

Note son *British Amphipoda*.—II. *Families* Leucothoidæ,  
Pardaliscidæ, and Gammaridæ (*Marine*). By the Rev.  
A. M. NORMAN, M.A., D.C.L., F.L.S.

[Plates X.-XII.]

Fam. Leucothoidæ.

Genus I. LEUCOTHÖE, Leach, 1814.

1. *Leucothöe spinicarpa* (Abildgaard).

1789. *Gammarus spinicarpus*, Abildgaard, Müller, Zool. Dan. vol. iii.  
p. 66, pl. xciv. figs. 1, 2.  
1804. *Cancer* (*Gammarus*) *articulatus*, Montagu, Trans. Linn. Soc.  
vol. iii. p. 70, pl. vi. fig. 7.  
1814. *Leucothöe articulosa*, Leach, Edinb. Encycl. vol. vii. p. 403.  
1853. *Leucothöe denticulata*, Costa, Crust. Amphip. del Regno di Napoli,  
p. 226.  
1862. *Leucothöe articulosa*, Bate & Westw. Brit. Sessile-eyed Crust.  
vol. i. p. 271.  
1870. *Leucothöe spinicarpa*, Boeck, Crust. Amphip. bor. et arct. p. 78.  
1876. *Leucothöe spinicarpa*, Boeck, De Skand. og Arkt. Amphip. p. 507.

*Hab.* Although as often perhaps found free, this species is  
commonly met with in the branchial sac of Ascidians (*men-  
tula*, *venosa*, *sordida*, &c.). Shetland; the Minch; Skye;  
*Ann. & Mag. N. Hist.* Ser. 6. Vol. iv. 8

Oban; Loch Fyne; Firth of Clyde; Lulworth, Dorset; Jersey (*A. M. N.*); Banff (*T. Edward*); Polperro (*Laughrin*): *Mus. Norm.*

*Distribution.* Adriatic (*Heller and Claus*): *Mus. Norm.* Naples (*Costa*); Marseilles (*Catta*); Western France (*M.-Edwards &c.*); South and West Norway (*M. Sars &c.*); Azores (*Barrois*).

## 2. *Leucothoë furina* (Savigny).

1809. *Lycesta furina*, Savigny, Descr. de l'Égypte, Crust. pl. ii. fig. 2.

1830. *Leucothoë furina*, M.-Edwards, Ann. des Sci. Nat. vol. xx. p. 381.

1840. *Leucothoë furina*, M.-Edwards, Hist. Nat. des Crust. vol. iii. p. 57, pl. xxix. fig. 14.

1857. *Leucothoë procera*, Bate, Ann. & Mag. Nat. Hist. vol. xix. p. 146.

1862. *Leucothoë furina*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 275.

*Hab.* The specimen described by Bate and Westwood was taken by the late Mr. T. Edward at Banff. I know of no other British examples.

*Distribution.* Mediterranean (*Savigny &c.*); Western France (*Chevreaux &c.*).

I recorded specimens under this name in my 'Shetland Dredging Report' of 1868; but they seem to differ in so many particulars that I now describe them under the name *Leucothoë imparicornis*.

Chevreaux states that this species is always found free and not in Ascidians or sponges; he adds:—"On reconnaît facilement cette espèce à la forme toute particulière du telson, et surtout à un caractère fort net que Sp. Bate n'a pas signalé: le bord inférieur du troisième segment de l'abdomen se termine en arrière par un petit crochet aigu et recourbé tandis que ce bord est carrément tronqué chez *L. spinicarpa*."

## 3. *Leucothoë imparicornis*, n. sp. (Pl. X. figs. 1-4.)

*Antennæ* (fig. 1) feeble and very short, not longer, or only a little longer than the first two joints of the peduncle of antennules; in the specimen figured the penultimate joint only reaches to the end of the first joint of antennules, in other specimens it is slightly (but only slightly) longer, penultimate joint the longest; flagellum of seven or eight articulations, subequal in length to last joint of peduncle. *First gnathopods* (fig. 2) having the hand narrow and the finger short, about equal to one fourth of the length of the hand. *Second gnathopods* (fig. 3) elongated, pyriform, dorsal margin slightly concave

distally, palm rather waved, wholly devoid of teeth or tubercles. *Telson* (fig. 4) forming three fourths of an ellipse, sides gradually sloping to the well-rounded extremity. Length 7 millim.

*Leucothoë imparicornis* differs from the described British species in the very small size of the antennæ, in the narrow hand and short nail of the first gnathopods. The form of the hand approaches that of *L. furina*, but the palm has no teeth; the telson also distinguishes it from the species just named.

*Hab.* St. Magnus Bay and Balta Sound, Shetland (*A. M. N.*).

## Genus II. *Eusirus*, Krøyer, 1845.

### *Eusirus longipes*, A. Boeck.

1860. *Eusirus longipes*, Boeck, Forh. ved de Skand. Naturf. p. 656.

1862. *Eusirus helvetica*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 155, pl. xxix. fig. 2.

1862. *Eusirus helvetica*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 207.

1866. *Eusirus bidens*, Heller, Amphip. des Adriat. Meeres, p. 32, pl. iii. fig. 19.

1868. *Eusirus helvetica*, Norman, Last Report Dredging Shetland Isles, Brit. Assoc. Rep. p. 281.

1872. *Eusirus longipes*, A. Boeck, De Skand. og Arkt. Amphip. p. 504, pl. xix. fig. 4.

First two segments of pleon with a central dorsal tooth; hinder margin of third segment denticulately serrated throughout its entire length, serrations of lower portion pointing upwards, but those near the summit pointing downwards\*. Length of thigh of last three peræopods measuring scarcely more than one fifth the length of the attenuated limbs. Telson cleft to not more than one third of its length. Thighs of last three peræopods strongly serrated posteriorly. Length 14 millim.

*Hab.* Shetland; Skye; Firth of Clyde; off Berwick (*A. M. N.*); Aberdeenshire (*Dawson*): *Mus. Norm.*

*Distribution.* West Norway (*G. O. Sars*): *Mus. Norm.* South Norway (*G. O. Sars*); Bay of Biscay (*Prince de Monaco*); Adriatic (*Heller*).

\* In *Eusirus cuspidatus*, Krøyer (from Greenland, 'Valorous' Exped. 1876, and off Halifax, Nova Scotia (*S. I. Smith*): *Mus. Norm.*), the hinder margin of third segment is also denticulately serrated; but in that species the denticulations throughout the entire length point upwards.

## Genus III. LILLJEBORGIA, Bate, 1862.

(= *Iduna*, A. Boeck, 1860 (name in use), = *Microplox*, Lilljeborg, 1865 \*.)

1. *Lilljeborgia pallida*, Bate. (Pl. X. fig. 10.)

1855. *Gammarus pallidus*, Bate, Brit. Assoc. Rep. p. 55.  
 1859. *Gammarus brevicornis*, Bruzelius, Skand. Amphip. Gamm. p. 62, pl. iii. fig. 11.  
 1860. *Iduna brevicornis*, A. Boeck, Forh. ved de Skand. Naturf. 8de Møde, p. 646.  
 1862. *Lilljeborgia pallida*, Bate, Cat. Amphip. Brit. Mus. p. 118, pl. xx. fig. 5.  
 1862. *Lilljeborgia pallida*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 203.  
 1876. *Lilljeborgia pallida*, A. Boeck, De Skand. og Arkt. Amphip. p. 497, pl. xviii. fig. 9.

The *Gammarus pallidus* of Goës is *Lilljeborgia fissicornis*, M. Sars, and not the present species.

*Hab.* Oban; off Cumbræ, 20–25 fath. (*A. M. N.*): *Mus. Norm.*

*Distribution.* Tromsø (*S. Schneider*): *Mus. Norm.* South and West Norway, 50–300 fath. (*G. O. Sars*); Sweden (*Bruzelius*); Finmark (*Lovén*); South-west France (*Chevreau &c.*); Mediterranean (*Catta &c.*).

2. *Lilljeborgia picta*, n. sp. (Pl. X. figs. 5–9.)

