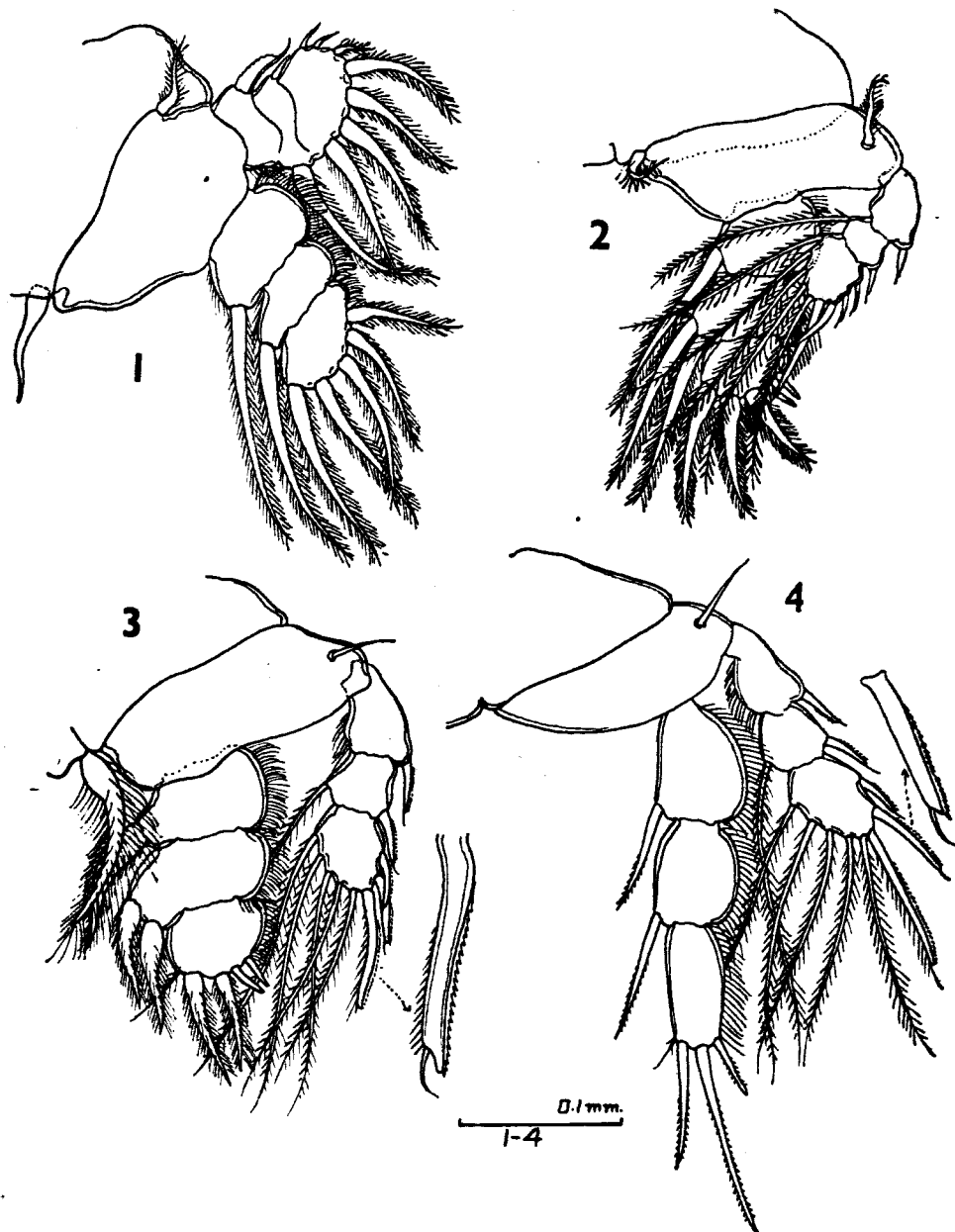


FIG. IV. *Bomolochus palleucus* (Wilson). 1. leg 1 ; 2. leg 2 ; 3. leg 3 ; 4. leg 4.

have examined these segments are fully separated and even the small fourth segment is clearly visible. The mandible is armed with two elongated blades and not tipped

with a straight spine as described by Wilson. Maxillule has four setae and not three as stated by Wilson. On the second segment of the maxilliped Wilson has shown a single spine but there are actually two short plumose setae. According to Wilson the exopod of the first leg is one-jointed with a stout spine and six setae. The exopod is actually three-jointed and I was able to find only five large setae. The third endopod segment of the second leg has two spines but Wilson has shown only one, similarly the third exopod segment has four spines and five setae whereas Wilson has shown seven setae and two spines. The first endopod segment of the third leg has an inner seta that has not been shown by Wilson. It is obvious that Wilson failed to distinguish clearly the spines from the setae on the third exopod segment of legs two to four. But it should be emphasised that in certain species the difference between the spines and setae, especially on the tip of the distal exopod segment is only very slender. The description of the fifth leg by Wilson is very meagre.

*B. palleucus* possesses several prominent characters which make its identification comparatively easy. The antennule is nearly cylindrical. The antenna has an enormous hook the like of which is not found in any other species. The first leg unlike as in most species of *Bomolochus* is not modified. The third leg is also peculiar in that its endopod is slightly more flattened than that of the first leg. The seta on the coxal segment of the third leg is also unusually large. The shape of the body is also very characteristic.

#### *Bomolochus nothrus* Wilson

Figs. V-VI

*Bomolochus nothrus* Wilson, 1913, p. 195, pls. 19, 20; Vervoort, 1962, p. 22.

*Material examined*: A single female (syntype) collected from the gill cavity of *Abudedefduf sexatilis* at Montego Bay, Jamaica. Identified by C. B. Wilson. U.S. National Museum Catalogue number 42253.

*Female*: Cephalothorax is comparatively very broad, about two and a half times as broad as long. Rostral plate is rather low, not projecting beyond the cephalothorax. There is a faint dorso-median chitinous ridge. Second thoracic segment is much narrower than the cephalothorax, about four times as broad as long, with rounded lateral margins. Third segment is narrower than second but slightly longer. Fourth segment is narrow, transversely ovate and partially overlapped by the third segment. Fifth segment is broader than long. Genital segment is nearly equal in length and width, not swollen. Abdomen is three-segmented, first segment is the longest and the second the shortest. Caudal rami are only slightly longer than broad, with two of the distal setae stout, long and jointed, inner of the two is longer.

Antennules are gracefully curved and projecting prominently in front of the cephalothorax. The three basal segments are more or less well demarcated and very broad. There are fifteen plumose setae which are well spaced, there are also four modified sensory setae. The flagellum is three-segmented.

Basal segment of the antenna is only slightly longer than the third segment and carries a long distal seta, second segment has a comparatively short seta, third segment is roughened with spines not falling into rows, from the distal inner part of the segment arises a short spiny process carrying a row of stiff long spines extending on

