

Report on the Surface Collections made by Mr. W. T. Grenfell in the North Sea and West of Scotland.

By

Gilbert C. Bourne, M.A., F.L.S.

With Plate XXV.

MR. WILFRID GRENFELL, the Superintendent of the Mission to Deep Sea Fishermen, has most kindly arranged to carry on a series of observations on the pelagic fauna and the fishes of the seas traversed by the Mission boats in the course of their work. The following report gives an account of the pelagic fauna collected in the North Sea during the early spring, and in the west of Scotland and Kinsale Harbour during the summer. The collections were preserved in picro-sulphuric acid and spirit, and were forwarded to Plymouth for examination. Owing to pressure of work, and to my leaving Plymouth somewhat unexpectedly, I have not been able to make a thorough investigation of all the collections, but have worked out the Copepoda with care, and have confined myself to short notes on the other species.

Fourteen bottles were sent from the North Sea, the stations being—

No. 1.—February 28th. East of Winterton shoal. The surface-net was used for twenty minutes just below the surface at 10.15 a.m. Temperature of the air 35.5° , of the surface 42° , of the bottom 39° F. A heavy swell.

No. 2.—February 28th. Three to four miles W. of No. 1. Net sunk some fathoms below the surface. Temperature at surface 41.5° F.

No. 3.—March 1st, 10 a.m. Winterton shoal. Temperature of air 38.5° , of surface 42° . Wind N.N.W.

No. 4.—March 1st, 12.30 a.m. Within a mile or so of No. 3. About fifty miles E. of Yarmouth.

No. 5.—March 3rd. On Winterton shoal, Yarmouth bearing W.S.W. forty-five miles. Net sunk below surface. Temperature the same as No. 3. Bright sun.

No. 6.—March 3rd, 8.30 p.m. N.E. edge of Winterton shoal, about sixty miles E.N.E. of Yarmouth. Temperature of air 30° , of surface 41.2° . Wind E., moderate.

No. 7.—March 4th, 9.40 a.m. Fifty miles due E. of Winterton shoal. Lat. $52^{\circ} 41'$. Wind W. Temperature of air 41.5° , of surface 41.5° , of bottom 39.5° . "Strong sickly smell."

No. 8.—March 5th, 10.5 a.m. On Winterton shoal. Forty-five miles W. of Yarmouth. Temperature of air 43° , of surface 41.25° , of bottom 40° . Wind N.N.W., fresh. Bright sun after snow and sleet on previous night. Contents of tow-net had offensive smell.

No. 9.—March 6th, 5.30—6.30 p.m. Lat. $53^{\circ} 12'$, about sixty miles E. of Cromer on shoals of the Lemon. Temperature of air 40.25° , of surface 38.5° . Strong breeze from N.W. by W. with a heavy swell.

No. 10.—March 6th, 7.30—8.30 p.m. Lat. $53^{\circ} 14'$, on Black Bank. Temperature of air 41° , of surface 40.5° .

No. 11.—March 7th, 7.30—8.30 a.m. Between Black Bank and shoals of Lemon. Temperature of air 44.5° , of surface 40° , of bottom 38.5° .

No. 12.—March 9th, 1.15—2.15 p.m. East of shoal of Lemon. Temperature of the air 39° , of the surface 40° . Weather squally, with sunshine in intervals. Heavy gusts from N. by W.

No. 13.—March 9th, 7.30—8.30 p.m. About one mile N.W. of No. 12. Temperature of air 37° .

No. 14.—March 10th, 7.30—8.20 p.m. The Lemon shoal bearing N.W. by W. Temperature of air 47° , of surface 42° . Heavy wind from W.S.W.

The collections made in the first eight stations are described by Mr. Grenfell as smelling sickly and offensive. This was evidently due to the floating Algæ which cause the well-known "foul water" on many parts of our coast during the spring months. There was abundant evidence of these Algæ in the collections, but when the ship moved further north to Station 9 the offensive smell was not noticeable, and there are but few Algæ and Diatoms in the catch.

The first eight gatherings contained an abundance of Teleostean ova and larvæ in different stages of development. It is nearly impossible to identify the ova after they are preserved in spirit, but a considerable proportion may safely be identified as plaice ova from their large size. The greater part of the newly hatched larvæ were Pleuronectids, of what species could not be determined. In No. 6 there were several larvæ of *Clupea harengus*. One larval

herring about an inch long was taken in No. 12, and herring larvæ were abundant in the last haul, No. 14. As a considerable proportion of the ova showed only a small blastodisc, it is evident that they must have been emitted not far from where they were taken, viz. on Winterton shoal.

The bulk of material taken in each haul was considerable (with the exception of No. 2), but consisted mostly of the commoner species of Calanidæ. The other contents were as follows:

Appendicularia. Not abundant, in 3, 4, 6, and 8.

Sagitta. All the gatherings; most abundant in 1, 5, 10.