*Antennules* (fig. 5) shorter than peduncle of antennæ, secondary appendage consisting of only three articulations, (the distal very minute), subequal in length to two joints of the flagellum. *Antennæ*: last joint of peduncle two thirds length of the penultimate, flagellum eight-jointed, rather longer than last joint of peduncle. *First gnathopods* with wrist not produced into a calx, the hand widening gradually from base to extremity; palm oblique, well arched, scarcely occupying more than one third of total length; anterior portion of hinder margin with about six transverse rows of simple setæ and a small spine at commencement of palm. *Second gnathopods* (fig. 7): wrist with no produced calx; hand ovate, palm occupying half the length, and forming with the anterior portion a continuous arch, so that greatest width is at the commencement of the palm, where there is a single spine; the margin anterior to this with fascicles (about seven) of

\* Lilljeborg, 'On *Lysianassa magellanica* and Crust. *Lysianassina*,' p. 19.

divaricating simple setæ, which have hamate tips; outer margin of palm (fig. 7) furnished with regularly arranged long setæ, inner margin (fig. 8) with stiff bent setæ, each of which is furnished at the bend with two or three lateral prongs; alternating with these stiff setæ are a series of short, blunt-topped spinules, and another series is seen behind these of a similar character. Two anterior pair of *peræopods* with the dactylus scarcely more than one fourth length of preceding joint. Last *peræopods* (fig. 9) with meros and carpus subequal, propodos slightly longer, of good breadth (but not flattened out, as in *L. fissicornis*), with four pairs of spines on the anterior and two or three setæ on posterior margin; finger short, not exceeding one fourth of length of propodos, gradually attenuated, two spines on the propodos at its base. *Telson* longer than peduncle of last uropods, and these have the branches very broad and foliaceous. As in *L. pallida* the first, second, fourth, and fifth segments of pleon have a central dorsal tooth. The colouring of the two specimens is alike and remarkable, the ground-colour pale with markings as follows of deep purple (at least that is their colour now in specimens which were mounted fresh from the sea twenty-three years ago):—Antennæ and antennules each with a spot on the last joint of peduncle; the purple colour commences on the head, across which it passes obliquely from behind forwards to the mandibles; thence the colour is suffused over all parts except the distal joints of the anterior *peræopods* until the middle of the last segment of *peræon*; here it passes obliquely forwards, and is continued through the thighs of the fourth *peræopods*, leaving the thighs of the last *peræopods* white, except that distally on them is a small spot of the same colour, which also appears in a spot near the base of every joint (except ischium and propodos) of three posterior *peræopods*, as well as in blotches on the back of second and two following segments of pleon, and stainings at the base of the pleopods attached to these segments, on the distal portion of first and second and on the basal portion of the last uropods. Length 6 millim., exclusive of antennæ.

The absence of a produced calx to the wrist of the two gnathopods will, apart from all other characters, at once serve to distinguish this species from *L. pallida*, *L. Kinahani*, and *L. fissicornis* (M. Sars). In this respect it resembles *L. æquicornis*, G. O. Sars; but from that species it may be known by the different antennules, the much smaller wrists of the gnathopods, longer and less flattened propodos and shorter and stronger nail of last *peræopods*, and by the four dorsal teeth on the pleon instead of one only.

*Hab.* Two specimens taken at Guernsey, 1865 (*A. M. N.*):  
*Mus. Norm.*

I figure the terminal joints of the last peræopods of the four North-European species with which I am acquainted.

*L. pallida*, Bate (Pl. X. fig. 10).—Propodos longer than carpus by about one fourth, its hinder margin with groups of very long setæ; dactylus exceedingly long and slender, fully two thirds as long as propodos.

*L. fissicornis* (M. Sars) (fig. 11).—Propodos nearly half as long again as carpus, with single spines on front margin; dactylus scarcely more than one fourth its length.

*L. æquicornis*, G. O. Sars (fig. 12).—Propodos peculiarly flattened, somewhat fusiform, widest in the middle, only slightly longer than carpus; dactylus flattened, lanceolate, equal in length to two thirds of propodos.

*L. picta*, Norman (fig. 9).—Propodos slightly longer than carpus, front margin with three or four pairs of spinules; dactylus short, scarcely exceeding one fourth of the length of propodos.

### 3. *Lilljeborgia Kinahani* (Bate).

1862. *Phædra Kinahani*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 119, pl. xxi. fig. 1.

1863. *Phædra Kinahani*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 211.

1887. *Lilljeborgia Kinahani*, Chevreux, Nouvelles espèces de Crust. Amphip. du Sud-ouest de la Bretagne, p. 2.

*Hab.* The British habitat of the type was "Nullipore bank off the coast of Cumbrae," where it was found by Mr. D. Robertson. Being anxious to see the type I applied to Mr. Robertson; but he found that the specimen had been mislaid. Dredged near Hope's Nose, Devonshire, Sept. 1874 (*Stebbing*).

*Distribution.* Coast of Brittany (*Chevreux*).

It is difficult to understand why this species was not placed by Bate and Westwood in the genus *Lilljeborgia*, to which they refer in their description, comparing *P. Kinahani* with it and pointing out similarities to *L. pallida*.

Chevreux says of it:—"Cette forme, décrite par Sp. Bate sous le nom de *Phædra Kinahani* d'après un spécimen dragué sur un banc de Nullipores, près de Glasou, n'a jamais été signalée depuis. Je me suis rangé à l'opinion de Boeck, qui pense qu'elle doit appartenir au genre *Lilljeborgia*. Elle est en effet très voisine de *L. pallida*, Sp. Bate, et n'en diffère guère que par sa petite taille, et par la forme de la main de ses deux premières paires de pattes thoraciques: sa coloration est à peu près semblable à celle de l'espèce voisine, la

partie antérieure du corps étant teintée de violet, tandis que la partie postérieure est du blanc rosé. Le telson, que l'auteur anglais n'a pu observer complètement, est fendu jusqu'à la base."

### Fam. Pardaliscidæ.

#### Genus NICIPPE, Bruzelius, 1859.

##### *Nicippe tumida*, Bruzelius.

1859. *Nicippe tumida*, Bruzelius, Skand. Amphip. Gamm. p. 99, pl. iv. fig. 19.

1868. *Nicippe tumida*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. ii. p. 414, pl. xxi. figs. 4-6.

1868. *Nicippe tumida*, Bate & Westw. Brit. Sessile-eyed Crust. vol. ii. p. 511.

1872. *Nicippe tumida*, A. Boeck, De Skand. og Arkt. Amphip. p. 493.

*Hab.* Sound of Skye, 1866 (*A. M. N.*): *Mus. Norm.*

*Distribution.* South and West Norway (*G. O. Sars and Bruzelius*); Greenland (*H. J. Hansen*).

### Fam. Gammaridæ.

#### Genus I. AMATHILLA, Bate & Westwood, 1863.

(= *Amathia*, Rathke, 1837, name in use.)

##### *Amathilla Sabini* (Leach).

1819. *Gammarus Sabini*, Leach, Appendix to Ross's First Voy. edit. ii. p. 178.

1850. *Devamine carinospinosa*, White, Cat. Brit. Crust. Brit. Mus. p. 49.

1855. *Amathia carinata*, Bate, Brit. Assoc. Rep. p. 58.

1855. *Amphithoë Moggridgei*, Bate, Ann. & Mag. Nat. Hist. ser. 2, vol. vii. p. 318, pl. x. fig. 10.

1862. *Graia imbricata*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 101, pl. xvi. fig. 4 (junior).

1862. *Amathia Sabini*, id. ibid. p. 197, pl. xxxv. fig. 9.

1862. *Amathia carinospinosa*, id. ibid. p. 199, pl. xxxv. fig. 11.

1862. *Graia imbricata*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 152.

1862. *Amathilla Sabini*, id. ibid. vol. i. p. 361.

1870. *Amathilla Sabini*, A. Boeck, Crust. Amphip. bor. et arct. p. 136.

1872. *Amathilla Sabini*, A. Boeck, De Skand. og Arkt. Amphip. p. 406.

1874. *Amathilla Sabini*, Buchholz, Die zweite Deutsche Nordpolarfahrt 1869-70, vol. ii. p. 346, pls. viii. and ix. fig. 1.

1884. *Amathilla Sabini*, Blanc, "Die Amphip. der kieler Bucht," Nov. Act. Leop. Akad. xlvii. no. 2, p. 73, pl. iii. figs. 78 and 79, and pl. iv. figs. 1-2.

As observed by Bate northern specimens greatly exceed in size those from southern localities. A Spitzbergen specimen in my collection measures (exclusive of antennæ) 37 millim. in length; large British examples measure 23 millim., while in a series from Cornwall the greatest length is only 12 millim.

The larger the specimen the more strongly marked are the sculpture and elevation of both dorsal spines and carina. In its younger stages there are no dorsal carinal teeth, the eye is small and nearly round, and the state is accurately represented by Bates's figure of *Graia imbricata*. But *Graia imbricata* is described and figured as having no secondary appendage to the antennules. The young always have such an appendage, though it is reduced to two articulations. My Northumberland specimens of *Graia imbricata*, taken by the late Mr. Alder and recorded by Bate, were preserved dry, which may account for the appendage having been overlooked; they were undoubtedly the young of the present species. It is not improbable that Mr. Webster's specimens were similarly preserved, as that gentleman sent to myself Amphipods only in that state. The fine figures of Buchholz may be consulted with advantage, and the difference in armature of peræopods, uropods, &c. there shown in the young and the adult have their warning lesson against the establishment of species on slight variations\*.

*Hab.* Mostly taken in tide-pools among weeds; Shetland; Firth of Clyde; Durham and Northumberland coasts; the Humber; Devon and Cornwall (*A. M. N.*): *Mus. Norm.* Liverpool Bay (*A. O. Walker*).

*Distribution.* Spitzbergen (*Lovén*); Tromsø (*Schneider*): *Mus. Norm.* Greenland (*Ross &c.*); Siberia (*Stuxberg*); Norway (*Rathke &c.*); Sweden (*Lilljeborg*); Denmark (*Meinert*); Kiel (*Blanc*); Western France (*Chevreaux &c.*); Boulogne (*Chevreaux*); North-east America (*Stimpson*).

