

[WORK FROM THE PORT ERIN BIOLOGICAL STATION.]

REVISION of the AMPHIPODA of the L. M. B. C.
DISTRICT.

By ALFRED O. WALKER, F.L.S.

With Plates XVIII. and XIX.

[Read April 5th, 1895.]

THE completion of that portion of Prof. G. O. Sars' invaluable work on the Crustacea of Norway which deals with the Amphipoda, has enabled me to name our collection in accordance with it, and at the same time to correct a good many errors that had occurred in our former lists. As Prof. Sars' work is likely to be the standard for many years I have throughout adopted his nomenclature for species described by him and would refer any student of this class to it for descriptions. In the case of species not described by him I have given references to the best descriptions with which I am acquainted. If I have occasionally ventured to differ as to the validity of species with Prof. Sars I do so with the full conviction that his knowledge of the Amphipoda is so vastly greater than mine that in all probability he will prove to be right. Many of these differences of opinion depend upon the solution of the very difficult question whether the Amphipoda, or some species of them, can become sexually mature before they are full-grown. My own opinion is that they can, and in support of this view I have given various instances below of small females with ova. If this be proved (and it can only be done by rearing them through successive stages in aquaria—a difficult and generally impossible process) it will enormously increase

the difficulty of defining species, but it ought to be attempted at the Port Erin Biological Station. It might probably be tried with success on *Bathyporeia pilosa*, Lindström, (the form called *B. pelagica*, Bate, by Sars), which is common in the harbour and appears to remain in shallow water. If young specimens were kept in small aquaria with sand at the bottom it would be seen what changes they undergo. Very small females with ova were dredged by Mr. I. C. Thompson, in June, in the harbour and, if again taken, would form good subjects for the experiment.

With regard to the new species described, the first, *Nannonyx spinimanus*, is not only very distinct from the only other species (*N. goësii*) but might be thought to require a new genus. It agrees, however, so well with the rather peculiar external characteristics of *Nannonyx*—a genus so distinct that the points on which my species differs might well be omitted and yet leave the definition quite satisfactory—that I have preferred to include it, at the same time pointing out the differences. On the other hand *Amphilochus melanops* and *Photis pollex* are so near to other species that were geographical sub-species permissible, I should have preferred to rank them as such.

I have given the lengths of the largest specimen of each species in my possession for comparison with those of other localities—the length including the uropods but not the antennæ. These measurements must, however, be taken for what they are worth as it is impossible to be certain that the specimens have reached their full size.

The specimens in the list have all been taken by dredging except where otherwise stated. The initials to some of the species mean that the specimen was collected by the gentlemen indicated, as follows:

W. A. H., Prof. W. A. Herdman, F.R.S.,

I. C. T., Mr. Isaac C. Thompson, F.L.S.

F. A., The late Frank Archer, Esq.

The specimens from Galley Head, which is in the Irish Channel but not in the L.M.B.C. district, were taken by Mr. R. L. Ascroft in trawl refuse or in a tow-net attached to the trawl beam.

Of the species recorded the following are new to science, viz., *Nannonyx spinimanus*, *Amphilochus melanops*, *Photis pollex*, and *Podocerus herdmani* (*P. odontonyx*, Sars). The following are, or were when I first published them, new to the British Fauna: *Orchomenella ciliata*, *Nannonyx goësii*, *Harpinia lœvis*, *H. crenulata*, *Metopa bruzelii*, *M. pusilla*, *Paratylus falcatus*, *P. uncinatus*, *Gammaropsis nana*, *Ischyrocerus minutus*, and *Siphonacetes colletti*; the last, however, has probably been recorded as *S. typicus*, Kröyer which Sars considers to be distinct.

It must be understood that the present list supersedes all previous records of Amphipoda in the L.M.B.C. Reports both as to species and localities.

In the notes on the species I make use of the following abbreviations:—

acc. *app.* = Accessory appendage of upper antennæ; *ant.¹* = upper or first antennæ; *ant.²* = lower or second antennæ; *carp.* = carpus, wrist, fourth joint; *dact.* = dactylus, finger, sixth and last joint; *fl.* = flagellum of ant.; *Gn.¹* = first gnathopods, first pair of feet; *Gn.²* = second gnathopods, second pair of feet; *Mdl.* = Mandible; *Max.¹* = first maxillæ; *Max.²* = second maxillæ; *Mxps.* = maxilipedes; *ped.* = peduncle; *per.* = peræon, mesosome; *prp.¹⁻⁵* = first to fifth pereopods, third to seventh pairs of feet; *pl.* = pleon, metasome; *prop.* = propodos, hand, fifth joint; *post.* = posterior; *seg.* = segment; *t.* = telson; *up.¹⁻³* = first to third pair of uropods.

HYPERIIDÆ.

Hyperia galba (Montagu).

Females common in the bell of *Rhizostoma pulmo* throughout the district: males rather scarce. Mr. R. Newstead who collected some large ovigerous females from lobster pots at Bull Bay, Anglesea, says that the large eyes were very luminous. Length 10 mm.

Hyperoche tauriformis (Bate, 1868) = *H. kröyeri*, Bovallius, 1885.

One young male in a tow-net attached to a buoy at Puffin Island. An examination of the remains of the specimens labelled as above in Sp. Bate's Collection, at Plymouth, has satisfied me of the identity of the above two species which were separated by Bovallius.* Bate's name of course should have priority. Length 3 mm.

[*Parathemisto obliqua* (Kröyer).

A few taken in a tow-net attached to a trawl beam by Mr. R. L. Ascroft, off Galley Head, Co. Cork. Length 5 mm.]

ORCHESTIIDÆ.

Talitrus locusta (Pallas).

Abundant under drift-weed about high water mark, at Colwyn Bay. Length 18 mm.

Orchestia littorea (Mont.) = *O. gammarellus*? (Pallas).

Under stones above high water mark. Tal y Cafn, Conway River; Burton Rock, Dee; Fleshwick Bay and Port Erin, Isle of Man; at the latter place it is very abundant and sometimes invades the laboratory in great numbers. One specimen taken at dead low water at Colwyn Bay. Length 18 mm.

Hyale nilssonii (Rathke).

Among stones and algæ on shore at Hilbre Island,

* Monograph of the Amphipoda Hyperiidea, pt. II., p. 115.

Puffin Island, Porthwen Bay, Anglesea, and Port St. Mary. One young 10 to 17 m. N.W. of Mersey Bar 10 to 14 fath. 27/9/90 (I. C. T.). Length 5 mm.

LYSIANASSIDÆ.

Lysianax longicornis (Lucas) = *L. ceratinus*,* Walker.

Little Orme; Puffin Island; Menai Straits; 5 to 12 fath. I have never taken a male with fully developed lower antennæ. An old female taken off the Little Orme had these organs rudimentary and the eyes imperfectly developed. Colour dull yellow, eyes large, dark. Length 9 mm.

Socarnes erythrophthalmus, Robertson.†

Port Erin 15 to 20 fath., 24/3/94; Menai Bridges 5 to 7 f. Common April and May, 1894. Length $4\frac{1}{2}$ mm.

Perrierella audouiniana (Bate) = *Lysianax audouiniana*, Bate.

