

NOTES ON THE OSTRACOD FAUNA OF PLYMOUTH

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(Text-figs. 1-13)

On June 15 and 20, 1938 Mr W. J. Rees of the laboratory of the Marine Biological Association, Plymouth, collected some mud samples at Mewstone and Rame Mud near Plymouth for Mr J. Hult, Uppsala. By kind permission of the director of the laboratory and of Mr Hult I have examined the Ostracoda contained in the samples.

The samples proved to contain seventeen species of Ostracoda. They will all be mentioned here in view of the uncertainty of the older identifications of these animals:

<i>Philomedes interpuncta</i> (Baird) <i>Polycope areolata</i> G. O. Sars <i>Pontocypris trigonella</i> G. O. Sars <i>Erythrocypris mytiloides</i> (Norman) <i>Bairdia inflata</i> (Norman) <i>Xenocythere cuneiformis</i> (Brady) <i>Cythereis villosa</i> G. O. Sars <i>Cythereis runcinata</i> (Baird) <i>Cythereis emaciata</i> (Brady)	<i>Cythereis antiquata</i> (Baird) <i>Cythereis jonesi</i> (Baird) <i>Loxoconcha impressa</i> (Baird) <i>Loxoconcha guttata</i> (Norman) <i>Loxoconcha tamarindus</i> (Jones) <i>Bythocythere turgida</i> G. O. Sars <i>Xestoleberis depressa</i> G. O. Sars <i>Paradoxostoma ensiforme</i> Brady
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Of these species only two have not been recorded before from the Plymouth district (Marine Biological Association, 1931, p. 150), viz. *Xenocythere cuneiformis* and *Xestoleberis depressa*. Both of these are, however, found in other parts of the English Channel (Norman & Scott, 1906, pp. 119, 121).

Three of the above-mentioned species have been very insufficiently described, since their appendages were not examined. These are *Cythereis runcinata*, *C. emaciata*, and *Loxoconcha guttata*; they are here described in greater detail.

The material on which this paper is based has been deposited in the museum of the Plymouth laboratory.

Genus *Cythereis* Jones, 1849

Cythereis runcinata (Baird), 1850

1850	<i>Cythere runcinata</i> , Baird, p. 254.
?1869	<i>Cythere stimpsoni</i> , Brady, p. 48.
1880	<i>Cythere stimpsoni</i> , Brady, p. 85.
1889	<i>Cythere runcinata</i> , Brady & Norman, p. 160.

Description. The structure of the shell and the appendages agree to a large extent with the diagnosis given for the subgenus *Cythereis* (Jones) by

Skogsberg (1928, p. 126). The following alterations and additions may be made.

Female. Shell (Fig. 4): with the same characteristics as in the subgenus *Cythereis*. The bristles along the margin usually with several branches.

First antenna (Fig. 5): six-segmented. Of moderate strength. The relative lengths of the segments are about as follows: $\frac{16}{16} : \frac{15}{9} : \frac{4}{4.5} : \frac{5}{2.5} : \frac{4}{5} : \frac{6.5}{6.5}$.

Bristles comparatively long. Bristle of second segment about twice as long as posterior side of the segment. Bristle of third segment three times as long as posterior side of the segment. Anterior bristle of fourth segment longer than its claw; its lateral bristle reaches with its point nearly to the point of the claw of the fifth segment. Anterior bristle of fifth segment as long as on the preceding segment; near this bristle a small spine-like bristle of the same length as that of the distal segment; it is directed more forward than the other bristles. Lateral bristle of about the length of the claw. Close by the end claw, the distal segment has two bristles of the same type and of about the same position and relative length as the two long and narrow bristles of the fourth segment. Sensorial bristle somewhat longer than the segment. The pilosity is about the same as in the subgenus *Cythereis*.