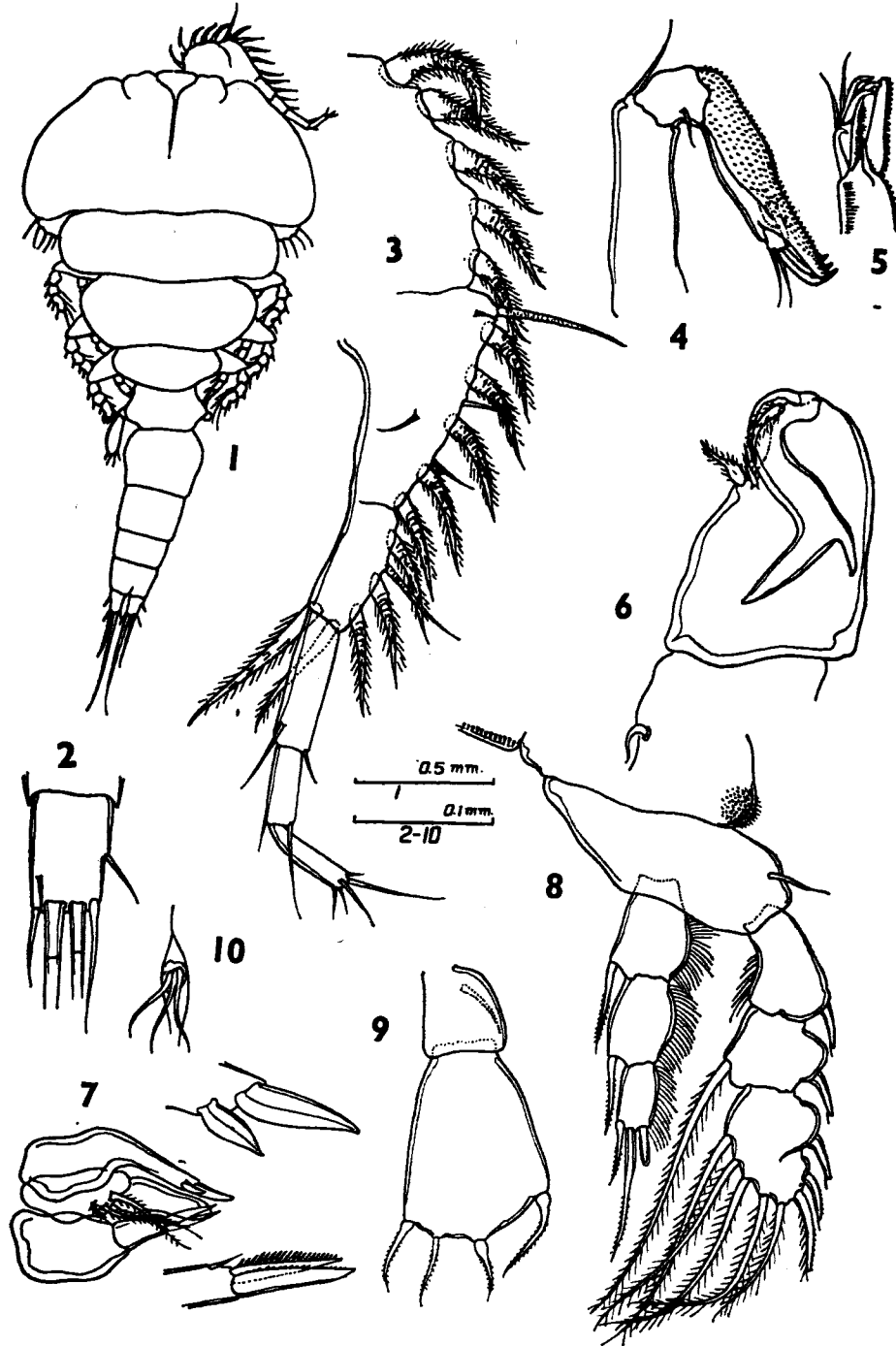


FIG. V. *Bomolochus nothrus* Wilson. 1. female, dorsal view; 2. caudal furca; 3. antennule; 4. antenna; 5. same, outer view; 6. maxilliped; 7. mandible, maxillule and maxilla; 8, leg 4; 9, leg 5.

BOMOLOCHIDS (COPEPODA) FROM THE U. S. NATIONAL MUSEUM 253

to the segment proper and a small claw. There is a distal bunch of three claws and two setae. Fourth segment is rather long and fully coalesced with the third segment.

Second segment of the maxilliped is rather massive and carries on its inner border two very short setae, the claw is bent at right angles and carries a prominent accessory claw and a short basal seta. Mandible has two blades. Maxillule carries three setae. Apex of the paragnath is blunt. Maxilla carries a short spine and two blades barbed on one side.

Both rami of the first leg are flattened and three-segmented. Outer part of the basis carries a stout prominently hairy process. First exopod segment carries an outer stout spine, second segment carries a slender outer process and an inner seta, the third segment has two slender processes and a short spine and five stout setae. Each of the first two segments of the endopod carries an inner seta and the third segment five setae.

Endopod of the second leg is only slightly broader than the exopod, the first segment carries an inner seta, second carries two setae and the third three setae and two spines. First exopod segment carries an outer spine, second an outer spine and inner seta, third segment carries four spines and five setae. All the spines except the last two are strong but not barbed, each has a subapical spinule, the last two spines are comparatively weak and pectinate on the outer side.

Coxal segment of the third leg has a very large inner seta, exopod is more or less similar to that of the second leg except that the third segment carries only three spines instead of four. The endopod as in the corresponding appendage of *B. palleucus* is highly flattened, slightly broader and stouter than that of the first leg. The first segment has one and the second two inner setae, third segment has two setae and two spines.

Exopod of the fourth leg is similar to that of the third. Endopod is rather small and narrow, each of the first two segments carries an inner spine seta, the third segment has a spine and two pectinate spine setae on the apex.

Fifth leg is very characteristic, the basal segment carries a seta, distal segment is very broad and roughly triangular, the distal border carries four pectinate setae.

Sixth leg is formed of three setae.

Length 2.4 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, III+5	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+2, II+2
Leg 4	I+0, I+1, III+5	0+(1), 0+(1), I+(2)

*Remarks* : The specimen studied was not in good condition. From Wilson's description the following variations were observed. The abdomen is three and not two-segmented as stated by Wilson. Wilson has stated that the third segment of the second antenna has in addition to two stout processes two claws and a spine. But there are four claws and two spines. Wilson did not mention about the setae on the maxilliped, there are three setae, two on the second segment and one on the

third. The exopod of the first leg is three and not two-segmented. Third exopod segment of second leg has four spines and not two as stated by Wilson, first two

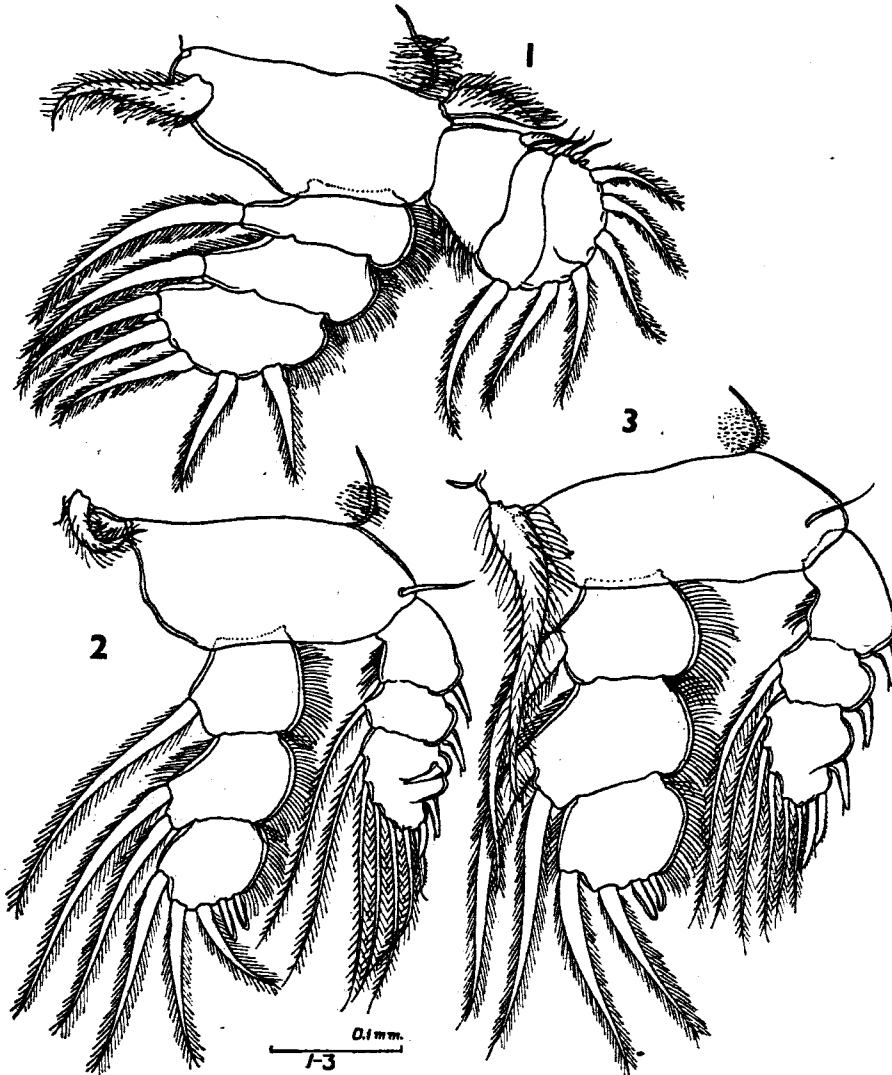


FIG. VI. *Bomolochus nothrus* Wilson. 1. leg 1; 2. leg 2; 3. leg 3.

