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On *Collocheres* Canu, 1893, and *Leptomyzon* Sars, 1915, two synonymous genera of Copepoda

JAN H. STOCK

I. Introduction

Canu, 1893, founded the genus *Collocheres* for a siphonostome cyclopoid copepod, which — at least in Canu's eyes — was identical with *Cyclopicera gracilicauda* described by Brady in 1880. Brady's material, a single female, was found detached from its host between dredged material from a depth of 35 fathoms, Robin Hood's Bay, Yorkshire (Great Britain). Canu found 12 specimens, males and females, very firmly attached to certain unidentified, floating gelatinous algae, at Boulogne (France) and, having described this material in his usual, thorough way, he rightly considered it so different from *Cyclopicera* (= *Asterocheres* according to our present views) that a new genus was instituted for it.

Unaware of Canu's publication, Giesbrecht (1895) came to the same conclusion, and created the genus *Clausomyzon* for the reception of *C. gracilicauda*. Two years later (1897), Giesbrecht reduced *Clausomyzon* to a synonym of *Collocheres*, and again two years later (1899), he described in his admirable monograph two Mediterranean species of this genus in detail, viz. *C. gracilicauda* (Brady, 1880) and *C. canui* Giesbrecht, 1897. Thompson & A. Scott, added in 1903 another species, *C. giesbrechti*, from Ceylon. A species described in 1896 from Port Erin (Isle of Man) by A. Scott as *Collocheres elegans*, was removed by Sars, 1915, from that genus and placed in a newly created one, called *Leptomyzon*. He also referred *C. giesbrechti* to his genus *Leptomyzon*. Apart from a very imperfectly described Antarctic form, *C. dubius* Brady, 1910, of which we know so little that it is not included in this discussion, no other species were described in either of the genera *Collocheres* and *Leptomyzon*. For none of these species a host was known, with the exception, of course, of Canu's observation of numerous specimens clinging to pelagic algae.

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Grainger, 1950, observed that in the type-locality Port Erin the host of *Leptomyzon elegans* is the brittlestar *Ophiocomina nigra* (Abildgaard); he described the male of this species, and concludes that the "relation with the closely allied *Collocheres* is particularly well shown in the structure of the fifth legs and genital segment." Stock, 1960, showed that the normal hosts of *Collocheres gracilicauda* are likewise brittlestars, viz. two closely related species of the genus *Ophiothrix, O. fragilis* (Abildgaard) and *O. quinquemaculata* (D. Ch.). It must be emphasized on this place that Rosoll (1889) recorded a copepod from Trieste under the name of *Ascomyzon comatulae*, found on the crinoid *Antedon mediterranea* (Lam.), but which was considered by all subsequent authors (e.g. Canu, 1893; Giesbrecht, 1899; Sars, 1915; Stock, 1960) synonymous with *Collocheres gracilicauda.* Subsequent search by Rosoll himself and by later authors (Stock, 1960; Bresciani & Lützen, 1962) has never revealed any *Collocheres* from *Antedon.* Yet, Rosoll's observation is of a certain interest, since a new species described in this paper from the Gulf of Aqaba (Red Sea) is a constant associate of crinoids.

II. The synonymy of *Collocheres* and *Leptomyzon*

As Grainger, 1950, remarked already, *Leptomyzon* resembles *Collocheres* very closely. According to Sars, 1915, who created *Leptomyzon*, it differs chiefly from *Collocheres* in "the structure of the oral cone, the last pair of legs and the caudal rami." The oral cone carries "at the apex 2 remarkable diverging tentacular appendages, attached to the posterior lip." Grainger, 1950, also observed these tentacular appendages, likewise in *L. elegans.* They were not described in *C. giesbrechti* by Thompson & Scott, but Sars refers this species nevertheless to *Leptomyzon.* In my own material, I have occasionally observed flabby, non-descript lateral projections of the siphon in *C. gracilicauda*, but none of the specimens had well-defined "tentacles" as figured by Sars. In all cases that I fancied their presence, a closer examination learned that they were nothing else than one of the maxillular setae. More in particular the recurved, strong seta on the outer lobe of the anterior maxilla of *C. uncinatus* (a Red Sea species to be described below) is easily mistaken for a "tentacle" (cf. fig. 1c).

As to the other two characteristics of *Leptomyzon*, the 5th leg and the caudal ramus, I agree with Sars that there are slight differences between *L. elegans* and *C. gracilicauda.* I am inclined to consider these differences of specific, and not of generic value. First of all, the differences are of degree (and not at all fundamental), such as "more elongate" versus "less slender" and "the outer seta of the caudal ramus more or less remote from the apex", to use Sars' own words. In the second place, the remaining species attributed to *Collocheres* and *Leptomyzon*, especially also the two new species described in the sequel, do not support Sars' subdivision. So, the 5th leg of *Collocheres canui* (although this species was referred to *Collocheres*, even by Sars) does not differ much from that of *Leptomyzon elegans.*

The outer seta of the caudal ramus is, in all species of both *Leptomyzon*

and *Collocheres*, displaced in proximal direction along the lateral margin of the ramus. The displacement is very considerable in *C. canui*, moderate in *C. gracilicauda*, *L. elegans*, and *L. giesbrechti*, feeble in *C. breei*, *C. gracilipes*, and *C. uncinatus*. Sars' remark (in the diagnosis of *Leptomyzon*) that "the dorsal bristle, however, (is) occupying its usual place near the end of the ramus" (1915, p. 105) is true for all species, regardless whether they belong to *Leptomyzon* or *Collocheres*. This remark by Sars is no doubt a result of an incorrect observation: in *Collocheres gracilicauda* (pl. LXIII) he missed the dorsal seta (which is present in its usual place, cf. fig. 7 a in the present paper), and he took as a result the lateral furcal seta (which arises near the displaced outer "terminal" seta) for the dorsal seta. In his figure of the caudal ramus of *L. elegans* (Sars, 1915, pl. LXV), the reverse occurred: he found the dorsal seta, but missed the lateral seta. This slight omission accounts no doubt for his ideas on the different position of the setae on the caudal ramus; in fact, there is no such difference. The great elongation of the caudal rami cannot be a generic character either. In the female of *C. breei*, these rami are long and slender (of the type of *Collocheres gracilicauda*), in the male of the same species, they are short (of the type of *Leptomyzon elegans*).

As result of these observations, I can only conclude that *Leptomyzon* must be reunited with *Collocheres*. The species belonging to this genus can be distinguished with the aid of the key on page 224.

III. On *Collocheres gracilicauda* of Canu, 1893, and Sars, 1915

As Giesbrecht (1899, p. 79—80) already showed, Canu's description does not entirely agree with specimens of *C. gracilicauda* studied by him. As we know now, not only certain morphological details are different, but also the host: Canu's species came from gelatinous algae, *C. gracilicauda* lives on *Ophiothrix*. Since Sars' illustrations agree in many details with those of Canu, I presume that they had the same species at hand. Giesbrecht's description, 1899, is fully substantiated by freshly collected material described in the present paper. It is my opinion, therefore, that two species are confused under the name of *C. gracilicauda*. Since Brady's original description (1880) fits clearly on Giesbrecht's, and not on Canu's and Sars' reports, I have fixed the name *C. gracilicauda* to the animal redescribed by Giesbrecht, 1899. This animal is an associate of brittlestars of the genus *Ophiothrix* and occurs both in the Mediterranean and in the Atlantic. For the other species, associated with algae, and found in France (Boulogne) and Norway (Risør), a new name must be chosen, and it is proposed herewith to call it *C. gracilipes* nom. nov. Since it was upon this species that Canu based his genus *Collocheres*, *C. gracilipes* becomes the type-species by monotypy.

