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The Marine Fauna of the Coast of Ireland.

Part V.

ISOPODA

BY

W. M. TATTERSALL, B.Sc.

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THE MARINE FAUNA OF THE COAST OF IRELAND.*

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PLATES I. to XI.

INTRODUCTORY.

The word *Isopoda* is here used in its widest and most comprehensive sense to include, besides the more normal and true *Isopoda*, the somewhat anomalous order *Tanaidacea*. The latter have been included by most authors in the *Isopoda* proper as an aberrant tribe, and Sars, in his latest work on the group, regards them in this light, placing them in a separate tribe of *Isopoda*, to which he gives the name *Chelifera*. The arrangement which separates the *Tanaidacea* from the rest of the *Isopoda*, as a separate order of *Crustacea Malacostraca*, appears to be the most natural one, since the *Tanaidacea* diverge very markedly from the Isopodan type, and show in some of their characters a remarkable similarity to the higher crustacea. The most striking of these characters is the strongly built perfectly chelate structure of the first thoracic legs, a type of limb only met with elsewhere in the *Decapoda*. The *Apseudidae*, one of the families of the *Tanaidacea*, show further resemblance to the *Mysidae* and *Eucarida* generally in having two flagella to the superior antenna and a small antennal scale to the inferior antenna. I have, therefore, in this paper dealt with the *Tanaidæ* and *Apseudidæ* as a separate order, the *Tanaidacea*, of equal value to the *Isopoda*.

The material dealt with is derived from (1) the collections made at the Marine Laboratory of the Department when stationed at Ballynakill and Bofin, Co. Galway, between the years 1899 and 1904; and (2) the collections made by the Department's fishery cruiser, *Helga*, in deep water off the west coast of Ireland, and also on the east coast.

* This series has previously been entitled "Marine Fauna of the West Coast of Ireland." Since its inception, facilities for work on the East coast have been materially increased, and henceforth it will be convenient to deal with the fauna under the general groups without geographical sub-division.

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The *Isopoda* as a whole are not pelagic organisms, and, therefore, are not liable to capture by townets. Certain species, however, are pelagic. These include *Gnathia maxillaris* (larvae only), the four species of *Eurydice*, *Munropsis Murrayi*, *M. oceanica*, and the larvae of *Epicarida*. Various species of *Idotea* are frequently captured by coarse townets towed rapidly at the surface, but it is their association with floating weeds rather than that they are truly free swimming which leads to their capture in this manner. By far the majority of *Isopoda* are bottom-living forms, and it is the dredged material and the contents of townets attached to the back of trawls and dredges which yield the larger number of species. The latter method of capture has proved remarkably efficient in the collecting of bottom-living forms. A tow net placed on the back of a trawl just where the swirl caused by the ground rope passes up through the meshes of the trawl net is sure to collect all the sediment and organisms thus stirred up. Occasionally the nets thus placed become full of sand, which on washing and sieving is nearly certain to yield new or rare species. One remarkable haul of this nature contained no fewer than twenty-one species of *Isopoda*, seven of them new to science, three new to the British and Irish fauna,* and the majority of the remainder very rare indeed.

By kind permission of Dr. G. H. Fowler I include a note on a remarkable Isopodan parasite of *Euphausia Mülleri* taken by him in the Bay of Biscay.

The paper is divided into five parts, the first containing descriptions of new genera and species, the second dealing with the Isopodan fauna of Ballynakill and Bofin Harbours, while the third enumerates those species taken in deep water on the Atlantic slope. Part four gives a list of species taken on the east coast, while a few remarks on the geographical distribution of the species dealt with are given at the end of the paper.

i.—DESCRIPTIONS OF NEW GENERA AND SPECIES.

Ten new species in all are described and figured below. Five of these have been referred to new genera, while one has been regarded as forming the type of a new family.

A preliminary description of seven of these new forms was presented to the British Association Meeting at Cambridge, in August, 1904. Since then three more new species have come

* In this paper, in order to avoid the confusion which has arisen from attempts to subdivide the marine fauna of the United Kingdom, the term "British and Irish" is used to denote the area defined by Norman as "British."

to hand, and descriptions and figures of all the ten are now offered. They may be enumerated as follows:—

- Typhlotanais proctagon*, sp. nov.
Bathycopea typhlops, gen. et sp. nov.
Metamunna typica, gen. et sp. nov.
Ischnosoma Greeni, sp. nov.
Munnopsis oceanica, sp. nov.
Munnopsoides Beddardi, gen. et sp. nov.
Ilyarachna Plunketti, sp. nov.
Eurycope longipes, sp. nov.
Lipomera lamellata, gen. et sp. nov.
Scyracepon tuberculosa, gen. et sp. nov.

The number of new forms is not surprising when one thinks how very little the undoubtedly rich ground, which lies to the west of our islands on the border of the Atlantic slope, has been explored.

In this part of the paper I give descriptions of the two sexes of two British species of *Cymodoce*. Though not new species, the sexually mature females were previously unknown, and descriptions of them can most conveniently be given here.

Terminology.—With the single exception of regarding the *Chelifera* as a separate order of equal rank to the *Isopoda*, the general arrangement and nomenclature followed in this paper are essentially those used by Sars in his work on the *Isopoda* of Norway. In this connection it is well to remember that the maxillipeds of *Isopoda*, though apparently appendages of the cephalon, are morphologically thoracic in origin, and should therefore be more properly described as the "first thoracic limbs." This title is given in the following paper to the second thoracic limbs in order to bring the terminology into line with that used by Sars, and also because in *Isopoda* and *Amphipoda* the first thoracic limbs proper or maxillipedes function more in connection with the true cephalic appendages than with those of the thorax.

ORDER TANAIIDACEA.

FAMILY TANAIIDAE.

GENUS *Typhlotanais*, G. O. Sars.

Typhlotanais proctagon, Tattersall.

T. proctagon, Tattersall, Report British Association, 1904.

Pl. I. Figs. 1-9.

Body (Fig. 1) linear, narrow but compact, about seven times as long as broad, of even width throughout.

Cephalosome about one and a half to twice as long as the first free segment of the mesosome, comparatively robust, widest just posterior to the middle, rostrum very feebly developed.

Mesosome with the segments not narrowed posteriorly, but of even width throughout; first free segment smaller than the remaining five, which are subequal; first free segment with a very strongly acute forwardly directed spine on the ventral surface (Fig. 2); no trace of this spine on the succeeding segments.

Metasome equal to the last two segments of the mesosome combined, and about one quarter of the entire length of the body, first five segments subequal, last segment larger than the rest, and terminating in a somewhat acute process tipped by two small setae.

Superior antennae (Fig. 1) three-jointed; the first joint the longest, slightly longer than the remaining two combined, dilated somewhat at its base; second joint very short; third joint terminated by four or five long setae.

Inferior antennae (Fig. 9) shorter than the superior; second joint dilated, its outer corner produced acutely; fourth joint the longest; fifth slightly shorter than the fourth, terminating in a rudimentary one-jointed flagellum which is tipped by one very long seta longer than the terminal peduncular joint, and two shorter setae.

Mouth parts do not exhibit any salient points of difference from those of the type species of the genus, *T. tenuimana*.

Chelipeds or *first thoracic legs* (Fig. 3) moderately robust, with feeble hand about as long as the carpus, fingers shorter than the palm, appendage devoid of armature save for a few setae on the immovable finger of the hand.

Second thoracic legs (Fig. 4) slender, merus equal in length to the carpus, propodus longer than the carpus, nail very long and slender, equal in length to the propodus.

Third and fourth thoracic legs (Fig. 5) similar to the second except the nail, which is only about half as long as the propodus, merus and carpus provided with a small spine at their inner distal corners, that on the merus being stronger than the one on the carpus, propodus with a spine on the inner and one on the outer distal corners.

Fifth to seventh thoracic legs (Figs. 6, 7 and 8) with the basal joint markedly swollen; carpus, merus, and propodus with one or two spines on their inner distal corners, the latter joint with two spines on its outer distal corner; nail slightly shorter than the propodus, sometimes with secondary teeth; a very long seta on the outer distal corner of the propodus; inner edge of the merus and carpus finely crenulated, while these joints have also a ring of fine serrations on their inner distal corners. The spinulation differs somewhat in different specimens.

Pleopods of normal structure.

Uropods (Fig. 1) rather long, very nearly half the length of the metasome, biramous; the inner ramus biarticulate, the segments about equal in length, terminated by four long setae; outer ramus unarticulate, about one half the length of the inner ramus, tipped by one seta.

Length of adult female, 6 mm.

Male unknown.

Locality.—See p. 60.