endopod segments of third leg are shown by Wilson as having one spine and one seta each, but these segments have no spines, the third segment has two spines and two setae, according to Wilson there is one spine and three setae. Wilson's description of the fifth leg is incorrect as he apparently observed this appendage in a folded condition. A comparison of the legs with the description given by Wilson is made difficult since the setation formula does not fully agree with the illustrations. He has, as pointed out by Vervoort (1962, p. 22), confused in naming the various legs,

pl. 19, fig. 17 is described as the second leg but it should be the fourth, fig. 18 is that of the second leg and fig. 19 that of the third.

The general shape of the body and the projecting antennules with well spaced setae easily distinguish this species. The nature of legs one to three is surprisingly very close to those of *B. palleucus*, in both species the first leg is least modified and the endopod of the second and third are flattened. The third endopod in both species is the broadest and the inner seta on the coxal segment is unusually large.

***Bomolochus exilipes* Wilson**

Figs. VII-VIII

*Bomolochus exilipes* Wilson, 1911, p. 377, pl. 58 ; Vervoort, 1962, p. 25.

*Material examined* : A single female (syntype) collected from the gill cavity of *Archosargus probatocephalus* by C. B. Wilson at Beaufort, North Carolina. U.S. National Museum Catalogue No. 38608.

*Female* : Cephalothorax is comparatively large and forms more than half the total length of the body minus the abdomen. Rostral plate is rather low and slightly concave in dorsal view. At the anterior part of the cephalothorax, just behind the rostral plate, is a pair of submedian conical protuberances. Hind border of the cephalothorax is nearly transverse. Thoracic segments two to four successively narrow backwards, fourth segment is longer than the second and third which are subequal. Fifth segment is partly overlapped by the previous segment. Genital segment is swollen. Abdomen is very short and three-segmented, third segment is the longest. Caudal furca are slightly shorter than the last abdominal segment and are tipped with two long and four short setae.

Antennules are comparatively short and hardly extend beyond the lateral borders of the cephalothorax. The three basal segments are rather heavily built but only moderately flattened, there are in all fifteen plumose setae and two simple sensory setae. Ventral chitinous plates fuse with the third to the eighth setae as in *Parabomolochus* but the strong hook characteristic of this genus was not observed. The basal upper part of the second segment is produced into a well chitinised conical process in line with the boss on the cephalothorax and in the dorsal view there appear two pairs of frontal bosses. The flagellum is three-segmented and the first segment is the longest.

The first segment of the second antenna is as long as the rest of the limb. The ventral surface of the third segment is armed with longitudinal rows of spines. Originating from the distal part is a bunch of five claws and a seta and a slender long process carrying a row of long spines, a similar row of spines is present on the third segment. The fourth segment is completely fused with the third and is a mere prolongation of the latter.

Basal segment of the maxilliped has a small inner seta, second segment has two inner distal setae, one seta is very stout, third segment or claw is stout and strongly bent and has a prominent accessory claw and a stout basal seta.

Mandible has apparently only a single blade. Maxillule has four setae, the inner seta is the stoutest and the third the smallest. The paragnath narrows towards

the blunt tip. Maxilla is distally curved, the second segment has a sharp spine and two strongly barbed blades.

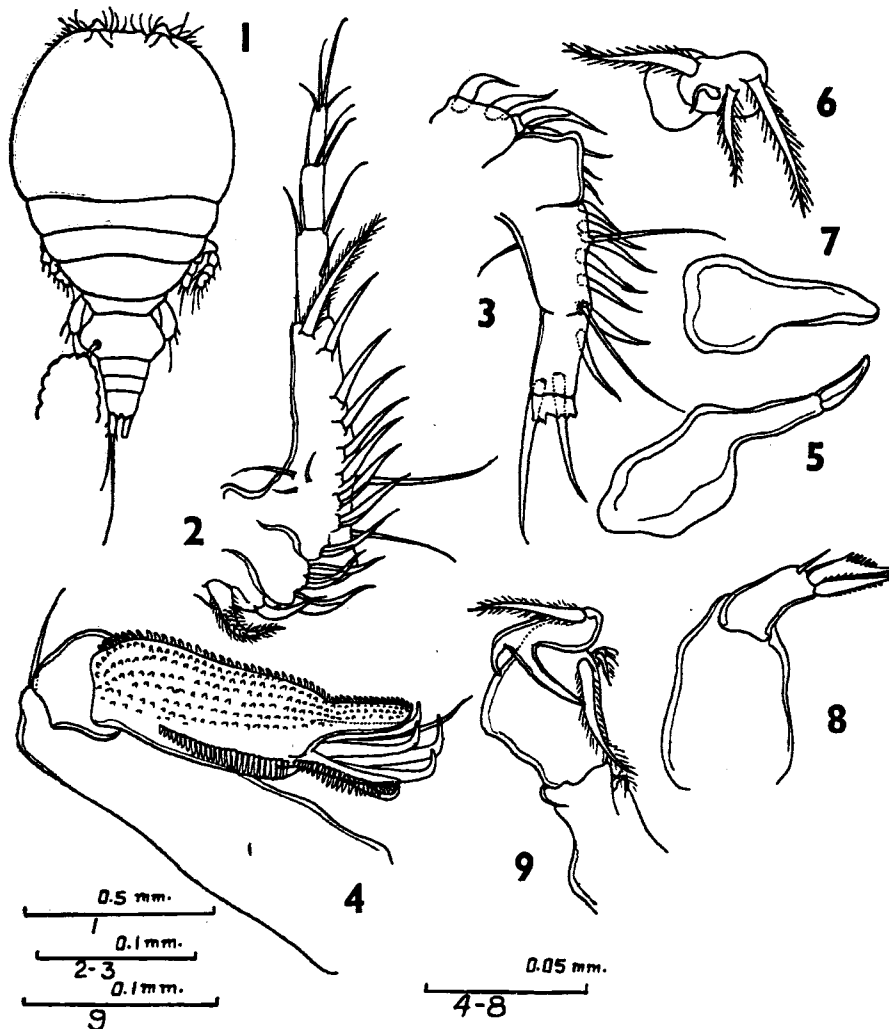


FIG. VII. *Bomolochus exilipes* Wilson. 1. female, dorsal view; 2. antennule; 3. same, dorsal view; 4. antenna; 5. mandible; 6. maxillule; 7. same, paragnath; 8. maxilla; 9. maxilliped.

Coxal segment of the first leg has an apically narrowed hairy process, rami are highly flattened. Exopod is indistinctly three-segmented, first segment has an outer modified spine, second an outer spine and inner seta, third segment has a minute outer spine and a short plumose spine seta and five setae.

Endopod of the second leg is flattened, twice as broad as the exopod, first segment has one and second two setae on the inner side, third segment has two spines and three setae. First exopod segment has one outer spine, second an outer spine

and inner seta, third segment has four spines and five setae, each of the spines has a subapical spinule and the outer border has a serrate wing.