C. gracilipes n. nom.

C. gracilicauda (non Brady), Canu, 1893 : 100—108, pl. VI—VII (type-locality : Boulogne-sur-Mer, French Channel coast; type-host: floating, gelatinous algae); Sars, 1915 : 101—102, pl. LXIII (Risør, Norway; among dredged material, 30 fathoms).

This species differs chiefly from *C. gracilicauda* in the following respects: (1) distal segment of fifth leg (♀) 8½ (Canu) to 9 (Sars) times as long as wide [in *gracilicauda* this segment is 5 (Brady) to 6½ (Giesbrecht, present observations) times as long as wide]; (2) distal end of 2nd segment of P5 ♀ pointed (truncate in *gracilicauda*); (3) the outer "terminal" seta arises on the lateral margin of the caudal ramus at a distance from the tip which is about equal to the distal diameter of the ramus (this seta is placed at a greater distance from the tip in *gracilicauda*).

IV. Key to species of *Collocheres*[1])

1a) Caudal ramus (♀) more than 7 × as long as wide 2
b) Caudal ramus (♀) less than 5 × as long as wide 5
2a) Lateral bristle implanted at about ⅝ of the length of the caudal ramus (♀, ♂). Fifth leg (♀) less than 4 × as long as wide ..... *C. canui* Giesbrecht, 1897 Mediterranean
b) Lateral bristle inserts at about ⁹/₁₀ of the length of the caudal ramus (♀, ♂). Fifth leg (♀) more than 4 × as long as wide 3
3a) Basal segment of P5 (♀, ♂) with strongly produced, pointed inner lobe. Mandible palp (including terminal seta) about as long as the mandibular stylet 4
b) Basal segment of P5 (♀, ♂) with rounded, hardly produced, inner lobe. Mandible palp (including terminal seta) rudimentary..... *C. breei* n.sp. Mediterranean
4a) Distal segment of P5 (♀) 8½ to 9 × as long as wide. .... *C. gracilipes* n.nom. Eastern Atlantic
b) Distal segment of P5 (♀) 5 to 6½ as long as wide .. *C. gracilicauda* (Brady, 1880) Eastern Atlantic, Mediterranean
5a) Distal segment of P5 (♀) with 4 setae. Caudal ramus (♀) less than 3 × as long as wide 6
b) Distal segment of P5 (♀) with 3 setae. Caudal ramus (♀) about 4 × as long as wide ..... *C. elegans* A. Scott, 1896 Eastern Atlantic
6a) Mandible palp (♀, ♂) rudimentary. Anterior maxilla (♀, ♂) with 1 transformed (hooked and very elongate) seta on the outer lobe; 4 normal, shorter setae on the inner lobe. ..... *C. uncinatus* n.sp. Red Sea
b) Mandible palp (♀ only known sex) with long seta, reaching to the end of the masticatory stylet. None of the setae on the anterior maxilla transformed, 2 on the outer and 3 on the inner lobe. ..... *C. giesbrechti* Thompson & Scott, 1903 Ceylon

V. Descriptive part

Two new species are described in the next pages. The one was collected on two different species of Crinoida from Eilat on the Gulf of Aqaba. The other was collected on the ophiuroid *Ophioderma longicauda* (Retzius), at Banyuls, in the western Mediterranean. The latter is closely related to *Collocheres gracilicauda*, and a number of figures have been included of that species, in order to make comparison possible.

[1]) The incompletely described *C. dubius* Brady, 1910, is omitted.

Collocheres uncinatus n.sp. Figs. 1—3.

Material examined. — 27 ♀, 7 ♂ (of which 1 ♀ is made the holotype, 1 ♂ the allotype, the remaining paratypes). From the crinoid, *Heterometra savignyi* (J. Müll.). Eilat (Gulf of Aqaba), Coral Beach; depth about 1 m. Apr. 27, 1962. (ZMA. Co. 100.975 a-c).

14 ♀, 4 ♂. Same host. Eilat; depth 15 m. Leg. L. Fishelson, 1965. (ZMA. Co. 100.976).

4 ♀, 1 ♂, 2 copepodids. From the crinoid, *Oligometra serripinna* (P. H. Carpenter) Eilat; depth 20 m. Leg. L. Fishelson, 1965. (ZMA. Co. 100.977).

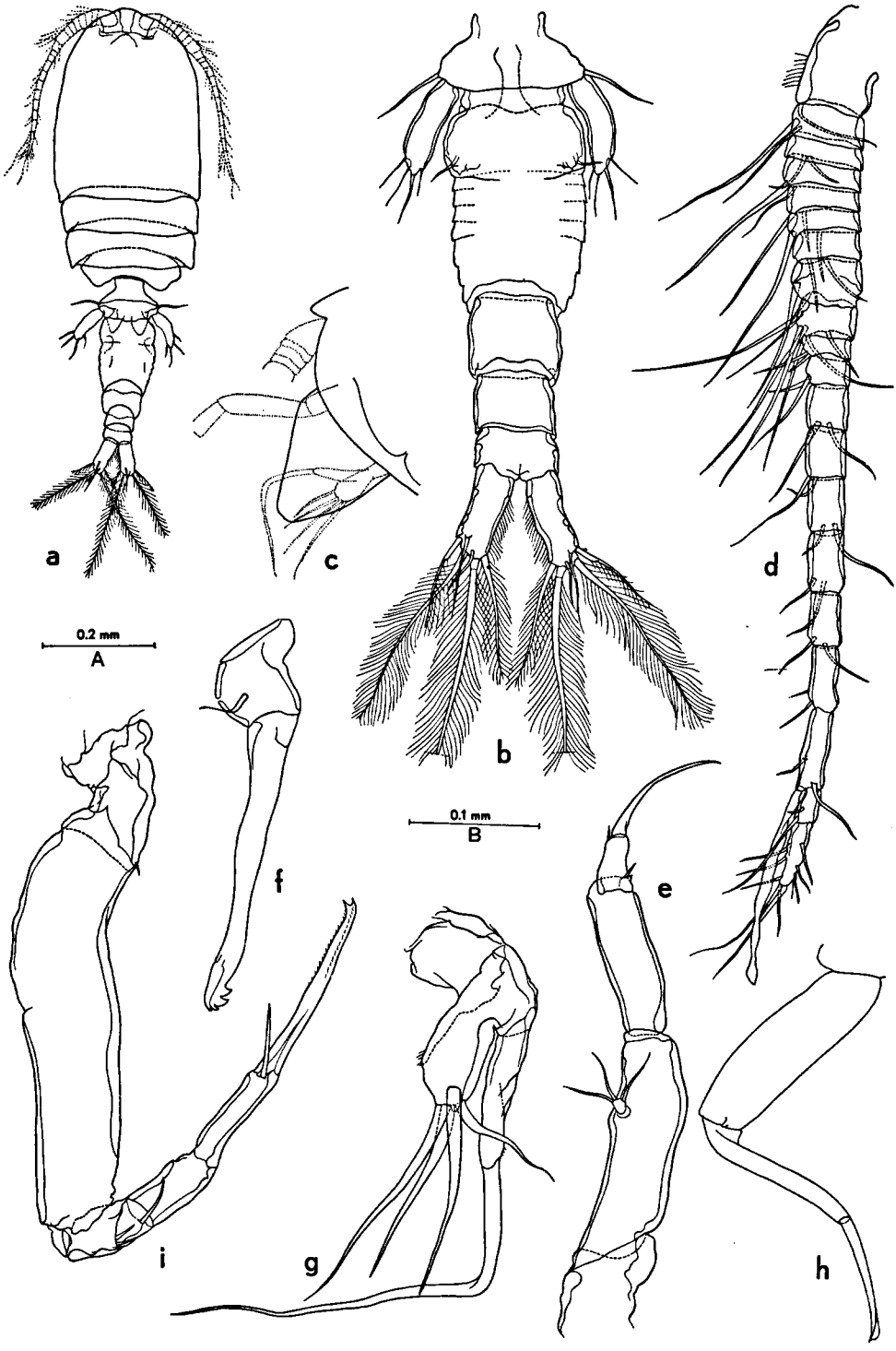
Description. — Female. The body (fig. 1a) is rather slender, 773—837 μ (mean 807 μ) long, and (at the level of the first pair of legs) 225—258 μ (mean 235 μ) wide (measurements based on 5 specimens). The lateral margins of cephalosome and metasome segments 1 and 2 run nearly parallel, metasome segment 3 is suddenly narrower. The urosome (fig. 1b) is 5-segmented. The genital segment consists of two parts: the anterior third with more or less evenly rounded margins, and separated by a constriction at the level of the genital openings from the posterior two thirds, which has slightly serrated margins. The three post-genital segments are rectangular and unornamented, except for a row of minute spinules at the ventral posterior border of the anal segment. The caudal ramus is nearly as long as the last two urosome segments combined, and less than 3 times as long as wide; its inner margin is ciliated; the distal armature consists of 6 setae: the 4 strong terminal setae are plumose, the outer and inner subterminal setae are smooth; the most lateral of the plumose setae is displaced a short distance in proximal direction along the outer margin of the ramus. The distal margin of the ramus bears 2 or 3 larger and 3 smaller cuticular teeth (fig. 3e).

