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Norman

*A mouth on the
Eendhjem fjord*

(Christians)

1894



Vlaams Instituut voor de Zee
Flanders Marine Institute



A Month on the Trondhjem Fiord.

By the Rev. Canon NORMAN, M.A., D.C.L., F.R.S., &c.

[Continued from p. 164.]

[Plate XII.]

[THE reader is requested to make the following corrections in the preceding Table of Distribution:—

P. 162, for *Heteromysis* read *Hemimysis*.

” for *Chiromysis* read *Heteromysis*.

P. 163. The S in column 14 should be opposite *Eudorella truncatula* instead of *E. emarginata*.

P. 164, column 13. Put N instead of ? opposite *Campylaspis costata*.]

This Table of Distribution of the Higher Crustacea of Norway contains one hundred and seventy-eight species. The distribution of these species may be summed up as follows:—

Species which occur both to the north and to the south of Norway	30
Species known only to the north of Norway	19
Species known only to the south of Norway	104
Species here recorded only as Norwegian	25

178

But of these last twenty-five species *Bythocaris Payeri*, Heller, has a wide distribution in the great depths of the cold area of the North Atlantic, and *Euphausia pellucida*, Dana, is an oceanic form with world-wide distribution; and although this species is not marked in the Mediterranean column, it should have been so, since *Euphausia Mulleri*, Claus, is a synonym.

Deducting these two species, we have twenty-three remaining which are as yet unknown beyond the Norwegian seas.

Of the 178 Norwegian species, 121 are known in British seas and 57 reach the Mediterranean, while 44 occur on the N.E. coast of North America. A study of the table will show that the species common to Norway and N.E. America are, with the exception of *Carcinus mœnas*, *Eupagurus Bernhardus*, and *Crangon vulgaris*, either Arctic or deep-water forms.

The Isopoda of Norway differ in general character from those of the British sea by the fact that the family Sphæromidæ is only represented by the single species *Limnoria lignorum*; this family is altogether unknown in the Arctic seas, and in Denmark only two forms occur, *Limnoria lignorum* and *Sphæroma rugicauda*. On the other hand, the

families Tanaidæ, Munnidæ, and Munnopsidæ are largely represented in Norway; the first of these has been little studied in our own seas, while the two latter families are lovers of a soft muddy bottom and, for the most part, of a considerable depth of water, conditions rarely met with on or off our coasts; but there can be no doubt that our fauna will hereafter be enriched by many additions in these three interesting groups.

The Norwegian seas are very rich in Amphipoda, and here again many groups are more largely represented than in British seas on account of the greater depth of water and the nature of the bottom of the fiords; but there can be no question that the much larger number of Amphipods known in Norway as compared with the British fauna is due in no small degree to the fact that the Norwegian Amphipoda have been more thoroughly studied than the British. The following is a comparative statement of the number of Amphipoda at present known in Norway, Denmark, Britain, and the Mediterranean; the species of Norway are from Sars and Boeck, those of Denmark are taken from Meinert's works, those of Britain are from my own computation (including some unrecorded species), those of the Mediterranean are on the authority of Claus, Della Valle, and Mayer.

	Norway.	Denmark.	Britain.	Mediterranean.
Hyperina . . .	9	1	10	21
Gammarina . .	333	107	214	106
Caprellina . . .	17 (?)	5	12	16
	<hr/>	<hr/>	<hr/>	<hr/>
	359	113	236	143

When we pass to the consideration of the Entomostraca, we find that these, with the exception of one group, have been more studied and are better known in the British fauna and in that of the Mediterranean than in Scandinavia. With respect to Copepoda of the latter country the only papers we have are those of Boeck, published many years ago. The Ostracoda of the Norwegian seas have, however, been worked at both by Professor G. O. Sars and myself. One hundred and eighteen species of marine Ostracoda are now known from that coast* and one hundred and forty-six from our own †.

* Norman (A. M.), "Notes on the Marine Crustacea Ostracoda of Norway," *Ann. & Mag. Nat. Hist.* ser. 6, vol. vii. 1891, p. 108.

† Norman and Brady, "Mon. Marine and Freshwater Ostracoda of the North Atlantic and North-western Europe," Section I, Podocopa, *Trans. Roy. Dublin Soc.* ser. 2, vol. iv. 1889, p. 63. To the species of Podocopa there enumerated are added those of the other sections of the group.

BRACHYURA.

- 1.
- Portunus depurator*
- , Linn.

One small specimen, Trondhjem.

ANOMURA.

- 2.
- Eupagurus pubescens*
- , Kröyer.

Trondhjem and Rödberg.

- 3.
- Galathea strigosa*
- , Linn.

Two young examples, Laminarian zone, Rödberg.

Professor M. Sars found this species as far north as the North Cape ('Oversigt over de i den Norsk-arctiske Region forekommende Krebsdyr,' 1858).

- 4.
- Galathodes tridentatus*
- , Esmark.

? 1852. *Galathea serricornis*, Lovén, Öfv. Vet.-Akad. p. 22 (? junior).

1856. *Galathea tridentata*, Esmark, Skand. Naturf. Møte, p. 239.

1882. *Galathodes tridentata*, G. O. Sars, "Oversigt af Norges Crustaceer, I.," Vidensk.-Selsk. Forhand. Christ. p. 43 (separate copy), pl. i. fig. 3.

On the precipices at Rödberg down to 300 fathoms, as well as in similar localities in Kors and Hardanger Fiords.

This species would seem to feed on *Lophohelia prolifera*. It is usually found clinging to that coral or met with in its immediate neighbourhood.