Third leg has nearly subequal rami, first segment of exopod is swollen and has an outer spine, second segment has an outer spine and inner seta, third segment has three spines and five setae, all but the last spine, have both borders barbed. First and second segments of endopod have an inner seta, third segment has two spines and two setae.

Exopod of the fourth leg is similar to that of the third, but the endopod is long and stout. Each of the first two segments has an inner pectinate seta, third segment has a long pectinate seta and two spines.

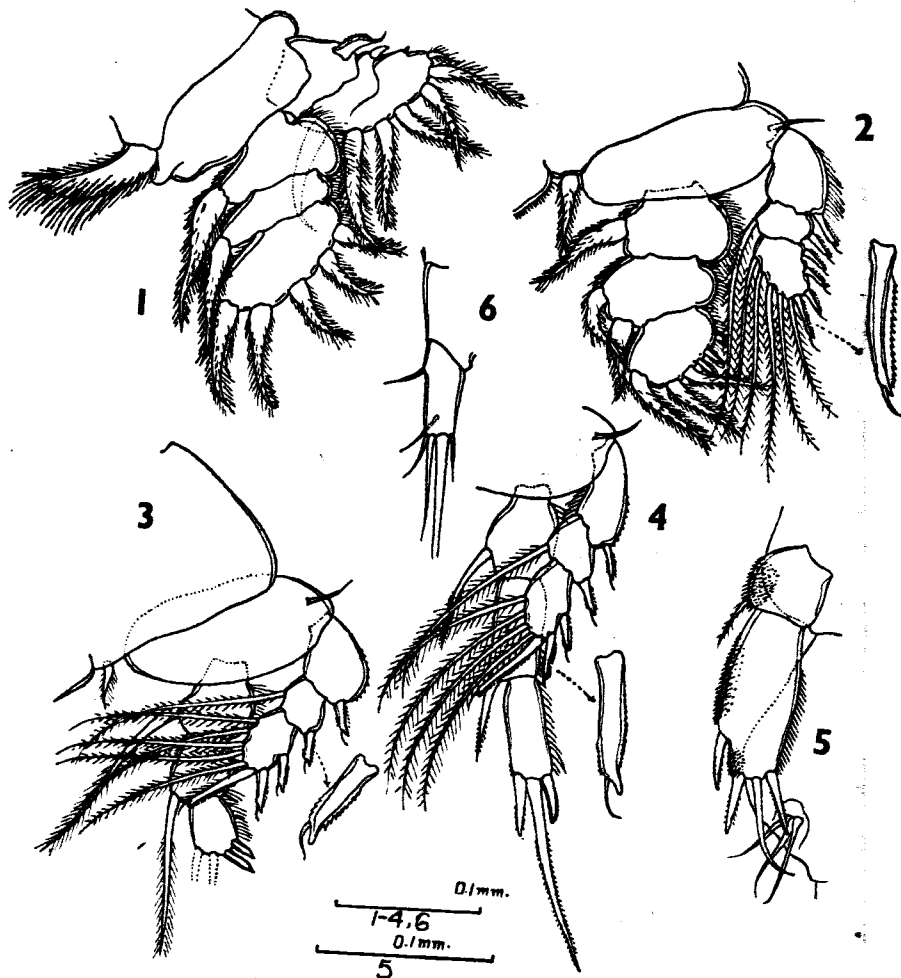


FIG. VIII. *Bomolochus exilipes* Wilson. 1. leg 1; 2. leg 2; 3. leg 3; 4. leg 4; 5. legs 5 and 6.

Basal segment of the fifth leg has a seta and a large patch of denticles. Distal segment has a prominent patch of denticles and a strong claw on the outer side, the



segment beyond the claw is narrowed and the apex carries two barbed claws and a spine seta, there is a small outer patch and long inner row of spines.

Sixth leg is formed of three setae.

Length 1.5 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, II+5	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+1, II+2
Leg 4	I+0, I+1, III+4	0+(1), 0+(1), I+(2)

*Remarks.* Wilson did not mention the submedian bosses on the cephalothorax or the prolongations on the antennules. These are really very characteristic and give the animal a very distinctive appearance. The general shape of the body is also different from the illustration given by Wilson. Unfortunately the only specimen available for study was in a very bad state. It may be remarked that except for the absence of the hook the antennule of *B. exilipes* agrees with the typical form in *Parabomolochus*.

#### Genus *Parabomolochus* Vervoort

Vervoort, 1962, p. 31.

#### *Parabomolochus nitidus* (Wilson)

Figs. IX-X

*Bomolochus nitidus* Wilson, 1911, p. 374, pl. 56 and pl. 58, fig. 201.

*Bomolochoides nitidus* Vervoort, 1962, p. 30.

*Material examined:* Three females collected from the branchial cavity of *Strongylurus tumica* at Lemon Bay, Florida in 1934-35. Identified by Ruby Bere. U.S. National Museum Catalogue No. 79114.

*Female.* Cephalothorax is semicircular, about one and one-fourth times as broad as long. Rostral lobe is prominent but does not cover the basal part of the antennules. Second thoracic segment is clearly narrower than cephalothorax with rounded slanting lateral borders. Third segment is comparatively long and transversely ovate and much narrower than the second segment. Fourth segment is small and nearly half of it is hidden by the third segment. Fifth segment is very short. Genital segment is moderately swollen and as broad as the fifth segment. Abdomen is short and three-segmented, the segments successively decrease in length and width. Caudal furca are nearly twice as long as broad, each is armed with four short and two long setae, one of the latter is twice as long as the other.

Antennule has an indistinctly three-segmented peduncle bent at right angles near the base, there are fifteen plumose setae, of which the fourth is modified into a strong hook. In addition to the plumose setae there are three long simple sensory setae, fourth to the eighth sensory setae are fused with prolongations of ventral

chitinous plates. Flagellum is three-segmented and rather large, first segment is the longest.

Basal segment of the second antenna is as long as the rest of the appendage and carries a long seta, second segment has a small seta. Third segment is stout and carries a submarginal row of long blunt teeth, ventral surface is armed with longitudinal rows of blunt tubercles. At the distal inner part is a strong claw and a straight rod-like process with a row of long spines. There is a bunch of three hooks and two setae. The fourth segment is comparatively small and fully coalesced with the third segment.

Basal segment of the maxilliped carries a small seta, second segment has two setae, a long one in the middle of the inner side and a short one at the inner distal part, the claw is moderately curved and carries long basal seta and a moderately stout accessory claw.