## Genus II. MELPHIDIPPA, Boeck, 1870.

*Mandibles* with a short and very narrow palp, third joint shorter than the second. *First maxillæ* having the inner lamina moderately broad but not long, inner margin with numerous plumose setæ. *Maxillipeds* with narrow elongated palps; outer lamina short, broad, with a few small teeth on the inner margin. *Form* elongated, especially the pleon; segments of pleon armed on the hinder margin with teeth of

\* British young examples in my collection 3-4 millim. long exactly agree with Buchholz's figure of that stage.

greater or less size. *Epimera* rather small. *Antennules* and *antennæ* long and slender, subequal in length. *Gnathopods* of both pairs long and slender; hands small, subchelate. *Peræopods* also long and slender, the three hinder pairs with the thighs only slightly dilated. *Last uropods* much longer than the two preceding pairs. *Telson* long, more or less deeply cleft. (*Boeck*.)

### *Melphidippa macra*, Norman.

(Pl. X. fig. 14, and Pl. XII. figs. 4-7.)

1868. *Atylus macer*, Norman, Last Report Dredging Shetland, Brit. Assoc. Rep. p. 280.

1870. *Melphidippa longipes*, A. Boeck, Crust. Amphip. bor. et arct. p. 139.

1876. *Melphidippa longipes*, Boeck, De Skand. og Arkt. Amphip. p. 414, pl. xxiv. fig. 5.

*Pleon* having the posterior margin (Pl. X. fig. 14) of the first five segments serrated right across the back, with a large central hastate tooth, which increases in size from the first to the fourth segment, where it attains its greatest development. *First gnathopods* (Pl. XII. fig. 4) with wrist and hand subequal in length, somewhat fusiform, the former the broader; hand widest in the middle, front margin gently convex, no defined palm, finger half as long as the hand, slender. *Second gnathopods* (Pl. XII. fig. 5) with wrist and hand subequal, long, and narrow; hand narrow, fully four times as long as broad, margins subparallel, with four or five long setæ on dorsal and about five fascicles of shorter setæ on front margin; palm oblique, nail with a seta on outer and a group of about three setæ on inner margin. *Peræopods* excessively long and delicate, basos of posterior pairs (Pl. XII. fig. 6) very long, narrow, linear; meros and carpus both very long and slender (Pl. XII. fig. 7) and both longer than the long propodos; nail very slender, half as long as the propodos, with a single seta beyond the middle on the inner margin. *Uropods* very long, the last pair with peduncle and branches subequal, the total length equal to four segments of pleon (*i. e.* third to sixth). The *eye* is situated unusually low down and opposite the base of the antennæ. The antennules and antennæ are broken off in my specimens; Boeck says of the former "flagello accessorio brevissimo, fere obsoleto," and thus describes the telson:—"Appendix caudalis ultra medium fissa; laciniis in apice rotundatis." Length 5 millim.

*Hab.* St. Magnus Bay, Shetland, 60 fath., muddy bottom, 1867 (*A. M. N.*).

*Distribution.* Hardanger Fiord and Aalesund, Norway, 80-100 fath. (*G. O. Sars*); Christiania Fiord and Hangesund (*Boeck*).

The specimens found by me had all lost their antennules and antennæ, and, as genera were in 1868 understood, appeared to me to be most nearly allied to *Atylus*. *Melphidippa* belongs to the Gammaridæ, which family has a secondary appendage to the antennules. In *M. borealis*, *Boeck*, and *M. spinosa*, *Goës*, this appendage is well developed, consisting of two or three articulations; but it will be seen that *Boeck* states that in the present species it is rudimentary, "fere obsoleto;" indeed, his figure shows no trace of it.

### Genus III. MEGALUROPUS, Norman, 1889.

Dr. P. P. C. Hoek, in his 'Crustacea Neerlandica,' has just described the type of this genus, and has used my name, which was MS. at the time he wrote, an act of the greater courtesy, inasmuch as I was unaware that he had met with the form, which, however, has been long known (twenty-five years) to myself and friends in Britain. Dr. Hoek has placed the genus in the family Pardaliscidæ, a position which in my opinion it cannot retain. The mouth-organs are quite different from those of *Pardalisca*. It does not, moreover, agree in the following very important characters:—"Antennæ superiores . . . articulis anterioribus apud marem coalitis et articulum magnum, intus fasciculis setarum instructum, junctis formantibus"—or with the following particulars:—"Pedes tertii et quarti paris [=first and second peræopods] validi, articulo tertio brevi. Pedes trium parium ultimorum . . . unguibus longis." Had Dr. Hoek been acquainted with the male or fully seen the mouth-organs he would not have assigned the genus to the Pardaliscidæ. His figures of the mouth-organs are very good as far as they go, except that the mandible was evidently seen by him in his dissection in an unsatisfactory position, while my own drawing also was defective as representing a broken specimen. I now give (Pl. X. figs. 15 and 16) illustrations of that member in two positions. The inner lamina (Pl. X. fig. 17) of the maxillipeds also escaped his observation, while the outer lamina and palp are accurately figured; this inner lamina is furnished at the extremity with about four blunt teeth, very similar in character to those of the outer lamina, and short setæ, and on the distal portion of the side are a few plumose setæ. The inner lamina of the first maxillæ is very small, rounded, and bearing two or three setæ.

### *Megaluropus agilis*, Norman. (Pl. X. figs. 15-17.)

1889. *Megaluropus agilis*, Norman, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 446, pl. xviii. figs. 1-10; Hoek, Crustacea Neerlandica, Tijdschrift der Nederlandsche Dierkundige Vereeniging, 2de Reeks, Dec. ii. p. 28, pl. vii. fig. 7, pl. viii. fig. 3, pl. ix. fig. 3.

*Distribution.* Holland (*Hoek*).

*Female.*—The second gnathopod of the female is well figured by *Hoek*. It is not ovate, as in the male, but narrow and not more than half the breadth of the wrist, widest and slightly angled below at half its length.

*Male.*—The figure given by me of the second gnathopod represents that of the male. The eye is considerably larger than in the female and passes upwards behind the base of the antennules. Antennules and antennæ longer, the two basal joints of the former and the three distal joints of the peduncle of the latter hirsute, with short stiff setæ. Antennules shorter than peduncle of antennæ, second joint longer than the first, third very short, subequal to first joint of flagellum; flagellum consisting of eight articulations, without calceola, but each articulation furnished with one of the long strap-formed membranaceous appendages or "olfactory papillæ" often met with in this situation; secondary appendage two-jointed, about as long as the first articulation of the flagellum. Antennæ with third and fourth joints stout and the latter and the fifth joint very long and subequal; flagellum of sixteen very long and slender articulations, without calceola or strap-shaped appendages.

### Genus IV. ELASMOPUS, Costa, 1853.

*Mandibles* with third joint of palpus much larger than the second, curved and very setose. *Second maxillæ* having the inner lamina ovate, ending in setæ. *Antennules* longer than antennæ, the peduncle elongated. *Second gnathopods* longer than the first. *Peræopods* of last three pairs with the joints very broad and outspread. *Uropods* of last pair with branches of equal length and broad. *Telson* deeply cleft.

The chief points by which this genus is distinguished from *Mæra* are the very broad joints of the peræopods, and the branches of the last uropods being short, equal, and abruptly truncated apically.

*Elasmopus rapax*, Costa. (Pl. XI. figs. 1-8.)

1853. *Elasmopus rapax*, Costa, *Crust. Amphip. del Regno di Napoli*, p. 212, pl. iv. fig. 5, ♂.  
 1855. *Gammarus brevicaudatus*, Bate, *Rep. Brit. Assoc.* p. 58, ♀.  
 1862. *Megamæra brevicaudata*, Bate, *Cat. Amphip. Crust. Brit. Mus.* p. 228, pl. xl. fig. 2.  
 1862. *Megamæra brevicaudata*, Bate & Westw. *Brit. Sessile-eyed Crust.* vol. i. p. 409, ♀.  
 1866. *Mæra brevicaudata*, Heller, *Amphip. des Adriat. Meeres*, p. 42, pl. iii. figs. 27, 28, ♂ ♀.  
 1870. *Elasmopus latipes*, Boeck, *Crust. Amphip. bor. et arct.* p. 132.  
 1876. *Elasmopus latipes*, Boeck, *De Skand. og Arkt. Amphip.* p. 393, pl. xxiv. fig. 1, ♂: 1887. Chevreux, *Crust. Amphip. du Sud-ouest de la Bretagne*, p. 20, and woodcut 3, ♂.  
 1888. *Mæra rapax*, Th. Barrois, *Cat. des Crustacés marins recueillis aux Açores*, p. 39, pl. iv. figs. 1-4, and woodcuts, ♂ ♀.

*Hab.* In my 'Shetland Dredging Report' this species is recorded thus:—"A specimen, determined by Mr. Bate, dredged in 4 fathoms, Brassay Sound, 1861." That specimen I do not remember to have ever seen; it certainly is not in my collection now, nor have I seen any British specimen. On Bate and Westwood's authority we have the following:—Plymouth (*Bate*); Moray Firth (*Rev. G. Gordon*).