22 m. S.E. Isle of Man, 21/5/88, 30 fath. on sponge; on *Pecten maximus*, 1/4/93 (I. C. T.); Menai Bridges, 2/4/94, 5 to 12 f. rocky ground; off Fleshwick Bay, 8/7/94, broken shells and gravel, Pectens, &c., 22 f. Having succeeded in cleaning the type specimen, in Bate's Collection at the British Museum, I have no hesitation in saying that it is this species.‡ Length $2\frac{1}{2}$ mm.

Callisoma crenata, Bate.

7 m. W. of Bradda Head, 31 f., 25/4/95. One female. [One male with adult antennæ, length 4 mm., from trawl off Galley Head, Co. Cork, 24/10/94 (R. L. A.)]. Length 4 mm.

Hippomedon denticulatus (Bate).

* Fauna of Liverpool Bay, Vol. II. Third Report on Higher Crustacea.

† Second List of Amphipoda and Isopoda of the Firth of Clyde, &c. Trans. Nat. Hist. Soc., Glasgow, Vol. III., p. 200, 1892; also Bonnier, Bull. Sci. de France, Vol. XXIV., p. 183, Pl. VI.

‡ Bonnier, l.c., p. 181, Pl. V.

Port Erin, electric light, 20/5/88. One young. [Galley Head, one adult male. Length 14 mm.]

Orchomenella ciliata, Sars = *Tryphosa ciliata*, Sars.

Between Isle of Man and Liverpool, 30 fath.; Puffin Island, 15 f.; Colwyn Bay, $2\frac{1}{2}$ f., 1/2/90; off Port Erin, 15 to 20 f., 24/3/94. [Galley Head, one male. Length $3\frac{1}{2}$ mm.]

Nannonyx goësii (Boeck) = *Orchomene goësii*, Boeck.

Puffin Island, low water spring tide, 8/8/88. Length $2\frac{1}{2}$ mm.

N. spinimanus, n.sp.* (Pl. XVIII., figs. 1—11).

Menai Bridges, 2/4/94 and 31/5/94, rocky bottom, 5 to 8 f.

This species falls into the genus *Nannonyx*, G. O. Sars, except as to the maxillæ, maxillipedes, gnathopoda and pereiopoda. In these there are more or less important differences but not sufficient in my opinion to constitute a new genus.

Body short and thick. Head as long as first segment of per. lateral angles produced and rounded. Anterior coxal plates about as deep as the body, angles rounded. Third pl. seg. with hind margin straight, serrate, hinder angle rather acute with the point blunt; fourth seg. with a prominent rounded hump, fifth very short.

Ant.¹ with first joint of ped. longer than the two next, fl. seven-jointed, the first as long as the remaining six, second short and wide, acc. app. four-jointed the first longer than the remaining three and as long as first joint of fl. which is very hairy.

Ant.² slender, fl. in both sexes five-jointed and shorter than ped.

* Walker, A. O., Rep. on Marine Zool. of Irish Sea. Brit. Ass., 1894, p. 327.

Mandibles long; cutting edge longer than in *N. goësii*, yellow and strongly refractive.

Max.¹ with outer lobe much longer and broader than inner which has two setæ at the tip.

Max.² with the inner lobe twice as wide as the outer.

Mxp. with the base moderate sized, not setose; the masticatory lobe large and armed with strong triangular tooth-like spines at the tip and nearly half way down the inner side, reaching to the middle of the second joint of the palp; basal lobe narrow and only half as long as the masticatory; palp with third joint longer than first or second, last joint of the usual claw form. Eyes very large, oval, dark brown.

Gn.¹ Strong, first joint nearly as long as last three; carp. more than half the length of prop.; prop. in male tapering to base of dact., armed with five or six short stout spines along the hinder margin; the female has the margins almost parallel, the postero-distal extremity rounded and provided with three spines placed close together, not setose; dact. rather short with three spinules close together in the middle of the hind margin.

Gn.² Prop. subchelate, rather shorter and nearly as wide as carp.

Prp. First and second with first joint about the same width as third (merus) which is longer than fourth, and about the same length as fifth; the last three prp. increase in length successively but slightly; first joints dilated, hind margins entire; the third joint in third and fourth prp. is wider and more produced posteriorly than in the fifth; dact. of moderate size.

Up. First and second with rami shorter than ped. spinous; third with inner ramus much shorter than outer, styliform; in the male the outer is rather shorter than the ped. and furnished at the tip with a tuft of long

plumose setæ; in the female the outer is about half as long as the ped. very stout and with two short spines near the base of the nail, the inner ovate with two or three minute spinules at the tip and one spine lower down.

Telson erect, convex, as broad as long, distally rounded with two spines on the outer margin, and a setule behind each. Colour brown. Length $4\frac{1}{2}$ mm. Easily distinguished from *N. goësii* by the longer, more rectangular, glabrous and spinous prop. of first gnathopoda and by the smaller coxal plates of the per. Four specimens were taken in the deep holes near the Menai Bridges on a very rocky bottom.

Tryphosa nana (Kröyer) = *T. hörningii*, in third Report on Higher Crust.

Puffin Island, 10 to 15 f., 24/3/88; Menai Bridges, 31/5/94. Length 4 mm.

Tryphosa hörningii, Boeck.

Bull Bay, Anglesea, "from ambulacral grooves of common Starfish" (F. A.).

[*Tryphosites longipes* (Bate).]

Galley Head, two males. Length 14 mm.]

Hoplonyx similis, Sars.

Laxey Bay, 8 fathoms, 24/9/92, one sp. The red eyes lost their colour in a mixture of meth. spirit, glycerine, and water in a few days, becoming very pale yellow. Length 10 mm.

[*Lepidepecreum carinatum*, Bate.]

Galley Head, two males, 7 mm.]

Euonyx chelatus, Norman.

Puffin Island, off the lighthouse; between Holyhead and Isle of Man, 50 f. on *Echinus sphæra* 20/7/89; 10 to 17 m. N.W. of Mersey Bar on *Echinus* 27/9/90; Length 8 mm.

PONTOPOREIIDÆ.

Bathyporeia norvegica, Sars.

Llanfairfechan, dug out of sand between tide marks 1/9/83; Port Erin, electric light; Colwyn Bay; off Garwick Head, Isle of Man 24/9/92. Length 8½ mm. A small one from the same locality measuring 4½ mm. had the characteristic acute and up-turned post. angle of the third pleon seg.

Bathyporeia pelagica, Bate = *B. pilosa*, Lind., in Rep. III.

Port Erin Harbour, abundant; Colwyn Bay; Llanfairfechan; Menai Straits. Length of ovigerous females from 2 mm. to 4½ mm. Males with fully developed antennæ from 3 mm. to 4½ mm. from the same locality.

This is the commonest form of what with all deference to Prof. Sars' superior knowledge I cannot but consider with Mr. Stebbing to be but one species, viz., *B. pilosa*, Lindström. The differences that Sars indicates between *B. pelagica*, *B. robertsonii*, *B. gracilis* and *B. pilosa* depending mainly on the colour of the eyes and the presence or absence of the small spines on the first urus-segment appear to me insufficient for specific distinction. I have known the red eyes of *B. pelagica* turn white in some specimens (and not in others) after two days in weak spirit and glycerine while in other specimens they become dark. The eyes of the specimen marked *B. pelagica* in the Sp. Bate Collection in the British Museum are large and dark—this is an adult male. In the same collection are eleven specimens in one tube marked *B. pilosa* (Lind.) some of which have, and others have not the spines on the first urus-segment. One large female has a rudimentary tooth on the lower margin of the third pleon segment. *B. pelagica* (or *pilosa*) becomes sexually mature at a very early period, specimens only two mm. long containing one to three ova having been dredged by I. C. Thompson on June 19, 1892.