MACRURA.

- 5.
- Calocaris Macandreae*
- , Bell.

In 150-300 fathoms, Trondhjem and Rödberg; also Oster Fiord, near Bergen, 400 fathoms, and off Batalden, near Florö, 200-300 fathoms.

- 6.
- Cheraphilus nanus*
- , Kröyer.

Trondhjem, 150 fathoms.

This is *Crangon bispinosus*, Westwood.

- 7.
- Pontophilus*
- , sp.

I did not find any mature specimen of this genus, but an example occurred in the postlarval stage (see G. O. Sars, "Bidrag til Kundskaben om Decapodernes Forvandlinger, III. Fam. Crangonidæ," Archiv f. Mathem. og Naturv. 1890, pl. iv. figs. 19, 20), in which the telson and second leg are as

figured by Sars, while the carapace has two dorsal spines, a rostrum as long as the eye, and traces of lateral carinæ.

8. *Spirontocaris polaris*, Sabine.

1824. *Alpheus polaris*, Sabine, Supp. to Appendix of Parry's Voyage, p. 238, pl. ii. figs. 5-8.
 1843. *Hippolyte polaris*, Krøyer, Monog. Fremst. af Hippolyte's Nordiske Arter, p. 324, pl. iii. figs. 78-81, pl. iv. fig. 82, ♀.
 1843. *Hippolyte borealis*, id. ibid. p. 330, pl. iii. figs. 74-77, ♂.
 1835. *Hippolyte borealis*, Owen, in Append. Ross's Second Voyage, p. 84, pl. B. fig. 3, ♂.
 1867. *Hippolyte cultellata*, Norman, "Report Exploring Coasts of Hebrides," Brit. Assoc. Report, 1866, p. 200.
 1869. *Hippolyte cultellata*, Norman, "Last Report Dredging Shetland," Brit. Assoc. Report, 1868, p. 265.
 1879. *Hippolyte polaris*, S. I. Smith, "Stalk-eyed Crustaceans Atlantic Coast of N. America," Trans. Connect. Acad. vol. v. p. 80, pl. xi. figs. 1-4.

Trondhjem and Rödberg, 40-300 fathoms. I have the species also in my collection from Hardanger Fiord, off Lervig, and in Stoksund; Norddals Fiord, Florø; Svolveær, Lofoten Islands; Varanger and Bog Fiords, East Finmark; from the Minch and off Shetland: all dredged by myself. Also from Greenland ('*Valorous' Exped.*); lat. 60° 14' N., long. 4° 30' W., 290 fathoms ('*Porcupine*,' 1869, Stat. 78); and off Halifax, N.E. America (*S. I. Smith*).

9. *Spirontocaris securifrons*, Norman.

Trondhjem, 150 fathoms.

This is a much more common species than *S. spinus*, Sow. In British seas the latter is very rare; the former I have from Northumberland and Durham coasts, Shetland, the Minch, Loch Fyne, Firth of Clyde, &c. in our own seas; from most of the fiords in which I have dredged in West Norway and Finmark; also from Tromsø (*I. Sparre Schneider*), and off Salem, Massachusetts Bay, 90 fathoms (*S. I. Smith*).

10. *Spirontocaris pusiola*, Krøyer.

Rödberg, 3-10 fathoms.

11. *Bythocaris simplicirostris*, G. O. Sars. (Pl. XII. fig. 1.)

1869. *Bythocaris simplicirostris*, G. O. Sars, "Nye Dybvandscrustaceer fra Lofoten" (Vidensk.-Selsk. Forhand. Christ. 1869), p. 5 (separate copy).

For generic characters see G. O. Sars, 'Den Norske Nordhavs Exped. Crustaceer,' 1885, p. 26. Five species of the

genus have been described—*B. Panschii*, Bucholz*, *B. Payeri*, Heller †, *B. leucopis*, G. O. Sars ‡, and *B. nana*, S. I. Smith §; and the present species, which is the type of the genus.

Bythocaris simplicirostris appears to be extremely rare. I dredged two specimens in 250–300 fathoms, Rödberg. Sars described the species from a single female dredged in 250 fathoms, Lofoten Islands. Two mutilated examples were taken by the Norwegian North-Atlantic Expedition, one between Finmark and Bear Island in 191 fathoms, the other west of Spitzbergen in 416 fathoms.

B. simplicirostris is distinguished from the more recently described species by the following characters:—

Carapace with only a very slight central carina, suddenly terminated anteriorly in a notch and armed with a spine. Frontal area considerably projecting; middle spine-process (rostrum) subulate, round, smooth, acute, extending forwards to beyond the middle of the basal joint of the antennules, and longer than the long eyes; the flanking lateral spine-processes acute and well-developed, about one third the length of the central. Eyes well developed, on long peduncles, when laterally projected extending beyond the sides of the carapace. Scale of antennæ of great size, as long as the entire carapace and three times as long as its own greatest breadth; apically well rounded and greatly overtopping the spine-process of the outer margin. Telson slightly emarginate at the extremity.

12. *Cryptocheles pygmæa*, G. O. Sars. (Pl. XII. figs. 2–5.)

1869. *Cryptocheles pygmæa*, G. O. Sars, "Nye Dybvandserustaceer fra Lofoten" (Vidensk.-Selsk. Forhand.), p. 6 (separate copy).