Larvæ of *Pagurus*. 1, 2, 3, 4, 6, and very abundant in 5 and 13.

Cumacea. A few specimens in each gathering. I am not able to determine these with certainty before going to press for want of Sars' works, but they appear to be *Eudorella truncatula*.

Mysidæ. No. 14 consisted chiefly of *Euphausia*.

Proto ventricosa, O. F. M. Isolated specimens occurred in the first six gatherings.

Evadne Nordmanni. A few in 5 and 9.

Tomopteris. A single specimen in 4 and in 13.

Cyphonautes. In 1, 3, and 5. Not numerous.

Bipinnaria. A few in 9 and 11.

Ctenophora. Several Cydippidæ too much damaged for recognition in 4, and a single *Pleurobrachia* in 8.

Medusæ. Several damaged beyond recognition in 4.

Coscinodiscus concinnus. All the gatherings; particularly abundant in 11.

The Copepods consisted chiefly of Calanidæ, the species represented being—

Cetochilus septentrionalis, Goodsir.

Clausia elongata, Boeck.

Paracalanus parvus, Claus.

Temora longicornis, Müller.

Temora velox, Ljlb.

Centropages hamatus, Ljlb.

Centropages typicus, Kröyer.

Dias longiremis, Ljlb.

CYCLOPIDÆ.

Cyclopina littoralis, Brady. A few specimens were taken in most of the gatherings, but a very large proportion of the Copepoda in No. 9 consisted of this species, which, according to Brady, is rarely taken in large numbers.

Oithona spinifrons, Boeck.

HARPACTIDÆ.

Longipedia coronata, Claus. A few specimens in 1, 6, and 11.

Eutерpe gracilis, Claus.

Stenhelia ima, Brady.

HERSILIIDÆ.

Hersiliodes Canuensis, nov. sp. Pl. XXV, figs. 1—6.

Form of the body cyclopoid, robust. The first thoracic segment united with the head, the remainder free. Pleuræ of the thoracic segments well developed and prominent. Abdomen of three somites, the first swollen, with the posterior angles produced into short spines, with a small moveable spine exteriorly. Second abdominal somite also produced posteriorly into short spines. Second and third abdominal somites equal in length, the length of the first being relatively to the second as 4 to 3. Furca very short, half as long as the last somite, with three long hairs, and one shorter internally; two short spines on the outer edge. Antennæ 6-jointed, the first, second, fourth, fifth, and sixth joints subequal in length, the third joint twice as long. Mandibles, maxillæ, and maxillipedes characteristic of the genus. Fifth pair of swimming feet flattened as in *H. Thompsoni*, and provided with three flattened and serrated spines, with a single seta internal to the innermost spine.

Two specimens in No. 11. These are probably at a young stage, as shown by the 6-jointed antennæ, but they differ so markedly from the described species of the genus, that I have felt justified in ranking them as a separate species, and have named them after M. Eugène Canu, whose researches have greatly improved our knowledge of the family. In the form of the fifth pair of swimming feet and in the internal maxillipedes *H. Canuensis* closely resembles *H. Thompsoni*, but differs from it in the details of the second antennæ, mandibles, and maxillæ, and in the shape of the cephalothorax and free thoracic and abdominal segments.

In addition to the collections from the North Sea, Mr. Grenfell sent me four bottles collected in the west of Scotland, and one from Kinsale Bay.

A. June 6th. Oban Bay. Midnight. Wind N.W., slight. Contents: *Hormiphora plumosa* abundant. Many Medusæ, unrecognisable.

COPEPODA.

CALANIDÆ.

Cetochilus septentrionalis, Goodsir.

Clausia elongata, Boeck.

Temora longicornis, Müller.

CYCLOPIDÆ.

Oithona spinifrons, Boeck.

HARPACTIDÆ.

Stenhelia ima, Brady.

Diosaccus tenuicornis, Claus.

Westwoodia nobilis, Baird.

Harpacticus chelififer, Müller.

Peltdidium interruptum, Goodsir.

Oniscidium armatum, Claus. As far as I am able to determine, this is the first record of *O. armatum* from British coasts.

Idya furcata, Baird.

B. Great Minch. Ten miles S. of Stornoway in Lewis. Temperature of air 57° , of surface 51.5° . Calm. Full of bad-smelling green Algæ.

Contents: Many Teleostean ova. Many Medusæ and Ctenophora, too much damaged for recognition. Megalopa stages of Brachyura. *Euphausia*. Very few Calanidæ, mostly *Temora longicornis* and *Clausia elongata*. A single young Gadoid, probably *Gadus merlangus*.

c. June 14th, 8 p.m. N.W. of Cape Wrath. Temperature of air 49.5° , of surface 51.25° .