Haustorius arenarius (Slabber).

Llanfairfechan, shore; Colwyn Bay, shore 31/7/90.
Length 8 mm.

Urothoë brevicornis, Bate.

Llanfairfechan, shore, Sept., 1883. Dug out of sand between tide marks. Length 6 mm.

Urothoë elegans, Bate = *U. marinus*, Rep. III., p. 205.

Puffin Island (I. C. T.); Menai Straits between Beaumaris and Garth 5 to 10 f., 16/5/91 and 17/9/94; Little Orme 4 to 7 fathoms, 14/9/94; length 3½ mm. The above two species are very difficult to separate and it is possible that the latter is only the young of the former. Mr. Stebbing has treated the genus exhaustively in Trans. Zool. Soc. (London), Vol. XIII., part 1, 1891, Pls. I—IV.

Urothoë marinus, Bate.

2 miles S.E. of Kitterland 17 f., 27/5/94.

Several specimens including adult male and female: these have been examined by Mr. Stebbing who considers them to be this species. Length 5 mm.

PHOXOCEPHALIDÆ.

Phoxocephalus fultoni, T. Scott, (see Eighth Ann. Rep. of Fishery Board, Scot., 1890, p. 327, Pls. XII., and XIII., for female and young male; and Robertson, D., second list of Amphipoda, &c., of Firth of Clyde, for adult male) = *P. chelatus* Della Valle, Gammarini of the Gulf of Naples.

Port Erin, electric light, 1888 and dredged 15 to 20 f., 24/3/94; Menai Bridges 5 to 12 f., 30/5/94; length 2½ mm. I have also taken it off Jersey and Guernsey. The large eyes would seem to place this species in *Paraphoxus*, Sars, but the gnathopoda are distinctly unequal.

Paraphoxus oculatus, Sars.

7 miles W. of Bradda Head 31 f., 25/4/95, one specimen,

Harpinia neglecta, Sars= *H. plumosa* (Kr.), in Rep. III.

Between Isle of Man and Mersey Bar, 10 to 20 f., 3/9/87; Colwyn Bay, 2½ f.; Menai Straits, 16/5/91; 5 m. W. of Dalby, Isle of Man, 30 f. sandy mud, 8/7/94. Length 3½ mm.

None of the specimens had the pleon hairy as described by Sars, and as the character of the post antennal angle is very difficult to see I have great hesitation in determining whether they should be referred to this species or to *H. plumosa* (Kröyer). As, however, the latter appears not to have been met with south of the Arctic circle it is safer to call them *H. neglecta*.

Harpinia crenulata, Boeck.

7 m. N.W. of Bradda Head, Port Erin, 39 f., 29/1/93. Three adults and one young. Length 2½ mm.

Harpinia lavis, Sars.

7 m. W. of Niarbyl, Isle of Man, 45 f., mud, 8/7/94. Length 2½ mm.

AMPELISCIDÆ.

Ampelisca typica, Bate= *A. tenuicornis*, Rep. III., 207.

Port Erin, electric light, 21/4/89. Length 9½ mm.

Ampelisca tenuicornis, Lilljeborg.

Port Erin; 5 m. W. of Dalby, 30 f., sandy mud, and 6 m. W. of Contrary Head, 38 f., mud, Isle of Man, 8/7/94. Length 9 mm.

Ampelisca brevicornis (Costa)= *A. laevigata*, Lilljeborg.

Between Isle of Man and Orme's Head, 20 to 30 f., 28/8/86; Colwyn Bay, 3 f., 24/5/87; Bull Bay; Port Erin—electric light; off Southport, 10 to 20 f., June '91. Eyes crimson with a scarlet line behind them and five black stellate spots behind that. Lower part of head having a scarlet cloud extending to the first epimere. Remainder of body transparent white with scattered black stellate spots. Length 13 mm.

Ampelisca spinipes, Boeck = *A. tenuicornis*, Rep. III., 207.

Throughout the L. M. B. C. district in 20 to 50 fath. Length 17 mm. This is the commonest species in the district, the preceding one being the next commonest. I have little doubt that the species figured as *A. gaimardii* (Kr.) in the British Sess.-eyed Crust. is this species and not as Sars supposes, *A. typica* (Bate). I have examined Bate's specimen, in the British Museum, and find both it and the figure to confirm this view. The relative proportions of the upper and lower antennæ which are correctly drawn, are alone sufficient to show that it cannot be *A. typica*.

Ampelisca macrocephala, Lilljeborg.

Port Erin, Aug., 1893 (W. A. H.). Length 10 mm. Resembles *A. brevicornis* in the form of the hind margin of the third pleon segment, but may be distinguished most readily by the greater length of the upper antennæ, and by a long spine near the tip of the outer ramus of the second uropods.

Haploops tubicola, Lillje.

One specimen between Isle of Man and Orme's Head, 20 to 30 f., 28/8/86. Length 8 mm.

AMPHILOCIDÆ.

Amphilochus manudens, Bate.

Little Orme, Aug. and Sept., '89; Gt. Orme, 8 f., 1/4/90; Puffin Island; Menai Bridge, 5 to 12 f., April and May, '94; 2 m. S.E. of Kitterland, Isle of Man, 17 f., 27/5/94. Colour generally brownish, sometimes almost black; one specimen from Gt. Orme bright scarlet. Eyes red, rather small. Length $2\frac{1}{2}$ mm.

Amphilochus melanops, n.sp.* (Pl. XVIII., fig. 12; Pl. XIX., figs. 13—15).

Little Orme, 5 to 7 f.; Menai Straits near Beaumaris, 5 to 10 f., 17/9/94.

* Walker, Rep. on Mar. Zool. of Irish Sea, Brit. Assn., 1893, p. 535.

Head much curved, about as long as the two first per. segs., lateral angle rounded. Eye round with large dark brown centre. First coxal plate small oval, second rounded at lower margin, which is minutely crenate; third less deeply crenate; fourth and fifth entire or smooth; per. segs. increasing successively in length, the last equal to the first pl. seg. Pl. segs. all somewhat produced but rounded at the post. angle. Ant.¹ in female shorter than ant.², fl. 7—8 jointed as long as ped.; ant.² with last joint of ped. longer than preceding, a small tooth on the lower margin of the distal end of second and third joints; fl. slender 7—8 jointed shorter than ped.

Gn.¹ much smaller than gn.², first joint as long as the next four combined, merus and carp. having the ends truncate and setose the carp. prolonged to half the length of the post. margin of the prop., anterior margin of prop. slightly convex and not produced into a tooth. Dact. serrate on the proximal two-thirds of its length the serration ending in a secondary tooth.

Gn.² of the same general form as gn.¹ but the carpal process reaches almost to the post. angle of the palm; the anterior margin of the prop. is slightly concave.

Prps. There is nothing distinctive about these.

Up. First "æque-attinent," (*i.e.*, reaching as far back) as the third, extremity of longest ramus of up.² not quite reaching to the end of ped. of up.³. It is rare to find a specimen which has not lost its third uropods.