Rödberg, on the precipices, in 150–250 fathoms. I have also dredged it in 200 fathoms near Lervig, on the Hardanger Fiord. Sars's types were from the Lofoten Islands in 120–300 fathoms; he has also procured it at Hesthammer, in the Hardanger Fiord, in 100–150 fathoms, and it was dredged by the Norwegian North-Atlantic Expedition at the mouth of the Sogne Fiord, in 200 fathoms. It has as yet only been found on the Norwegian coast.

* *Hippolyte Panschii*, Bucholz, Die zweite Deutsche Nordpolarfahrt, 1869 und 1870, vol. ii. 1874, p. 277, pl. i. fig. 1.

† *Hippolyte Payeri*, Heller, Crustaceen, Pycnogoniden, und Tunicaten Oesterr.-Ungar. Nordpol-Exped. p. 2, pl. i. figs. 1–4.

‡ *Bythocaris leucopis*, G. O. Sars, Den Norske Nordhavs-Exped. 1876–78, Crustacea, I., 1885, p. 27, pl. iii. figs. 1–26.

§ *Bythocaris nana*, S. I. Smith, "Report Decapod Crustacea 'Albatross,' 1884," Annual Rep. Comm. Fish and Fisheries, 1885, p. 56 (separate copy), pl. xii. fig. 2.

This is probably the smallest Macruran known, measuring only about 13 millim. long.

Outer maxillipeds (fig. 4) strongly developed, with a small palp at the base, last joint longer than penultimate, on the anterior side furnished with semiverticils of setæ, extremity terminating in a very strong triangular spine, at the base of which is projected to about one third of its length a dentated lobe. First feet very short (fig. 5), hand greatly elongated, nearly twice the length of the wrist, attenuated distally, the finger and thumb extremely small and weak. Second feet slender and weak; wrist longer than the anterior portion of limb, composed of seven articulations; hand very minute and the chela so small that it can only be seen when the limb is mounted and microscopically examined. Remaining feet simple. The front portion of the carapace is dorsally keeled and spined, spines about four; rostrum (fig. 3) about half as long as the carapace, nearly horizontal, narrow, above with "8-12" spines, beneath unarmed, except sometimes a small tooth at the apex. No spine over the eye, but three minute spines below. Antennal scale elongated, rhomboidal, with a spine about the middle of the outer margin. Epimera of first three segments of pleon very large in the female, especially the second. Telson shorter than uropods, elongated-ovate, with numerous spines on the sides, distally truncate, and furnished with six spines. "Branchiæ utrinque 5 structura singulari, laminas formantes ovatas in superficie modo exteriori plicas 4-7 ut rudimenta foliolorum præbentes; branchia posterior ceteris major et forma subreniformi" (*G. O. Sars*).

Both *Bythocaris* and *Cryptocheles* have only a few ova, and these are very large; and *G. O. Sars* has recorded that in these genera the young issue from the egg with the full complement of limbs, and do not undergo any metamorphosis subsequently. Thus these genera differ from all shallow-water Macrura. In most deep-water Macrura the eggs are few and large, and it is probable therefore that the development is similar in character to that of *Bythocaris* and *Cryptocheles*. [Notes by Prof. S. I. Smith on the large size of the eggs of abyssal Crustacea will be found in papers printed in *Ann. & Mag. Nat. Hist.* ser. 5, vol. xiv. 1884, p. 183; "Report Decapod Crustacea 'Albatross' Dredgings, 1884," in *Ann. Rep. Comm. Fish and Fisheries, 1885 (1886)*, p. 13 (separate copy); *Ann. & Mag. Nat. Hist.*, ser. 5, vol. xvii. 1886, p. 197.]

13. *Pandalus brevirostris*, Rathke.

Rödberg, 150 fathoms.

Two specimens, both presenting peculiarities. One is more slender in form than usual and has the rostrum less deep and much longer, equal to twice the length of the eye; it bears ten teeth above, of which six are articulated on the carapace and two are situated beyond the extremity of the eye; there is usually a cilium in front of each tooth of the carapace, but in this specimen it is absent; there are three teeth on the underside of the rostrum of larger size than usual. The second specimen has the rostrum somewhat shorter, with eight teeth above of which five are on the carapace, and four below, the two proximal of which are of good size and at some distance from the extremity.

14. *Caridion Gordoni*, Bate.

Rödberg, 150 fathoms.

15. *Pasiphæa tarda*, Kröyer.

1845. *Pasiphæa tarda*, Kröyer, Naturhist. Tidsk. Anden Rækkes, vol. i. p. 453.

1844? *Pasiphæa tarda*, Kröyer, Voyage en Scandinavie &c. pl. vi. figs. A, B, a-o*.

1868. *Pasiphæa norvegica*, M. Sars, Bidrag til Kunds. om Christianiafjordens Fauna, p. 42, pls. iv. and v. figs. 65-90.

1882. *Pasiphæa tarda*, G. O. Sars, "Overs. af Norges Crustaceer, I." (Vidensk.-Selsk. Forhand. Christ.), p. 42 (separate copy).

A single specimen off Rödberg in about 300 fathoms.

The chief points which distinguish this species from *P. sivado*, our British species, are that the telson is cleft at the extremity and that there is no spine over its base on the hinder margin of the preceding segment. The segments are also strongly keeled dorsally.

Both *P. sivado* and *P. tarda* are usually found in depths exceeding 80 fathoms; but on one occasion, about forty years ago, I found the former in enormous quantities in stake-nets which had been set between tide-marks at Clevedon, Somerset; and these could not have temporarily come out of deep water, since the whole of the Bristol Channel is shallow.

MYSIDEA.