*Distribution.* Adriatic (*Heller*): *Mus. Norm.* Naples (*Costa*); Azores (*Barrois*); South-west of France (*Chevreux*); Norway? (*Boeck*).

Chevreux tells us that *Elasmopus rapax* is a commensal of *Maia squinado*, and states that in some places it is more abundant on that crab than its well-known companion *Isœa Montagu*. As, however, *Maia squinado* is not known in either the Moray Firth, Shetland, or Norway, *Elasmopus*, if found in these localities, must there forego the friendship.

I give figures taken from Adriatic specimens which will for the most part speak for themselves. But it is desirable to call attention to the variation in form of the hand in the second gnathopod of the male. I give figures (Pl. XI. figs. 3-5), all to the same scale, of this organ in three specimens of different size. The finger closes, as has been described by Barrois, into a hollow on the inner face of the hand, at the proximal end of which is a tooth-process (*a*). This hollow, it will be seen in the youngest specimen, is ovoid, and the hand itself is nearly oblong; with increasing age the hand becomes more pyriform, narrowing distally, the hollowed space longer and narrower, and the portion of the hand anterior to the commencement of the hollow shorter in proportion to that beyond it. As regards the spines and tubercles, in none of my specimens is the tooth-process (*a*) in

such a situation that it can be seen (as in Barrois's figured specimen) when the hand is viewed from the outside, and Costa's figure might very fairly represent the external aspect of the hand of such an example as that figured here as fig. 4, provided the tubercle (*c*) was not quite so prominent. The tubercle (*b*) is present in all three specimens and is tipped with short blunt spines; but the tubercle (*c*) is not developed in fig. 3; is small in the next size (fig. 4), but is largely developed in the most mature form (fig. 5).

A comparison of these figures with each other and with those given by other authors will show that there must be considerable latitude allowed for variation in the exact armature of this limb; the finger increases in comparative length with age and is more strongly bent in the younger specimens than in the mature.

The hand of the second gnathopods (Pl. XI. fig. 2) in the female is more regularly ovate, the finger closes on the inner face, but there is no groove, the finger impinging against a few spines on the surface.

The species is readily known from other British Amphipods by the characters of the telson (fig. 8), the remarkable last uropods (fig. 7), and the broadly expanded joints of the hinder peræopods (fig. 6).

Stebbing has described two more species of this genus in the 'Challenger' Report. The *E. subcarinatus*, Haswell, may at once be distinguished by the very different telson, and *E. delaplata*, Stebbing, by the difference in the last uropods. The general form of the second gnathopod is remarkably alike in the three species.

The illustrations of this species are to many scales of enlargement. The peræopod (fig. 6) is the least magnified; the illustrations of second gnathopods (♂) (figs. 3, 4, 5) are more magnified; those of the gnathopods of female and of last uropods (figs. 1, 2, 7) are more magnified than the last, and the telson (fig. 8) is the most enlarged of all.

## Genus V. MÆRA, Leach, 1814.

(= *Megamæra*, Bate, *Ceradocus*, Costa, and *Leptochoë*, Stimpson.)

1. *Mæra othonis* (H. Milne-Edwards).

1830. *Gammarus othonis*, H. Milne-Edwards, *Ann. des Sc. Nat.* vol. xx. p. 373, pl. x. fig. 11, ♀.  
 1847. *Gammarus longimanus* (Leach, MS.), Wm. Thompson, *Ann. & Mag. Nat. Hist.* ser. 1, vol. xx. p. 242, ♂.  
 1847. *Gammarus elongatus*, Frey and Leuckart, *Beitr. zur Kennt. wirbell. Thiere*, p. 160.

1859. *Gammarus laevis*, Bruzelius, Skand. Amphip. Gamm. p. 60, pl. ii. fig. 10, ♂ ♀.  
 1863. *Megamæra longimana*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 403, ♂.  
 1863. *Megamæra othonis*, iid. ibid. p. 405, ♀.  
 1868. *Mæra longimana*, Norman, Last Report Dredging Shetland, Brit. Assoc. Rep. p. 284, ♂ ♀.  
 1876. *Mæra longimana*, Boeck, De Skand. og Arkt. Amphip. p. 382, ♂ ♀.

The *Gammarus othonis*, M.-Edwards, and *Gammarus longimanus*, Leach, MS., are female and male of one species, and the first name has precedence.

*Hab.* Shetland; the Minch; Sound of Skye; Oban; Loch Fyne; Firth of Clyde, many places; Northumberland and Durham coasts; Guernsey; Roundstone, Ireland (*A. M. N.*); Banff (*T. Edward*); North-east Scotland (*Dr. Day*): *Mus. Norm.* Salcombe, Devon (*Stebbing*); Liverpool Bay (*G. H. Fowler*).

*Distribution.* Bohuslän (*Bruzelius*); Moss, Norway (*Boeck*); Western France (*M. Dolfuss*, fide *Chevreaux*); Marseilles (*Marion*); Heligoland (*Frey and Leuckart*).

## 2. *Mæra grossimana* (Montagu).

1804. *Cancer (Gammarus) grossimanus*, Montagu, Linn. Trans. vol. ix. pl. iv. fig. 5.  
 1814. *Mæra grossimana*, Leach, Edinb. Encyclop. vol. vii. p. 403.  
 1830. *Gammarus Impostii*, H. Milne-Edwards, Ann. des Sc. Nat. vol. xx. p. 368.  
 1862. *Mæra grossimana*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 350, ♂.  
 1866. *Mæra Donatoi*, Heller, Beitr. Amphip. des Adriatischen Meeres, p. 41, pl. iii. fig. 26, ♀.  
 1885. *Mæra Donatoi*, Carus, Prodr. Faunæ Mediterraneæ, p. 414, ♀.  
 1885. *Mæra grossimana*, id. ibid. p. 414, ♂.  
 1888. *Mæra grossimana*, Th. Barrois, Cat. des Crust. marins rec. aux Açores, p. 38, pl. iii. fig. 7, ♀.

Prof. Th. Barrois has rightly pointed out that the *Mæra Donatoi*, Heller, is the female of this species. The female, as found in our seas, exactly accords with it. That sex differs from the male chiefly in the form of the hand of the second gnathopods, which widens rather more distally and has the palm less irregular, being simply crenulated throughout and edged with small spines (as in male); the strong finger is similar to that of the male in being furnished on the upper margin with a row of setæ, but is without cilia on the lower margin.

*Hab.* So far as I am aware *Mæra grossimana* is confined to the southern part of our seas, Jersey, Guernsey, and Herm;

Falmouth, Torbay, Salcombe, and Starcross, Devon (*A. M. N.*).

*Distribution.* Adriatic (*Claus*): *Mus. Norm.* Many places in the Adriatic (*Grube and Heller*); Marseilles (*Marion*); Western France and Azores (*Th. Barrois*).

Mr. Thomas Scott ('Sixth Annual Report Fishery Board of Scotland,' 1888, p. 239) has recorded this species from the Firth of Forth; but he subsequently sent me the specimen for examination, and it proved to be *M. Loveni*.

## 3. *Mæra Batei*, Norman.

1868. *Mæra Batei*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. ii. p. 416, pl. xxii. figs. 1-3.  
 1868\*. *Megamæra multidentata*, Bate & Westw. Brit. Sessile-eyed Crust. vol. ii. p. 515.

*Hab.* The types were dredged off St. Martin's Point, Guernsey, in 1865 (*A. M. N.*); off Puffin Island, Liverpool Bay (*G. H. Fowler*!).

*Distribution.* Off Lorient, Western France (*Chevreaux*).

## 4. *Mæra semiserrata* (Bate).

1862. *Megamæra semiserrata*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 226, pl. xxxix. fig. 6; Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 401.  
 1869. *Mæra semiserrata*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. iii. p. 359.

*Hab.* Oban, 1877; Salcombe, Devonshire, 1875; Roundstone, Ireland, 1874; off St. Martin's Point, Guernsey, 1865 (*A. M. N.*); Clifden Bay, Connemara (*G. S. Brady*): *Mus. Norm.* Cumbrae, Scotland (*D. Robertson*!).

*Distribution.* Western France (*Chevreaux*).

## 5. *Mæra Loveni* (Bruzelius).

1859. *Gammarus Loveni*, Bruzelius, Skand. Amphip. Gamm. p. 59, pl. ii. fig. 9.  
 1865. *Gammarus Loveni*, Goës, Crust. Amphip. maris Spetsb. p. 14.  
 1862. *Mæra Loveni*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 193, pl. xxxv. fig. 1.  
 1868. *Mæra Loveni*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. ii. p. 416, pl. xxi. figs. 11, 12.  
 1870. *Mæra Loveni*, A. Boeck, Crust. Amphip. bor. et arct. p. 128.  
 1876. *Mæra Loveni*, A. Boeck, De Skand. og Arkt. Amphip. p. 378.