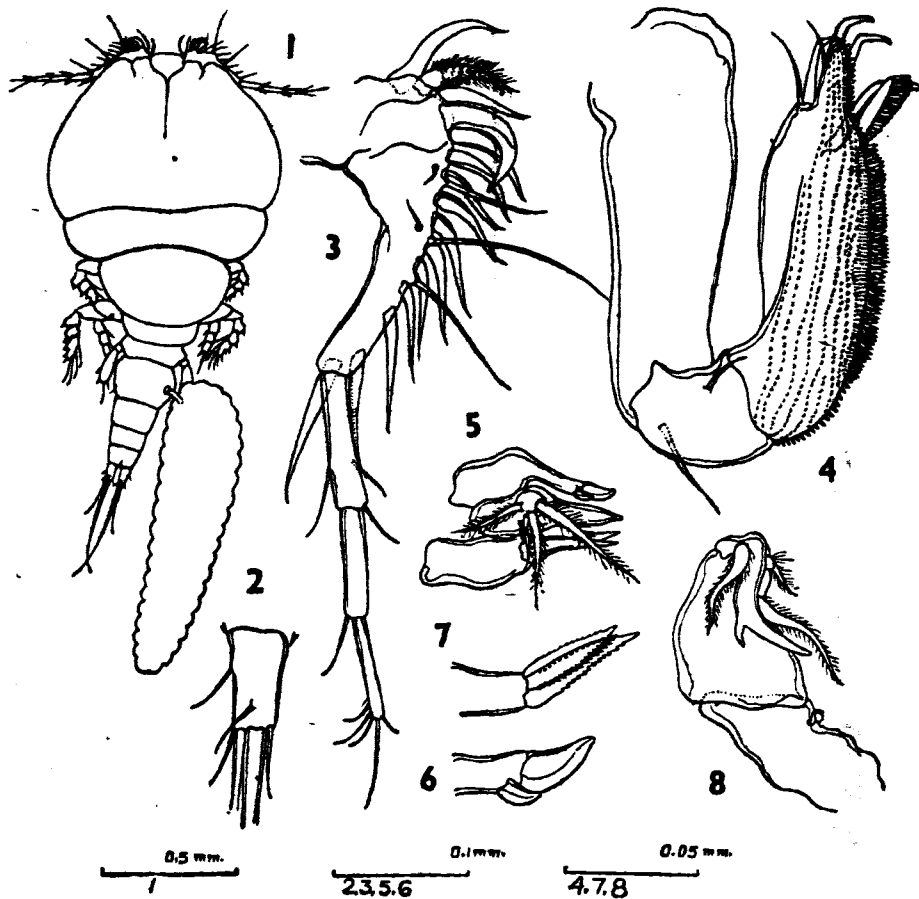


FIG. IX. *Parabomolochus nitidus* (Wilson). 1. female, dorsal view; 2. caudal furca; 3. antennule; 4. antenna; 5. mandible, maxillule and maxilla; 6. mandible enlarged; 7. maxilla enlarged; 8. maxilliped.

Mandible has a stout apical blade and a small accessory blade. Maxillule carries four diverging setae, the third seta from the inner side is small, paragnath steadily narrows towards the inner end. Maxilla carries two long blades, the stouter blade is armed along both margins with short teeth, and the other with long spines.

Both rami of the first leg are three-segmented, exopod is only moderately flattened and the segmentation is not complete, first segment carries an outer spine, second an outer spine and inner seta, third segment has an outer spine and five setae. Each of the first two endopod segments carries an inner seta, third segment has five setae.

Endopod of the second leg is as broad as that of the first and more massive, first segment carries one inner seta, second two inner setae and the third three setae and two spines. First exopod segment has a long outer spine, second an outer spine and inner seta, third segment has four spines and five setae. Each of the spines except the last has a subapical spinule and an outer barbed wing.

Rami of the third leg are subsimilar, not flattened. The armature of the exopod is similar to that of the second leg except that the sixth spine is absent and the fifth is longer than the corresponding spine of the second leg. Each of the first two endopod segments carries an inner seta, third segment has two setae and two spines.

Exopod of the fourth leg is similar to that of the third except that it is slightly longer and the third segment has only four setae. The endopod is comparatively slender, each of the first two segments has a pectinate inner seta, third segment has a long pectinate seta and two spines.

Basal segment of the fifth leg has a seta and an outer patch of denticles. Second segment has an outer claw and a patch of denticles. Distal border is armed with a claw having a patch of denticles near its base and two long pectinate setae, the outer seta is twice as long as the inner. Inner distal border of the segment is spiny.

Sixth leg is composed of three setae.

Length 2.0 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, I+5	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+1, II+2
Leg 4	I+0, I+1, III+4	0+(1) 0+(1), I+(1)+I

*Remarks* : Wilson stated that the antennules are very indistinctly segmented even at the flagellar portion. In the present specimens the flagellum is clearly three-segmented and reaches beyond the lateral borders of the céphalothorax. On the basal part of the antennules Wilson has shown twentytwo rather short plumose setae but in the present specimens there is the usual number of fifteen plumose setae. The fourth seta is modified into a strong hook and the fourth to the ninth setae are fused with finger shaped processes of ventral chitinised plates.

Wilson has shown only three setae on the maxillule but there are actually four. Second segment of the maxilliped has two setae which are not mentioned by Wilson

and contrary to Wilson's observation the claw has an accessory process. According to Wilson the exopod of the first leg is single-jointed. Similarly the first endopod

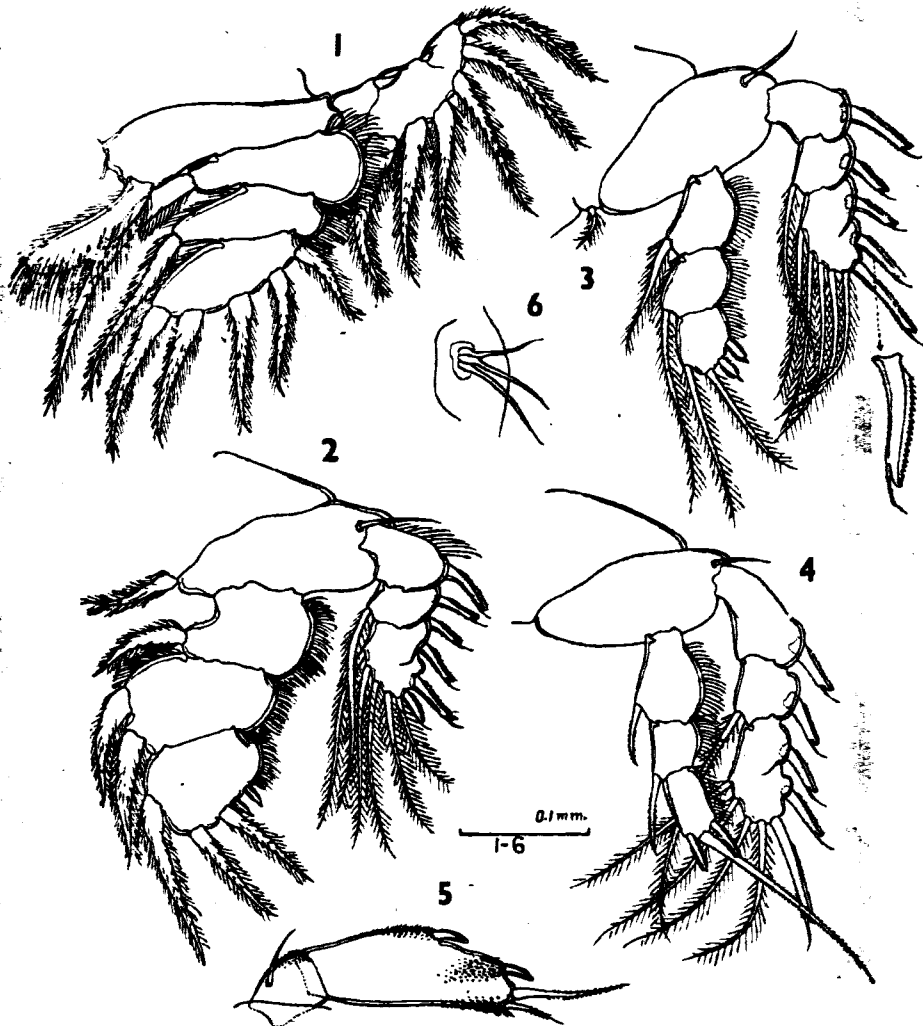


FIG. X. *Parabomolochus nitidus* (Wilson). 1. leg 1; 2. leg 2; 3. leg 3; 4. leg 4; 5. leg 5; 6. leg 6.

segment carries an inner seta but Wilson says that it carries neither spines nor setae. The second endopod segment carries two setae and not one as stated by Wilson and the third segment has three setae and not two. As is evident from the following illustration Wilson's description of the fifth leg is insufficient.

The structure of the antennule is quite different compared to Wilson's description and shows that this species should be transferred to *Parabomolochus* from *Bomolochus*. The difference in the structure of the maxilliped makes me suspect that the specimens described here may not belong to *B. nitidus*. The present specimens closely

resemble *B. concinnus* Wilson (1910) (vide infra), that I suspect that Bere (1936) wrongly identified her material. It should be remembered in this connection that *B. concinnus* was collected from *Strongylura marina* (Walbaum) at Beaufort, North Carolina and Bere's material from *Strongylura tumica* (Walbaum) at Lemon Bay, Florida. Until a re-examination of the type is made I prefer to leave this question open.