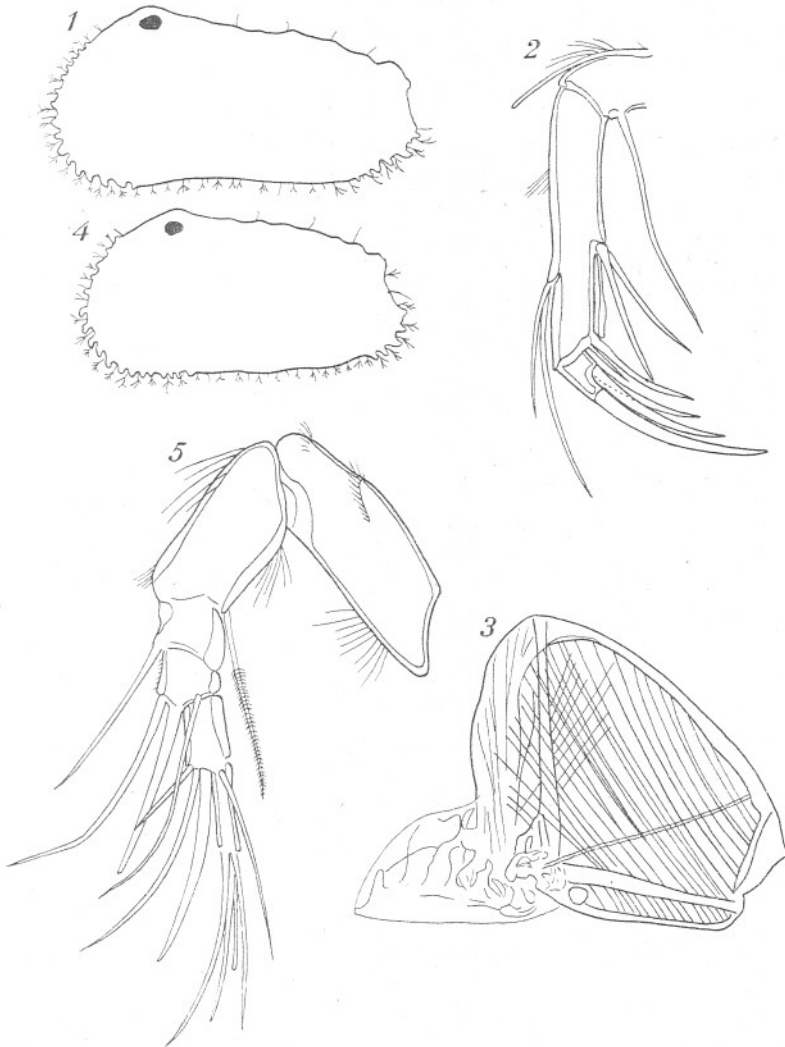
Second antenna: of moderate size. Exopodite thick, two-segmented, with the end broader, of the same length as half the anterior side of the second endopodite segment. Relative lengths of the segments of the endopodite about as follows: $\frac{7.5}{4} : \frac{21}{17} : \frac{4.5}{4.5}$. Bristle of first segment of about the same length as the posterior side of the second segment. The two bristles on the anterior side of the second segment situated at a distance of nearly a third of this side from its distal end; one of them reaches to the point of the distal segment, the other much farther. The three posterior bristles are situated about two-thirds of the way from the distal end of the segment. The sensorial bristle reaches the distal end of the segment. The remaining two strong, extend beyond the point of the third segment. One of the postero-distal bristles claw-like, somewhat more than twice as long as the anterior side of the distal segment. The other bristle weak, less than half the length of the claw-like bristle. Antero-distal claw of end segment three and a half times as long as the anterior side of the segment. The two others much shorter.

Mandible: masticatory segment strong, short, wedge-shaped, without a hump on the anterior side. Epipodial appendage with three long and two short bristles. The relative lengths of the endopodite segments are about $\frac{4.5}{3} : \frac{6.5}{6} : \frac{5.5}{5.5}$. Dorso-distal bristle of first segment with long hairs. The two long ventro-distal bristles of this segment very thinly set with hairs.

Maxilla: without any special characteristics.