Telson concave forming a triangle of which the sides are little longer than the base reaching about one-third of the length of the ped. of up.³

This species is undoubtedly very near both to *A. marionis*, Stebbing ("Challenger" Amphipoda, 1888), and to *A. brunneus*, Della Valle (Gammarini, Fauna des Golfe v. Neapel, 1894). From the former it differs in its

conspicuously large and dark eyes and in the less convex palm and greater relative length of the prop. of the gnathopods. From the latter the principal difference is in the much shorter telson. The eyes also differentiate it at once from *A. tenuimanus*, Boeck, and from *A. manudens*, (Bate), with which I have found it associated. From this species it is also distinguished by the rounded lateral angle of the head, and by (as also from *A. oculatus*, Hansen) the absence of the distal tooth on the anterior margin of the prop. of the gnathopods. Males of this species are scarce. Colour brown. Length $2\frac{1}{2}$ mm.

Amphilochoides odontonyx (Boeck).

8 m. W. of Fleshwick Bay, 33 f., 5/6/92. Length 2 mm.

Gitana sarsi, Boeck.

Little Orme; Menai Straits, 5 to 10 f., 17/9/94; 8 m. W. of Fleshwick Bay, 33 f. Length $2\frac{1}{4}$ mm.

Cypridia brevirostris, T. and A. Scott (Ann. and Mag.

N. H., 1893, Vol. XII., p. 244, Pl. XIII.).

8 m. W. of Fleshwick Bay, 33 f. Length 2 mm. Very near *C. damnoniensis* (Stebbing) from which its most obvious difference is the concave lower margin of the first joint of the last peraeopods. In *C. damnoniensis* the lower margin is convex.

STENOTHOIDÆ.

Stenothoe marina (Bate).

Common from the mouth of the Dee to Menai Straits, 2 to 15 f.; off Fleetwood and Blackcombe. Two specimens 6 m. S.E. Calf of Man, 34 f., 25/4/95. Colour white or stained with red especially about the head. Length 4 mm.

Stenothoe monoculoides (Montagu).

Abundant in tidal pools Port Erin, Fleshwick Bay, and Port St. Mary, Isle of Man; Menai Straits, April and May, '94, 7 to 12 fath., rocky ground, common. Length $3\frac{1}{2}$ mm.

This species seems to prefer rocky ground while *S. marina* is found on sand, I have not met with it E. of Menai Straits.

Metopa alderi (Bate).

Menai Bridge, April and May, '94, 7 to 12 f.; Turbot Hole, Puffin Island. Colour white with red blotches on second, third, and fourth epimeres and first joint of corresponding legs, also on the urus. Length $4\frac{1}{2}$ mm.

Metopa borealis, Sars.

Little Orme, 5 to 10 f., common; Menai Straits; Puffin Island, 14 f. Colour uniform white or grey. Length 2 mm.

Metopa pusilla, Sars.

Rhos Bay just below tide mark, 13/5/93; Menai Bridge, 7 to 12 f., 2/4/94. White, tinged with red on the back and limbs. Length 2 mm.

Metopa rubro-vittata, Sars.

Little Orme, 4 to 7 f.; Colwyn Bay, $2\frac{1}{2}$ f.; Menai Bridge. One specimen was beautifully and uniformly speckled with bright red. This species is best distinguished by the spine on the posterior margin of the propodos of the first gnathopods. Length $2\frac{1}{4}$ mm.

Metopa bruzelii (Goës).

Colwyn Bay and Little Orme, common; off Port Erin, 24 f., 5/6/92; Port Erin harbour, Nov. '92 (I. C. T.). Colour white with large blotches of brilliant red on front segments and epimeres. Length $2\frac{1}{4}$ mm.

Cressa dubia (Bate).

Great and Little Ormes; Colwyn Bay; Menai Straits; 10 to 17 m. N.W. of Mersey Bar; 2 m. S.E. of Kitterland, Isle of Man, 27/5/94, 17 fath. Colour pale yellow clouded with red on fifth, sixth, and seventh segments of pereon. Length 2 mm.

LEUCOTHOIDÆ.

Leucothoe spinicarpa (Abildgaard).

S.E. coast of Isle of Man, in branchial sac of *Ascidia venosa* and *A. mentula*; off Port Erin, washed out of Pectens (I.C.T.); Towyn, Anglesea, 5 f. Length 12 mm. Generally speaking only one or two individuals are found in each Ascidian.

Leucothoe lilljeborgii, Boeck = ? *L. imparicornis*, Nor.

Off Port Erin, "Lady Loch," 24/3/94, "washed out of dredged material from several hauls" (I.C.T.). Length $2\frac{1}{4}$ mm. Of the above two species the latter (indicated by the up-turned hinder angle of the third pleon segment and other characters) had the upper and lower antennæ of the same length, while in the former the upper were much longer than the lower, showing how fallacious characters derived from the relative length of these organs are. My specimen was doubtless immature.

ÆDICERIDÆ.

Monoculodes carinatus, Bate.

Port Erin, outside harbour, 21/8/92 (I.C.T.) [Galley Head, 24/10/94] 7. m. W. of Bradda Head, 31 f., 25/4/95. Length 3 mm.

Perioculodes longimanus (Bate).

Port Erin Harbour; Colwyn Bay; Menai Straits. Shore to 39 fathoms, sandy ground. Eyes generally red but sometimes dark. An abundant species where it occurs. Length 4 mm.

Pontocrates arenarius (Bate) = *P. norvegicus* in Rep. II.

Rhos and Colwyn Bays; Menai Straits; Port Erin Harbour, common; Garwick Head; in stomach of *Agonus*, Morecambe Bay; a female 6 mm. long, 1 m. S.E. of Kitterland 20 f., average length of females with ova from Port Erin Harbour 3 to 4 mm. Colour white.

Synchelidium haplocheles (Grube, not G. O. Sars) = *S. brevicarpum*, Sars.

Little Orme; Port Erin and Ramsey Harbours at electric light; off Port Erin, "John Fell," 8/7/94. 22 f. Length 3 mm. The dark markings on the body segments is the most easily seen distinction between this species and the preceding.

PARAMPHITHOIDÆ.

Paramphithoë bicuspis (Kröyer).

Dee to Menai Straits, shore to 17 f.; between Holyhead and Isle of Man 40 to 60 f., 20/7/89; Towyn, Anglesea; 10 to 17 m. N.W. of Mersey Bar, 27/9/90. Length 12 mm.

A common species on the N. coast of Wales but not met with hitherto on the Isle of Man coast. It is variable in colour, generally closely freckled with brown but sometimes almost pure white. I cannot regard *P. monocuspis*, Sars, as anything but the young of this species, as I have constantly taken them together and always observed that only the largest specimens have a dorsal tooth on the first pleon segment and this varies in length in proportion to the size of the specimen.

Paramphithoë assimilis, Sars. (*Pleustes glaber*, Rep. IV., p. 241.)

Puffin Island, shore; Great and Little Orme's Heads; 10 to 17 m. N.W. off Mersey Bar; Calf Sound; Menai Straits 10 to 12 f., 2/4/94; off Blackcombe. Colour greenish white sparingly mottled with brown. Length $5\frac{1}{2}$ mm.

Stenopleustes nodifer, Sars.

Little Orme and Rhos Bay, 4 to 7 f., April and July, 1893; 7 miles W. of Bradda Head, 31 f., 25/4/95.