Form long and slender. *Epimera* very short, rounded

\* The part in which this description was published, though dated 1868, was not published until 1869, and contains at p. 530 a reference to the previously published *Mæra Batei*.

below, the first pointed in front. *Pleon* with dorsal margins smooth, not spined; second and third segments with infero-posteal angles produced into a spine-like point. *Antennules* with first two joints of peduncle remarkably long, the second slightly longer than the first, third not one third the length of the second; flagellum of 17-24 articulations, secondary appendage five-jointed, subequal in length to four joints of flagellum. *Antennae* about equal in length to the peduncle of the antennules; fourth joint longer than fifth; flagellum short, subequal in length to last joint of peduncle. *First gnathopods* with subtriangular wrist; hand subovate, wider at the extremity than at the base, subequal in length to the wrist, palm convex, scarcely defined; finger strong, slightly curved, simple, with setae on the outer and cilia on the inner margin. *Second gnathopods* having the meros produced below into a spine-point; wrist subtriangular, widening much distally; hand of moderate size, subquadrate, length to breadth as 5 to 3, widening slightly to the palm; palm only very little oblique, defined by a long spine, crenulated or toothed, and edged with a few spinules. *Pereopods* all slender, with very long linear thighs, which in all the limbs are the longest joints; thighs of last three pairs gradually increasing in breadth, but that of last pair about four times as long as broad, its margins with distant serrulations; nails of moderate length and acute. *Last uropods* with very long lanceolate branches, about three times the length of the peduncle. *Telson* cleft to two thirds its length, cleft widely open, each apex ending in two spine-points and a cilium. Length 18-22 millim.

*Hab.* Sound of Skye, 1866 (*A. M. N.*); Loch Fyne, dredged by the 'Medusa,' the vessel of the Scotch Marine Station, 1888 (*D. Robertson*): *Mus. Norm.* Taken by 'Medusa' off the lighthouse, Little Cumbræ, Firth of Clyde, in 55-60 fath., and off the Isle of Arran, N.B., in 80 fath., on soft mud (*D. Robertson*!); one specimen among material dredged a little west of Inchkeith, Firth of Forth, 1887 (*T. Scott*!).

*Distribution.* Greenland (*Hansen*); Advent Bay, Spitzbergen, 20 fath. (*Smitt*, fide *Goës*); Bohuslän, Sweden (*Lovén*, fide *Goës*); Denmark (*Meinert*); West Norway (*Daniélssen*).

#### Genus VI. GAMMARELLA, Bate, 1857.

*Gammarella brevicaudata* (H. Milne-Edwards).

1830. *Gammarus brevicaudatus*, H. Milne-Edwards, Ann. des Sc. Nat. vol. xx. p. 369, ♂ ♀.

1853. *Gammarus punctimanus*, A. Costa, Ricerche sui Crost. Amphip. del Regno di Napoli, p. 222, pl. iii. fig. 6, ♂.  
 1853. *Gammarus obtusunguis*, id. ibid. p. 219, pl. iii. fig. 8, ♂ junior.  
 1853. *Amphithoë semicarinata*, id. ibid. p. 210, pl. iii. fig. 3, ♀.  
 1857. *Gammarella orchestiformis*, Bate, Ann. & Mag. Nat. Hist. ser. 2, vol. xix. p. 143, ♂.  
 1862. *Gammarella brevicaudata*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 180, pl. xxxii. fig. 8, ♂; Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 330, ♂.  
 1862. *Gammarella Normani*, iid. ibid. vol. i. p. 333, ♀.  
 1874. *Gammarella brevicaudata*, Stebbing, Ann. & Mag. Nat. Hist. ser. 4, vol. xiv. p. 13, pl. ii. fig. 3 a-g, ♂ ♀.  
 1886. *Gammarella longicornis*, Koehler, Faun. litt. des Iles Anglo-Normandes, p. 60, ♂ & ♀.  
 1888. *Gammarella brevicaudata*, Th. Barrois, Cat. des Crust. marins aux Açores, p. 47, pl. iv. figs. 5-12, ♂ ♀.

*Hab.* Jersey; Falmouth (*A. M. N.*); Torquay (*Stebbing*); *Mus. Norm.* Salcombe Harbour, Devon (*Stebbing*); off Hunterston, Firth of Clyde (*D. Robertson*).

*Distribution.* Adriatic (*Heller*); Azores; Northern and Western France (*Th. Barrois*); St. Lunaire and Arcachon, *M. Dolfuss* (*Chevreau*).

In young males the hand of the second gnathopod differs markedly from that of the adult, especially in the finger, which is not more than half the length of the hand.

This is a southern form, not as yet recorded from any station north of the Firth of Clyde.

#### Genus VII. CHEIROCRATUS, Norman, 1865.

(Nat. Hist. Trans. Northumberland and Durham, vol. i. (1865) p. 12.)

##### 1. *Cheirocratus assimilis* (Lilljeborg). (Pl. X. fig. 13, and Pl. XI. fig. 11.)

1851. *Gammarus assimilis*, Lilljeborg, Öfv. af Kongl. Vet.-Akad. Förh. 1851, p. 23.  
 1853. *Gammarus assimilis*, id. ibid. 1853, p. 445.  
 1859. *Gammarus assimilis*, Bruzelius, Skand. Amphip. Gamm. p. 58.  
 1862. *Gammarus assimilis*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 214.  
 1865. *Cheirocratus mantis*, Norman, Nat. Hist. Trans. Northumb. and Durham, vol. i. p. 13, pl. vii. figs. 14, 15, ♂.  
 1868. *Cheirocratus mantis*, Bate & Westw. Brit. Sessile-eyed Crust. vol. ii. p. 513, ♂.  
 1870. *Cheirocratus assimilis*, A. Boeck, Crust. Amphip. bor. et arct. p. 134.  
 1876. *Cheirocratus assimilis*, A. Boeck, De Skand. og Arkt. Amphip. p. 398, pl. xiv. fig. 3.

The telson (Pl. X. fig. 13) has the central portion of the extremity of each half concave, while the corners are pro-

jected in tooth-like form; from the concavity spring three spines, of which the central is the longest.

The female is very like the same sex of *C. Sundevalli*; but the transverse rows of setæ of the wrist of second gnathopod (Pl. XI. fig. 11) appear to want the hamate character so conspicuous in the adult and more or less evident in the young of the allied species.

*Hab.* Off Holy Island, on the Northumberland coast, 1864\* (*A. M. N.*); off coast of Aberdeen (*the late Mr. R. Dawson*); off Farland Point, Isle of Cumbrae, 20 fath. (*A. M. N. and D. Robertson*, 1888): *Mus. Norm.*

*Distribution.* Florø, Norway, 45–70 fath. (*A. M. N.*): *Mus. Norm.* Bohuslän, Sweden (*Bruzelius*); Norway, at Mandal (*Boeck*); Christiansund (*Düben*); Arcachon, France, *M. Dolfuss*, Luc-sur-Mer, *M. Topsent*, and Croisic (*Chevreau*).

## 2. *Cheirocratus Sundevalli* (Rathke).

(Pl. XI. figs. 9, 10, and Pl. XII. figs. 1–3.)

1843. *Gammarus Sundevalli*, Rathke, Beiträge zur Fauna Norwegens, p. 65, pl. iii. fig. 2, ♂.  
 1853. *Gammarus Sundevalli*, Lilljeborg, Kongl. Vet.-Akad. Handl. p. 454.  
 1859. *Gammarus Sundevalli*, Bruzelius, Skand. Amphip. Gamm. p. 57.  
 1862. *Gammarus Sundevalli*, Bate, Cat. Amphip. Crust. Brit. Mus. p. 213, pl. xxxviii. fig. 1, ♂.  
 1862. *Protomedeia Whitei*, id. ibid. p. 169, pl. xxxi. fig. 3, ♀.  
 1862. *Liljeborgia shetlandica*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 206, ♂.  
 1862. *Protomedeia Whitei*, id. ibid. p. 300, ♀.  
 1868. *Protomedeia* (?) *Whitei*, Norman, Last Report Dredging Shetland Isles, Brit. Assoc. Rep. p. 283, ♀ & ♂.  
 1870. *Cheirocratus Sundevalli*, A. Boeck, Crust. Amphip. bor. et arct. p. 133.  
 1876. *Cheirocratus Sundevalli*, A. Boeck, De Skand. og Arkt. Amphip. p. 396, pl. xxiv. fig. 2, ♂ ♀.  
 1874. *Liljeborgia Normanni*, Stebbing, Ann. & Mag. Nat. Hist. ser. 4, vol. xiv. p. 10, pl. i. fig. 1 a–c, ♂.  
 1876. *Liljeborgia Normanni*, id. ibid. vol. xvii. p. 76, pl. v. fig. 4, ♂.  
 1880. *Cheirocratus brevicornis*, Hoek, Carcinologisches (Tijdschr. d. Ned. Dierk. Vereen. vol. iv.), p. 142, pl. x. figs. 10–13, ♂.  
 1884. *Cheirocratus brevicornis*, Blanc, Die Amphipoden der Kieler Bucht, p. 72, pl. viii. figs. 76, 77, ♂ ♀.