Fifth limb: proximal bristle of the anterior side of the protopodite very short and weak. Bristle on the posterior side swollen at the base, non-

annulated, furnished with long hairs, thinly set, of nearly the same length as the dorsal side of the segment. Relative lengths of the segments of the



Figs. 1-3. *Cythereis runcinata* (Baird). Male. 1. Left shell. 2. Second antenn
3. Penis.

Figs. 4, 5. *Cythereis runcinata* (Baird). Female. 4. Left shell. 5. First antenna.

endopodite segments about as follows: 10: 6.5: 6. Bristle of first segment half as long as second segment. End claw as long as first segment.

Sixth limb: the swollen bristle on the protopodite as on the fifth limb. Proportions of the lengths of the segments of the endopodite about 13: 7.5: 7.5.

Bristle of the first segment of the length of half the second segment. End claw as long as second and third segment together.

Seventh limb: bristle on the posterior side of the protopodite narrow, annulated, with fine hairs, of the length of half the anterior side of the protopodite. The segments of the endopodite have the following relative lengths: 20 : 8 : 9. Bristle of the first segment as long as the second segment. End claw much longer than first segment.

Furca: with two bristles, furnished with fine hairs.

Male. Second antenna (Fig. 2): exopodite narrow, indistinctly segmented, of the same length as in the female.

Fifth limb: the thick bristle on the posterior side of the protopodite as in the female.

Sixth limb: the same bristle shorter than in the female, with longer hairs. Bristle on first endopodite segment weak, as long as two-fifths of the second joint.

Brush-shaped organ: about three times as long as wide. Distal bristles about as long as stem.

Penis (Fig. 3): basal part triangular. Terminal part comparatively small with a straight ventral side. Its dorsal margin curved. Vas deferens with spiral thickenings. Free tube of ductus ejaculatorius not observed.

Dimensions.

	Length mm.	Height mm.	Breadth mm.
Female	0.84-0.86	0.43-0.44	0.40-0.41
Male	0.91-0.93	0.42-0.43	0.39-0.40

Distribution. English Channel, Vigo Bay and Mediterranean.

Remarks. In the second part of his studies, Skogsberg (1928) has begun to divide the genus *Cythereis* Jones into subfamilies on the basis of a number of new species from the Arctic regions and California. To these subfamilies Procter (1933) has added two more. *Cythereis runcinata*, like the following species, does not belong to any of the subfamilies referred to. They certainly represent two different subfamilies. But it is at present too early to define these subfamilies, because most of the species described by authors previous to those mentioned above are too insufficiently known, and the two species under notice are so far the only representatives of their subfamilies.

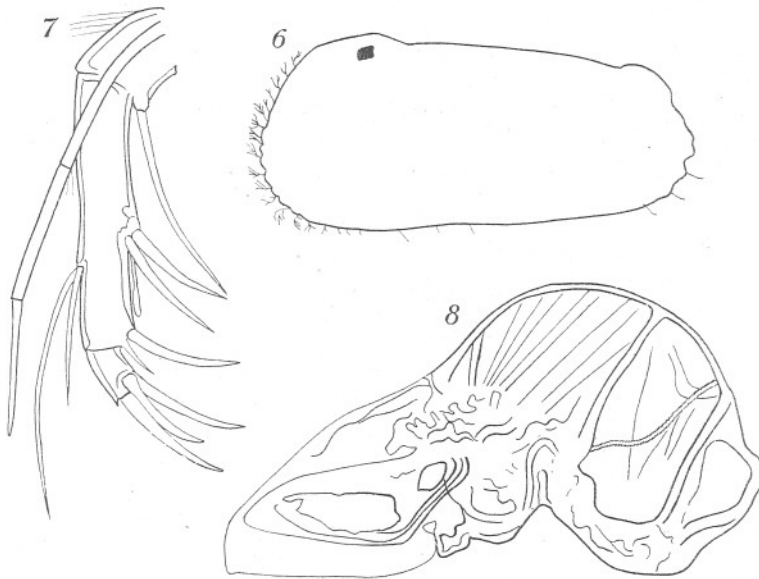
Cythereis emaciata (Brady), 1867

- 1867 *Cythere emaciata*, Brady, p. 210.
 1868 *Cythere emaciata*, Brady, p. 413.
 1874 *Cythere emaciata*, Brady, Crosskey & Robertson, p. 161.
 1889 *Cythere emaciata*, Brady & Norman, p. 159.