The "nodiform projections" in the specimens taken were reduced to a mere emargination of the hind margin of the two anterior segments of the pleon. The limbs

and greater part of the body are speckled with dark red of which colour there is a dark cloud on the fourth, fifth and sixth peræon segments. The immense reniform eyes are very characteristic. Length 3 mm.

EPIMERIDÆ.

[*Epimeria cornigera* (Fabricius)].

Galley Head, 24/10/94. Length 10 mm.¹

IPHIMEDIIDÆ.

Iphimedia obesa, Rathke.

Throughout the district 2 to 15 f. Length of large female taken about 17 miles N.W. of Mersey Bar, 27/9/90; 11 mm.

Iphimedia minuta, Sars.

Colwyn Bay, 22/1/92, &c.; Little Orme, 14/9/94; Menai Straits, 17/9/94, 10 to 12 f., abundant; Port Erin, 15 to 20 f., 24/3/94. Generally lighter coloured than *I. obesa*, sometimes almost colourless (Menai Straits). Length 5 mm.

LAPHYSTIIDÆ.

Laphystius sturionis, Kröyer.

One specimen from underneath the pectoral fin of a Cod from Liverpool Bay (Lancashire Fisheries Laboratories, November, 1893). Length 8 mm.

SYRRHOIDÆ.

Syrrhoe fimbriatus, Stebbing and Robertson (Trans. Zool. Soc., London. Vol. XIII., part 1, 1891, p. 31, Pl. V.).

Two miles S.E. of Kitterland, Isle of Man, 17 fathoms 27/5/94 (I. C. T.); 7 miles W. of Bradda Head, 31 f., 25/4/95; four specimens. Length of female with ova $1\frac{1}{2}$ mm.

EUSIRIDÆ.

Eusirus longipes, Boeck.

Off Port Erin, August, 1893 (W. A. H.). Length $5\frac{1}{2}$ mm.

CALLIOPIIDÆ.

Apherusa bispinosa (Bate).

In tidal pools and shallow water throughout the district generally abundant. Very variable in colour—sometimes black. Length 6 mm. A small female with ova measured only $3\frac{1}{2}$ mm.

Apherusa jurinii (M. Edwards) = *Calliopius norvegicus*, (Rathke).

Common in tidal pools throughout the district. Colour whitish mottled with red. Length 8 mm.

Calliopius leviusculus (Kröyer).

Another common shore species. Generally greenish white and without markings but sometimes mottled with red. It is a question whether *C. rathkei* (Zaddach) is not the young of this species. A large female with ova from Colwyn Bay measures 13 mm., another only $6\frac{1}{2}$ mm.; no doubt Sars would call this *C. rathkei*, which form was common at Puffin Island in tidal pools September 9, 1888. It differed from the commonest form of *C. leviusculus* in being spotted with red.

ATYLIDÆ.

Paratylus swammerdamii (M. Edwards).

Abundant throughout the district, shore to 20 fathoms. Adult males and females reach $9\frac{1}{2}$ mm. in length but males with the ciliated antennæ characteristic of sexual perfection and females with ova, both only 4 mm. long, were taken in tidal pools at Colwyn Bay and in 4 to 7 f. off the Little Orme in July, 1893. One of the small females had young ones escaping from the incubatory pouches.

Paratylus falcatus (Metzger).

Little Orme; Colwyn Bay. White with a red spot on the back of each segment except the fourth pleon. Length 5 mm.

Paratylus uncinatus (Sars, *Oversigt af Norg. Crust.*, p. 102).

Red Wharf Bay, Anglesea, 20 f., 8/6/89. This species which has been accidentally united by Sars in his Norwegian Amphipoda with the preceding, differs from it only in not having the pleon segments furnished with dorsal teeth. The species figured in the above work is this form and not Metzger's. The difference does not appear to be one of age or sex. Length about 5 mm.

Paratylus vedlomensis (Bate).

Puffin Island—low water; Port Erin Harbour, electric light, &c.; 8 miles W. of Fleshwick Bay, 33 fathoms; 3 miles W. of Calf of Man, 19 f. (Galley Head). Length 8 mm.

Dexamine spinosa (Montagu).

Common throughout the district; shore to 10 fathoms. Length 15 mm.

Dexamine thea, Boeck.

Port Erin Harbour, 4/6/92, several. Length 4½ mm.

Tritæta gibbosa (Bate).

Colwyn Bay; Anglesea Coast; Puffin Island and Port Erin encysted in the outer integument of Ascidians; 16 miles N. of Holyhead 40 to 50 fathoms; Menai Bridge very abundant; adult males at electric light, Port Erin, 21/4/89. Length 5 mm. It is remarkable that the emargination of the ant. margin of prop. of the first gnath. in the adult males of this species which caused Nebeski to make a distinct species of it (*T. dolichonyx*) should have escaped the notice of so many carcinologists, including even so careful and accurate an observer as Prof. G. O. Sars. Canon A. M. Norman informs me that such males

occur "among his Shetland specimens examined by Spence Bate when engaged on his work."

Guernea coalita (Norman, Ann. and Mag. N. H., Ser. 4, Vol. II., 1868).

Off Great Orme's Head, 1/4/90; 25 miles S.E. of Calf, 6/6/92; Off Port Erin 15 to 20 f., 24/3/94; 2 miles S.E. of Kitterland, 17 f., 27/5/94. Length $1\frac{3}{4}$ mm.

GAMMARIDÆ.*

Melphidippella macera (Norman).

8 miles W. of Fleshwick Bay, 33 f., 5/6/92; 7 miles W. of Bradda Head, 31 f., 25/4/95. Length 5 mm.

Amathilla homari (Fabricius) = *Amathilla sabini* (Leach).

The young of this species is one of the commonest Amphipoda on our coasts, in tidal pools during spring and early summer. I cannot doubt that *A. angulosa* (Rathke) is this young form. The large females measuring 26 mm. in length come to the shore in early spring to deposit their young and may then be taken among Algæ. The young at first have no dorsal carina which is only developed by degrees; in their earliest stage these are *Grayia imbricata* (Bate). The largest I have of the young form is 9 mm. long, nor have I have ever seen one between these sizes.

Gammarus marinus, Leach.

Puffin Island; Hilbre Swash; Colwyn Bay; Port Erin Harbour. Length 16 mm.

Gammarus locusta (Linné).

Common everywhere on the shore under stones between tide marks. Length 25 mm.

Gammarus pulex (De Geer).

In brooks and springs up to 700 feet above the sea. Length 16 mm.

* For the Gammaridæ see a valuable paper by Canon A. M. Norman in Ann. and Mag. N. H., Ser. 6, Vol. 4 (1882).

Melita palmata (Montagu).

Colwyn Bay; Puffin Island; Port Erin; shore to 30 f. Length, excl. of third uropods, 9 mm.

Melita obtusata (Mont.).

Throughout the district: sometimes on Echinoderms, shore to 30 f. Length, excl. third uropods, 9 mm.

Mæra othonis (M. Edw.) = *M. longimana* [second Rep.

L.M.B.C.] (Bate and West., male) *M. othonis* (Bate and West., female).

Bull Bay, Anglesea, 20 f., 8/6/89; off Port Erin and Fleshwick Bay, 15 to 24 f. Colourless or light brown. Length, excl. of third uropods, 12 mm.

Mæra semi-serrata, Bate.

Off Port Erin, 15 to 25 f., 5/6/92; 24/3/94. Light brown. Length 5 mm.