Consisted almost entirely of the commoner species of Calanidæ, with *Cyphonautes*, *Evadne Nordmanni*, and *Podon intermedius*.

d. Ardnamurchan Point. Temperature of air 53° , of surface 51° . Calm.

A single young Gadoid, probably *Gadus carbonarius*, and a single young *Trigla*. Abundant Ctenophora, probably *Hormiphora plumosa*. Large numbers of young stages of *Corystes cassivelaunus*. A few common Calanidæ, and *Westwoodia nobilis*, *Harpacticus chelififer*, and *Trebius caudatus*.

e. Kinsale Bay. May 15th. Temperature of air 50.25° , of surface 50.75° . Wind S.W., light.

Contents: Larval Pleuronectidæ, including one *Solea*. Larvæ of *Terebella* and *Holothuria*. Veliger larvæ very abundant. Many Medusæ damaged beyond recognition. Megalopa stages of Brachyura, Copepods, Calanidæ, chiefly *Temora longicornis* and *Dias longiremis*. Cyclopidæ, *Oithona spinifrons*. Corycæidæ, *Corycæus anglicus*.



Fig. 4.

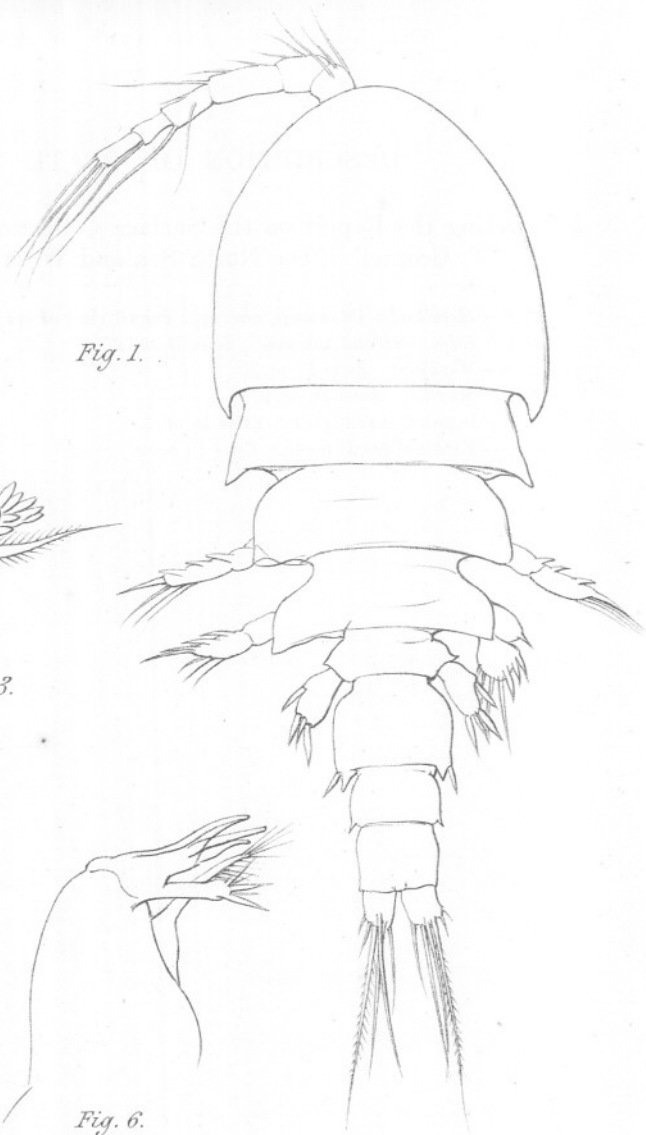


Fig. 1.

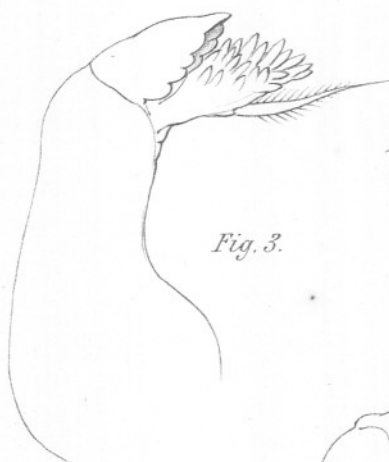


Fig. 3.



Fig. 6.



Fig. 5.



Fig. 2.

DESCRIPTION OF PLATE XXV,

Illustrating the Report on the Surface Collections made by Mr. W. T. Grenfell in the North Sea and West of Scotland.

FIG. 1.—*Hersiliodes Canuensis*, nov. sp. Dorsal view of the entire animal.

FIG. 2.—*Idem*. Second antenna. Zeiss D, oc. 2.

FIG. 3.—Mandible. Zeiss F, oc. 2.

FIG. 4.—Maxilla. Zeiss D, oc. 2.

FIG. 5.—Internal maxillipede. Zeiss D, oc. 2.

FIG. 6.—External maxillipede. Zeiss D, oc. 2.