Description. As in the preceding species, the structure of the shell and the appendages agrees to a large extent with Skogsberg's (1928) diagnosis for the subfamily *Cythereis* Jones. The following alterations and additions may be made.

Male. Shell (Fig. 6): bristles along the anterior margin long, with several branches.

First antenna: six-segmented, of the same type as in *C. runcinata*. Relative lengths of its segments about as follows: $\frac{14}{13} : \frac{14}{8} : \frac{3.5}{5} : \frac{4}{2} : \frac{2.5}{3} : \frac{5.5}{6}$. Bristles long. Bristle of second segment twice as long as posterior side of the segment, reaches beyond the point of the distal segment. Bristle of third segment a little more than three times as long as anterior side of the segment. Claws of fourth and sixth segments of the same length as the posterior side of the two



Figs. 6-8. *Cythereis emaciata* (Brady). Male. 6. Left shell. 7. Second antenna. 8. Penis.

distal segments, the one of the fifth segment a little longer. The other bristles of fifth and sixth segments as in the preceding species. Pilosity also identical; apparently, however, no dorso-distal bunch of hairs on the first segment.

Second antenna (Fig. 7): of about the same breadth as in the preceding species. Exopodite long, divided into three segments, reaches beyond the distal point of the antenna. The relative lengths of the segments of the endopodite are about as follows: $\frac{7.5}{4} : \frac{18}{15} : \frac{3.5}{3.5}$. Bristle of first segment somewhat shorter than posterior side of the segment. Situation of anterior and posterior bristles of second segment and the length of the former as in *C. runcinata*. The posterior bristles, except the sensorial one, the postero-distal bristles and the bristles of the third segment shorter and thicker than in that species. All these bristles, except the little postero-distal one of the second segment, the sensorial

one and one of the posterior bristles of the last segment, claw-like, about two-fifths of the length of the posterior side of the second segment. Antero-distal claw of third segment about twice as long as the anterior side of this segment. Pilosity as in the preceding species.

Mandible: as in *C. runcinata*. Relative lengths of the endopodite segments as follows: $4 : \frac{6}{3} : \frac{5.5}{5.5}$. Dorso-distal bristle of first segment with short hairs.

Maxilla: without peculiarities.

Fifth limb: bristle on posterior side of protopodite swollen at the base, thin, covered with long hairs, as long as half the anterior side of the segment. Proportional lengths of the segments of the endopodite about as follows: 9.5 : 6.5 : 5. End claw as long as second segment. Other bristles as in the preceding species.

Sixth limb: bristle on posterior side of protopodite not swollen, annulated, with short hairs, as long as half the segment. Relative lengths of the endopodite segments are: 12 : 7.5 : 7. Bristle of first segment nearly as long as second segment. End claw as long as first segment.

Seventh limb: bristle on posterior side of protopodite as in the sixth limb but with only very short hairs. Relative lengths of the endopodite segments: 18 : 8.5 : 9.5. Bristle of first segment longer than second segment. End claw much longer than third segment.

Brush-shaped organ: as in the preceding species.

Penis (Fig. 8): terminal part big, triangular, with a rounded point. Vas deferens has spiral thickenings.

Female unknown.

Dimensions. The shells of the few specimens which were contained in the samples were in a very bad condition. Yet, the length seemed to be about 0.83 and the height about 0.37 mm.

Distribution. Around the British coasts, Bay of Biscay, Mediterranean.

Remarks. See *Cythereis runcinata*.

Genus *Loxoconcha* G. O. Sars, 1865

Loxoconcha guttata (Norman), 1865

1865	<i>Cythere guttata</i> , Norman, p. 19.
1865	<i>Cythere guttata</i> , Brady, p. 192.
1868	<i>Loxoconcha guttata</i> , Brady, p. 436.
1874	<i>Loxoconcha guttata</i> , Brady, Crosskey & Robertson, p. 186.
1880	<i>Loxoconcha guttata</i> , Brady, p. 120.
1889	<i>Loxoconcha guttata</i> (partim), Brady & Norman, p. 184.
1906	(<i>non Loxoconcha guttata</i> , Cushman, p. 370).