Great confusion has existed respecting this species. This confusion has arisen from three causes:—first, the separation of the sexes; secondly, the insufficiency of the earlier figures

\* Mr. Robertson, in his 'Contrib. to Cat. of Amphipoda and Isopoda of the Firth of Clyde,' has by an error thought that the Holy Island off which I took this species was the island so named in the Firth of Clyde.

and descriptions; thirdly, from some of the figures in Boeck's plate xxiv. having been wrongly lettered.

Boeck's plate xxiv. fig. 2 *k*, has nothing to do with the present species, and probably ought to have been lettered 4 *k*, as representing, though imperfectly, a second gnathopod of the female of *Melita palmata* (or possibly, from the shortness of the wrist, the second gnathopod of *Melita pellucida*, G. O. Sars); the 4 *k* should perhaps be 2 *k*, and intended to represent the second gnathopod of the immature male of *Cheirocratus Sundevalli*.

While all the other general characters are nearly similar in the two sexes of *Cheirocratus Sundevalli*, the second gnathopods are widely different. That of the male (Pl. XII. figs. 1–3) has a large and remarkably ovate hand; this hand is densely clothed with long setæ towards the distal extremity of the upper margin, and the lower side (not the margin only) is also densely setose; but the peculiarity of the hand is that the strongly curved finger, which is half the length of the hand, does not close against the margin, but upon the middle of the inner face of the hand, where there are three or four spines, against which it in some measure closes, the position being such that when the hand is viewed from the outside the closed finger is completely hidden\*. This hand has been well figured by Hoek and Blanc, but not accurately by any previous authors; and I give illustrations of three forms of it.

The second gnathopod in the female (Pl. XI. fig. 10) is very like the first gnathopod (fig. 9), but the finger is straightly corrected and the face of the wrist is furnished with numerous transverse rows (about seven to nine in number) of hooked setæ; these setæ are confined to the front half of the limb, and the innermost seta of each transverse row is very short, while each seta thence to the margin increases in length in most regular gradation, the outermost and longest being simple (*i. e.* not hooked).

The hinder segments of the pleon with their three dorsal teeth and intervening long erect spines are well represented by Stebbing (pl. v. fig. 4), Hoek (pl. x. fig. 13), and Blanc (fig. 77). A glance at this portion of the body will suffice to distinguish this species from all others except its congener *C. assimilis*.

*Hab.* Outer Skerries Harbour, 2–5 fath.; off these same islets in 40 fath., and also in Balta Sound, Shetland; the

\* In the immature male (fig. 3) the finger is shorter and thicker in proportion to its length and closes on the palm instead of on the face, while the lateral spines are not developed.

Minch; Sound of Skye; Loch Fyne; Firth of Clyde, many places; off Holy Island, Northumberland; Salcombe, Devon; Guernsey; Roundstone, Ireland (*A. M. N.*); Banff (*T. Edward*): *Mus. Norm.* Kirkwall Bay, Orkney (*D. Robertson*).

*Distribution.* Florö, Norway (*A. M. N.*): *Mus. Norm.* Off west coast of Schleswig-Holstein (*Metzger*); Kiel (*Blanc*); Holland (*Hoek*); Denmark (*Meinert*); Bohuslän (*Bruzelius*); Norway, many places (*Rathke &c.*); St. Lunaire, France, *M. Dolfuss* (*Chevreaux*); Bay of Biscay (*Chevreaux*).

## Genus VIII. MELITA, Leach, 1813.

### 1. *Melita palmata* (Montagu).

1806. *Cancer* (*Gammarus*) *palmatus*, Montagu, Trans. Linn. Soc. vol. vii. p. 69, pl. vi. fig. 4.  
 1813. *Melita palmata*, Leach, Edinb. Encycl. vol. vii. p. 403.  
 1840. *Gammarus Dugesii*, M.-Edwards, Hist. des Crust. vol. iii. p. 54.  
 1853. *Melita palmata*, Costa, Rec. sui Crost. Amphip. del Regno di Napoli, p. 192, pl. ii. fig. 4.  
 1857. *Gammarus inaequimanus*, Bate, Ann. & Mag. Nat. Hist. ser. 2, vol. xix. p. 145.  
 1862. *Melita palmata*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 337.  
 1876. *Melita palmata*, Boeck, De Skand. og Arkt. Amphip. p. 388, pl. xxiv. fig. 4.  
 1878. *Melita palmata*, G. Zaddach, Die Meeres-Fauna an der preussischen Küste, p. 25, woodcuts.

*Hab.* Firth of Clyde; Guernsey; Starcross, Devon (*A. M. N.*); Polperro, Cornwall (*Laughlin*): *Mus. Norm.* Banff (*T. Edward*); Rhos and Colwyn Bays, North Wales (*A. O. Walker*); Ilfracombe and Seaton, Devonshire (*Parfitt*).

*Distribution.* Adriatic (*Heller*): *Mus. Norm.* Naples (*Costa*); Baltic (*Zaddach*); Sweden (*Lilljeborg*); Norway (*Boeck*); Denmark (*Meinert*); Northern France (*Guerne*); Western France (*Milne-Edwards*, *Boucharde-Chantreaux*, &c.); Portugal and Azores (*Chevreaux*).

The form of the hand in the first gnathopods of the male is very remarkable, the finger being peculiar as springing from a deep hollow in the middle of the wide extremity of the hand. It is well figured by Zaddach (*l. c.*).

### 2. *Melita obtusata* (Montagu).

1815. *Cancer* (*Gammarus*) *obtusatus*, Montagu, Trans. Linn. Soc. vol. ix. p. 5, pl. ii. fig. 7.

1830. *Gammarus podager*, Milne-Edwards, Ann. des Sci. Nat. vol. xx. p. 369.  
 1840. *Amphithoe obtusata*, M.-Edwards, Hist. des Crust. vol. iii. p. 83.  
 1852. *Gammarus maculatus*, Lilljeborg, Öfv. af Kongl. Vet.-Akad. Förh. p. 10.  
 1859. *Gammarus obtusatus*, Bruzelius, Skand. Amphip. Gamm. p. 55.  
 1862. *Melita obtusata*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 341, ♂ (figure but not description).  
 1862. *Melita proxima*, iid. ibid. p. 334 (var. ♂).  
 1862. *Megamæra Alderi*, iid. ibid. p. 407, ♀.  
 1862. *Melita podager*, Bate, Cat. Amphip. Brit. Mus. p. 184, pl. xxxiii. fig. 5.  
 1868. *Melita obtusata*, Norman, Last Report Dredging Shetland, Brit. Assoc. Report, p. 284.  
 1872. *Melita obtusata*, Boeck, De Skand. og Arkt. Amphip. p. 386.  
 1880. *Melita obtusata*, Hoek, Carcinologisches, p. 140, pl. x. figs. 8, 9.

In the 'Last Report of Dredging among the Shetland Isles' I drew attention to the facts that *obtusata* and *proxima* were two forms of the male, and that *Megamæra Alderi* was the female of this species; and it is not without some hesitation that I retain even the following species *M. gladiosa* as distinct from the present. If it is to be kept distinct some corrections must, I take it, be made in the synonymy.

*M. obtusata* is characterized by several forms, those named being the type, which has a single dorsal tooth upon the second and third segments of pleon, "segmenta postabdominis secundum et tertium in medio margine posteriore dentibus singulis armata; segmenta quartum et quintum dentibus binis aut ternis instructa" (*Boeck*), and the variety *proxima*, in which the dorsal teeth of second and third segments are absent. Judging from Bate and Westwood's figure (which is, however, at any rate unsatisfactory as regards the fourth and fifth segments) Montagu's type appears to be the first form. When we come to examine further, however, there appears to be confusion. The figure in the Cat. Amphip. Brit. Mus. must have been taken from Bate's Plymouth specimen, and represents three teeth or divisions of the second and third segments, while in the description no mention is made of the exact number of teeth. "Second, third, fourth, and fifth segments of the pleon have small teeth upon the postero-dorsal margin." On the other hand, in the Hist. Brit. Sessile-eyed Crust. the Plymouth specimen and not Montagu's is described, and we are told "the second, third, fourth, and fifth segments of the tail are furnished at the posterior margin, on the back, with a central and two small lateral denticles or tooth-like processes." It would seem therefore that the Plymouth specimen thus figured in the Catalogue and described in Brit. Sessile-eyed Crust.

must be referred to the following species if that form is to retain specific rank.

In both *obtusata* and *gladiosa* the armature of the fourth segments is alike and much more constant than that of the other segments. This segment is furnished with three dorsal teeth, the laterals considerably exceeding the central in size: the fifth segment varies greatly in armature; sometimes there are two teeth, one behind the other on each side, the posterior being the larger; sometimes one tooth and an articulated spine; sometimes no tooth and only the spine; rarely smooth, without either tooth or spine. The armature of the second and third segments also varies greatly, sometimes the second has three teeth, the third one, a rare condition; sometimes one on the second and one on the third, when it is typical *obtusata*; sometimes one on the second, but none on the third; sometimes these two segments are unarmed, when it is the typical *proxima* ♂ and *Alderi* ♀. I have never met with a specimen in which the second segment has been unarmed, and the third armed, though probably such a variety will sometimes occur.

The hinder corner of the epimera of the third segment is much produced, acute, and upturned, and either quite smooth on the margins or with very few serrations.