This interesting species differs from all the Norwegian members of the genus in having a spine on the first free segment of the mesosome. The type of this section of the genus is *T. kerguelenensis*, described from the *Challenger* collections by Beddard. The present species differs from *T. kerguelenensis* in the much more feeble rostrum, and more robust cephalosome, in the shorter and stouter chelipeds, in the very markedly dilated base to the fifth, sixth, and seventh thoracic legs, and finally in size, *T. proctagon* being double the size of *T. kerguelenensis*. In the latter species the chelipeds are remarkably long and slender, with a long and narrow carpus. The hand is shorter than the carpus, with two long and slender fingers. In *T. proctagon* the chelipeds, as described above, are much stouter and shorter, with the hand equal to the carpus. With regard to the basal joint of the fifth, sixth, and seventh legs, Beddard does not mention, in the description of *T. kerguelenensis*, whether they are swollen or not. Judging from his figures they are only very slightly dilated, while the present species has them very much swollen. The swollen basal joint of the last three thoracic limbs is characteristic of the genus.

Dollfuss has lately described three new species of *Typhlotanais*, all of which bear spines on the ventrum of the first free thoracic segment, namely, *T. Richardi*, *T. spiniventris*, and *T. longimanus*. From *T. spiniventris*, this species is distinguished by the absence of spines from the second and following free segments of the mesosome, in the angular termination of the metasome, in the even width throughout of the segments of the mesosome, these latter in *T. spiniventris* being markedly narrower posteriorly, in the structure of the uropods and cephalosome and in the much more robust chelipeds. From *T. Richardi* it is chiefly distinguished by the structure of the cephalosome, the angular termination to the metasome, and by the character of the uropods. From *T. longimanus* the form of the chelipeds serves at once to readily distinguish it.

T. proctagon is one of the largest Tanaisids, and is a most interesting addition to our fauna. Its nearest allies mentioned above are much deeper-water forms, only hitherto found to the west of the Azores.

ORDER ISOPODA.

TRIBE FLABELLIFERA.

FAMILY SPHAEROMIDAE.

The absence of this family from the fauna of Norway must be regarded as a great misfortune, since we are thereby deprived of the valuable help and unrivalled knowledge of Professor Sars, in the elucidation of a family whose present condition is one of absolute chaos. The sexual differences exhibited by the majority of species are the cause of this confusion. In many instances different stages of one sex have been described as separate species, while the two sexes often figure in different genera altogether. Both sexes of one species are in many cases not definitely known. Moreover, though almost endless species have been described, their mouth parts are only recently coming to be studied and receiving the attention they undoubtedly deserve.

The discovery by Dr. Hansen that the mouth parts of the females of the genus *Cymodoce* undergo considerable reduction during the breeding time in a similar manner to those of the Cymothoidae must completely revolutionise our knowledge of this genus, and inevitably lead to a reduction in the number of known species. Two species of this genus are recorded below, and their two sexes described. Dr. Norman, to whom I am very much indebted for valuable help with this difficult family, informs me by letter that he considers *Cymodoce truncata* and *C. emarginata* as different forms of the male, and *Sphaeroma curtum* and *S. prideauxianum* different forms of the female of one species, which must therefore bear the name *Cymodoce truncata*. Dr. Norman will deal with this in a paper shortly to be published. I also submitted to him specimens of the species recorded below as *C. granulatum* M.-Ed., and which I had thought to be *C. emarginata*. He very kindly told me that they were not *C. emarginata*, but were very close to *C. granulatum* M.-Ed., and sent me specimens of the latter, received from Prof. Heller under that name, for comparison. On examination of Dr. Norman's specimens and comparison with my own, I found that my examples agreed very well with *C. granulatum* M.-Ed., and I therefore record them provisionally under this name.

***Cymodoce truncata* (Montagu).**

Sphaeroma inerme, Tattersall, *loc. cit.*

Pl. II. Figs. 1-9.

Female (gravid).

General form of the body (Fig. 1) very much as in species of the genera *Sphaeroma* and *Dynamene*, short, oval in outline, compact, fringed all over by short fine hairs.

Cephalon, short, only equal in length to the first thoracic segment, evenly rounded in front.

First segment of the mesosome larger than any of the following, with the epimera well developed and expanded, both anteriorly and posteriorly.

Remaining segments of the mesosome decreasing in length posteriorly, epimera of all well developed.

First segment of the metasome faintly marked off from the rest, second and third segments partially separated, and fourth segment completely separated from the remainder of the pleon, fifth segment coalesced with the telson. In the specimens from which this description is taken and the figures drawn, the pleotelson was almost quite smooth. The most typical specimens have two more or less distinctly marked tubercles on the pleotelson.

Posterior border of the metasome with the centre produced into an obtuse point with a very faint notch on either side. Looked at from behind the produced point appears semi-tubular.

Eyes large, and laterally placed.

Antennae appear to be ventrally placed owing to the peculiar formation of the head, just as seen in *Sphaeroma*.

Superior antennae (Fig. 2) with the peduncle three-jointed, the first two joints broader and longer than the third, flagellum fifteen-jointed, the distal joints with few setae.

Inferior antennae (Fig. 3) with the peduncle four-jointed, the first three joints sub-equal, the fourth as long as the two preceding joints combined, flagellum fifteen-jointed, the first joint much the longest, the distal joints with few setae.

Mandibles (Fig. 4) broad and quadrangular, anterior end very bluntly rounded, without teeth, spines, or molar processes, palp three-jointed, the basal joint the longest and unarmed, the distal two joints carrying long plumose setae on their outer edges, the last joint terminated by a very long and strong plumose seta.

First maxillae (Fig. 5) consisting of two very blunt lobes, the inner one with three, and the outer one with a single very small spine at the tip; the whole appendage devoid of long setae, but having a general armature of very short and fine hairs.

Second maxillae (Fig. 6) consisting of three lobes, the inner with three very short spines at its tip, the outer two without spines; the whole appendage, like the first maxilla, devoid of long setae, but covered by a fringe of very fine short hairs.

Maxillipedes (Fig. 7) seven-jointed, basal joint short; second joint large and expanded, its inner edge with a fringe of fine short hairs, its outer edge carrying a broadly oval epignath, and armed with several long plumose setae; third joint very small; fourth joint long and somewhat expanded distally,

the inner distal corner with a single short spine; fifth joint shorter than the fourth, its inner border somewhat produced, with a single spine at the tip of the produced part; sixth joint longer than the fifth, not expanded, with a single spine at its inner distal corner; last joint short and narrow, with three setae at its tip; masticatory lobe conical in shape, its tip armed with two short spines and a longer plumose spine, with a masticatory process on its inner edge; whole limb, with the exception of the second joint, singularly devoid of the long setae so characteristic of these appendages in the male and female (not gravid).

First thoracic legs (Fig. 8) with the basal joint long and stout, the merus somewhat expanded, carpus small, propodus as long as the merus and carpus combined, dactylus shorter than the propodus, stout, bidentate at the tip; inner edge of merus, carpus and propodus respectively armed with four, three and three spines.

Remaining thoracic legs similar in structure to the first.

Pleopods of normal form.

Uropods (Fig. 9) reaching to the tip of the pleon, biramous, the outer ramus shorter than the inner, but owing to the mode of attachment of the appendage to the pleon it appears to be of equal length to the inner ramus. The latter with the tip truncate, the outer ramus with the tip more pointed, whole appendage armed with rather long setae.

Length, 9 mm.

Colour.—Preserved, the body is generally greyish, spotted all over with regular small black dots.

Immature females and adult females not gravid, differ from the gravid females in the mouth organs, which are not reduced, but agree in all points with those of the male described below.

Male.

The male form agrees essentially with the female form described above except in the following points:—

Body generally much more hirsute than in the female, especially as regards the metasome, and minutely granulated throughout.

Metasome strongly and rather coarsely tuberculated all over, the posterior border of the fourth segment drawn out a little on each side of the median line into a short pointed process, the border on the outside of this process strongly setose. The remainder of the metasome (pleotelson) has two low parallel carinae which lie directly behind and in line with the processes of the posterior border of the fourth segment. The carinae extend about half way down the pleotelson and end posteriorly in a very conspicuous tubercle. On the outer side of each carina is a row of strong setae. Behind the carinae, and in the median line, is a rather prominent tubercle with a smaller one on each side of it, all three tubercles densely setose. The

posterior border of the pleotelson is tridentate, the teeth very prominent and tuberculate, and the clefts moderately deep. The median tooth is abruptly truncate at its tip, the lateral teeth being more pointed.

Uropods very densely setose, the outer one with its outer edge very greatly thickened by a very prominent ridge, so that it is incapable of being completely closed under the inner one.

Mandibles very much more complicated than in the gravid female, cutting edge divided into two parts, each portion strongly toothed, molar process well developed and very prominent; palp three jointed, somewhat shorter than in the female, the last two joints somewhat expanded and setose on their inner margin.