There were ten specimens in the samples, the shells of which agreed in all respects with the descriptions of *Loxoconcha guttata* (Norman). The following additions may be made.

Description. Female. Shell (Fig. 9): anterior and posterior margins with simple marginal pores and thinly set with fine hairs. Other pores on the shell few in number. Line of concrescence and inner line coincide except on the anterior and posterior margins.

Eyes: separate.

First antenna (Fig. 10): six-segmented. Proportional lengths of the segments about as follows: $\frac{10.5}{10} : \frac{10}{8} : \frac{3}{3} : \frac{4}{4} : \frac{6}{6} : \frac{6.5}{6.5}$. Bristle of second segment thick at the base, suddenly growing narrower and in the middle provided with long hairs. Bristle of third segment and dorsal bristle of fourth segment thicker than the other bristles and as long as the fourth and fifth segments put together. Lateral bristles of fourth segment somewhat shorter. Of the bristles of the fifth segment two are but slightly longer than the segment. The remaining two and the two longest bristles of the sixth segment about the length of the two distal segments put together. The short bristle of the last segment and the sensorial one of about the length of the segment.

Second antenna (Fig. 11): exopodite three-segmented, reaches to the points of the end claws. Relative lengths of the segments about as follows: $\frac{10.5}{10} : \frac{6}{2.5} : \frac{17.5}{17} : \frac{2}{2}$. Bristle of first endopodite segment as long as one-third of the anterior side of the second segment. The two bristles on the anterior side of this last segment situated on the middle of this side, the three on the posterior side at a distance of three-sevenths of this side from its distal end. Of these latter, one is very short, one reaches to the end of the segment, only the sensorial bristle reaches beyond the distal end of the antenna. Of the bristles of the anterior side one is about as long as the middle bristle of the posterior side, the other shorter. End claws long, nearly two-thirds of the second segment.

Mandible: epipodial appendage with three very long and one short bristle. Endopodite indistinctly three-segmented.

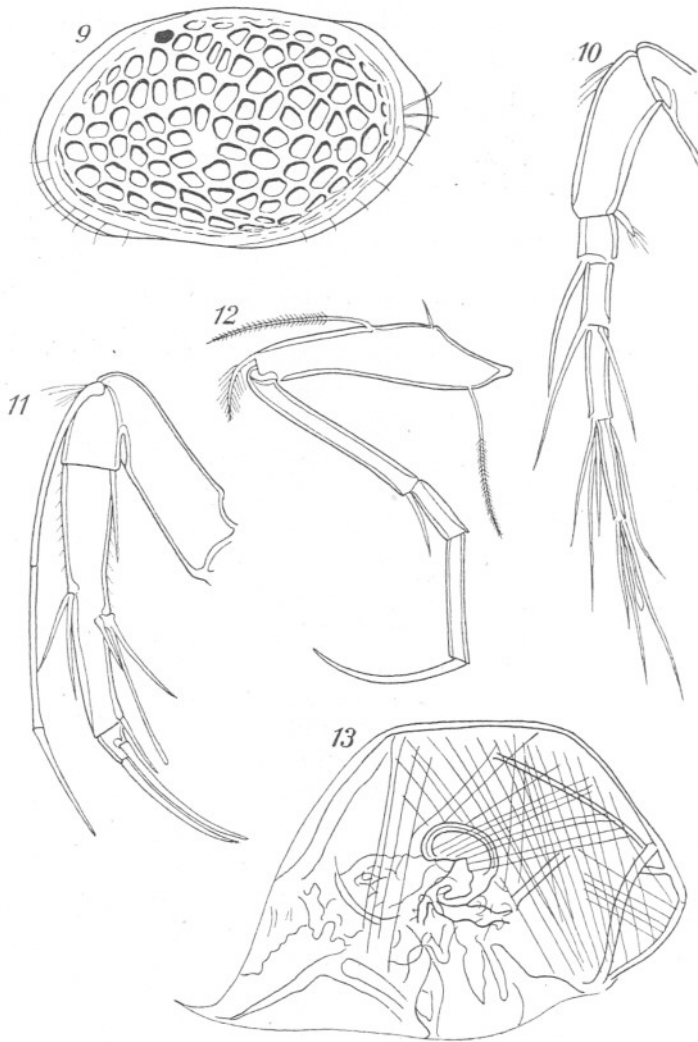
Maxilla: with the first segment of the endopodite rather prolonged. Epipodial appendage with one "aberrant" bristle.