***Parabomolochus concinnus* (Wilson)**

Figs. XI-XII

*Bomolochus concinnus* Wilson, 1911, p. 371, pls. 54, 55 ; Vervoort, 1962, p. 27.

**Material examined :** A single female (syntype) collected from the gills of *Tylosurus marinus* at Beaufort, North Carolina in 1905. Identified by C. B. Wilson. U.S. National Museum Catalogue No. 38622.

**Female :** Cephalothorax is semicircular and about one and a half times as broad as long. Anterior border of the rostral lobe is slightly concave and partly covers the base of the antennules. There is a short dorso-median chitinous ridge. Second thoracic segment is clearly narrower than the cephalothorax with perfectly rounded lateral borders. Third segment is transversely oblong, much narrower than the second segment and slightly overlapped by the second. Fourth thoracic segment is similar to the third in shape but much smaller. Fifth segment is short, broader than long and overlapped by the fourth segment. Genital segment is rather swollen and broader than the fifth segment. Abdomen is short and three-segmented, the third segment is subequal to the first in length. Caudal furca are about twice as long as broad and armed with three short and two long setae, inner apical seta is twice as long as the outer.

Antennules were partly damaged. Basal part with a right-angled bent, there are fifteen plumose setae and two long simple setae. The fourth seta is modified into a strong hook. Third to the ninth setae are strengthened by prolongations of ventral chitinous plates. The ventral surface of the antennular peduncle carries four simple setae.

Basal segment of the antenna is as long as the rest of the limb and carries a conical process and a long seta, second segment has a seta and an oblong process. Third segment is rather stout and distally prolonged into a linguiform process, its ventral surface carries longitudinal rows of pustules. From the distal inner part of third segment originates a slender process armed with a row of long blunt teeth, the spine row is continued along the inner border of the third segment. There is a strong hook arising close near the process. The apex of the segment is armed with a bunch of five claws and a seta. Fourth segment is small and fused with the third segment.

First segment of the maxilliped carries an inner seta, second segment carries two setae, one of which is very large, the claw is strong and carries a short basal seta and an accessory process.

Mandible has a stout swollen base and a fairly long blade, the accessory blade is comparatively small. Maxillule has four setae, the inner seta is large. Paragnath steadily narrows inwards and is apically pointed. Basal segment of the maxilla is

slender and small, second segment carries a small spinule and two barbed blades, the barbs on the smaller blade are longer.

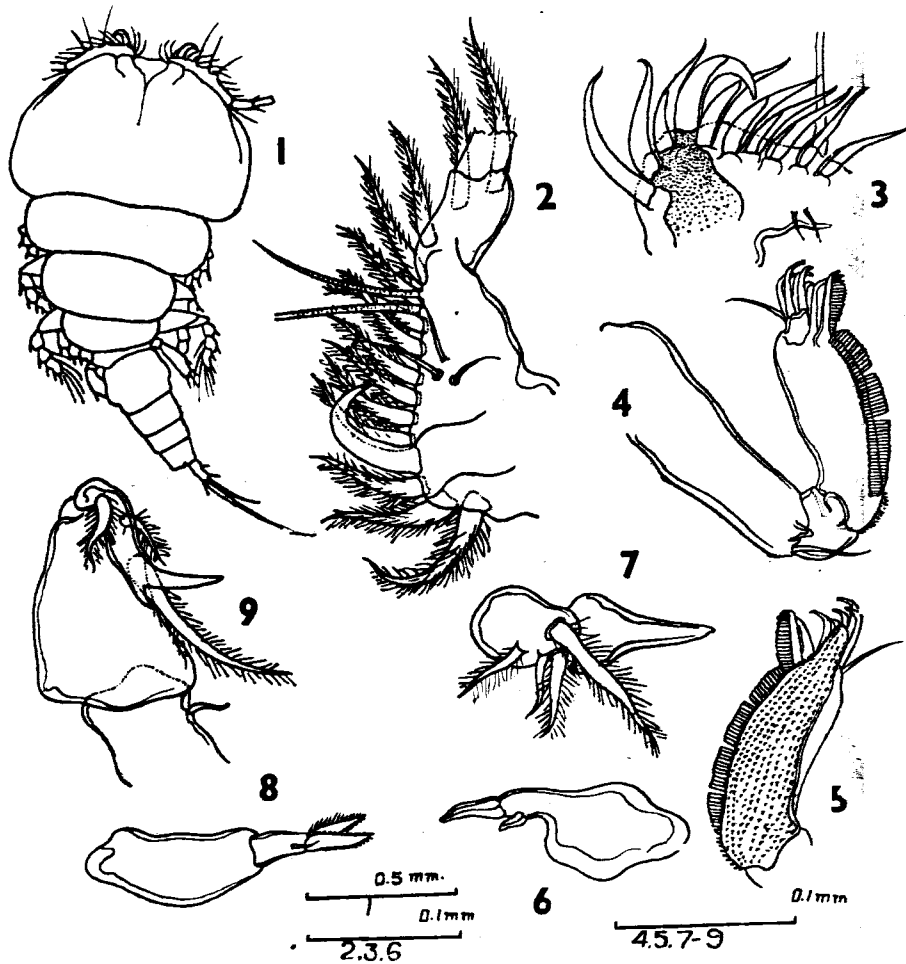


FIG. XI. *Parabomolochus concinnus* (Wilson). 1. female, dorsal view; 2. antennule, dorsal view; 3. same, ventral view; 4. antenna; 5. same, ventral view; 6. mandible; 7. maxillule, 8. maxilla; 9. maxilliped.

Rami of the first leg are highly flattened. Exopod is indistinctly three-segmented, first segment has a stout outer process, second has a small outer spine and one inner seta, third segment has two outer spines and five setae. Each of the first two endopod segments has one inner seta, third segment has five setae. The inner process on the coxal segment is apically broadly rounded.

Endopod of the second leg is flattened and nearly as broad as that of the first leg, first segment has an inner seta, second two inner setae and the third two spines and three setae. First exopod segment has one spine, second an outer spine and inner seta and the third four spines and five setae, each spine has a subapical spinule and a pectinate flange on the outer side.

The rami of the third leg are subequal, armature of the exopod is similar to that of the second leg but the third segment has only three spines. Each of the first two endopod segments has an inner seta, third segment has two setae and two blunt spines carrying an apical spinule.

Exopod of the fourth leg is very much like that of the third except that the third segment has only four setae. Endopod is comparatively slender, each of the first two segments carries a short inner pectinate seta, third segment has two blunt claws and a long pectinate seta at the apex.