First maxillae very different from the same parts of the gravid female, and much more normal in structure, consisting of two lobes, the outer armed with about ten very strong chitinous spines, the inner one bearing at its tip four long plumose spines and a short simple spine.

Second maxillae likewise profoundly different from those of the gravid female, consisting of three lobes, each lobe armed with several strong and plumose spines.

Maxillipedes with the fourth, fifth, and sixth joints produced into lobes, all armed at the tip with numerous fairly long setae, masticatory lobe strongly armed at its tip with plumose spines, two plumose spines also on the inner edge internal to the single masticatory hook.

Thoracic legs exactly as in the female, except that in the specimen examined in detail the merus, carpus and propodus bore five, three and four short spines respectively.

In a male specimen of this species kindly sent to me by Rev. Canon Norman, the two carinae on the pleotelson were very much more prominent and ended posteriorly in a strongly raised ridge, which in lateral view was triangular in shape. The lower outer corners of both uropods were also produced into a very acute process resembling a spine. In most of my specimens this process was absent.

The gravid female of this species has up till now remained quite unknown. On first examining and dissecting it I thought it represented an entirely new type of Sphaeromid, and provisionally gave it the name of *Sphaeroma inerme* in the paper presented to the last meeting of the British Association, though at the same time I had strong suspicions as to its true identity, since it was found in company with one or other species of *Cymodoce* each time the latter was taken. The profound differences which exist in the mouth parts of the two sexes, however, decided me to regard my type as new. Dr. Hansen very kindly put me right in this matter, and informed me that the species which I called *S. inerme* was in reality only the gravid female of the species of *Cymodoce* with which it was found, thus confirming the suspicions which I

had regarding its true identity. Gourret had likewise been misled in the same way, his two species, *Dynamene corallina* and *Dynamene setosa*, being in reality only female forms of *Cymodoce*, as will be seen from an examination of his figures of the mouth parts, which agree, as far as they go, with those here figured for the female of *Cymodoce truncata*.

Locality and distribution, see p. 47.

***Cymodoce granulatum*, M.—Ed.**

This species is so closely allied to *C. truncata* that it will suffice if the differences noted between the two are enumerated.

Female (gravid).

The gravid female *C. granulatum* differs from the same sex in *C. truncata*—(1) in the presence of two very faint parallel carinae on the pleotelson, (2) in having the ante-penultimate joint of the maxillipedes much less produced, and the masticatory lobes much narrower and of equal width throughout, whereas in *C. truncata* they are broader and somewhat conical in shape at the anterior end; (3) in having the outer branch of the uropods proportionally narrower and much less truncate at the tip.

Male.

The male differs chiefly from the male of *C. truncata* in the form of the metasome.

The metasome of the male of *C. granulatum* is, like that in *C. truncata*, somewhat coarsely granulated all over, but is not anything like so densely setose. The fourth segment is produced a little on each side of the middle line into a short acute process. On the pleotelson immediately behind the two processes of the fourth segment are two somewhat diverging sharp carinae much more distinct and raised than in *C. truncata*. They do not terminate in a tubercle, but are more elevated at their extremity than at any other point in their length. They extend about half-way down the pleotelson. Someway posterior to the carinae and in the median line is a small, smooth linguiform process which projects almost at right angles to the surface, and has on each side of it a low granulated tubercle, while a very slight carina likewise proceeds from each side of it outwards and forwards to the posterior end of the two large carinae. The posterior border is tridentate as in *C. truncata*, but the median tooth is not truncate but broadly rounded. The setae are almost absent, a few only fringing the posterior border of the fourth segment and the terminal border of the pleotelson. There are signs of two obtuse tubercles on the combined second and third segment of the metasome. The general body is also minutely tuberculated throughout.

Uropods with the ridge on the outer side of the external ramus very much less pronounced than on *C. truncata*, and the setae considerably fewer.

Locality and distribution, see p. 64.

FAMILY ANCINIIDAE nov.

Body broadly oval in shape, and exceedingly depressed; capable of being doubled up on itself, so that the metasome becomes opposed to the ventral surface of the cephalon; without armature save for a few scattered setae on the sides of the mesosome.

Cephalon small, distinct from the mesosome.

Mesosome with all the segments distinct and sub-equal in size, epimera broad and very distinct, so that the body is divided into three divisions, a broader central one and two narrower lateral ones, as in the *Serolidae*.

Metasome with the first two segments distinct, the first having well defined epimera; the remaining four segments fused into a large triangular plate.

Eyes, when present, placed on the dorsal surface of the cephalon and not laterally.

Antennae sub-equal, the superior pair being if anything slightly longer than the inferior ones.

Mandibles moderately strong, with a well developed three-jointed palp.

Maxillae small and delicate.

Maxillipedes small, covering entirely the maxillae.

First thoracic legs of both sexes large, subcheliform, propodus much expanded, dactylus long and strongly curved.

Second thoracic leg of the male similar to that of the first, but much smaller. That of the female simple and slender.

Third to seventh thoracic legs of both sexes simple and somewhat slender in form.

Pleopods foliaceous, partly natatory, partly branchial.

Uropods extremely large and uniramous, consisting of a short stout basal joint and a long curved scythe-like terminal joint.

The type genus of the family is *Ancinus*, M.-Ed., founded for the reception of the remarkable *Naesa depressa* of Leach.

This definition of the family is founded entirely upon the examination of the new generic type described below. I believe *Ancinus* to belong to the same family, and as the earliest known genus it must give the family its name. The new genus below is only provisionally kept distinct from *Ancinus* till the type of the latter has been minutely examined. When this is done it may be found that *Bathycopea* is generically the same, and the name will therefore lapse.

GENUS **Bathycopea**, Tattersall.

Bathycopea, Tattersall, *loc. cit.*

Having the characters of the family given above and differing, as far as can be seen in the absence of a detailed examination of the type, from the only other genus in the family, *Ancinus*, in the total absence of eyes.

Bathycopea typhlops, Tattersall.

Bathycopea typhlops, Tattersall, *loc. cit.*

Pl. III. Figs. 1-13.

Body (Fig. 1) broadly oval in shape, very flattened, capable of being doubled up on itself so that the metasome lies against the ventral surface of the cephalon.

Cephalon small, distinct from the mesosome, though the suture becomes rather faint towards the middle of the body, front produced into a short but very acutely pointed rostrum, the cephalon on each side of the rostrum somewhat hollowed out for the reception of the basal joints of the antennae.

Mesosome composed of seven sub-equal segments, the first two of which are, if anything, slightly larger than the remaining ones; epimeral plates well marked, each being produced on its anterior edge, just at the junction with the main segment, into a short blunt process which underlies the preceding epimeral plate, and is thus not visible in a dorsal view (Fig. 13); these processes become double in the posterior segments; armature consisting merely of a few short scattered setae on the lateral edges of the epimeral plates.

The well-marked and broad epimera give the appearance to the body of being divided into three parts, a broad median and two narrower lateral parts, recalling the general form of the *Serolidae*. This character has been regarded by some authors as indicating for the latter family an affinity with the now extinct Trilobites.

Metasome with the two anterior segments free, the first provided with well marked epimera, which do not, however, possess processes on their anterior edges similar to those of the epimera of the mesosome. Last four segments united into a large and massive triangular plate which tapers gradually to a point and has not the apex truncate as in *Ancinus depressus*.

Eyes entirely absent.

Superior antennae (Fig. 2) slightly longer than the inferior ones, with a peduncle of four and a flagellum of seven joints; basal joint of the flagellum rather stout, almost as broad as long, slightly longer than the next joint; the second

joint narrower and shorter than the first; the third joint much narrower than either of the preceding ones, and as long as those two combined; last joint exceedingly small; flagellum with the first joint longer than any of the succeeding ones; the whole appendage very sparsely provided with setae, one or two of the peculiar sensory cylindrical setae being present on the terminal joints.

Inferior antennae (Fig. 3) with a peduncle of five joints and a flagellum of five joints; the first joint of the peduncle small and fairly stout; the second as stout as the first but considerably longer; the third shorter than the second; the fourth as long as the second but not so stout; the fifth the smallest of all; the whole appendage sparingly armed with setae, none of which are sensory.

Labrum produced somewhat acutely into a process underlying the rostrum.