The anterior antenna (fig. 1d) is 20-segmented. Segment 1 bears 1 seta; segments 2 to 7 are narrowly rectangular and bear each 2 setae; segment 8, with 2 setae, is irregularly rectangular and not as short as the previous segments; segment 9 bears 7 setae, it is shorter than segment 8, and is probably built up of 2 fused segments; segments 10 to 17 each bear 2 elements; 10 and 11 are still short, but 13, 14, and 15 grow longer, 16 is shorter than 15, but 17 is longer again; segment 18 bears 2 setae and 1 long aesthete; segment 19 is short and armed with 2 setae; segment 20 is tapering, armed with 10 elements of which 3 terminal.

The posterior antenna (fig. 1e) has a 2-segmented, unarmed protopod; the exopod is unimerous, very small, and provided with 3 setae; the endopod consists of a long, unarmed basal segment and a tapering distal segment, apparently originated by fusion of two segments, as is indicated by the position of the medial spinule on the fusion complex; terminally, the armature consists of a small spinule and a long, pointed, curved claw.

The oral cone is robust and short (fig. 1c), not produced into a tubiform part. The lips are devoid of tentacular appendages.

The mandible (fig. 1f) consists of a nearly straight blade, distally with 4 teeth; the palp is minute or even vestigial, and is composed of a unimerous,


a
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A
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digitiform segment and a terminal setule; the former being 15 times shorter than the masticatory part of the mandible.

The anterior maxilla (fig. 1g) has a narrow, slender outer lobe which bears one enormous terminal element. This thick element is, at about $^1/_3$ of its length, rectangularly bent. The inner lobe is nearly twice as wide as the outer lobe, and distinctly shorter than it; its distal armature consists of 4 setae, that reach to the rectangular bend of the outer lobe element.

The posterior maxilla (fig. 1h) has a slender, unarmed basal segment and a 2-segmented claw; each of the claw segments is nearly straight; no spinule could be found on the first claw segment; the second, shorter, claw segment bears terminally a hyaline flange.

The maxilliped (fig. 1i) has a short basal segment carrying 1 spinule, an unarmed, elongate 2nd segment, and a 5-segmented claw; claw segments 1, 2, 3, and 4 bear 2, 1, 0, and 1 distal spine, respectively; claw segment 5 bears 2 rows of cilii; it is terminally bifid.

Legs 1 to 4 are biramous; all rami are 3-segmented. Leg 1 (fig. 2a) is remarkable by the rudimentary condition of the medial basipod setule, and by the shortness of the lateral spine on segment 2, and the basalmost lateral spine on segment 3 of the exopod. In leg 2 (fig. 2b) the lateral spine on exopod segment 1 is shortened; the 3rd endopod segment is armed with 1 + 2 + 3 elements, all setiform. In the 3rd leg (fig. 3a) the lateral elements on exopod segment 1 and on endopod segment 3 are reduced in length, in the 4th leg (fig. 3b), the lateral elements on exopod segments 1 and 2, and on endopod segment 3. The great elongation of the terminal segments of both rami in leg 4 should be noted. All legs have intercoxal plates, all have a lateral basipod seta and a medial, plumose, coxopod seta. The chaetotaxis formula of legs 1 to 4 is as follows:

P_1	exp.	I — 1;	I — 1;	III — 1*— 4
	enp.	0 — 1;	0 — 2;	1 — 2 — 3
P_2	exp.	I — 1;	I — 1;	III — I — 5
	enp.	0 — 1;	0 — 2;	1 — 2 — 3
P_3	exp.	I — 1;	I — 1;	III — I — 4
	enp.	0 — 1;	0 — 2;	1 — I — 3
P_4	exp.	I — 1;	I — 1;	III — I — 3
	enp.	0 — 1;	0 — 2;	1 — I — 2

*) This element is setiform, but bears plumosities only on its medial side; the lateral side is smooth.

FIG. 1. *Collocheres uncinatus* n.sp. (female). a, entire animal, dorsal (scale A); b, urosome, dorsal (B); c, cephalosome, from the left, showing the siphon and the position of the anterior maxilla (B); d, anterior antenna (C); e, posterior antenna (D); f, mandible (D); g anterior maxilla (D); h, posterior maxilla (C); i, maxilliped (D).