The fact of the above two species being found together and their resemblance in many points, coupled with the smaller size of *M. semi-serrata*, would seem to point to this species being the young of *M. othonis*. In my specimens of the latter the lower margin only of the third pleon segment is serrated, while in *M. semi-serrata* it is the hind margin which is so. But Bate and Westwood in their figure and description of *M. othonis* (female) show both margins serrate. This seems to indicate an intermediate age when the one form is passing into the other.

Mæra batei, Norman (Ann. and Mag. N. H., Ser. 4, Vol. II., Pl. XXII.).

M. multidentata (Bate and West., Vol. II., p. 515, male).

Gammarus tenuimanus (Bate and West., Vol. I., p. 384, female; Bate, Cat. Amph. Brit. Mus., p. 214).

Puffin Island, 15 f., April, '81; on *Spatangus*, 3 m. off Dulas Bay, 14 f., 8/6/89; Menai Straits, 10 to 15 f.,

17/9/94; off Port Erin, 15 to 20 f., 24/3/94; 10 to 17 m. N.W. of Mersey Bar. Length 6 mm.

I have examined the specimen marked *Gammarus tenuimanus*, in the Sp. Bate Collection at the British Museum, and am satisfied it is this species. The description and drawing of the second gnathopod in the Brit. Sess. Eyed Crust. are very faulty; the description in the catalogue is much more accurate.

Megaluropus agilis, Norman (Ann. and Mag. N. H., Ser. 6 (1889), Vol. III., p. 446, Pl. XVIII.).

Common on the N. coast of Wales and the Isle of Man, 2 to 10 fath. Colouring when alive very beautiful. It has a bright crimson blotch on the head above the eye; telson and base of third uropods yellow—the latter with three or four opaque white spots on the outer edge of the outer ramus. Length 4 mm.

Cheirocratus sundevalli (Rathke).

Not uncommon on the N. coast of Wales and the Isle of Man, from 2 to 30 fath. Margins of the first joint of all the legs and both ant. scarlet; segments and epimeres spotted with the same colour. Length 8 mm.

Cheirocratus assimilis (Lilljeborg).

Port Erin Harbour, 28/1/93; 7 m. W. of Bradda Head, 31 f., 25/4/95. Colourless, by which, when fresh, the female may most readily be distinguished from the preceding species. See also Norman in Ann. and Mag. N. H., Ser. 6 (1889), Vol. IV., p. 131, Pl. XI. and XII. Length 7 mm.

Lilljeborgia pallida, Bate.

Bull Bay, Anglesea, 8/6/89, 17 f.; Port Erin, 22/8/93 (W. A. H.). Length $4\frac{1}{4}$ mm.

Lilljeborgia kinahani (Bate).

3 m. W. of Calf of Man, 29/1/93; Menai Straits off Rhianfa, 30/5/94, 7 f. Length $3\frac{1}{4}$ mm.

PHOTIDÆ.

Aora gracilis (Bate).

North coast of Wales, 2 to 15 fath., rather common; Port Erin; [Lambay Isle, 28/10/94, R.L.A.]. Length 8 mm.

Autonoe longipes (Lilljeborg).

Anglesea coast, "Spindrift," 8/6/89, one male; Laxey Bay, 4 to 12 fath., 24/9/92; 5 m. W. of Dalby, 30 f., 8/7/94; Calf Sound, 30/8/94; Menai Straits. Length 3 mm.

Leptocheirus pilosus, Zaddach.

Protomedæia pectinata, Norman (Final Rep. of Shetland Dredging, 1868).

Protomedæia pilosa (Zadd.) and *P. hirsutimana* Bate? Grube, Beitr. z. Kenntniss der Istrischen Amphipodenfauna.

Leptocheirus pilosus (Zadd.) Della Valle, Fauna des Golfe v. Neapel—Gammarini.

Menai Bridge, April and May, '94; washed out of dredged stuff, off Port Erin, many young, 24/3/94 (I.C.T.); 2 m. S. E. of Kitterland, 17 f., 27/5/94. Colour deep yellow with transverse brown lines on all the segments. Length of female with ova $2\frac{1}{2}$ mm.

Leptocheirus hirsutimanus (Bate).

Protomedia hirsutimana, Bate.

Leptocheirus pilosus (Sars, not Zaddach).

One specimen 2 m. S. E. of Kitterland, 17 f., 27/5/94. Colour very pale yellow without markings. Length $5\frac{1}{2}$ mm.

I regret that I am unable to agree with Prof. Sars in assigning the species described by him, and which he rightly identifies with *P. hirsutimana*, Bate, to *L. pilosus*, Zaddach. The latter author in describing his species entirely overlooked the secondary appendage, which, however, Fr. Müller subsequently stated to be one-jointed. This Zaddach could hardly have done had it been the long six-jointed appendage of Sars' species. In *L.*

pectinatus (Norman) which I consider identical with *L. pilosus* (Zadd.) this appendage is two-jointed and very small and the minute second joint might easily be overlooked by Müller, as indeed might the whole appendage by Zaddach. Again, the form of the propodos of the first gnathopods, described by Zaddach as somewhat swollen and broader towards the extremity, does not agree with Sars' figure; and the dactylus of the second gnathopods which is described by Zaddach as straight and feeble ("...ungue recto debilique terminatur") and which in *L. pectinatus* is a very characteristic thin narrow lamina terminated by a small tuft of setæ, is quite normal in *L. hirsutimanus*. Finally, Zaddach could hardly have failed to call attention to the powerful second uropods described by Norman (Shetland Dredging Rep.) under *P. hirsutimanus* had they existed in his species.

Gammaropsis erythrophthalma (Lillje.).

Turbot Hole, Puffin Island, 15 f.; Anglesea coast, 20 f., 8/6/89; 16 m. of N. of Holyhead, 45 to 50 f.; between Mersey Bar and Isle of Man, 20 to 30 f., 28/8/86; 8 m. W. of Fleshwick Bay, 30 to 33 f. [off Blackcombe; Lambay Isle]. Length $7\frac{1}{2}$ mm.

Gammaropsis nana, Sars.

My specimen differs slightly from Sars' description, the secondary app. of upper ant. being three-jointed (the last very small) and the dactylus of first gnathopods finely serrate on the proximal half. The eyes are oval—not round. Otherwise they agree. 5 miles W. of Dalby, Isle of Man, 30 f., sandy mud, 8/7/94; 8 miles off Fleshwick Bay, 30 to 33 f., 5/6/92. Length of female with ova $2\frac{1}{2}$ mm.

Megamphopus cornutus, Norman.

Podoceropsis intermedia, Stebbing.

Protomedea longimana, Boeck.

Off Garwick Head, 24/9/92; Little Orme, 28/7/93; 8 miles off Fleshwick Bay, 30 to 33 f., 5/6/92; Menai Straits off Beaumaris 10 to 15 f., 17/9/94. None of the specimens taken so far show the prolongation of the first epimere of the peræon described by Norman and from which this species takes its name. Apparently it only acquires its full development in northern seas. Colour transparent whitish sparingly freckled with dull red. Length 4 mm.

Microprotopus maculatus, Norman.

Colwyn Bay and Little Orme; Puffin Island, 15 fathoms; Menai Straits; Port Erin Harbour—abundant; tow-net 25 miles S. E. of Calf of Man 6/6/92. Colour brown. Length 3½ mm.