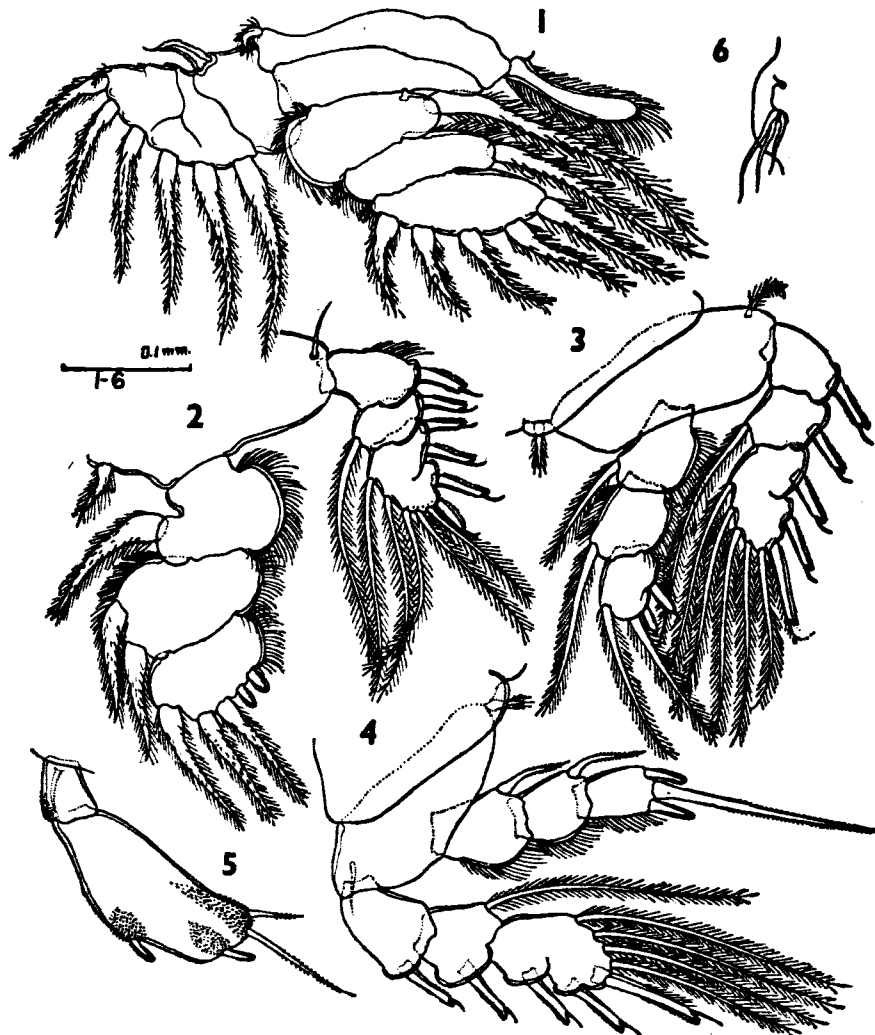


FIG. XII. *Parabomolochus concinnus* (Wilson). 1. leg 1; 2. leg 2; 3. leg 3; 4. leg 4; 5. leg 5.

Fifth leg is two-segmented, first segment carries a seta and a patch of denticles, second segment has an outer claw and a patch of denticles and a distal claw and two pectinate setae and two patches of denticles, the outer pectinate seta is very long.

Sixth leg is formed of a bunch of three setae.

Length 1.9 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, II+5	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+1, II+2
Leg 4	I+0, I+1, III+4	0+1, 0+1, I+1+I

*Remarks* : The only available description of this species is that by Wilson which is unfortunately very inadequate. Wilson obviously failed to observe the hook-like process on the basal part of the antennule. The presence of this hook makes it necessary to transfer this species to *Parabomolochus*. Vervoort, relying on Wilson's description placed it under *Bomolochus* as defined by him.

The present specimens show certain differences from the description given by Wilson. Wilson has shown only one blade on the mandible but the mandible has an accessory blade. The paragnath is not semi-oblong but narrows inwards. Maxilla has two blades and a spinule and not one blade as stated by Wilson. Wilson's description of the legs is inadequate. The exopod of the first leg is three-segmented and not two-segmented as stated by Wilson. The third endopod segment of the second leg has two blunt spines which were not mentioned by Wilson. In the description of the exopods it is often stated that there is a fourth segment resulting from a division of the third segment (Vervoort, 1962, p. 5) and Wilson has often illustrated the exopod as distinctly four-segmented. The division of the third segment is so incomplete that it would be better to describe the exopod as three-segmented.

As already mentioned *B. nitidus* described above might be the same as *B. concinnus* (Wilson).

#### Genus *Nothobomolochus* Vervoort

Vervoort, 1962, p. 58.

#### *Nothobomolochus teres* (Wilson)

Figs. XIII-XIV

*Bomolochus teres* Wilson, 1911, p. 379, pl. 59; 1932, p. 381, pl. 23, figs. a, b; Vervoort, 1962, p. 21.

*Material examined* : Three females collected by E. G. Simmons from the gills and mouth of *Brevoortia patronus* at Upper Laguna Madre, Texas, on 27-3-1956. Identified by T. E. Bowman. U.S. National Museum Catalogue No. 99327.

*Female* : Body is elongated and stoutly built, abdomen together with the genital segment is almost equal to the pregenital part in length. Cephalothorax is very slightly broader than long, with the hind border concave and the postero-lateral parts rounded and slightly produced backwards. Frontal plate is prominent, with convex free margin and covers the basal part of the antennules. There is a dorso-median chitinous ridge and a pair of indistinct lateral ridges. Second thoracic segment



is narrower than the cephalothorax, with straight lateral borders, third segment is as long as the second but narrower. Fourth segment is slightly longer than third but

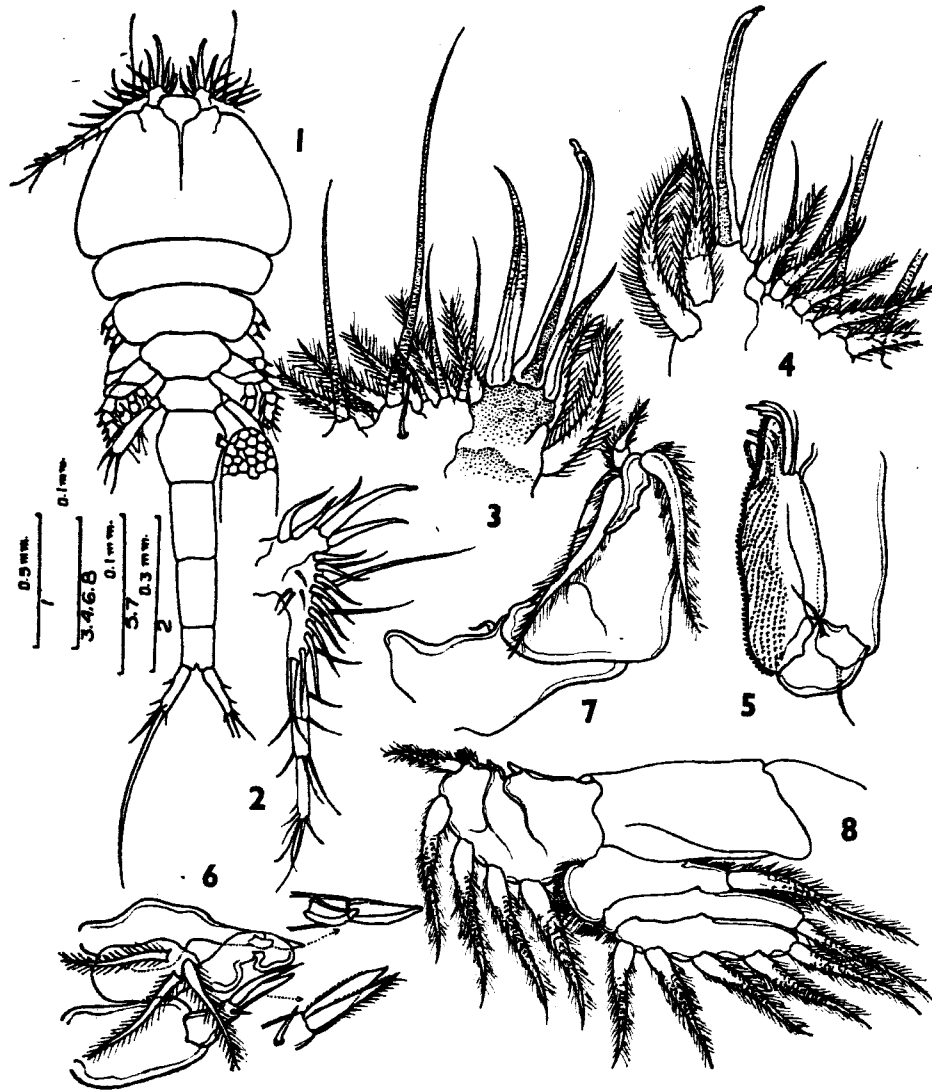


FIG. XIII. *Nothobomolochus teres* (Wilson). 1. female, dorsal view; 2. antennule; 3. same, base, dorsal view; 4. same, base, ventral view; 5. antenna; 6. mandible, maxillule and maxilla; 7. maxilliped; 8. leg 1.

much narrower, lateral borders are produced. Fifth segment is broader than long but much narrower than the fourth segment. Genital segment is hardly swollen, longer than broad. Abdomen is very long, three-segmented, first two segments are subequal, third is shorter. Caudal furca are long and slender and prominently

diverging, each is provided with two outer and four apical setae, one of the apical setae is stout and distally pectinate and as long as the abdomen.