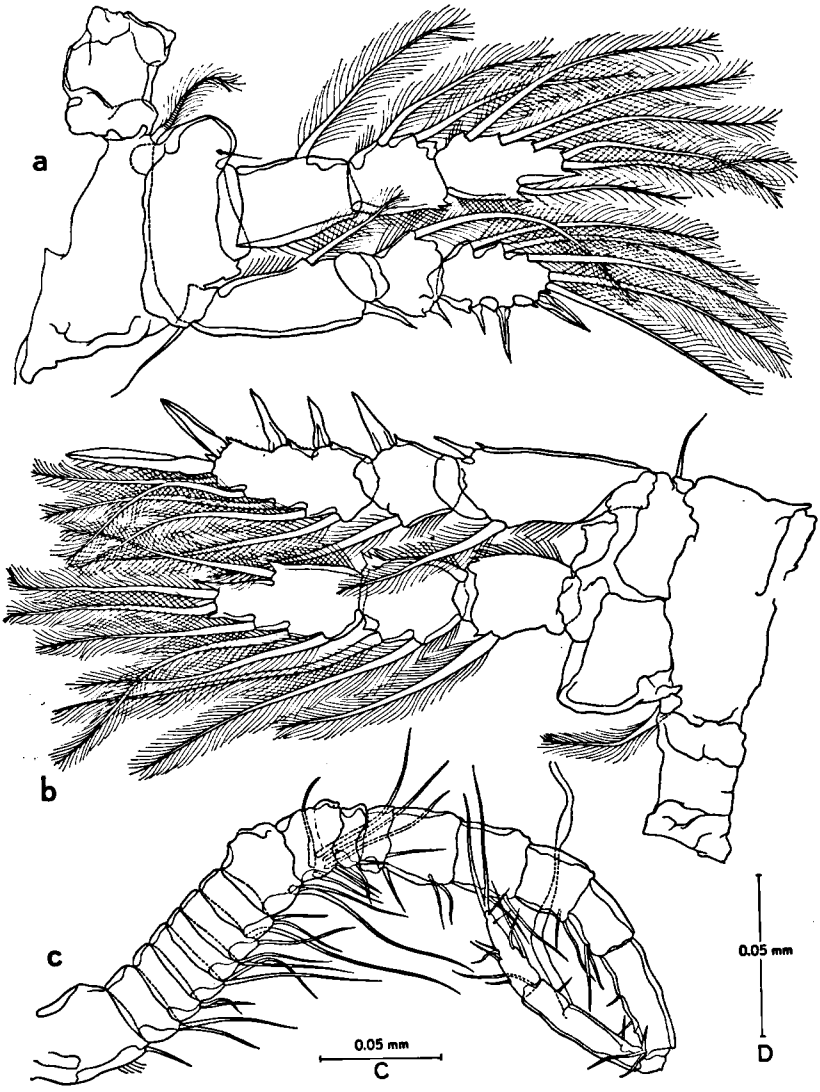

FIG. 2. *Collocheres uncinatus* n.sp. a, first leg, ♀ (scale D); b, second leg, ♀ (D); c, anterior antenna, ♂ (C).

The fifth leg (fig. 3c) is 2-segmented. The basal segment bears 1 lateral seta; medially, it is produced into a triangular flap; the flaps of left and right P5 nearly touch in the midline of the body. The distal segment is slightly tapering, its shape differs somewhat according to the angle under which it is seen; it bears 1 thin, lateral, subterminal seta, 1 thick, lateral subterminal seta (this is the longest element) and 2 thin, terminal setae.

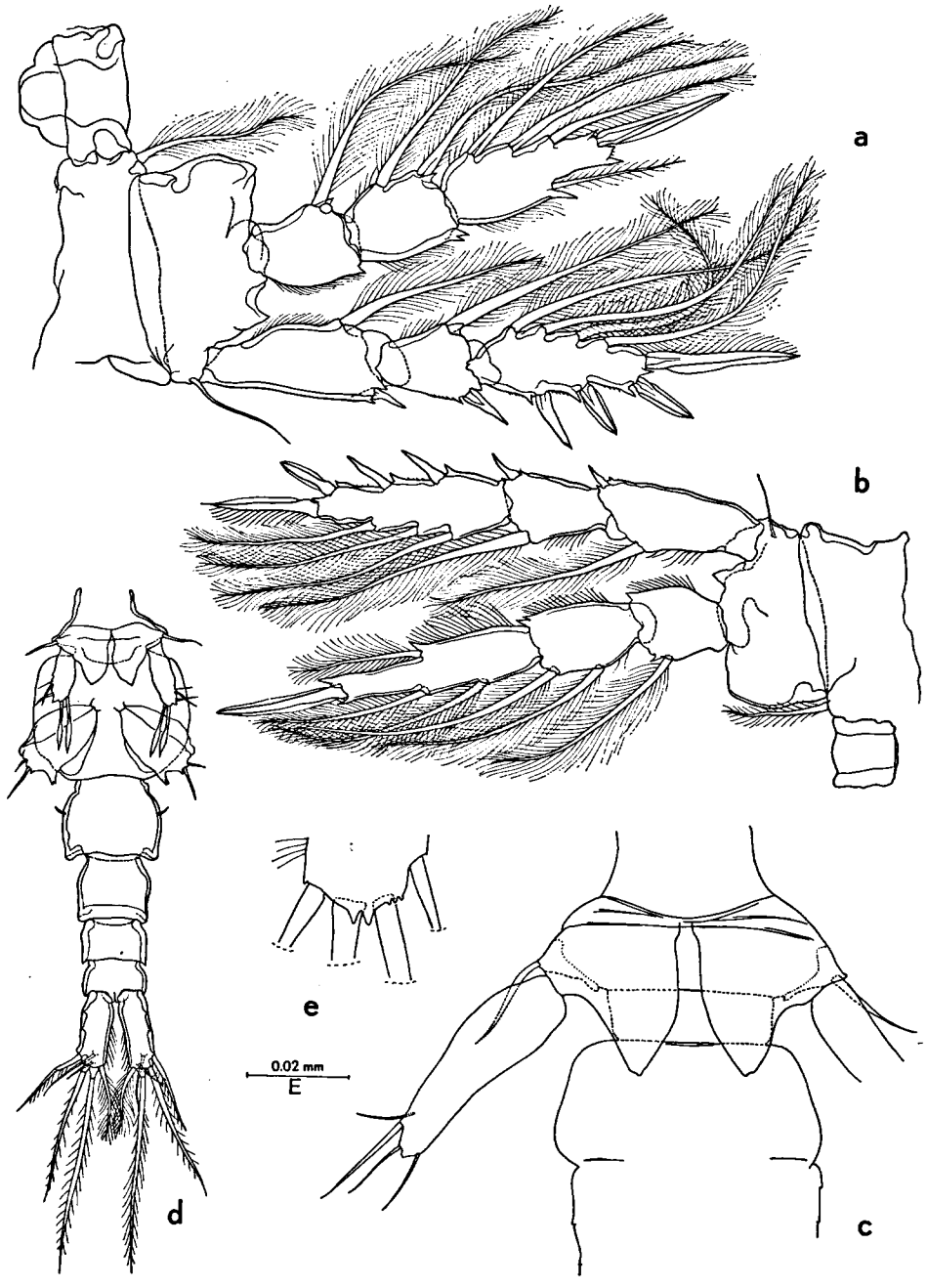

FIG. 3. *Collocheres uncinatus* n.sp. a, third leg, ♀ (scale D); b, fourth leg, ♀ (D); c, fifth leg, ♀ (C); d, urosome, ♂, ventral (B); e, tip of caudal ramus, ♂ (E).