Descriptions and admirable figures of the following Schizopods will be found in G. O. Sars's "Monog. over de ved Norges Kyster forekommende Mysider," and descriptions of such as are found in Britain in my paper on British Mysidæ in Ann. & Mag. Nat. Hist. ser. vi. vol. x. 1892.

* The generic name in the Voyage en Scand. is spelt *Pasiphæa*, and this is the spelling of Savigny, who instituted the genus.

16. *Boreomysis tridens*, G. O. Sars.

In 3–300 fathoms, Trondhjem and Rödberg. Some young examples were taken among *Laminariae* in very shallow water, but close at hand there was a precipice descending to 250 fathoms.

17. *Erythropros microphthalma*, G. O. Sars.

A single specimen off Trondhjem, in 150 fathoms.

18. *Parerythropros abyssicola*, G. O. Sars.

In considerable numbers, Rödberg, 250–300 fathoms.

19. *Mysidopsis didelphys*, Norman.

Trondhjem, between Munkholmen and the harbour.

20. *Pseudomma roseum*, G. O. Sars.

Among *Lophohelia* and Alcyonarians on the precipices and on the bottom of the fiord, Rödberg.

21. *Pseudomma affine*, G. O. Sars.

One only, 250–300 fathoms, Rödberg.

22. *Mysideis insignis*, G. O. Sars.

Rödberg, 150 fathoms, one only.

23. *Hemimysis abyssicola*, G. O. Sars.

Rödberg, 250–300 fathoms, abundant.

24. *Macromysis inermis*, Rathke.

Trondhjem and Rödberg, 3–5 fathoms.

25. *Schistomysis ornata*, G. O. Sars.

Rödberg, 3–5 fathoms.

CUMACEA.

I do not in the following list give reference to such species as are described in G. O. Sars's paper "Om den aberrante Krebsdyrgruppe Cumacea og den Norske Arter" (Vidensk.-Selsk. Forhand. 1864) except when other papers contain figures of the species.

26. *Lamprops fasciata*, G. O. Sars.

One specimen in 1 fathom, west bay at Trondhjem.

27. *Hemilamprops rosea*, Norman.

1863. *Vaunthompsonia rosea*, Norman, Trans. Tyneside Nat. Field-Club, vol. v. p. 251, pl. xiii. figs. 1-3, ♀.

1863. *Cyrianassa elegans*, id. *ibid.* p. 275, pl. xiv. figs. 1-6, ♂.

Specimens here and there in 15-150 fathoms, Trondhjem and Röddberg.

28. *Hemilamprops cristata*, G. O. Sars.

1869. *Lamprops cristata*, G. O. Sars, "Nye Dybvandskrustaceer fra Lofoten" (Vidensk.-Selsk. Forhand.), p. 13 (separate copy).

Four specimens, 150-300 fathoms, Trondhjem and Röddberg.

29. *Leucon nasicus*, Kröyer.

Leucon nasica, Kröyer, Voyage en Skand. &c. pl. iii. fig. 3, a-o.

In 20-150 fathoms, Trondhjem and Röddberg.

30. *Leucon pallidus*, G. O. Sars.

Röddberg, 40-300 fathoms.

31. *Leucon acutirostris*, G. O. Sars.

Röddberg, 150-300 fathoms.

32. *Eudorella truncatula*, Bate.

1856. *Eudora truncatula*, Bate, "On British Diastylidæ," Ann. & Mag. Nat. Hist. ser. 2, vol. xvii. p. 457, pl. xiv. fig. 3.

1871. *Eudorella truncatula*, G. O. Sars, "Besk. af 'Josephines' Exped. fundne Cumaceer," Kong. Svenska Vetensk.-Akad. Hand. vol. ix. pl. xviii. fig. 99.

Röddberg and Trondhjem, 20-300 fathoms.

33. *Eudorella emarginata*, Kröyer.

1844? *Leucon emarginatus*, Kröyer, Voyage en Scand. &c. pl. v. fig. 2, ♀.

1863. *Cyrianassa ciliata*, Norman, Trans. Tyneside Nat. Field-Club, vol. v. p. 273, pl. xiii. figs. 4-9, ♂.

1871. *Eudorella emarginata*, G. O. Sars, "Besk. af 'Josephines' Exped. fundne Cumaceer," Kong. Svenska Vetensk.-Akad. Hand. vol. ix. pl. xvii. fig. 98.

Common, 40-300 fathoms, Trondhjem and Röddberg.

34. *Eudorella hirsuta*, G. O. Sars.

1869. *Eudora hirsuta*, G. O. Sars, Undersøgelser over Christianiafjordens Dybvandsfauna, p. 43.

1871. *Eudorella hirsuta*, G. O. Sars, "Besk. af 'Josephines' Exped. fundne Cumaceer," Kong. Svenska Vetensk.-Akad. Hand. vol. ix. pl. xvii. fig. 100.

A single specimen, Röddberg, 250-300 fathoms.

35. *Diastylis lucifer*, Kröyer.

Cuma lucifera, Kröyer, Voyage en Skand. &c. pl. iii. fig. 3.

Very abundant at Trondhjem in 20–150 fathoms; also at Rödberg, sparingly, in 40–70 fathoms.

36. *Diastylis cornutus*, A. Boeck.

1863. *Cuma cornuta*, A. Boeck, "Vidensk.-Selsk. Forhand. p. 190" (*vide* G. O. Sars; I have not this paper).

1865. *Diastylis bicornis*, Bate, Ann. & Mag. Nat. Hist. ser. iii. vol. xv. p. 84, pl. i. fig. 2.