Photis longicaudata (Bate).

Puffin Island, 15 fathoms. 8 m. W. of Port Erin, 38 f., mud and 6 m. S.E. of Calf, 34 f., sand, shells, and gravel, 25/4/95. Length 6 mm.

Photis pollex, n. sp. (Pl. XIX., figs. 16—19).

= *P. reinhardi*, Rep. I., p. 216. Very near *P. tenuicornis*, Sars, from which it differs only in the second gnathopod of the male. In this the second joint is nearly half as long as the first and equal to the third. The prop. has the post. margin prolonged into a tooth or thumb having its base much nearer the carp. than in *P. reinhardi* (whence the specific name) the point of which exactly meets that of the dactylus. The palm, which is longer than the post. margin, is concave but expands distally into two tubercles so that this portion of the propodos is wider than the middle. The female is like that of *P. tenuicornis*. Length 2 mm. Colwyn Bay, shore to 2½ f.; Little Orme; Menai Straits, 5 to 10 f., 24/5/90.

Podoceropsis excavata (Bate) = *Nænia rimipalmata*,
Rep. I., p. 217.

Rhos Bay; Puffin Island; Red Wharf Bay, 20 f., 8/6/89; Port Erin, outside harbour; off Southport. Length 8 mm.

PODOCERIDÆ.

Amphithoe rubricata (Montagu) = *A. podoceroides*, Rath.
= *A. littorina*, Bate.

North Coasts of Wales to Holyhead and Isle of Man, generally under stones between tide marks. Length 13 mm.

Pleonexes gammaroides (Bate) = *Sunamphithoe gammaroides*.

Moelfre Bay, Anglesea in rock pools among *Laminaria* August, 1889 (F. Archer). Length 8 mm.

Ischyrocerus minutus, Lilljeborg = *Podocerus isopus*, Walker, Rep. III. and IV.

Abundant in tidal pools in April, Rhos and Colwyn Bays; Great Orme; Puffin Island; Menai Straits. Colour whitish with broad transverse bands of reddish brown in the females, and numerous small spots of the same colour in the male. Length of adult male 5 mm. This species was erroneously united by Boeck with *P. anguipes* (Kröyer) which caused me to make a new species of it. Adult males are rare, and ovigerous females vary greatly in size. Dredging just below low water mark in Rhos Bay among stones on May 13, 1893 I took more individuals of this species than of all the other (22) species taken together; some of the ovigerous females measured $3\frac{1}{2}$ mm. and others only $2\frac{1}{2}$ mm.

Podocerus falcatus (Montagu) (Pl. XIX., fig. 20).

Rhos and Colwyn Bays; Puffin Island; Menai Straits; Port Erin Harbour; between Holyhead and Isle of Man, 50 f., 20/7/89, a very large male 10 mm. long—the prop. of second gnathopod being 4 mm. long—taken in a tow-net on the bottom. Colour yellow with brown transverse

bars and spots which keep their colour in spirit. I have occasionally seen the markings reddish. Length of a large male from Port Erin Harbour 7 mm.

Podocerus pusillus, Sars, = *P. minutus*, Sars.

Off Port Erin 6/6/92, 1 male and 2 or 3 females with ova. Length $3\frac{1}{2}$ mm.

Podocerus herdmani, Walker (Sixth Ann. Rep. L.M.B.

Com., 1893, p. 37, fig. 13. Brit. Ass. Rep. 1893,
p. 539). *P. odontonyx*, Sars, 1894.

Off Port Erin from Pecten, &c.; 8 miles W. of Fleshwick Bay, 33 f.; 4 miles N. W. of Bradda Head, 21 f., 29/1/93; Colwyn Bay, tidal pool, 29/1/93. Length $3\frac{1}{2}$ mm. There is no doubt that the above species are identical as suggested by Prof. Sars, and as *P. herdmani* was published first, the name *P. odontonyx* must lapse.

It is difficult to say whether the two last species (*P. pusillus* and *P. herdmani*) are really distinct from *P. falcatus*. If it be admitted that Amphipoda may become sexually mature before they have attained their final moult I think these species can hardly be maintained. As regards *P. pusillus*, Sars bases his separation of it from *P. falcatus* on (1) the structure of the post. gnathopods (2) its inferior size and (3) (Oversigt af Norges Crust., p. 112) its occurrence in deep water, while *P. falcatus* is a littoral or sub-littoral form. As to (1) one need only compare Sars' figures of the 2 species (and the accuracy of his drawings is remarkable) to see how slight these differences are; as to (2) the variation in size of apparently adult individuals is so great that this cannot be properly used as a specific character; while as to (3) I have mentioned above the occurrence of a very large male of *P. falcatus* at a greater depth than we have taken *P. pusillus*.

The adult male of *P. herdmani* again closely resembles

the immature male of *P. falcatus* (see Sars, Pl. 212 p.² male \div). The specimen from tidal pool, Colwyn Bay, 5 mm. long has all the appearance of a young male of *P. falcatus* but the lower antennæ have the last joint of the peduncle and the first of the flagellum densely clothed with the plumose setæ characteristic of the adult male. The tooth at the base of the palm of the second gnathopod is more pointed, and that on the dactylus scarcely so large as in the typical form but hardly two specimens are exactly alike in these points, especially the latter. As to the females of all three species, I confess that I am unable to see any difference between them except in size.

Podocerus variegatus (Leach) (Pl. XIX., fig. 21).

17 miles N. W. of Mersey Bar, 27/9/90; Menai Straits 7 f., 30/5/94. Whitish variegated with red. Length 7 mm. There has been much controversy about this species. Boeck (Crust. Amph. bor. and arct.) describes *Janassa capillata* (Rathke) under the name of *J. variegata*, Leach, while Nebeski (Beitr z. Kenntniss der Amph. der Adria) unites it with *P. falcatus* to the female of which it bears a considerable resemblance in the form of the second gnathopod. It may, however, be at once recognised by the more robust antennæ and the difference in the flagellum of the upper. In *P. variegatus* the flagellum is four-jointed, the first joint being nearly twice as long as the remaining three which are subequal. There is a distinct secondary appendage which is about $\frac{1}{8}$ th the length of the first joint. In *P. falcatus* the flagellum is seven-jointed, the first joint rather shorter than the three following; the secondary appendage about $\frac{1}{4}$ th the length of the first joint. In *P. variegatus* the second gnathopods do not differ materially in the two sexes except in size, those of the male proportionally much the larger.

From *Janassa capillata* (Rathke) this species may be at

once distinguished by having two secondary teeth below the curved terminal nail of the third uropods, in which respect it resembles *P. falcatus*, and by the distinct, though small, secondary appendage of the upper antennæ, this in *Janassa* being so absolutely rudimentary that it is only visible as a minute tubercle under a very high power—say $\frac{1}{4}$ in. obj. All the limbs are proportionally shorter and stronger than in *P. falcatus* and the second joint of the palp of the maxillipedes is *more* than half the length of the first joint, while in *P. falcatus* it is *less* than half the length.

Podocerus ocius, Bate (female)—Della Valle, Fauna des Golfe v. Neapel—Gammarini.

From sponge débris, Port Erin. Bate's figure appear to have been taken from a female specimen; the male is figured by Della Valle. It has two pointed teeth or processes at the base of the palm in the second gnathopods the proximal one being the longer. The outer ramus of the third uropods has a curved but blunt nail and no secondary teeth. Colour brown. Length of adult male $2\frac{1}{2}$ mm.