Male. The length of 4 specimens is 692—741 μ (mean 713 μ). The genital segment (fig. 3d) bears the "genital lobes" (probably the transformed 6th legs); each lobe has a medio-terminal bicuspidate point and a sinuous latero-terminal portion with 2 setae. There are 4 rectangular postgenital segments, the first of which is slightly wider than the others and carries a lateral setule at each side.

Distinct secondary sexual dimorphism is observed in the A1 and P5 only.

The anterior antenna (fig. 2a) is 18-segmented, but the 9th segment is indistinctly subdivided. If one counts the 9th segment for two distinct segments, the total number of segments in A1 is 19. The armature is much the same as in female; between the 16th and 17th segment, the appendage is hinged. Segment 17 (which is homologous with segments 18 + 19 of the female) bears the aesthete.

The 5th leg (fig. 3d) is less elongate than in female. It bears 3 lateral setules and 2 lanceolate, long, distal spines; between the setules and the spines, the segment is produced into a triangular process.

Very slight secondary sexual differences have been found in P2 and P3. In these legs, the exopod spines are in male a trifle longer than in female.

Colour. — The body is usually purple-black, but lighter (more or less red-brown) in some specimens. The eggs are white.

Remarks. — The new species differs from all others attributed to *Collocheres* by the transformed, hooked element on the outer ramus of the anterior maxilla. The proposed specific name, *uncinatus*, refers to this character.

The only two species having, like *uncinatus*, relatively short caudal rami, are *C. giesbrechti* and *C. elegans*. Apart from the characters mentioned in the key, the following small differences may be observed between these species:

C. uncinatus differs from *C. giesbrechti* and *C. elegans* in the bifid tip of the maxilliped claw, in having the exopod spines of P1 of unequal lengths, and in the shape of the genital segment. *C. elegans* (as described by Sars, 1915) seems to differ moreover in the chaetotaxis of the endopod of the 2nd leg (in *uncinatus*, the 3rd segment has the formula 1 — 2 — 3; in *elegans* 1 — I + 1 — 3).

Collocheres breei n.sp. Figs. 4—6.

Syn.: *Leptomyzon* spec., Stock, 1960, p. 228—229.

Material examined. — 12 ♀, 17 ♂, 2 copepodids. From *Ophioderma longicauda* (Retzius), an ophiuroid. Baie de Banyuls, under stones on sandy bottom. Depth about 4 m. August 20, 1960. 1 ♀ is selected as the holotype, 1 ♂ as the allotype; the remaining specimens are paratypes. (ZMA. Co. 100.982).

2 ♂, 1 copepodid. Same host. Banyuls, Le Troc. Under stones. Depth about 3 m. June 25, 1959. (ZMA. Co. 100.563). (These specimens have been cited by Stock, 1960, as *Leptomyzon* spec.).

6 ♀. Same host. Banyuls, Le Troc. Under stones. Depth about 2 m. August 25, 1962. (ZMA. Co. 100.983).

1 ♀. Same host. Pier of Banyuls. Depth about 2 m. August 26, 1962. (ZMA. Co. 100.984).

All localities are in the Mediterranean coast of France (Département des Pyrénées-Orientales).

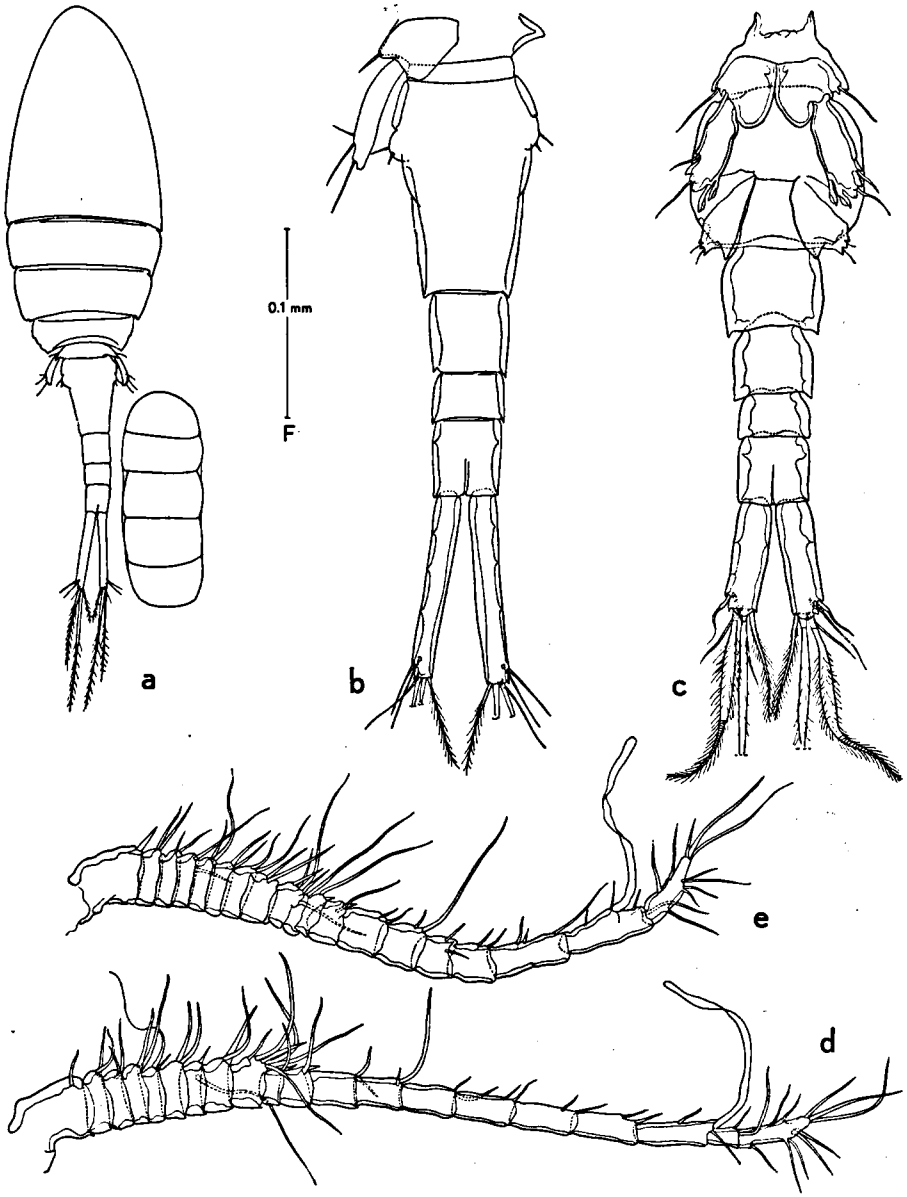

FIG. 4. *Collocheres breei* n.sp. a, female and ovisac, dorsal (scale A); b, urosome, ♀, ventral (B); c, urosome, ♂, ventral (F); d, anterior antenna, ♀ (F); e, anterior antenna, ♂ (C).

Frequency. — 6 ♀ from 30 specimens of the host (August 1962); 1 ♀ from 12 specimens of the host (August 1962); 2 ♂, 1 copepodid from 35 specimens of the host (June 1959).