Fifth limb: protopodite with two anterior, two antero-distal bristles and one posterior bristle. The antero-proximal bristle on all the three of the last limbs very short. The other anterior bristle reaches beyond the distal end of the segment, the posterior of about the same length. Proportional lengths of the segments of the endopodite about as follows: $13 : 5.5 : 7.5$. Bristle of first segment shorter than second segment. End claw, as on the other legs, about as long as distal segment.

Sixth limb: (Fig. 12): protopodite with two anterior bristles and with one antero-distal and one posterior bristle. The distal of the two anterior bristles and the posterior one relatively longer than on the fifth limb. Relative lengths of the endopodite segments about $17 : 5.5 : 10$. Bristle of first segment as long as second segment.

Seventh limb: protopodite as on the sixth limb. The long anterior bristle and

the posterior one shorter than the distance from the base of the first to the end



Figs. 9-12. *Loxoconcha guttata* (Norman). Female. 9. Left shell. 10. First antenna. 11. Second antenna. 12. Sixth limb.
Fig. 13. *Loxoconcha guttata* (Norman). Male. Penis.

of the segment. Relative lengths of the segments of the endopodite: 25 : 6 : 13.
Bristle of first segment longer than distal segment.

Posterior part of the back of the body with hairs.

Furca: with two bristles.

Male. Brush-shaped organ: of usual *Loxoconcha*-type.

Penis: (Fig. 13): subtriangular. Terminal part large, not clearly defined from the basal part, with prolonged, somewhat upturned point.

Dimensions.

	Length mm.	Height mm.	Breadth mm.
Female	0.60-0.63	0.35-0.36	0.33-0.35
Male	0.56-0.58	0.28-0.29	0.27-0.28

Distribution. Difficult to know exactly for reasons stated below. The species seems, however, to occur from Shetland and the British coasts down to the Bay of Biscay and Spain, probably also in the Mediterranean.

Remarks. After having regarded *Loxoconcha guttata* (Norman) and *L. granulata* G. O. Sars as two different species, Brady & Norman in their monograph (1889) united them as *L. guttata*, believing them to be only different stages of the same species, and most other authors have followed them in so doing. However, that this view is not right is already evident from the fact that the former species is not known from Scandinavia, where the latter is very common. And G. O. Sars (1928, p. 220) pointed out that these species can scarcely be identical, as the differences in the sculpture of the shell are considerable.

The resemblance between these species as regards the structure of the limbs (relative lengths of the segments, situation and length of the bristles) is, however, striking. Even the penis, which usually exhibits easily detectable and reliable characteristics, shows no noticeable differences here. The differences observed thus refer almost entirely to the shells. But since the shells of these species, belonging to a genus with very slight individual variations within the species, show very easily observable and quite constant differences, since only one of the species occurs on the Scandinavian shores, and since both occur quite constantly in the same British districts, there are nevertheless good reasons for classing *L. guttata* and *L. granulata* as two separate species.

Besides the material of *L. guttata* mentioned above, I have also examined material of *L. granulata* from the west coast of Sweden in my own collection, and of both species from the British coast. The British material is kept in the Hancock Museum at Newcastle-upon-Tyne and has been identified by G. S. Brady. I have great pleasure in thanking the keeper of this museum for his kindness in placing the material at my disposal.

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