Podocerus cumbrensis, Stebbing and Robertson (Trans. Zool. Soc., Vol. XIII., p. 38, Pl. VI.).

Rhos and Colwyn Bays; Puffin Island; Menai Straits. Colour brown. Length 3 mm. Not uncommon in the above localities. It has a strong superficial resemblance to *Microprotopus maculatus*, with which I have generally found it associated, and may easily be overlooked as being the latter species.

Janassa capillata (Rathke).

Puffin Island; Port Erin, breakwater, 2/8/94, common; 5 m. W. of Dalby, 30 f., 8/7/94. This species may be distinguished at a glance by the extreme hairiness of the antennæ; the flagellum of the upper is three-jointed, the

first joint three times as long as the remaining two. The first joint of the second gnathopods and two first pairs of peræopods are conspicuously yellow. Colour grey with transverse bars of brown. Length 6 mm.

Erichthonius abditus (Templeton).

Point of Ayr; Puffin Island, 14 f.; Little Orme; Menai Straits; 16 m. N. of Holyhead, 50 f.; Port Erin Harbour, Length 8 mm.

Erichthonius difformis, M. Edwards.

Port Erin—electric light; Laxey Bay, 4 to 12 f., 24/9/92, very abundant in tubes on *Zostera*. Length 6 mm.

COROPHIIDÆ.

Siphonæcetes colletti, Boeck.

Off Garwick Head, 4 to 12 f., 24/9/92; Port Erin Harbour; Little Orme. Length 3 mm.

Corophium grossipes (Linn.).

Mud banks in the estuary of the Dee; tidal ditch in Rhos Bay; Menai Straits. Occurs in immense numbers wherever there are mud banks left bare by the tide. There are hundreds of acres of such banks in the Dee closely perforated by its burrows. It forms an important part of the food supply of the various wading birds, and of fish. Length 7 mm.

Corophium crassicornе, Bruzelius.

C. spinicorne—Bate, Brit. Mus. Cat., female.

C. bonellii, M. Edw.—Bate and West., Brit. Sess.

Crust., female.

C. crassicornе, Bruz.—Della Valle, Gam. des Golfs v. Neapel, female.

C. crassicornе, Bruz.—Bate and West., Brit. Sess.

Crust., male.

Little Orme, 5 to 10 f., 5/10/93. The immature male has a row of spines on the penult. joint of the lower ant.

as in the female, but this joint terminates in a tooth-like process as in the adult male. Length 3 mm.

Corophium bonellii, Milne Edwards.

C. crassicornis, Bruz., var., Hoek Tijdschrift Nederland. Dierkund Vereen. 4^{de} Deel, 1879, Pl. VIII., figs. 9 and 10.

Little Orme; Puffin Island; Menai Straits; Port Erin; off Clay Head, 18 f.

Corophium crassicornis of Hoek, l.c. Pl. VIII., figs. 4 and 5 seems to agree with *C. acherusicum* (Costa) as described by Della Valle. Costa's description is too vague for identification. Length 3½ mm.

Unciola crenatipalmata (Bate).

Porthwen and Dulas Bays, 17 f., 8/6/89; off Llanfaelog, Anglesea, 24/5/90; Penrhos Bay.

For description and synonyms see "Bonnier, Les Amph. du Boulonnais." Bull. Scient. de la France, &c., 1889, Pls. XII. and XIII. This species is closely allied to *U. leucopis* (Kröyer) from which it differs in the colour of its eyes which are dark and very distinct, in the absence of the nodules on the sides of the pleon, and (according to Sars) of the transverse ridges of the peraeon. This last feature is not mentioned by Kröyer or Boeck and may possibly have been produced (as it frequently is) by contraction after death. Length 5 mm.

U. planipes, Nor.=*U. leucopis* (Kr.) Bate & West., II., 517.

Red Wharf Bay, 20 f., 8/6/89; Dulas Bay; Little Orme, 28/7/93; off Southport, 10 to 20 f., June, '91 (I.C.T.) Length 5½ mm.

Colomastix pusilla, Grube, see Bonnier, l.c. Vol. XXIV., p. 197, Pl. VIII.

Cratippus tenuipes, Bate.

Exunguia stylipes, Norman (Ann. and Mag. N. H., Ser. 4, Vol. III., Pl. XXII., figs. 7 and 12).

Menai Bridge among sponges, 10 f., April and May, 1894. Sponge débris, Port Erin, 1894. Length 3 mm.

CHELURIDÆ.

Chelura terebrans, Philippi.

In posts of the old shipping stage, Penmaen, Colwyn Bay, with *Limnoria lignorum* (Rathke). Length 6 mm.

DULICHIIDÆ.

Dulichia porrecta (Bate).

Rhos and Colwyn Bays shore to 7 f., common; Menai Bridge, 10 f.; April and May, '94, common; from Pecten, 7 m. W. of Bradda Head, 38 f., 25/4/95. A large female with ova had the peduncles of the upper ant., the lower margins of the epimeres, and the peræopods (except the last which are variegated with white) dark red. Eggs white. Younger specimens are only speckled with red, as are generally the males which are comparatively scarce. Length 5 mm.

CAPRELLIDÆ.

Phtisica marina, Slabber= *Proto ventricosa* (Müller).

Little Orme; Puffin Island; Menai Straits; Port Erin Harbour. Length 7½ mm.

Protella phasma (Montagu).

Little Orme; Puffin Island; Menai Straits; Port Erin. Length 16 mm.

Pariambus typicus (Kröyer)= *Podalirius typicus*.

Throughout Liverpool Bay; Port Erin Harbour. On *Asterias rubens*. Length 5 mm.

Caprella linearis (Linné).

Abundant among Algæ throughout the district. Length 15 mm.

Caprella acanthifera, Leach.

Moelfre Bay, Anglesea, tidal pools, Aug., '89 (F. A.);
 Holyhead harbour, 12/9/89; Port Erin Harbour. Length
 11 mm.

EXPLANATION OF PLATES.

PLATE XVIII.

Figs. 1—11. *Nannonyx spinimanus*, n.sp.

- Fig. 1. Head.
- Fig. 2. First Maxilla.
- Fig. 3. Second Maxilla.
- Fig. 4. Mandible.
- Fig. 5. Maxillipedes.
- Fig. 6. First gnathopod of male.
- Fig. 6a. (on Pl. XIX.) Dactylus enlarged.
- Fig. 7. First gnathopod of female.
- Fig. 8. Fourth pleon segment with hind margin of third.
- Fig. 9. Telson.
- Fig. 10. Side view of telson and third uropods of male.
- Fig. 11. Second and third uropods of female.
- Fig. 12. *Amphilochus melanops*, n.sp., Head.

PLATE XIX.

- Fig. 13. *Amphilochus melanops*, n.sp., first gnathopod.
- Fig. 14. " second gnathopod.
- Fig. 15. " Telson and uropods.
- Fig. 16. *Photis pollex*, n.sp., first gnathopod.
- Fig. 17. " second gnathopod.
- Fig. 18. " third pleon segment.
- Fig. 19. " Telson and third uropods.
- Fig. 20. *Podocerus falcatus* (Mont.), flagellum of upper antenna.
- Fig. 21. *Podocerus variegatus*, Leach, flagellum of upper antenna.