Antennules are sharply bent backwards near their base but further on are straight. The first three segments are flattened and armed with twelve highly plumose setae and three long modified setae. A ventral chitinous plate fuses with the third to the fifth setae converting them into strong chitinised processes which remain elevated above the other setae. The middle process is the longest and is apically curved with a small hood-like lobe, lateral processes are less chitinised, apically drawn out and transversely wrinkled like the modified sensory setae, inner process is much shorter than the outer. Flagellum is three-segmented.

Basal segment of the antenna is as long as the third and carries a distal seta, the second segment also carries a seta. Third segment is fairly stout and its ventral surface is armed with longitudinal rows of denticles, distally it carries five claws and a small seta and a finger-shaped process with marginal spines. Fourth segment is completely fused with the third.

Basal segment of maxilliped has a small inner seta, second segment is comparatively large and carries two very stout distal setae, third segment or claw is very short with two low projections on its outer edge and a moderately stout seta at its base.

Mandible has two blades, the accessory blade is inserted far behind the main blade. Maxillule has three subequal diverging setae. Paragnath is very characteristically curved and apically blunt. Maxilla carries a small spinule and two long, stout and barbed blades, outer border of the inner blade is smooth and the outer border of the outer blade is armed with long barbs.

First leg has highly flattened three-segmented rami, segmentation of the exopod is, however, not complete. First exopod segment has one outer spine, second has an outer spine and inner seta, third segment has one outer spine seta and four setae. First two segments of the endopod are short but very broad and each carries an inner seta, third segment carries five setae.

Exopod of the second leg is comparatively short but robust, first segment has one outer spine, second an outer spine and inner seta and the third four spines and five setae, all the spines except the last are barbed on both borders and each carries a subapical spinule. The last spine is setiform and has pectinate outer wing. Endopod is comparatively large, first segment has an inner seta, second two inner setae and the third two spines and three setae.

Exopod of the third leg is very similar to that of the second but slightly stouter and the third segment carries only three instead of four spines. Endopod is also similar to that of the second leg but the first segment is slightly broader and the third segment carries two instead of three setae, the spines are armed and stouter.

Endopod of the fourth leg, unlike as is usual among the species of *Bomolochus*, is not modified. It is very much like that of legs two and three but the first segment is long and the third carries a stout spine, a long pectinate seta and a plumose seta. Exopod is similar to that of the third leg but slightly broader.

Fifth leg is two-segmented, with subparallel sides, first segment carries a pectinate seta, second segment has an outer long spine and a marginal row of spinules,

distal border is prominently spiny and carries a spine and two pectinate spine setae, the inner spine seta is more than twice as long as the outer.

Sixth leg is formed of three short but stout setae.

Length 2.1 mm.

	<i>Exopod</i>	<i>Endopod</i>
Leg 1	I+0, I+1, I+4	0+1, 0+1, 5
Leg 2	I+0, I+1, IV+5	0+1, 0+2, II+3
Leg 3	I+0, I+1, III+5	0+1, 0+2, II+2
Leg 4	I+0, I+1, III+5	0+1, 0+1, I+2

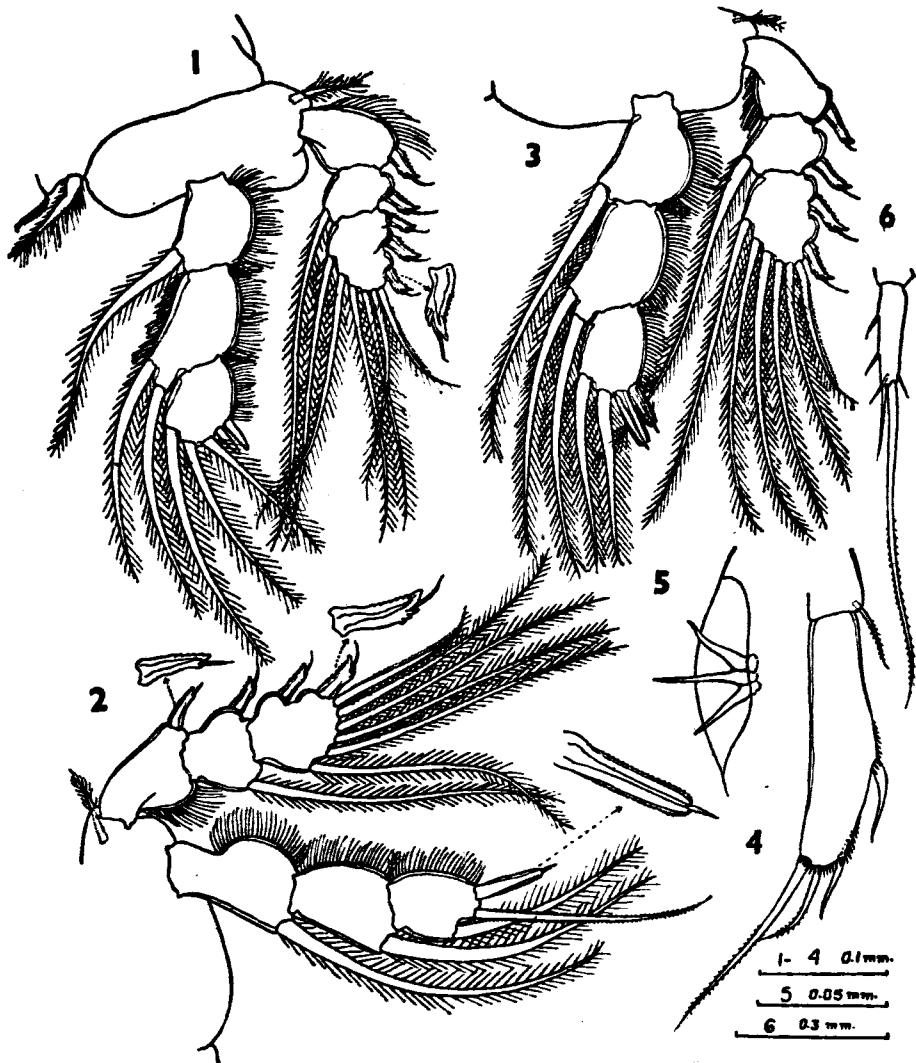


FIG. XIV. *Nothobomolochus teres* (Wilson). 1. leg 2; 2. leg 4; 3. leg 3; 4. leg 5; 5. leg 6; 6. caudal furca.

**Remarks :** The present specimens are very much similar to those described by Wilson. Unfortunately Wilson showed what should be chitinised processes as plumose setae. This obviously made Vervoort place this species under *Bomolochus*. It should, however, find a place in *Nothobomolochus* Vervoort (1962).

In the shape of the body Wilson's description applies to the present specimens except that the second thoracic segment is comparatively shorter. The seta at the distal end of the third segment of the antenna is not plumose. Both mandibles and maxillae have two terminal blades but Wilson has shown only one each and he makes no mention of the paragnath which has a very characteristic shape. The claw of the maxilliped carries a seta which Wilson failed to observe.

Wilson has observed that the rami of the first leg are two-jointed, but the exopod is indistinctly and the endopod distinctly three-jointed. As Wilson has described the exopods of legs two to four as four-segmented I am not attempting a comparison of the armature of legs one to four.

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