Mandibles (Fig. 4) of a type very similar to that seen in the *Serolidae*; the palp is three-jointed, the middle joint being the longest; the terminal joint is oval in shape and armed on one margin only with long hairs, of which the terminal one is longer and stronger than the rest; the distal part of one margin of the middle joint of the palp is likewise armed with long hairs, but the rest of the appendage is devoid of them; the basal portion of the mandible has the terminal half set at an angle to the basal half, the two parts rather markedly separated; the cutting edge is provided with three blunt teeth; in addition the mandible is also provided below the cutting edge with a chisel-like process and a spine serrated distally on one edge. The chisel-like process has the tip imperfectly formed into two blunt teeth. Similar processes and spines are noted by Beddard in the *Serolidae*. The chisel-shaped process is absent from the right mandible, a condition again met with in the *Serolidae*.

First maxillae (Fig. 5) very delicate, consisting of a large basal joint from which springs a large somewhat curved lobe furnished at its extremity with strong spiniform setae. At the base of this lobe, but springing directly from the basal portion of the maxilla, is a small straight blunt lobe, armed at its tip with one long and three short setae.

Second maxillae (Fig. 6) rather smaller than the first, consisting of three lobes armed at their tips with long setae.

Maxillipedes (Fig. 7) rather small, meeting in the middle line and entirely covering the maxillae, composed of the usual seven joints, of which the second is large and rectangular, and to which the remaining five are articulated as a palp; the third joint extremely small; the fourth and fifth, larger and longer than the two terminal ones, and each armed with one long and one short seta; the sixth joint has a similar armature,

while the seventh bears one long and two or three short setae. The second expanded joint is uniformly fringed with short hairs, and bears on its inner edge a single blunt sensory process.

First thoracic legs of both sexes (Fig. 8) large, subchelate, strongly built, the merus and carpus rather small and narrow, the latter having the distal corner somewhat acutely pointed and tipped by a few setae; propodus very much swollen and expanded, with the inner edge very coarsely toothed, and bearing a row of setae, one seta between each tooth; dactylus strongly recurved and suddenly narrowed at the extremity, bearing two conspicuous teeth on its inside edge near its articulation with the propodus.

Second thoracic legs in the male (Fig. 9) subchelate, smaller than the first, with the propodus not nearly so much expanded, unarmed along the inner edge save with a few setae, dactylus strongly recurved, blunt, not as long as on the first leg, without teeth on its inner edge.

Second thoracic legs in the female (Fig. 10) simple, somewhat slender, carpus equal in length to the propodus, dactylus shorter than the propodus, sharply pointed; very few setae present on limb.

The remaining thoracic limbs (Fig. 11) of both sexes are constructed on the same plan as the second thoracic leg of the female, though somewhat longer than the latter limb.

First pleopods consisting of a basal joint and two oval lamellae, the outer one shorter than the inner one, both setose all round the edges.

Second pleopods with the inner lamella slightly longer than the outer, trapezoidal in shape, with the outer edge very finely serrate, the distal edge alone bearing setae; outer lamella oval, with setae all round. The inner lamella in the male (Fig. 12) bears on its inner edge a long very finely pointed stylet as long as the lamella itself.

Third pleopods with the inner lamella oval in shape and slightly longer than the outer, with a very few setae at its distal extremity; the outer lamella with setae all round.

Fourth pleopods with the lamellae sub-equal, devoid of setae with the exception of a single strong bristle at the distal extremity of the inner lamella.

Fifth pleopods with the outer lamella longer than the inner one, both devoid of setae.

Uropods (Fig. 1) very large and massive, with a short and stout basal joint articulating with the proximal part of the metasome and projecting almost straight out at right angles to the longitudinal axis of the body; terminal joint large and scythe-shaped, curving strongly inwards and approximating

to its fellow of the other side; a short blunt tooth on the inner edge near the tip; the whole appendage armed with a few scattered setae. Under the high power of the microscope both edges seem to be regularly toothed along their full length.

Length of adult male and female, 5 mm.

Locality, see p. 65.

The little creature is extremely hardy, and was noticed to be alive and very active after coming up from so great a depth as 320 fathoms. The integument is extremely hard and brittle.

I am conscious that this species may not really be generically distinct from *Ancinus depressus* (Leach). The latter is only known to me from the brief descriptions and figures given by Milne-Edwards (*Histoire des Crustacés*, Vol. III.). I have not had the opportunity of examining the type specimen in the British Museum. From Milne-Edwards' figures, the present form is certainly most closely allied to *Ancinus depressus*, but is at least specifically distinct in differing, as it does, in the absence of eyes, and in the metasome not being truncate at its extremity.

Affinities.—It is obvious that the definition of no existing family of *Isopoda* will permit of the reception of this remarkable form within its limits. Hence it is necessary to form a new family to include it and *Ancinus*, the family taking its name from the latter genus and being co-extensive with the "*Spheromiens chelifers*" of Milne-Edwards. The *Ancinidae* are most clearly related, on the one hand, to the *Sphaeromidae*, and on the other, to the *Serolidae*, occupying a position intermediate between the two. Indeed, the generic name *Bathycopea*, which I have applied to the above form, was suggested by its close external resemblance to the Sphaeromid genus *Campecopea*.

The characters in which it agrees with the *Sphaeromidae* are:—

- (1.) The separation of the cephalon from the first segment of the mesosome.
- (2.) The large size and prominence of the metasome.
- (3.) The large scythe-like uniramous uropoda in which it approaches *Campecopea*.

With regard to the first character given above it may be remarked that the maxillipedes of *Isopoda* generally, though apparently belonging to the head, are clearly of thoracic origin, and the so-called cephalon of *Isopoda* is therefore really a cephalothorax. For convenience of description, and in order to bring the nomenclature into line with G. O. Sars' "*Crustacea of Norway*," I have referred to it as the cephalon simply. In all *Isopoda* save the *Chelifera* and the *Serolidae* the cephalon is distinct from the first segment of the mesosome.

In these latter two families it is united with the first segment of the mesosome. In the *Anciniidae* there is a tendency to such a union, the suture between the cephalon and first segment of the mesosome becoming indistinct towards the centre of the body. The large size of the metasome in the *Anciniidae* is in great contrast to that of the *Serolidae*, in which it is small and partially surrounded by the great development of the epimera. The large scythe-like uropods are exactly like those seen in *Campecopea*, and differ markedly from the small biramous uropoda of the *Serolidae*.

The relations of the present family to the *Serolidae* are of a much closer nature, the points of resemblance being both numerous and of great moment. They may be enumerated as follows :—

- (1.) The remarkably flattened and broadly oval shape of the body.
- (2.) The development of the epimera in both families is such as to divide the body into three distinct portions.
- (3.) The presence of a small but acutely pointed rostrum.
- (4.) Eyes, when present, placed on the top of the cephalon and not laterally.
- (5.) The general form and structure of the mouth parts.
- (6.) The remarkable modification of the first thoracic leg in both sexes, and the structure of the second thoracic leg in the male.

The development of the epimera on the *Anciniidae* is not so striking as in the *Serolidae*. In the latter family they are often prolonged enormously into spiniform processes, which curve backwards so as to almost enclose the metasome, *cf.* *S. bromleyana* and *S. neaera*. In others they are not so greatly developed, but as a rule are broader than in the *Anciniidae*, and the anterior ones are larger than the posterior, so that the body as a whole is wider in front than behind. The epimera of the *Anciniidae* are of about equal size throughout the mesosome, with the exception of those of the first two segments, which, though deeper than the succeeding ones, are not laterally expanded. The dorsal position of the eyes in the two families is a character in which they differ very conspicuously from all other Isopoda, in which they are laterally placed.

The structure of the mouth parts, with the exception of the maxillipedes, is remarkably similar in the two families. Particularly is this so with the mandibles. Beddard, in his monograph of the genus *Serolis*, has shown that the mandible bears, in addition to the usual cutting edge, two accessory processes, one a chisel-like cutting blade, and the other a spiniform process with a serrated edge. Moreover, the former process is

absent or replaced by a spine in the right mandible. Precisely similar processes are found in the mandible of *Bathycopea typhlops*, and here also the chisel-shaped process would appear to be absent from the mandible of the right side.

The first maxillae are likewise constructed on the same lines in both families. They consist, in *B. typhlops*, as described above, of a basal portion and a large terminal lobe tipped with strong spiniform setae. From the basal portion, at the base of the terminal lobe, there springs a small accessory lobe. The presence of this accessory lobe in the first maxillae of the *Serolidae* was first noticed by Audouin and Milne-Edwards. Its existence was later denied by Grube, but Beddard found it present in most, though not all, of the species of *Serolis* which he examined. In no other Isopoda are the first maxillae so constructed. The small secondary lobe is no doubt the remains of the large inner lobe of the first maxillae of most Isopoda.

The maxillipedes in the two families differ rather considerably from one another. In the *Anciniidae* they are of the more normal type found in the *Sphaeromidae*. Those of the *Serolidae* are described by Beddard as consisting of a basal part, broadly expanded and divided into four, and a three-jointed palp.