Description. — Female: The slender body (fig. 4a) is 918—1111 μ (mean

1016 μ) long (without the furcal setae), and 305—346 μ (mean 323 μ) wide at the posterior margin of the cephalosome (measurements based on 10 specimens). The first pedigerous segment is fully incorporated in the cephalosome. The first metasome segment (= 2nd pedigerous segment) is nearly as wide as the widest part of the cephalosome, segments 2 and 3 narrow very gradually a little. The postero-lateral corners of the metasome segments are hardly produced. The urosome (fig. 4b) consists of 5 segments. The first urosome segment (= 5th pedigerous segment) has small, triangular epimeral areas. The genital segment is widened at its anterior quarter; a rounded swelling and 2 setae indicate the position of the genital openings; the posterior part of the segment tapers slightly. The postgenital segments are rectangular to subquadrate, the first and last are longer than the 2nd postgenital segment; all are unornamented. The caudal ramus (fig. 4b) is 7 tot 8 times as long as wide and only slightly shorter than the 3 postgenital segments together. The distal armature consists of 6 setae: 3 of these, all plumose, (no doubt homologous with the inner terminal and central terminal setae of other asterocherids) are terminal. A dorsal, subterminal seta arises just proximally of the implantation of the lateralmost terminal seta. The lateral furcal seta and a seta, which is homologous with the outer terminal seta in other asterocherids are found at a slight distance (less than the furcal diameter) from the tip.

The anterior antenna is 20-segmented; the length of the segments is visible from fig. 4d. The numbers of elements on each segment is very similar to that of *C. uncinatus*, with the exception of segment 9 which bears 6 setae only. In general, the length of the elements is somewhat shorter than in *C. uncinatus*.

The posterior antenna (fig. 5a) has a unimerous but not very small exopod, armed with 3 setae. The distal endopod segments are slender. The straight claw is as long as the entire endopod; its tip is bifid.

The mandible has a tapering blade (fig. 5b), slightly curved near the tip and distally armed with a number of irregularly placed teeth. The palp is minute or vestigial; it consists (fig. 5c) of a single very thin segment distally armed with 2 very unequal setae. The entire palp, including its setae, is less than $^1/_3$ as long as the blade.

The anterior maxilla (fig. 5d) is composed of an outer lobe (armed with 1 normally developed terminal seta), which is only slightly smaller and narrower than the inner lobe, with 4 terminal setae.

The posterior maxilla (fig. 5e) has a very elongate claw; the first claw segment is fully as long as the basal segment; the 2nd claw segment is about half as long as the first.

The maxilliped (fig. 5f) has very slender, 2-segmented "hand"; each "hand" segment is armed with a short spine. The "claw" is 4-segmented; apparently, the basal claw segment consists of the fused segments 1 and 2 found in related forms; this fusion complex bears 2 + 1 elements. The 2nd claw segment has a minute distal spinule. The 3rd and 4th bear a row of fine denticles, the 3rd moreover a long distal element, which reaches $^2/_3$ of the length of the distalmost claw segment.

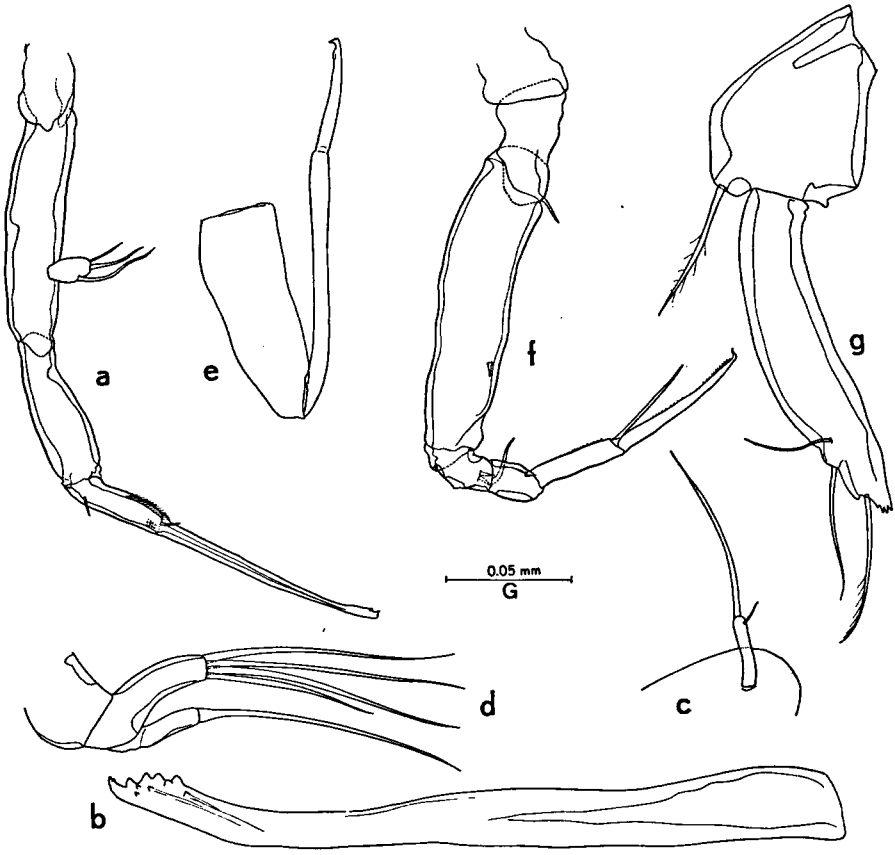

FIG. 5. *Collocheres breei* n.sp., ♀. a, posterior antenna (scale G); b, mandible stylet (E); c, mandible palp (E); d, anterior maxilla (C); e, posterior maxilla (C); f, maxilliped (C); g, fifth leg (D).

The first leg (fig. 6a) has normally developed exopod spines, provided with a wide, denticulated shaft; the terminal exopod seta is normally plumose. Contrary to the situation found in the previous species, no exopod element on legs 2, 3, or 4 is reduced in length (cf figs. 6b, c, d). On the 4th endopod, only the lateral seta on segment 3 is shortened.

The chaetotaxis formula is identical to that given for *C. uncinatus* (vide supra).

The fifth leg (fig. 5g) is 2-segmented. The basal segment is laterally expanded into an obtuse lobe armed with a plumose seta. Except for a minute protuberance, no medial expansion is found. The 2nd segment is slightly curved, 4½ times as long as wide; it bears 3 setae; its medio-terminal extremity is provided with 4 small teeth.

The ovisacs (fig. 4a) are cylindrical 354—403 μ long and 145—161 μ wide. They contain few (usually 5), uniserial eggs.