*Hab.* Shetland; the Minch; Firth of Clyde; Northumberland; Roundstone, Ireland: *Mus. Norm.* Liverpool Bay (*G. H. Fowler*).

*Distribution.* South and West Norway (*Boeck*); Sweden (*Bruzelius*); Denmark (*Meinert*); Holland (*Hoek*); Northern France (*Guerne*); Western France (*Chevreaux* &c.).

### 3. *Melita gladiosa*, Bate.

1862. *Melita gladiosa*, Bate, Cat. Amphip. Brit. Mus. p. 185, pl. xxxiii. fig. 6, ♂ (example figured abnormal).  
 1862. *Melita obtusata*, Bate, l. c. p. 183, pl. xxxiii. fig. 3 (partim), ♂.  
 1862. *Melita gladiosa*, Bate & Westw. Brit. Sessile-eyed Crust. p. 346, ♂.  
 1862. *Melita obtusata*, iid. ibid. p. 341 (description, not figure).  
 1876. *Melita gladiosa*, Stebbing, Ann. & Mag. Nat. Hist. ser. 4, vol. xvii. p. 77, pl. iv. fig. 2, ♀.

For notes on synonymy see the last species.

*M. gladiosa* is usually characterized by three largely developed teeth on the first four segments of the pleon, but sometimes the first is without teeth\*. These teeth are of large size except that the central tooth of the fourth segment is

\* The figure of *M. obtusata* given in Cat. Amphip. Brit. Mus. appears to have been taken from such a specimen of *M. gladiosa*.

much smaller. The fifth has four teeth—two on each side—of which the exterior is the larger, and between them an articulated spine; the sixth segment sometimes bears a pair of small tubercles or minute spines at the base of the telson. The infero-posteal angle of the epimera of the third segment of the pleon is greatly produced, upturned, very acute, and strongly toothed on both margins.

The armature of the earlier segments of the pleon is subject to some variation. Bate's figure of the type in Cat. Amphip. Brit. Mus. represents a remarkably abnormal form, the first segment of the pleon having five and the second seven teeth; but much latitude must be allowed for variation in the dorsal armature of members of this genus.

In the female the second gnathopods are nearly similar in form to the first, but larger, and it is without the fur which clothes the front margin of meros, carpus, and hand in the first pair.

*Hab.* Salcombe, Devon; Falmouth; Guernsey (*A. M. N.*); North-east Scotland (*Dr. Day*): *Mus. Norm.* Plymouth (*Parfitt*).

*Distribution.* Boulogne (*Paris Museum*); Western France (*Chevreaux*); Azores (*Th. Barrois*).

### 4. *Melita dentata* (Kröyer).

1842. *Gammarus dentatus*, Kröyer, Nat. Tidsskr. vol. iv. p. 159.  
 1854. *Gammarus purpuratus*, Stimpson, Invert. of Grand Manan, p. 55.  
 1855. *Gammarus Kröyeri*, Bell, App. to Belcher's Last Arctic Voyage, p. 405, pl. xxxiv. fig. 4.  
 1859. *Gammarus dentatus*, Bruzelius, Skand. Amphip. Gamm. p. 61.  
 1862. *Megamæra dentata*, Bate, Cat. Amphip. Brit. Mus. p. 225, pl. xxxix. fig. 4.  
 1862. *Megamæra Kröyeri*, id. ibid. p. 229, pl. xl. fig. 4.  
 1865. *Gammarus dentatus*, Goës, Crust. Amphip. Gamm. maris Spetsb. p. 14, fig. 29 (not fig. 29').  
 1870. *Melita dentata*, Boeck, Crust. Amphip. bor. et arct. p. 131.  
 1872. *Melita dentata*, Boeck, De Skand. og Arkt. Amphip. p. 389, pl. xxiii. fig. 10.  
 1884. *Melita dentata*, S. Schneider, Crust. og Pycnogon. indsamlede i Kvænangsfjorden, 1881, p. 113.

Antennules: first joint with a long spine at the lower side of the distal margin, second joint much more slender and longer than first; third one third length of preceding and equal to two first of flagellum; accessory flagellum of four long joints. Antennæ shorter than antennules, but peduncle longer than that of antennæ, its last two joints subequal; flagellum about equal to last joint of peduncle in length.

First gnathopods having meros rather longer than broad, below well rounded and covered with dense fur, and with a fascicle of setæ at the extremity; wrist fully twice as long as meros, upper margin with transverse rows of simple setæ, the distal portion between the two distal rows of setæ densely clothed with short fur, the face of the joint below with two or three transverse rows of setæ; lower margin with numerous fascicles of setæ; hand regularly ovate, much shorter than wrist, upper margin having the distal portion with transverse rows of setæ; lower margin with fascicles of setæ, the portion which forms the palm terminated by a small tooth-like process, very minutely crenulated and furnished with a series of little spinules; finger falcate, its inner margin divided up into minute teeth of peculiar form, widening in the middle and apiculate. All the setæ of the limb are simple except that mixed in the two distal fascicles of setæ on the lower margin are a few flattened setæ with pectinated edges.

Second gnathopods of moderate size; meros small, produced distally below to an acute point; carpus triangular, short, sparingly setose on the margins; hand nearly twice as long as wrist, of nearly equal width to the commencement of the palm (which occupies two fifths of the length), thence tapering to extremity; margins sparingly setose; palm defined at its commencement by a tooth-like process, slightly denticulated, one denticle near base of finger larger than the rest, set with a few long setæ and spinules; about four spines on side of the hand just within the palm; a row of equidistant cilia on inner and of setæ on outer margin of the nail.

Thigh of last peraeopods oblong, nearly parallel-sided, but the widest part at the base, distally truncate behind, front margin set with short spines, hind margin with distant crenulations, a cilium occupying each crenulation.

Epimera of the anterior segments of body with a single tooth on the infero-posteal corner. Third segment of pleon acutely produced infero-posteally and bent upwards.

All the segments of the pleon are furnished on the dorsal margin with numerous teeth; but their exact number is subject to considerable variation, as has been noticed in previous remarks to be the case in *M. obtusata* and *M. gladiosa*. In the specimen here described from Cullercoats they are: first segment five, second seven, third nine, fourth five, fifth three and two articulated spines.

The British examples measure 11 millim. exclusive of antennæ.

A large Greenland specimen taken in 1876 by H.M.S. 'Valorous' measures 22 millim. exclusive of antennæ, and

corresponds most closely in all its characters with those taken in our seas, except that the palm of the first gnathopods is more defined, being slightly hollowed, and the hand of the second gnathopods is a little larger in proportion to the wrist. All the microscopic characters of setæ, spines, fur, &c. exactly agree; but in consequence of the coarser growth of the limb the characters of armature of the inside of the finger of first gnathopods cannot be so exactly determined. The dorsal armature in this specimen is:—first segment (by accident lost in dissection); second eleven teeth; third eleven teeth; fourth seven, the central very large; fifth three, central large, and two articulated intervening spines.

In specimens received from Tromsø the dorsal spines are larger in size proportionately than in examples which I have had the opportunity of examining from other localities. The larger the number of spines on a segment the smaller the size those spines attain.

*Hab.* Three specimens taken from fishing-boats, Cullercoats, Northumberland (*A. M. N.*): *Mus. Norm.*

*Distribution.* Greenland, in lat. 66° 59' N., long. 55° 27' W., 57 fath., 'Valorous' Exped. 1876; off Halifax, Nova Scotia (*S. I. Smith*); Tromsø (*S. Schneider*); Sweden (*Lovén*): *Mus. Norm.* Iceland (*Torell*); Spitzbergen (*Goës*); Grand Manan (*Stimpson*); Labrador (*Packard*); West Norway, at Haugesund (*Boeck*); Denmark (*Meinert*).

#### Genus IX. GAMMARUS, Fabricius, 1776.

##### 1. *Gammarus locusta* (Linn.). (Pl. XII. fig. 11.)

1767. *Cancer locusta*, Linné, Syst. Nat. edit. xii. p. 1055.

1780. *Oniscus pulex*, Fabricius, Fauna Grœnlandica, p. 254.

1820. *Gammarus arcticus*, Scoresby, Account of the Arctic Regions, vol. i. p. 451, pl. xvi. fig. 4.

1824. *Gammarus boreas*, Sabine, Suppl. Appendix Parry's Voyage, p. 229.—1862. Bate, Cat. Amphip. Brit. Mus. p. 213, pl. xxxvii. fig. 10.

1830. *Gammarus ornatus*, H. Milne-Edwards, Ann. des Sci. Nat. xx. p. 372, pl. x. figs. 9, 10.—1840. Hist. Nat. des Crust. vol. iii. p. 47.—1862. Bate, Cat. Amphip. Brit. Mus. p. 212, pl. xxxvii. fig. 8.—1873. S. I. Smith, Report United-States Comm. Fish & Fisheries, p. 557, pl. iv. fig. 15.

1851. *Gammarus sitchensis*, Brandt, Middendorff's Sibir. Reise, Bd. ii. p. 137, pl. vi. figs. 28 a-c.—1862. Bate, Cat. Amphip. Brit. Mus. p. 210, pl. xxxvii. fig. 4.