The remarkable modification of the first thoracic leg in both sexes and the further modification of the second thoracic leg in the male only are of exactly similar nature in both families, and are points which indicate the closest affinity between the two. In no other Isopoda is such a striking form of thoracic leg met with, except, possibly, in *Tecticeps*, and the two families are thus sharply defined in this respect from all others of the order. Dana suggested that *Ancinus*, by reason of the sub-cheliform condition of the first thoracic legs, was nearly related to the *Tanaidae*. He had seen no specimens, however, and from the above description of a closely allied form it will be seen that such a suggestion cannot for a moment be entertained. Richardson has lately described, from North America, a remarkable new genus *Tecticeps*, which has a very much flattened body, eyes present on top of the head, and small biramous uropoda. The first and second thoracic legs are, moreover, described as having the propodus "dilated with reflexed dactylus." They therefore agree with the same limbs in the male of both *Serolis* and *Bathycopea*, and the genus appears very closely related to the former. It has been suggested that the *Serolidae*, by reason of the flattened condition of the body and its apparent division into three longitudinal parts in consequence of the great development of the epimera, show affinities with the fossil *Trilobita*. I am not prepared to make a similar suggestion with regard to the present family, nor do I think its discovery throws any new light on this much disputed point.

To sum up, therefore, the *Anciniidae* are intermediate in character between the *Sphaeromidae* and the *Serolidae*, with, perhaps, a rather closer relationship to the latter. With regard to the possible phylogeny of the group it would be premature, in the absence of knowledge of their ontogeny, to put forward any opinion, but it seems probable that both the *Anciniidae* and *Serolidae* are parallel offshoots from some primitive Sphaeromid stock.

TRIBE ASELLOTA.

FAMILY MUNNIDAE.

GENUS *Metamunna*, Tattersall.

Metamunna, Tattersall, *loc. cit.*

Very closely allied to the genera *Pleurogonium* and *Paramunna*, differing from the former in the presence of well-marked ocular processes and eyes, and from the latter in the absence of the two diverging lobes from the cephalon and in the general shape of the body.

The specimen on which this new genus is founded might well have been referred to the genus *Pleurogonium* G. O. Sars, were it not for the fact that Sars defines that genus as having the eyes wholly absent. Rather than interfere with the existing definition of genera, I have preferred to found a new genus for the reception of the form described below.

Metamunna typica, Tattersall.

Metamunna typica, Tattersall, *loc. cit.*

Pl. IX., Figs. 1-3.

Body (Fig. 1) shaped almost exactly as in the genus *Pleurogonium*, about twice as long as broad

Cephalon roughly quadrangular, front almost straight and entirely wanting the two lobes seen in *Paramunna*; sides produced into well marked narrow ocular processes with well developed eyes at their tips.

Mesosome with the first four segments broader than the last three and well marked off from the latter, lateral parts angular and unarmed; three posterior segments with the lateral parts slightly recurved.

Caudal segment or *metasome* narrower than the rest of the body, rather less than half of the total length of the animal, constricted at the base, terminal part produced into an obtusely pointed tip, sides serrated with about twelve small teeth.

Superior antennae (Fig. 1) projecting laterally from the cephalon just above the ocular lobes, peduncle three-jointed; first joint longer than the remaining two combined; third joint small, flagellum shorter than the peduncle, triarticulate; last joint with a long apical filament.

Inferior antennae (Fig. 1) longer than the superior antenna, peduncle six-jointed; first two joints small; the third the longest, with its inner distal corner produced into an acute process forming a distinct knee, from which the remaining part of the appendage projects laterally almost at right angles; fourth joint small; sixth rather shorter than fifth; flagellum five-jointed, shorter than the peduncle.

Mouth parts.—Only a single specimen of this new form having been taken the mouth parts were not dissected out. They will be found, I believe, to correspond substantially with those of *Pleurogonium*.

First thoracic legs (Fig. 2) shorter and more robust than the remainder, carpus longer and stouter than the merus, bearing three stout spines; propodus as long as the carpus; dactylus rather long and strongly recurved with a secondary tooth on the inside edge.

Remaining thoracic legs very much as in *Pleurogonium*.

Uropods (Fig. 3) short, proceeding from the sides of the metasome immediately behind the serrated part of the lateral edges, and some considerable way from the tip; biramous, inner ramus exceedingly small, only about half as long as the outer, armed at tip with two long setae, outer ramus with four long setae at the tip.

Length of female, 2 mm.

Male unknown.

Locality, see p. 71.

This new form is more closely related to the genus *Pleurogonium* than to the genus *Paramunna*. The general shape of the body, the pointed extremity of the metasome, the longer peduncle to the superior antenna, and the unigeniculate inferior antenna, are points in which it agrees exactly with *Pleurogonium* and differs from *Paramunna*. It agrees with the latter genus in the presence of well-marked, though small, ocular lobes and eyes, which in *Pleurogonium* are entirely absent. It is to be regretted that the scarcity of examples would not allow of the dissection of the mouth parts, but I did not think the dissection of the only known specimen justifiable. *Paramunna* differs from *Pleurogonium* in possessing palps to the mandibles, and it would have been interesting to have seen whether the close outward resemblance of this new form to *Pleurogonium* extended to the mouth parts also.

FAMILY DESMOSOMIDAE.

GENUS *Ischnosoma*, G. O. Sars.*Ischnosoma Greeni*, Tattersall.*I. Greeni*, Tattersall, *loc. cit.*

Pl. IV., Figs. 1-6.

Body (Fig. 1) sublinear in shape, about six times as long as broad in its widest part, much stouter in build comparatively than the type species of the genus, *I. bispinosum*, agreeing more in this respect with *I. quadrispinosum*, the body and appendages closely covered by coarse spinulose tubercles, but except on the first segment of the mesosome entirely devoid of large and prominent spines.

Cephalon small, quadrangular, front evenly rounded.

Mesosome with the first segment deeply emarginate anteriorly for the reception of the cephalon, its lateral parts bearing a short strong blunt spine beset by small spinules like the rest of the body; second and third segments of equal size, lateral parts unarmed; fourth and fifth segments together about two-fifths of the total length of the body, forming an hour-glass-shaped portion, which gives the characteristic shape to the body; sixth and seventh segments small, lateral parts unarmed.

Metasome (Fig. 6) with the first segment free from the abdominal shield, the latter rather less than one-fifth of the total length, posterior border evenly rounded.

Superior antennae (Fig. 2) of remarkable form, peduncle only two-jointed; first joint short and swollen; second joint nearly twice as long as the first, and near its distal extremity bearing three very long setae, flagellum exceedingly minute, three-jointed; the last joint very small.

Inferior antennae (Fig. 1) very long; first joint very small; second joint long and stout, bearing on its inner proximal edge a two-jointed blunt spine; third joint short; fourth joint long and narrow, slightly shorter than the fifth; flagellum as long as the last three joints of the peduncle and composed of eighteen to twenty joints.

Mouth organs exactly as found in *I. bispinosum*.

First thoracic legs (Fig. 3) shorter and much stouter than the rest; carpus as long as the two preceding joints combined, greatly inflated, armed with two long and two short spines as well as setae; propodus shorter than carpus, somewhat expanded, armed with three slender spines and one or two long setae; dactylus as long as the propodus, armed at its tip with setae.

Second thoracic legs (Fig. 4) with the carpus long and linear, longer than the propodus, dactylus slightly shorter than the propodus.

Third to seventh thoracic limbs (Fig. 5) very similar to the second, slightly longer, and with the propodus proportionally longer, so that it is almost as long as the carpus, carpus and propodus armed with few short spines.

Uropods (Fig. 6) nearly one-half the length of the metasome excluding the first free segment, consisting of a single stout pointed joint, armed with a few setae in addition to the spinules which cover the rest of the body.

Colour in spirit light; one specimen is, however, a dark green colour.

Length, 4 mm.

Locality, see p. 72.

The species is named in compliment to the Chief Inspector of Fisheries of the Department of Agriculture and Technical Instruction for Ireland. Including *I. Greeni*, seven species of *Ischnosoma* are now known, *I. bispinosum*, the type, *I. quadrispinosum*, described by Sars from the Norwegian North Atlantic Expedition, *I. spinosum*, *I. bacillus*, *I. bacilloides* and *I. Thomsoni*, described by Beddard from the collections of the *Challenger*.

From *I. bispinosum*, *I. bacillus* and *I. bacilloides*, *I. Greeni* is at once distinguished by the spinulose general armature of the body, by the unarticulate character of the uropoda, by the greatly elongated second joint of the inferior antenna, and by the structure of the superior antenna.