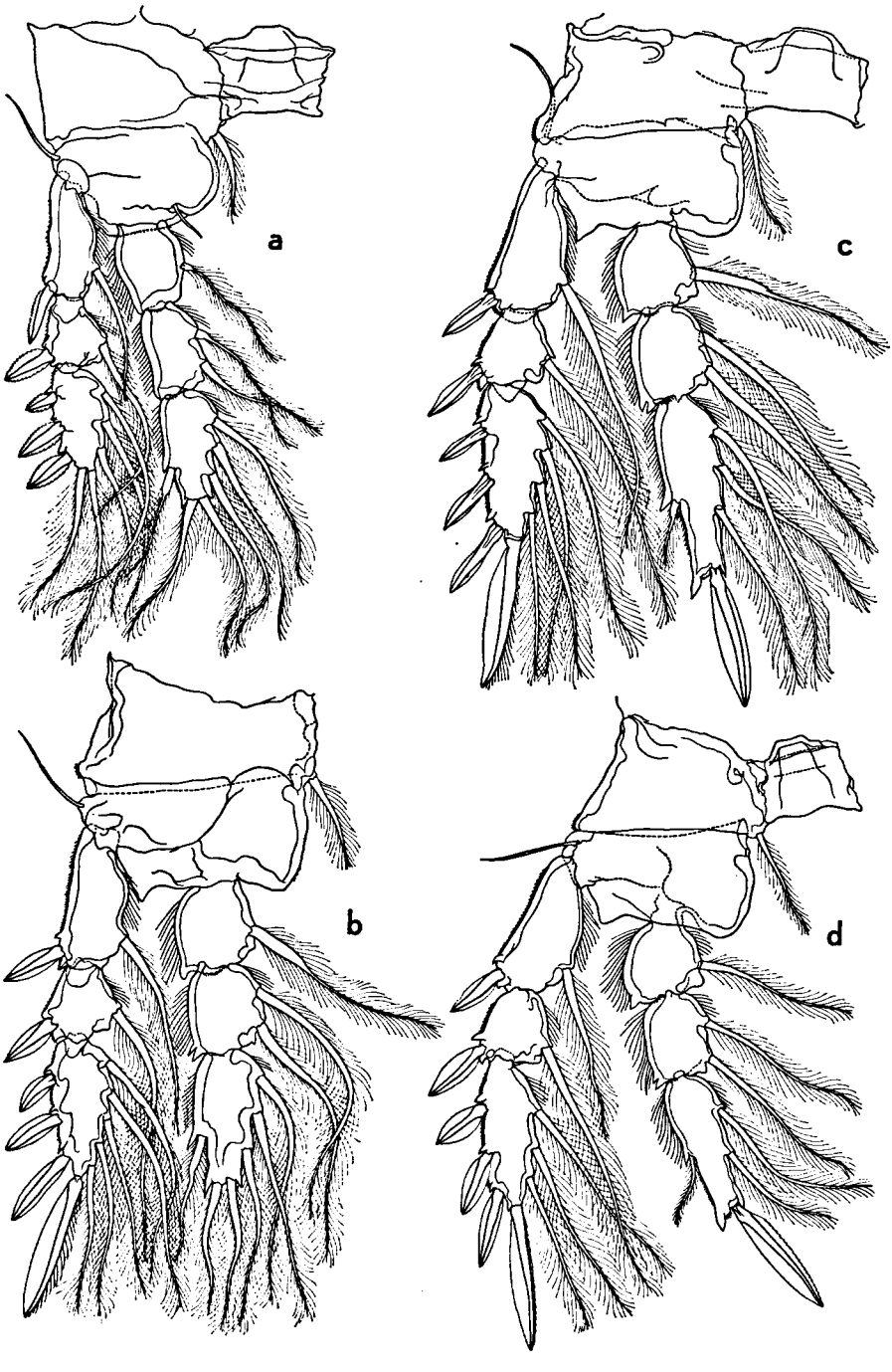

FIG. 6. *Collocheres breei* n.sp., ♀. a, first leg (scale C); b, second leg (c); c, third leg (C); d, fourth leg (C).

Male: Length, without caudal setae, of 6 specimens is 580—692 μ (mean 630 μ); width, at the posterior margin of the cephalosome, 161—209 μ (mean 182 μ).

The urosome (fig. 4c) is 6-segmented. The genital segment is ventrally provided with the "genital lobes"; each lobe has a medial, triangular portion, with a trace of a bicuspidation at the tip, and a lateral portion bearing 2 setae and 3 teeth.

Strong sexual dimorphism occurs in the anterior antenna, the fifth leg, and the caudal ramus. The other appendages resemble that of the female.

The anterior antenna (fig. 4e) is 19-segmented. The basal portion, up to segment 8, is similar to that of the female, but segment 9 (♀) is subdivided into two segments, 9 and 10, in the male; segment 9 (♂) bears 5 setae, segment 10 (♂) 1 seta. Segment 11 (♂) is much shorter than the corresponding segment (= 10) in the female. Segments 12 to 16 (♂) are homologous with segments 11 to 15 (♀), but, although their armature is similar, the male segments are much less elongate. Segment 17 (♂) is a fusion-complex of segments 16 and 17 (♀). Segment 18 (♂) is likewise a fusion-complex, of segments 18 and 19 (♀). The terminal segments of both antennae are homologous again.

The 5th leg (fig. 4c) is 2-segmented; the basal segment resembles in general that of the female; it has no trace of a medial point. The 2nd segment is straight, about 2½ times as long as wide and armed with 2 lateral setules and 2 more or less prong-like spines.

The caudal rami are much less elongate than those of the female. They are between 3 and 3½ times as long as wide. The setal armature is as in female.

Copepodid. — The caudal rami of the 2 available copepodids (probably copepodid V) are short, like those of the male.

Colouration. — Cephalosome and metasome are somewhat purplish, the urosome is red. Ovisacs purple.

Remarks. — The very curious secondary sexual dimorphism in the length of the caudal rami was one of my reasons to doubt the distinctness of the genus *Leptomyzon*. As stated above, the caudal rami of the female are elongate, of the type of *Collocheres gracilicauda*, those of the male are short, of the type of *Leptomyzon elegans*. As a matter of fact, *C. breei*, when first observed (Stock, 1960), was considered a species of *Leptomyzon*; these observations were based on 2 males and 1 copepodid, thus on material with a "*Leptomyzon* furca".

No such strong sexual dimorphism in the caudal rami is known in the other *Collocheres* species (the male of *G. giesbrechti* is unknown).

C. breei is closely related to *C. gracilicauda* and *C. gracilipes*. It differs from both these species in (1) the strong sexual dimorphism in the caudal ramus; (2) the rudimentary condition of the mandible palp; (3) the great length of the element on the penultimate segment of the maxilliped claw

(in the other two species, this element is less than ¼ as long as the terminal claw segment, cf. fig. 7d); (4) the maxilliped claw itself is less elongate than in the related species*); (5) the shape of the 5th leg, more in particular of its basal segment, which is characteristic for both sexes; (6) the distal endopod segment of P4, which is less elongate (cf. figs. 6d and 7f); (7) the first leg, which, in *C. gracilicauda*, is provided with a knob-like projection on the first endopod segment (fig. 7e); this projection is lacking in *C. breei*; (8) the shape of the genital lobe (♂) which is also characteristic.

This new species is named in honour of my friend and colleague, Drs. P. J. H. van Bree, who, during his visit to Banyuls in 1962, assisted in collecting the hosts, and thus in building up a good series of the copepod.

Collocheres gracilicauda (Brady, 1880). Fig. 7.

Certain references. —

Cyclopicera gracilicauda Brady, 1880, p. 58, pl. LXXXIII figs. 1—10.

Clausomyzon gracilicauda, Giesbrecht, 1895, p. 177.

Collocheres gracilicauda, Giesbrecht, 1897, p. 13, Giesbrecht, 1899, p. 12, 79, pl. I fig. 3, pl. III, figs. 40—45; Stock, 1960, p. 229; Bresciani & Lützen, 1962, p. 379—380.