186(4?)*. *Diastylis bispinosa*, G. O. Sars (*nec* Stimpson), Aberr. Krebsdyrgruppe Cumacea, p. 39.

In 150 fathoms at Trondhjem and 250–300 fathoms at Rödberg.

37. *Diastylis echinatus*, Bate.

1865. *Diastylis echinata*, Bate, Ann. & Mag. Nat. Hist. ser. 3, vol. xv. p. 81, pl. i. fig. 1.

Two specimens, Rödberg, 250–300 fathoms. I have also taken it in three places in the Hardanger Fiord, in 100–180 fathoms; and I have a specimen from 550 fathoms in the Faroe Channel.

38. *Diastylis serratus*, G. O. Sars.

Rödberg, 70–300 fathoms, the specimens for the most part very young. I have also taken it at Drobak, in the Christiania Fiord; off Lervig, in the Hardanger Fiord; and at Florö.

39. *Diastylis tumidus*, Lilljeborg.

Trondhjem, in 20–70 fathoms. I have also dredged it in several places near Florö, in 70–250 fathoms.

40. *Diastylis biplicatus*, G. O. Sars.

Diastylis lamellata, Norman, "Report Dredging Hebrides," Brit. Assoc. Rep. 1866 (1867), p. 200.

Trondhjem, between Munkholmen and the land. I have also taken it at Drobak; in Oster Fiord, north of Bergen; and off Lervig, in the Hardanger Fiord. It has a great range in depth from 20 to 1230 fathoms, at which last depth it was taken by the 'Porcupine' Exped., 1869.

* This paper bears date 1864; but as it quotes Bates's paper published in 1865, it must have been published later.

41. *Diastylis resimus*, Kröyer.

- 1844? *Cuma resima*, Kröyer, Voyage en Scand. &c., pl. iii. fig. 1; Naturhist. Tidsk. Anden Rækkes, vol. ii. 1846, pp. 165 and 206.
 1882. *Diastylis resimus*, G. O. Sars, "Oversigt af Norges Crustaceer, I.," Vidensk.-Selsk. Forhand. Christ. p. 58 (separate copy).

In abundance at Trondhjem, between Munkholmen and the land, and in other places, 20-70 fathoms. I have also found it in profusion in shallow water, 3-5 fathoms, at Vadsö, and in Bog and Klosterelv Fiords, Sydvaranger. Sars also found it "i stor Mængde" at Vadsö, in 6-10 fathoms, and also at Christiansund. It is remarkable that this *Diastylis*, originally described from specimens procured by Capt. Holboll in Greenland, should be the latest addition to our knowledge of the Cumacean fauna of the Norwegian coast, and not recorded again till about thirty-six years after its first discovery. The circumstance of its not having been found is the more remarkable since the species is an inhabitant of shallow water and is gregarious and most abundant where it occurs, and that it is now known to range from the borders of Russia (Sydvaranger) to Denmark. In form it is utterly different from any other species of the genus, being at once distinguished by its upturned rostrum, in which respect a counterpart may be found in *Eudorellopsis deformis*, Kröyer.

42. *Diastylis rugosus*, G. O. Sars.

1879. *Diastylis rugosa*, G. O. Sars, "Nye Bidrag til kunds. om Middelhavets Invertebratfauna, II. Middelhavets Cumaceer," Archiv. for Math. og Naturvidenskab. vols. iii. and iv. p. 98, pls. xxxiv.-xxxviii.

Two specimens, Trondhjem, 20-40 fathoms. I have also dredged it at Drobak and in the Hardanger Fiord; off Valentia, Ireland; and procured it at Naples.

43. *Leptostylis ampullaceus*, Lilljeborg.

Rödberg, in 250-300 fathoms. This is a rare species which I have also taken at Drobak (Sars's locality); and I am indebted to Prof. Lilljeborg for specimens from Kullen, Sweden.

44. *Campylaspis costata*, G. O. Sars. (Pl. XII. fig. 9.)

1864. *Campylaspis costata*, G. O. Sars, "Aberrante Krebsdyrgruppe Cumacea," Vid.-Selskab. Forhand. p. 79.

Carapace sculptured, with three oblique subcrescentic crests on each side; the lowest commencing at the anterior extremity of the lateral border, runs nearly parallel with that border until it arches over the back near the dorsal margin;

after pursuing rather more than half its length, it sends out a branch, which ascends thence nearly perpendicularly over the back; in front of this lowest and divided crest are the two remaining crests, which are flexuous, oblique, and sub-crescentic, the lower meeting the front margin at the base and the other a little above the summit of the rostrum. For description of limbs see Sars.

Trondhjem and Rödberg, 70–150 fathoms. In 1879 I dredged it in 80–100 fathoms in Stoksund, which is near the mouth of the Hardanger Fiord; and in 1878 at Drobak.

It is also a member of the British fauna, having been dredged by Mr. T. Scott at Rothesay, in the Firth of Clyde, and by myself off Little Cumbrae in 1885.

45. *Campylaspis verrucosa*, G. O. Sars. (Pl. XII. fig. 8.)

1866. *Campylaspis verrucosa*, G. O. Sars, Beret. om en i Somm. 1865 foretagen Zool. Reise ved Kysterne af Christianias og Christiansands Stifter, p. 24.

Carapace without crests or ribs; beset all over with conspicuous irregularly disposed tubercles. The whole animal is speckled with deep brown or black, and on the carapace there is usually one such dark speck on each tubercle.