From *I. quadrispinosum*, which *I. Greeni* approaches very closely, and which has the body beset with small spinules like *I. Greeni*, the latter is distinguished by the absence of spines from the third segment of the mesosome, by the structure of the superior antenna, and by the greater comparative length of the uropods.

From *I. spinosum*, *I. Greeni* can be distinguished by the absence of large spines from the segments of the mesosome as well as the cephalon, and by the somewhat stouter build of the body. Otherwise the two species are very nearly related, and the remarkable structure of the superior antenna is the same in both.

From *I. Thomsoni*, *I. Greeni* differs in having the first mesosome segment deeply emarginate for the reception of the cephalon, in the absence of large spines from the body, the comparative length of the uropods, and the shorter nail to the thoracic legs.

I had at first thought that *I. spinosum* and *I. Greeni*, and possibly *I. Thomsoni*, might be regarded as generically distinct from the other species of the genus by reason of the structure of the two antennae, the uniarticulate character of the uropods, and the separation of the first segment of the metasome from the remainder of the caudal segment, as well as by the general armature of the body. *I. quadrispinosum*, however, would seem to form a link between the two groups of the genus, agreeing with the type *I. bispinosum* in the structure of the superior antenna and the fusion of the first segment of the metasome with the remainder of the caudal segment, and on the other hand agreeing with the *I. spinosum* group in the armature of the body, structure of the inferior antenna and character of the uropoda. Moreover, the structure of the mouth organs would seem to be identical in all the species. It therefore seems best, at present, to include all the species in the one genus *Ischnosoma*.

The following table may be useful in determining the known species of the genus :—

GENUS *Ischnosoma*, G. O. Sars

A.—Body smooth, second joint of inferior antenna small and subequal to the first and third ; uropods biarticulate.

- (i.) Spines absent except on the first segment of the mesosome, which has a single spine on each lateral part.

I. bispinosum.

I. bacillus and *I. bacilloides* are only known from fragments, but have the fourth and fifth segments of the mesosome exceedingly slender and armed with long spines. The uropods are biarticulate.

B.—Body covered with small spinules, second joint of the inferior antenna elongate, uropods uniarticulate.

- (i.) Peduncle of superior antenna two-jointed, flagellum very small.

(a.) Spines on the lateral parts of the first three segments of the mesosome and on the dorsal surface generally.

I. spinosum.

(b.) Spines absent except a single one on the lateral parts of the first segment of the mesosome.

I. Greeni.

- (ii.) Peduncle of superior antenna three-jointed, flagellum almost as long as peduncle.

I. quadrispinosum.

I. Thomsoni would belong to group B above, but its antennae are unknown. It may, however, be distinguished by the exceedingly short uropods, which do not project beyond the tip of the caudal segment, and by the short rod-like spines on the segments of the mesosome.

FAMILY MUNNOPSISIDAE.

GENUS **Munnopsis**, M. Sars.**Munnopsis oceanica**, sp. n.

Pl. V., Figs. 1-7.

Body (Fig. 1) compact, more so than in *M. typica*, anterior division but little wider than the posterior, about three times as long as broad.

Cephalon small, deeply emarginate on each side for the reception of the antennae, front very slightly emarginate.

Mesosome with the first four segments small and compact, lateral parts unarmed, epimera very small; last three segments of the mesosome, combined, as long as the anterior division of the body; the fifth somewhat overlapping the preceding segment of the mesosome, its lateral parts narrow and extending for some way posteriorly, armed with a few strong setae; the lateral parts of the sixth segment somewhat produced posteriorly, and also armed with a few setae.

Caudal segment about one-third of the length of the body, and equal in length to the last three segments of the mesosome combined, regularly oval in form, tip obtusely produced.

Superior antennae (Fig. 2) with the basal joint somewhat expanded, inner corner produced but slightly, flagellum very long and composed of numerous articulations, each bearing long fine setae, the setae more numerous towards the distal end.

Inferior antennae, with the exception of the three basal joints, which are normal, wanting.

Mandibles (Fig. 3) with the cutting edge divided into two parts, each part strongly dentate; below the cutting edge is a small prominence bearing several strong spiniform setae serrate on one edge; below this lobe again, and in a position corresponding to the molar expansion of other Munnopsids, is a very strong spine, slightly serrate on one edge. Palp well developed, three-jointed; last joint somewhat expanded, and setose on one edge.

Maxillae of normal structure, but with scattered setae over the general body of them in addition to those at the tips of the lobes.

Maxillipedes (Fig. 4) with the antepenultimate joint expanded and rounded instead of pointed as in *M. typica*, bearing a few setae; penultimate joint very acutely and strongly produced on its inner edge into a lobe tipped with setae, masticatory lobe with four sensory processes on its inner edge, tip fringed with setae. There is a slight lobe on the lower edge of the masticatory part, as seen in *M. Murrayi*. Epignath acutely pointed.

First thoracic legs (Fig. 5) moderately slender, carpus broader and longer than the propodus, which is rather narrow, dactylus very short. Compared with the same limb in *M. typica*, the propodus and carpus are relatively longer and the ischium shorter.

The three succeeding pairs of legs are all wanting in the single specimen captured.

Natatory legs (Fig. 6) with the carpus large and expanded on one edge, the other edge being but slightly curved, propodus about half as long as the carpus, and oval in outline; both propodus and carpus fringed with very long plumose setae, dactylus wanting.

Pleopods normal, male operculum as in *M. typica*.

Uropods (Fig. 7) long and slender, about one-quarter the total length of the body, two-jointed, the first joint small, with a prominent spine on its inner distal corner; terminal joint from three to three and a half times as long as the basal joint.

Length, 7 mm. .

Female unknown.

Locality, see p. 72.

If the definition of the genus *Munnopsis*, given by Sars in his Crustacea of Norway, be strictly adhered to, the present species, as well as *M. longicornis*, Hansen, and *M. Murrayi*, Walker, could not be included in that genus. In the definition above referred to the mandibles are described as "without molar expansion, cutting edge but slightly dentated," and the natatory legs are defined as being without a dactylus. All the above three species differ from this generic definition in the characters of the mandibles. *M. longicornis* and *M. oceanica* have a strongly toothed cutting edge to the mandibles, but the molar process is replaced by a strong spine, as described above. *M. Murrayi* has a strongly dentate cutting edge, and a well developed broad molar expansion to the mandibles, and differs further in having a well-marked dactylus on the natatory legs. All three species have a prominent lobe bearing strong setae below the cutting edge.

The characters of the four species with respect to the mandibles and natatory legs may be summed up as follows:—

(i.) Mandible with cutting edge slightly dentate, no setose lobe, no molar expansion; natatory legs without dactylus.
M. typica.

(ii.) Mandible with cutting edge strongly dentate, setose lobe present, molar process replaced by a serrated spine, natatory legs without dactylus.

M. oceanica.

M. longicornis.

- (iii.) Mandibles with cutting edge strongly dentate, setose lobe and broad molar expansion present, natatory legs with a distinct dactylus.

M. Murrayi.

We must either regard each of these three groups as representing distinct though closely allied genera, or include them all under the one genus—*Munnopsis* enlarging Sars' definition of that genus with respect to the mandibles and natatory legs in order to embrace them all. In the present state of our knowledge of the group I prefer the latter course, though further discoveries will probably render the first course inevitable.

M. oceanica is very closely allied to *M. longicornis* in all essential points, but in the latter the metasome has a crenulated margin, and the sixth segment of the mesosome has a strong spine on each side, whereas in *M. oceanica* the sides of the metasome are smooth, and the sixth segment of the mesosome is without spines. Further, the antepenultimate joint of the maxillipedes is rounded in *M. oceanica* and acutely pointed in *M. longicornis*. In this respect *M. oceanica* resembles *M. Murrayi*. *M. oceanica* may be distinguished externally by the relatively large posterior division of the body and the long uropods.

GENUS *Munnopsoides*, Tattersall.

Munnopsoides, Tattersall, *loc. cit.*

Munnopsis (*pars.*), Beddard, *Challenger Report*, Isopoda.

Very closely allied to *Munnopsis*, *M. Sars*, but differing in having no palp to the mandible.

The type of this genus is *Munnopsis australis*, Beddard, described from the collections of the *Challenger*. The present form is very closely allied to *M. australis*, only differing in one or two minor points.

There are two other characters which are common to the two species included in *Munnopsoides*, but which do not perhaps deserve to rank as generic. Firstly, the first four segments of the mesosome are very sharply defined from the last three, while the fifth segment is elongate and narrow. Secondly, the two terminal joints of the last three thoracic legs are not so broad proportionally as in a true *Munnopsis*, and only one edge of the last joint bears setae. Beddard's figure of *M. australis* shows the terminal joint of the last three thoracic limbs as having setae on both edges, but a detailed drawing of one of these limbs has only one edge setose.