1853. *Gammarus pulex*, Stimpson, Invert. Grand Manan, p. 55.

1854. *Gammarus mutatus*, Lilljeborg, Kongl. Vet.-Akad. Handl. p. 447.

1862. *Gammarus locusta*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 378 (et auct.).

*Hab.* Common all round our coast between tide-marks.

*Distribution.* This species is found apparently everywhere throughout the arctic and boreal regions, and, as will be seen by the above synonymy, has received many names from different localities. I have carefully compared specimens from Spitzbergen, Greenland, and the United States with others from our own coasts. It extends also southwards as far as Naples (*Costa*), South-west France (*Barrois &c.*); Cullera, Spain (*Don Pedro Antiga, in Mus. Norm.*).

A large British example in my collection measures 34 millim.\*, and one from Spitzbergen reaches 38 millim.

The telson, of which one half is figured (Pl. XII. fig. 11), is elongated and each half usually bears three terminal spines and a seta at the extremity, a spine and seta at a short distance from it, and two spines and one or two setæ near the base. A certain latitude must be allowed as to the exact number of setæ and spines on the telsons in the genus *Gammarus*; but the general character in each species appears to be constant.

## 2. *Gammarus marinus*, Leach. (Pl. XII. fig. 12.)

1815. *Gammarus marinus*, Leach, Linn. Trans. vol. xi. p. 359.

1830. *Gammarus Olivii*, H. Milne-Edwards, Ann. des Sci. Nat. vol. xx. p. 369, pl. x. fig. 9.

1837. *Gammarus gracilis*, Rathke, Zur Fauna der Kryn. p. 374, pl. v. figs. 7-10.

1840. *Gammarus affinis*, Milne-Edwards, Hist. Nat. des Crust. vol. iii. p. 47.

1843. *Gammarus Krøyeri*, Rathke, Beitr. zur Fauna Norwegens, p. 69, pl. iv. fig. 1.

1853. *Gammarus pæcilurus*, id. ibid. p. 68, pl. iv. fig. 2.

1862. *Gammarus marinus*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 370.

*Hab.* Common round the British coasts.

*Distribution.* From Norway to the Bay of Biscay; Adriatic Sea (*Heller*); North-east America (*S. I. Smith*): *Mus. Norm.*

The telson (Pl. XII. fig. 12) has each half terminated by three spines and a spine at the side near the base; sometimes there is the small seta as figured near the extremity, but it is by no means always present; rarely there are one or two setæ at the extremity, but the character of the telson as distinguished from that of allied species is the entire absence or fewness of setæ.

\* All measurements in these papers are exclusive of the antennules, but include the uropods unless otherwise stated.

## 3. *Gammarus campylops*, Leach. (Pl. XII. fig. 13.)

1815. *Gammarus campylops*, Leach, Linn. Trans. vol. xi. p. 360.

? 1844. *Gammarus locusta* (?), E. G. Zaddach, Syn. Crust. Prussic. Prod. p. 4.

? 1851. *Gammarus Duebenii*, Lilljeborg, Öfv. af Kongl. Vet.-Akad. Förh. p. 22.

? 1854. *Gammarus locusta*, Lilljeborg, Kongl. Vet.-Akad. Handl. p. 448.

1862. *Gammarus campylops*, Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 375.

*Hab.* Bamborough, Northumberland; Guernsey; Newport, co. Mayo (*A. M. N.*).

*Distribution.* I know of no record beyond the British seas, unless Lilljeborg's and Zaddach's species are synonymous with the present.

The telson of this species (Pl. XII. fig. 13) terminates in three spines and as many (or about as many) setæ; towards the base is a group of three spines, and between this and the extremity two setæ having their bases close together, and sometimes accompanied, as in the figured example, by a small spine.

## 4. *Gammarus tenuimanus*, Bate.

1862. *Gammarus tenuimanus*, Bate, Cat. Amphip. Brit. Mus. p. 214, pl. xxxviii. fig. 2; Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 384.

Described from a single specimen which was found by Mr. Spence Bate among a lot of Crustacea sent to him by the Rev. G. Gordon from the mouths of the Rivers Ness and Braulay, which flow into the Moray Firth. It is unknown to me.

## 5. *Gammarus Edwardsii*, Bate.

1862. *Gammarus Edwardsii*, Bate, Cat. Amphip. Brit. Mus. p. 208, pl. xxxvii. fig. 2; Bate & Westw. Brit. Sessile-eyed Crust. vol. i. p. 386.

This species is also unknown to me. The two known specimens were found by Mr. Spence Bate in a pool into which the tide formerly flowed, but which is now of fresh water, at Starcross, Devon. Mr. D. Robertson recorded this species in his Contrib. to Cat. Amphip. and Isop. of Firth of Clyde, 1888, p. 94, but is now satisfied that the specimens must be referred to the young of other species.

## Genus X. ERIOPIS, Bruzelius, 1859.

*Eriopsis elongata*, Bruzelius.

1859. *Eriopsis elongata*, Bruzelius, Skand. Amphip. Gamm. p. 65, pl. iii. fig. 12.  
 1862. *Eriopsis elongata*, Bate, Cat. Amphip. Brit. Mus. p. 178, pl. xxxii. fig. 5.  
 1868. *Eriopsis elongata*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. ii. p. 415, pl. xxi. figs. 7-10.  
 1870. *Niphargus elongatus*, A. Boeck, Crust. Amphip. bor. et arct. p. 136.  
 1872. *Niphargus elongatus*, A. Boeck, De Skand. og Arkt. Amphip. p. 403, pl. xxii. fig. 5.

*Hab.* This interesting species has occurred in two localities in our seas. In 1866 I took a specimen when dredging with my late friend Dr. Jeffreys in the Sound of Skye; and in 1885 I took a second in 80 fathoms between the isles of Cumbrae and Arran, in the Firth of Clyde, when dredging in company with my friend Mr. J. Murray in the 'Medusa,' the vessel of the Scotch Marine Station: *Mus. Norm.*

*Distribution.* Sweden (*Lovén*): *Mus. Norm.* South Norway (*Boeck*); West Norway (*Køren*).

## EXPLANATION OF THE PLATES.

## PLATE X.

- Fig.* 1. *Leucothoë imparicornis*, n. sp. Antennule and antenna.  
*Fig.* 2. The same. First gnathopod.  
*Fig.* 3. The same. Second gnathopod.  
*Fig.* 4. The same. Telson.  
*Fig.* 5. *Lilljeborgia picta*, n. sp. Antennule and antenna.  
*Fig.* 6. The same. Dorsal portion of hinder segments of pleon.  
*Fig.* 7. The same. Second gnathopod, seen from without.  
*Fig.* 8. The same. Spines and setæ of palm of second gnathopod, as seen from within.  
*Fig.* 9. The same. Last peræopod, terminal joints.  
*Fig.* 10. *Lilljeborgia pallida*, Bate. Last peræopod, terminal joints.  
*Fig.* 11. *Lilljeborgia jissicornis* (M. Sars). Last peræopod, terminal joints.  
*Fig.* 12. *Lilljeborgia æquicornis*, G. O. Sars. Last peræopod, terminal joints.  
*Fig.* 13. *Cheirocratus assimilis* (Lilljeborg). The telson.  
*Fig.* 14. *Melphidippa macra*, Norman. Hinder margin of a segment of pleon.  
*Figs.* 15, 16. *Megaluropus agilis*, Norman. The mandible.  
*Fig.* 17. The same. Inner lamina of maxilliped.

## PLATE XI.

- Fig.* 1. *Elasmopus rapax*, Costa. First gnathopod, ♀.  
*Fig.* 2. The same. Second gnathopod, ♀.

- Figs.* 3-5. *Elasmopus rapax*. Second gnathopod, ♂, showing three stages of development of the hand.  
*Fig.* 6. The same. Last peræopod.  
*Fig.* 7. The same. Last uropods.  
*Fig.* 8. The same. Telson.  
*Fig.* 9. *Cheirocratus Sundevalli* (Lilljeborg). First gnathopod, ♀.  
*Fig.* 10. The same. Second gnathopod, ♀.  
*Fig.* 11. *Cheirocratus assimilis* (Lilljeborg). Second gnathopod, ♀.

## PLATE XII.

- Figs.* 1-3. *Cheirocratus Sundevalli* (Lilljeborg). Three stages of development of hand of second gnathopod in male.  
*Fig.* 4. *Melphidippa macra*, Norman. First gnathopod.  
*Fig.* 5. The same. Second gnathopod.  
*Fig.* 6. The same. Last peræopod, the thigh (basos).  
*Fig.* 7. The same. Last peræopod, terminal joints.  
*Fig.* 8. *Melita dentata* (Krøyer). First gnathopod.  
*Fig.* 9. The same. Second gnathopod.  
*Fig.* 10. The same. Last peræopod, the thigh (basos).  
*Fig.* 11. *Gammarus locusta* (Linn.). The telson (one half).  
*Fig.* 12. *Gammarus marinus*, Leach. The telson.  
*Fig.* 13. *Gammarus campylops*, Leach. The telson.