Rödberg, 100–300 fathoms; also in 1879 in 80–100 fathoms, in the Hardanger Fiord.

46. *Campylaspis horrida*, G. O. Sars. (Pl. XII. figs. 6, 7.)

1869. *Campylaspis horrida*, G. O. Sars, "Nye Dybvandscrustaceer fra Lofoten," Vidensk.-Selsk. Forhand. p. 18 (separate copy).

Carapace very large, but less tumid than usual; surface very uneven; a little within the lateral margin runs a plain crest or plica, which overhangs the inward sweep of the sides below it; above this is a longitudinal waved crest, and above this again the whole surface is tuberculated; there are also a few tubercles in the space between the waved and the plain crest.

One specimen only, Rödberg, in 250–300 fathoms.

For descriptions of the limbs of the three foregoing species Sars's papers can be consulted. As they have not hitherto been figured, I give illustrations of these interesting Cumaceans.

ISOPODA.

47. *Paranthura tenuis*, G. O. Sars.

1872. *Paranthura tenuis*, G. O. Sars, "Bid. til Kunds. om Dyrelivet paa vore Hafbanker," Vidensk.-Selsk. Forhand. p. 89.

1886. *Paranthura tenuis*, Norman and Stebbing, "Isopoda of 'Lightning,' 'Porcupine,' and 'Valorous' Expeditions," Trans. Linn. Soc. vol. xii. p. 191, pl. xxvii. fig. 1.

Rödberg, 250–300 fathoms.

48. *Anceus maxillaris*, Montagu.

Found down to 100 fathoms.

49. *Æga ventrosa*, M. Sars.

1858. *Æga ventrosa*, M. Sars, "Overs. af de i den norske-arct. Region forekom. Krebsdyr," Vidensk.-Selsk. Forhand. Christ. 1858, p. 156.

1879. *Æga ventrosa*, Schiödte and Meinert, "Symb. ad Monog. Cymothoarum, I. Ægidæ," Naturhist. Tidss. 3 Række, vol. xii. p. 375, pl. ix. figs. 7, 8.

Four specimens, among Alcyonarians and corals on the precipices at Rödberg. This species is only as yet known on the Norwegian coast. The type was taken in Öxfjord, Finmark, and though rare—Schiödte and Meinert record twelve specimens in all—it has been found in several places thence to the Christiania Fiord. I may add to recorded habitats near Lervig, in the Hardanger Fiord, where I took two specimens in 1879.

50. *Idotea marina*, Linné.

=*I. tricuspidata*, Desmarest, =*I. pelagica*, Leach, =*Oniscus balthicus*, Pallas, =*Stenosoma irrorata*, Say, =*Idotea Basteri*, Audouin, =*Idotea variegata*, Roux.

Rödberg. I have this species from Sicily, from the Adriatic, and from all parts of the British coast; West Norway generally, and up to Vadsö, East Finmark, and from the N.E. American coast.

It is subject to great variation as regards the form of the telson:—

a. The sides slope away without any angulation to a considerably produced central point. This is a common state in the young, but is sometimes preserved to full maturity.

b. The telson is markedly angled at that part whence the sides begin to slope away to the produced apex.

c. The angles just spoken of are produced into more or less acute points, which, however, are much shorter than the central apex. This is typical *I. tricuspidata*, Desmarest.

d. The extremity is very broad, somewhat produced and widely rounded at the sides, with a small central point, which is scarcely, if at all, longer than the lateral lobes. All the specimens I have seen from the Mediterranean, that is from Sicily and the Adriatic, are referable to this variety or, possibly, species. It is a form which I have never seen in the north, and is *I. Basteri*, Roux.

Miers, in his "Revision of the Idoteidæ" (Journ. Linn. Soc. vol. xvi. 1881, p. 31), has considered the North-east American *Idotea* described by Harger under the name *Idotea*

phosphorea * to be a variety of *I. marina*. In this I think he was mistaken. Neither Harger nor Miers alludes to what I consider the most important specific character. The manner in which the lateral lobes of the thoracic segments are distinctly separated from the epimera is important; but the form of the epimera themselves is quite different from what it is in *I. marina*—instead of being of subequal depth throughout, each is markedly narrow in front and gradually widens backward, and thus has a wedge-shaped form (Harger's figures distinctly show this to be the case: compare fig. 27, *I. phosphorea*, Harger, with fig. 24, *I. irrorata*, Harger, = *I. marina*). The specimens I have examined are types received from Harger taken in the Bay of Fundy, and they have been compared with *I. marina* from European localities as well as with specimens of the same species received from Vineyard Sound, N.E. America (from Harger as "*I. irrorata*").

51. *Astacilla longicornis*, Sowerby.

Two small females with pouches carrying eggs, Trondhjem. The most northern locality from which I have this species is Tromsö (*I. Sparre Schneider*).

52. *Janira maculata*, Leach.

Rödberg, 40–70 fathoms.

This is *Henopomus muticus*, Kröyer ('*Voyage en Skand. &c.*' pl. xxx. figs. 1 a–n).

53. *Pleurogonium rubicundum*, G. O. Sars.

Pleuracantha rubicunda, G. O. Sars, "Om en Anomal Gruppe af Isopoder," Vidensk.-Selsk. Forhand. Christ. 1863, p. 16 (separate copy).

Pleurogonium rubicundum, G. O. Sars, "Unders. over Hardangerf. Fauna, I. Crustaceer," Vidensk.-Selsk. Forhand. 1871, p. 30 (separate copy).