Unfortunately, these Isopods very seldom reach the surface undamaged. The examples of the species described below (only two in number) arrived with the cephalon detached from the remaining part of the body, and the second, third and fourth thoracic limbs missing. The drawing of the whole animal is, therefore, something of a restoration, and allowance must be made for this fact in examining future individuals of this species.

Munnopsoides Beddardi, Tattersall.

M. Beddardi, Tattersall, *loc. cit.*

Pl. VI., Figs. 1-8.

Body (Fig. 1) elongate, about four times as long as wide at its broadest part, divided into a wider anterior and a narrower posterior portion, the latter a little longer than the former. Under a moderately high power of the microscope the body is seen to be regularly roughened by an armature of very small spinulose tubercles, and has also a covering of short scattered setae most numerous on the cephalon.

Cephalon large, somewhat square in outline, front edge slightly emarginate, slightly raised into a transverse ridge between the bases of the antennae, this ridge carrying a row of prominent rather long and strong setae.

Mesosome with the first four segments subequal in size, much wider than the last three, and very sharply defined from the latter; first very deeply emarginate for the reception of the cephalon; fifth segment somewhat elongate, narrow anteriorly widening somewhat posteriorly; sixth and seventh, small and about as wide as the posterior part of the fifth segment, epimera small and not visible on dorsal view.

Metasome long and narrow, rather less than one-third the length of the body, bluntly rounded posteriorly, with an appearance as if divided slightly into two small obtuse lobes.

Superior antennae (Fig. 2) with the basal joint broadly expanded, triangular in shape, flagellum multiarticulate, first joint very long. In the female the antennae are scarcely one-third of the whole length of the body, in the male they are half the length of the body and much more setose than in the female.

Inferior antennae missing, except for the three basal joints, which are very like those of most *Munnopsidae*.

Mandibles (Fig. 3) consisting of a triangular, simple, rather bluntly pointed plate, obscurely bidentate, no molar process at all; palp entirely absent.

First maxillae (Fig. 4) consisting of two delicate lobes, the outer broader than the inner, both lobes with their tips armed with plumose spines, the inner lobe with one long curved simple seta in addition.

Second maxillae (Fig. 5) composed of three lobes, the inner one broader than either of the other two; tips of all three lobes with plumose spines, the inner one, here also, with one long curved simple seta in addition.

Maxillipedes (Fig. 6) seven-jointed; third joint very small; fourth and fifth broad, the latter with its inner distal corner somewhat acutely produced and armed with a few short simple spines; last two joints very small and very much narrower than preceding joints; epignath well developed and acutely pointed; masticatory lobe obliquely truncate, fringed with short hairs and carrying two sensory processes on the inner edge.

First thoracic legs (Fig. 7) small and simple, second joint long and narrow, merus small, carpus rather longer than propodus, dactylus rather short, whole appendage feebly armed.

Second to fourth thoracic legs missing.

Fifth to seventh thoracic legs (Fig. 8) similar in structure, natatory, carpus long and not so much expanded as in *Munnopsis typica*; setae very few, propodus shorter than carpus, narrowly oval in shape, and not as much expanded as usual, with setae on one edge only; dactylus wanting.

Pleopods normal in structure.

Uropods rather short, simple, two-jointed, first joint shorter than the second, armed with scattered setae.

Length: female, 6 mm.; male, 4 mm.

The species is named in compliment to the writer of the Report on the *Challenger* Isopoda, who described the type of the genus, *M. australis*.

Locality, see p. 73.

This species differs from the only other species of the genus in one or two minor points only.

The cephalon is of different shape, though in each species it is rather large.

The first four segments of the mesosome are larger in *M. Beddardi* than in *M. australis*. The fifth segment of the mesosome is longer and narrower in the latter species than in the present one; while the metasome would appear to be somewhat more developed in *M. Beddardi*. The basal joint of the superior antenna is more broadly expanded in the latter than in *M. australis*. The maxillipedes are of different shape in the two species. In *M. Beddardi* the

ante-penultimate joint is acutely produced, and the last two joints are very small. In *M. australis* the antepenultimate joint is not acutely produced, and the last two joints are much larger proportionally than in *M. Beddardi*. The maxillipedes of the latter approach more closely those seen in *Munnopsis typica* than do those of *M. australis*.

The remaining appendages agree closely in the two forms. Especially is this so with the natatory legs, which are longer and slenderer than in *Munnopsis*, with the carpus and propodus much less expanded and less strongly armed.

In the general roughening of the body and the armature of scattered setae, *M. Beddardi* likewise differs from *M. australis*, which is apparently smooth.

GENUS *Ilyarachna*, G. O. Sars.

Ilyarachna Plunketti, Tattersall.

1. *Plunketti*, Tattersall, *loc. cit.*

Pl. VII., Figs. 1-9.

Body (Fig. 1) of the usual characteristic form of the genus, from two and a half to three times as long as broad, sharply marked into two distinct regions.

Cephalon slightly emarginate in front, quite smooth.

Mesosome with the first four segments sharply defined from the last three; first segment smaller than the succeeding ones, with its lateral parts armed on each side with a stout spine and strong seta; second segment larger than the first, with similar armature; third and fourth segments with their anterior edges produced into somewhat acutely pointed lappets; fifth segment very slightly wider than the preceding four, and very deeply emarginate posteriorly; seventh segment about one-half as long as sixth.

Metasome about one-quarter of the total length of the body, longer than broad at its base; apex bluntly pointed.

Eyes absent.

Superior antennae (Fig. 2) with basal joint broad and expanded; *outer* corner more produced than inner one, and tipped by three spines; inner corner tipped with one spine; third joint of peduncle longer but much narrower than second; flagellum composed of six to eight joints in the female, and twelve in the male.

Inferior antennae (Fig. 3) only represented by the four basal joints, which are very much as in *I. longicornis*; the fourth joint is, however, armed with about nine strong setae on its outer proximal edge, and has its outer distal corner armed with three long setae.

Mouth parts exactly as in *I. longicornis*.

First thoracic legs (Fig. 4) rather slender, with the carpus and propodus subequal in length; nail short.

Second thoracic legs (Fig. 5) with the propodal joint shorter than the carpal, dactylus very long, about equal in length to the propodus.

Third and fourth thoracic legs missing.

Fifth and sixth thoracic legs (Fig. 6) of the usual natatory character; carpal joint very much expanded and densely setose; propodus somewhat dilated, and likewise setose; dactylus well developed.

Seventh thoracic legs (Fig. 7) long and slender; carpus shorter than propodus, with its inner edge bearing long setae; propodus with both edges fringed with short setae; dactylus long and slightly curved.

Uropods (Fig. 8) short, biarticulate; basal joint somewhat expanded and fringed with plumose setae; terminal joint short and narrow, and tipped with setae. On the basal joint there is seen under a high power a very small nodule tipped with plumose setae.

Female operculum (Fig. 9) diverging somewhat from type, shield-shaped, very strongly keeled, the keel with a row of strong setae.

Length, 4 mm.

Locality, see p. 74.

The species is named in compliment to the Vice-President of the Department of Agriculture for Ireland.

I. Plunketti differs from *I. hirticeps* in the smooth cephalon, and from *I. denticulata* in the smooth anterior edges of the segments of the body. It is very closely allied to *I. longicornis*, but differs from it—

- (1.) In the armature of the lateral parts of the first four segments of the mesosome.
- (2.) In the fifth segment of the mesosome being distinctly wider than the preceding part of the body.
- (3.) In having the *outer* corner of the basal joint more produced than the inner, whereas in *I. longicornis* the reverse obtains.
- (4.) In the shape of the female operculum.

These differences are very small, but they are constant in over one hundred specimens of the species which were taken.

Unfortunately, all the specimens were damaged. Indeed, for the most part they consisted of the body alone, devoid of all appendages. The above description has been compiled from several specimens.

GENUS *Eurycope*, G. O. Sars.*Eurycope longipes*, sp. n.

Pl. X., Figs. 1-8.

Body (Fig. 1) much more slender than in most species of the genus, its greatest length being rather less than one-third its total length; shape elongate, of even width throughout; anterior and posterior divisions well marked and about equal in size; integument of the cephalon strongly calcareous, hard, and rugose, that of the first four segments moderately calcareous and similarly roughened; the last three segments of the mesosome and the metasome with the integument soft, thin and without calcareous matter or any sculpture at all.

Cephalon large and broad, arched above, and emarginate on either side for the insertion of the antennae.

First segment of the mesosome scarcely broader than the cephalon, epimera small.

Succeeding three segments broader than the first, loosely articulated to one another; epimera well marked.