Uncertain references. —

(These references are unaccompanied by figures, or if figures are available, these do not provide sufficient details to make out whether the reference applies to *C. gracilicauda* or *C. gracilipes*).

Cyclopicera gracilicauda, Thompson, 1889, p. 189; T. Scott, 1892, p. 262; Thompson, 1893, p. 210, pl. XXVI fig. 1; Herdman, 1896, p. 52.

Ascomyzon comatulae Rosoll, 1889, p. 189—196, pl. I figs. 1—5, pl. II fig. 6.

Collocheres gracilicauda, T. Scott, 1901, p. 252; T. Scott, 1906, p. 357; Norman & T. Scott, 1906, p. 192—193; Van Oorde-De Lint & Schuurman Stekhoven, 1936, p. Xc 97, fig. 30; Bocquet, 1952, p. 497; Marine Biological Association, 1957, p. 174; Bruce et al., 1963, p. 126.

Non *C. gracilicauda*, Canu, 1893, and Sars, 1915 (= *C. gracilipes*, cf. p. 223).

Remarks. — I have examined material of this species from the following localities and hosts:

On *Ophiothrix fragilis* (Abildg.) — Le Troc, Banyuls, c. 3 m depth.
Northumberland, 5—6 miles N.E. of the mouth of the Tyne.
Baie de Morlaix (Brittany): N. of la Vieille, depth c. 25 m; N.W. of Ile de Batz, depth c. 86 m; St. Samson, intertidal; Chenal de l'Ile Verte, intertidal.

On *Ophiothrix quinquemaculata* (D.Ch.) — Off Collioure (France, Dépt. des Pyrénées-Orientales), depth c. 65 m.

The Atlantic material is slightly smaller in size than the Mediterranean specimens. Six Atlantic females are 660—725 μ (mean 704 μ); six Atlantic males are 580—627 μ long (mean 601 μ). Six Mediterranean females are 821—966 μ long (mean 855 μ); six Mediterranean males are 660—805 μ long

*) This is particularly clear in the ratio length distal claw segment — length penultimate claw segment. This ratio is for *C. breei* (♀ ♂) 1.60—1.70, for *C. gracilicauda* (♀ ♂) 1.83—2.00.

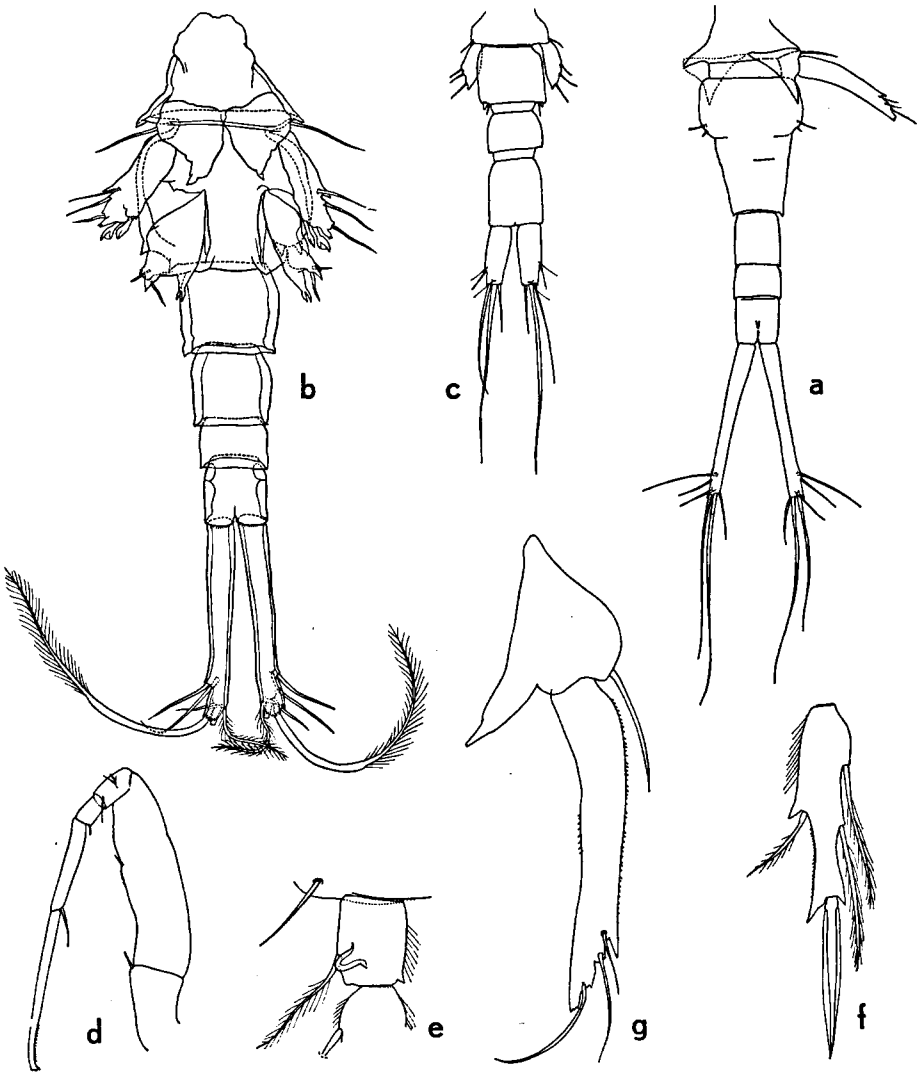

FIG. 7. *Collocheres gracilicauda* (Brady, 1880). a, urosome, ♀, ventral (scale B); b, urosome, ♂, ventral (F); c, urosome, copepodid V, dorsal (B); d, maxilliped, ♀ (C); e, first endopod segment of first leg, ♀ (D); f, third endopod segment of fourth leg, ♀ (D); g, fifth leg, ♀ (D).

(mean 725 μ). The morphological characters of Atlantic and Mediterranean specimens are identical. Some figures (fig. 7) are included in this paper to make a comparison with related forms possible.

The caudal rami of both sexes (fig. 7a and 7b) are elongate. In the 5th copepodid stage, however, the caudal rami are still short (fig. 7c), thus resembling the condition found in *C. breei* ♂ and in "*Leptomyzon*" *elegans* ♀ ♂.

VI. Acknowledgements

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Certain crinoid host specimens have been identified by Dr. A. M. Clark, London, whose cooperation is gratefully acknowledged.

Résumé

Deux espèces nouvelles du genre *Collocheres, C. breei* (Méditerranée occidentale, hôte *Ophioderma longicauda*) et *C. uncinatus* (Golfe d'Aqaba, hôtes *Heterometra savignyi* et *Oligometra serripinna*) ont été décrites. Certains caractères de ces nouvelles espèces, et une étude critique des espèces déjà connues, ont conduits à la réunion des genres *Collocheres* et *Leptomyzon*. Une clé de détermination des formes appartenantes à *Collocheres*, dans le sens nouveau, a été fournie. Certains animaux décrits comme *C. gracilicauda* diffèrent nettement de la forme typique de *gracilicauda;* aussi, je propose *C. gracilipes* nom. nov. pour le matériel signalé par Canu et Sars.

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Dr. J. H. STOCK
Zoölogisch Museum van de Universiteit van Amsterdam
Plantage Middenlaan 53
Amsterdam (C.) — The Netherlands