In 40 and 150 fathoms, Trondhjem and Rödberg. I have to thank Prof. G. O. Sars for specimens from Finmark, and I have myself taken the species at Vadsö, Finmark. It is also a British species, since I dredged it in 1888, in company with my friend Mr. D. Robertson †, in 20–25 fathoms off Fairland Point, Cumbræ, in the Firth of Clyde.

* Harger, "Report Marine Isopoda of New England," Report U.S. Comm. Fish and Fisheries, 1878, pt. 6, p. 347, pl. v. figs. 27–29.

† I may record here another species taken at the same time in company with *Pleurogonium rubicundum*, belonging to the same family and also new to the British fauna, *Paramunna bilobata*, G. O. Sars.

The genus *Leptaspidia*, Bate and Westw., is, I think, unquestionably a synonym of *Pleurogonium*.

54. *Macrostylis spinifer*, G. O. Sars.

Macrostylis spinifer, G. O. Sars, "Om Anom. Gruppe af Isopoder," Vidensk.-Selsk. Forhand. 1863, p. 15 (separate copy).

Vana longiremis, Meinert, Vidensk. Udbytte 'Hauchs' Togter, III. Crustacea Malacostraca, 1890, p. 195, pl. ii. figs. 63-73.

Two or three specimens of this curious little species in 40-70 fathoms, Röddberg. I also have received specimens from Denmark (Copenhagen Museum as "*Vana longiremis*").

55. *Ischnosoma bispinosum*, G. O. Sars.

Ischnosoma bispinosum, G. O. Sars, Beret. om en i Somm. 1865 foretagen Zool. Reise ved Kyst. af Christianias og Christiansands Stifter, 1866, p. 34.

Three specimens from the greatest depths at Röddberg. Also in my collection from Christiania Fiord, given me by G. O. Sars, who has also procured it at Lofoten and in the Hardanger Fiord.

56. *Eugerdia tenuimana*, G. O. Sars.

Desmosoma tenuimanum, G. O. Sars, Beret. om en i Somm. 1865 foretagen Zool. Reise ved Kyst. af Christianias og Christiansands Stifter, 1866, p. 33.

Eugerdia globiceps, Meinert, Vidensk. Udbytte 'Hauchs' Togter, III. Crustacea Malacostraca, 1890, p. 194, pl. ii. figs. 53-62.

Röddberg, 70-200 fathoms.

I have been able to compare my specimens with types of *Eugerdia globiceps* received from the Copenhagen Museum. There seems sufficient grounds for removing Sars's species from the genus *Desmosoma*, on account of the mandibles being destitute of a palp, the filiform character of the first feet, and the biramose caudal appendages.

57. *Munnopsis typica*, M. Sars.

Munnopsis typica, M. Sars, Beret. om en i Somm. 1859 Zool. Reise ved Kysten af Romsdals Amt. 1860, p. 10.

Munnopsis typica, M. Sars, "Besk. af en ny Stægt og Art af Isopoder," Vidensk.-Selsk. Forhand. 1860, p. 84.

Munnopsis typica, M. Sars, Bidrag til Kunds. om Christianiafj. Fauna, 1868, p. 70, pls. vi., vii.

Munnopsis typica, H. J. Hansen, Dijnphna-Togtets zool.-bot. Udbytte, 1887, p. 196, pl. xx. figs. 2-2 e.

Munnopsis typica, H. J. Hansen, Oversigt over det vestlige Grönlands Fauna af Malakos. Hafskrebsdyr, 1887, p. 195 (no description).

Rödberg, 250–300 fathoms. I also have it from Varanger Fiord, East Finmark, 150 fathoms (*A. M. N.*); off Hare Island, Disco, Greenland, 85 fathoms (*'Valorous,'* 1875); Faroe Channel, 540 fathoms (*'Knight Errant,'* Stat. 8); Faroe Channel, 640 fathoms (*'Triton,'* Stat. 8); West Greenland (*Prof. d'Arcy Thompson*).

58. *Ilyarachna hirticeps*, G. O. Sars.

Ilyarachna hirticeps, G. O. Sars, "Nye Dybdvandscrustaceer fra Lofoten," Vidensk.-Selsk. Forhand. 1869, p. 23 (separate copy).

Rödberg, 250–300 fathoms.

In this species the leading character is "Segmentorum thoraciorum 4 priorum margines anteriores in cristas subtiliter crenulatas elevati." Among the specimens occurring at Rödberg are some in which this crenation is almost wholly absent. I have also taken this species in the Varanger Fiord, East Finmark, and have one of the original specimens procured by the describer at the Lofoten Islands.

59. *Eurycope cornuta*, G. O. Sars.

Eurycope cornuta, G. O. Sars, "Om en Anomal Gruppe af Isopoder," Vidensk.-Selsk. Forhand. 1863, p. 5 (separate copy).

Rödberg, 250–300 fathoms. Also Christiania Fiord (*G. O. Sars, in Mus. Nor.*).

60. *Eurycope producta*, G. O. Sars.

Eurycope producta, G. O. Sars, Beret. Somm. 1865 Zool. Reise ved Kysterne af Christianias og Christiansands Stifter, 1866, p. 32.

Antennules having the basal joint broad and produced on each side into triangular lobes, which embrace the second joint between them; the inner of these lobes very long and reaching forward to the length of the fourth joint; rostrum having the base equal in breadth to about one fourth of that of the cephalic segment, deeply concave and bent downwards at the extremity, which is emarginate in the centre, rounded on each side, and bearing on the outer margin 6 to 8 tooth-like serrations; the rostrum is subequal in length to the long triangular lobe of the first joint of the antennules. The three anterior segments of the posterior portion of the body are distinctly separate and articulated, and are slightly grooved in the central dorsal line. Length of antennæ about $2\frac{1}{2}$ that of the body; length of latter 3 millim., of former 8 millim.

There are two species with which *E. producta* might be confounded; from *E. furcata* and *E. latirostris* the distinctly separated segments which precede the last will at once distinguish it, as well as the character of the basal joint of the antennules and the exact structure of the rostrum.

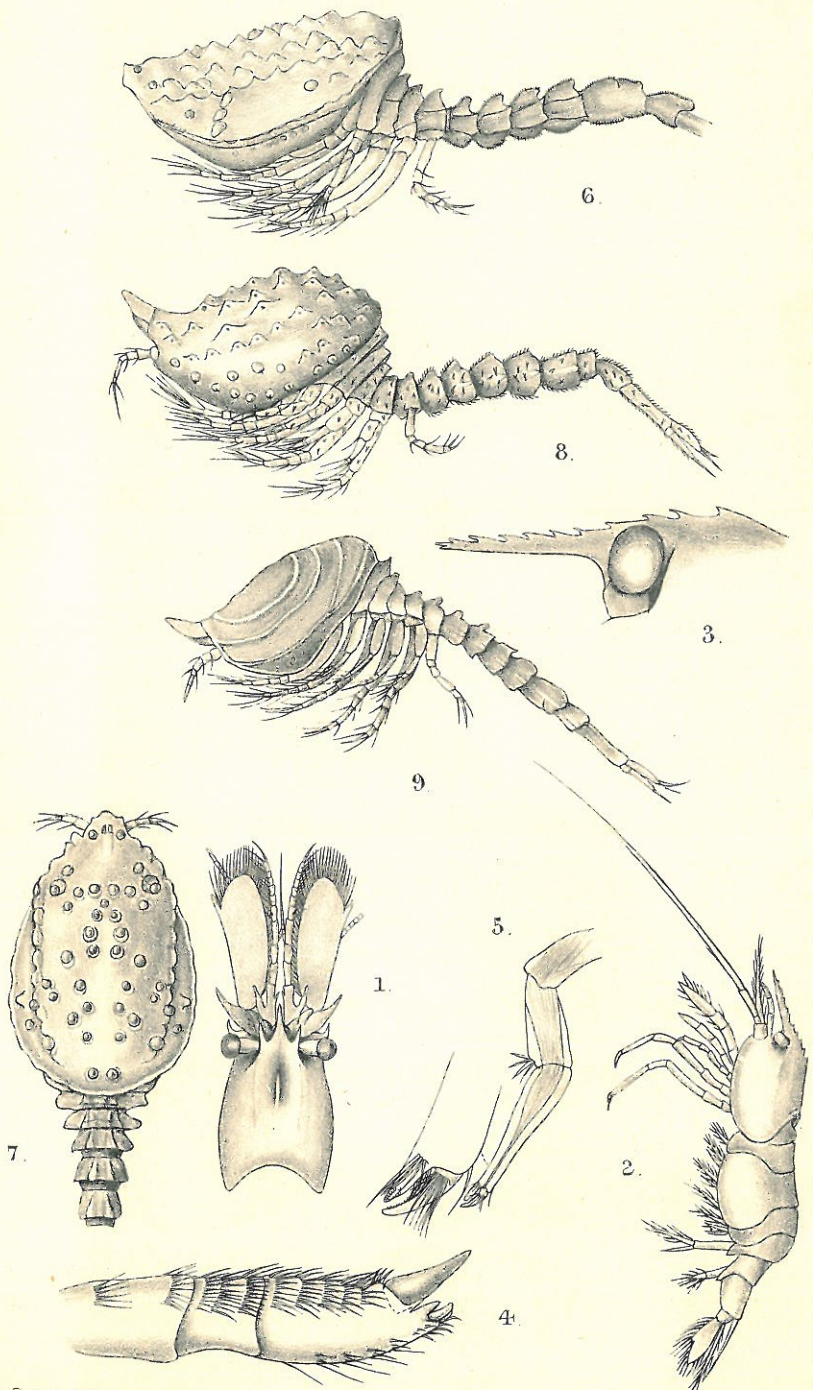
Rödberg, on the precipices among Alcyonarians, in about 150 fathoms.

Sars described the species from a single specimen, which was scarcely more than half the length of those found by me; and as in that description there is no allusion made to the structure of the antennules, I should have failed to recognize the species had it not been that I had the advantage of direct comparison with specimens kindly given me by Prof. G. O. Sars, and obtained by him in West Norway.

[To be continued.]

EXPLANATION OF PLATE XII.

- Fig. 1.* *Bythocaris simplicirostris*, G. O. Sars. Dorsal view of anterior portion of carapace, enlarged.
Fig. 2. *Cryptocheles pygmæa*, G. O. Sars. Enlarged about three diameters.
Fig. 3. Ditto. Rostrum.
Fig. 4. Ditto. Outer maxilliped.
Fig. 5. Ditto. First foot.
Fig. 6. *Campylaspis horrida*, G. O. Sars, ♀. Enlarged.
Fig. 7. Ditto. Dorsal view of carapace.
Fig. 8. *Campylaspis verrucosa*, G. O. Sars, ♂. Enlarged.
Fig. 9. *Campylaspis costata*, G. O. Sars, ♂. Enlarged.



A. Scott del.

Mintern Eros. lith.