Posterior three segments of the mesosome considerably larger than the anterior ones and more firmly articulated to each other, strongly arched above; anterior margins very arcuate, lateral parts evenly rounded.

Caudal segment as long as the preceding three segments combined, gradually narrowing to an obtuse apex, anterior margin but slightly arcuate.

Eyes wholly absent.

Superior antennae (Fig. 2) arising from the upper part of the head, and separated from one another by a distinct gap, rather short; basal joint rather large and narrowly squamiform in shape, bluntly rounded anteriorly; rest of antenna arising from the dorsal surface of this joint; last two joints of peduncle small, flagellum rather stout and multiarticulate, the articulations faintly marked at the base, fringed on one edge by long setae.

Inferior antennae broken off in all the specimens, but so much of them as remains not differing much from the same parts in *E. gigantea*.

Mandibles (Figs. 3 and 4) powerfully developed, roughly triangular in shape, cutting edge almost smooth; molar process very large, bluntly rounded, without teeth or armature save a single small spiniform bristle; palp well developed, long and narrow, three-jointed, the second joint elongate and longer than either

of the other two, terminal joint small and very narrow and terminated by a strong seta; rest of appendage feebly armed, with few setae.

First and second maxillae of the usual structure of the genus.

Maxillipedes (Fig. 5) large and lamelliform; antepenultimate and preceding joints broad and greatly dilated, the former rounded evenly on its inner edge; penultimate joint smaller than the two preceding, somewhat expanded, its inner edge not very prominently drawn out; last joint small and narrow; all the joints furnished with setae on their inner edges; masticatory process well developed, tipped by plumose setae, five masticatory hooks on its inner edge.

First thoracic legs (Fig. 6) longer than is usual for the genus, and very slender, almost equalling the body in length; carpus very long and narrow; propodus shorter than the carpus; dactylus distinct though small; the whole limb very feebly armed.

Remainder of the thoracic limbs broken away in all the specimens.

Operculum in the female of the usual form, that of the male (Fig. 8) narrow, and consisting of two distinct parts.

Second pleopods in the female (which correspond to the third pair in the male) very thin and delicate, biramous, the inner ramus forming a broad rounded plate, the outer narrow and curved, projecting beyond the inner, two-jointed, the outer joint the smaller, both joints setose on their outer margins. Second pleopods in the male, transformed in the usual way into accessory copulatory organs.

Remaining two pairs of pleopods in both sexes entirely branchial in nature, the first of them consisting of two broad lamelliform plates, the last of a single plate.

Uropods (Fig. 7) very small, attached on the ventral surface of the caudal segment, some way from the extremity, biramous, inner branch longer than the outer, both branches linear in shape and very feebly armed.

Length of the largest female 10 mm., that of the only male 5 mm.

Locality, see p. 75.

There is only one known species of *Eurycope* with which the present species is at all comparable, namely, *E. gigantea*, G. O. Sars, described from the Arctic Ocean. *E. gigantea* and *E. longipes* differ rather markedly from all the other species of the genus, and ought perhaps to be removed to a new genus. For instance, in the peculiar shape and formation of the superior antenna they are quite different from all the other known species. Moreover, the terminal joint of the mandibular palp is small and narrow in these two species, while in most of the remaining species it is broad and lamelliform, and

well armed. The molar process, further, though well developed is not so sharply marked off from the cutting edge, and both the latter and the molar process are almost smooth. Finally, the penultimate pair of pleopods are widely different from those seen in the other species. In the latter they consist of an inner broad rounded plate, and an outer narrow biarticulated and setose ramus. In *E. gigantea* and *E. longipes*, on the other hand, the penultimate pair of pleopods consists of a pair of broad evenly rounded smooth plates.

E. longipes differs from *E. gigantea* in its more elongate and narrow shape and in the calcareous nature of the first portion of the body. The penultimate joint of the maxillipedes of *E. gigantea* is rather narrow with its inner edge somewhat acutely produced. The same joint in *E. longipes* is broader and more expanded, with the inner edge scarcely, if at all, produced. Finally, the first thoracic legs in *E. longipes* are relatively much longer than in *E. gigantea*. Sars describes the first legs of the latter species as "scarcely more than half the length of the body." In *E. longipes* they are nearly as long as the body, the exact proportions being as seven is to eight.

GENUS *Lipomera*, Tattersall.

Lipomera, Tattersall, *loc. cit.*

Body shaped much as in the genus *Ilyarachna*, compact, posterior part of mesosome sharply defined from the anterior part, seventh segment of the mesosome very much reduced.

Superior antennae with the basal joint expanded, flagellum short.

Mandibles very much as in *Eurycope*, with a three-jointed distinct palp and a well-developed blunt molar process.

First maxillae with two lobes, the inner one being very small and reduced.

Second maxillae of the usual form.

Maxillipedes as in *Eurycope*.

First thoracic legs very slender, dactylus short.

Second thoracic legs longer than the first, very slender, dactylus long.

Third and fourth thoracic legs similar to the second, but rather longer.

Fifth and sixth thoracic legs natatory, with the carpus and propodus expanded and edged with densely plumose long setae; dactylus well developed.

Seventh thoracic leg very much reduced and feeble, consisting of a short, feebly articulate unarmed appendage.

Uropods consisting of a broad lamellar plate folded on itself and carrying on its lower ventral edge a uniarticulate appendage and a plumose spine.

Female operculum broad and triangular in outline, broadly carinated along centre.

***Lipomera lamellata*, Tattersall.**

Lipomera lamellata, Tattersall, *loc. cit.*

Pl. VIII., Figs. 1-14.

Body (Fig. 1) compact, small, rather more than twice as long as broad, distinctly divided into two parts.

Cephalon larger than any of the first four segments of the mesosome, emarginate anteriorly with a slight production in the centre of the anterior edge; unarmed.

Mesosome with the first four segments distinctly marked off from the last three, narrow; the third the largest, lateral parts armed with a single slender spine; fifth segment wider than the preceding part of the body, lateral parts rounded and unarmed, deeply emarginate behind; sixth segment smaller and narrower than the fifth, a single slender seta on the lateral parts, emarginate posteriorly; seventh segment small and reduced, overlapped laterally by the sixth, unarmed.

Metasome triangular in outline, tip obtusely pointed, about one-quarter the total length of the body.

Superior antenna (Fig. 2) with the basal joint of the peduncle expanded, its outer distal corner produced and armed with a long plumose seta; second joint of peduncle about as long as the basal joint, but very much narrower; flagellum in female two-jointed, the first joint small and bearing one very long plumose seta, the last joint longer, carrying at its tip a long apical filament; flagellum in male eight- to ten-jointed.

Inferior antennae (Fig. 2) only represented by the three small basal joints, which are exactly as seen in *Eurycope*.

Mandibles as in the genus *Eurycope*, with a three-jointed palp and a blunt molar process.

First maxillae (Fig. 3) composed of two lobes, a broad and larger outer lobe tipped by numerous strong setae, the inner lobe small and narrow, only about half as long as the outer lobe, and tipped by three simple setae.

Second maxillae (Fig. 4) normal.

Maxillipedes (Fig. 5) much as in the other *Munnopsidae*; fifth joint broad and expanded, inner edge bluntly lobed; sixth and seventh joints small, the sixth with its inner edge drawn out into a lobe tipped with two long setae; masticatory part normal, with two masticatory hooks on the inner edge.

First thoracic legs (Fig. 6) short and slender, carpus very narrow and longer than the propodus; dactylus short; the limbs bear a few scattered setae.

Second thoracic leg (Fig. 7) longer than the first, but still very slender; propodus very slightly longer than the carpus; dactylus long and slender; propodus with a row of short setae on the inner edge; a few scattered longer setae on the limb.

Third and fourth thoracic legs similar to the second, but longer.

Fifth thoracic legs (Fig. 8) natatory in structure; carpus very broadly expanded, both edges bearing numerous densely plumose setae; propodus shorter than the carpus, less expanded, but similarly armed, with the dactylus well developed and slender; a long spine at the base of the dactylus on the outer edge of the propodus.

Sixth thoracic legs (Fig. 9) similar to the fifth but smaller, and with the carpus and propodus less expanded.

Seventh thoracic legs (Fig. 10) very small and rudimentary, consisting of a feebly jointed slender appendage, unarmed save for two plumose setae.

Pleopods normal.

Uropods (Figs. 11 and 12) attached at the side of the metasome and consisting of a broad lamellar plate, which *in situ* is folded on itself longitudinally, has its dorsal edge tipped with three or four short setae, and bears on its ventral edge a plumose stout spine and a uniaarticulate appendage tipped with a long fine seta.

Female operculum (Fig. 13) broad and triangular in outline, with a broad blunt carina along its centre.

Male operculum (Fig. 14) small and narrow, each part tapering evenly to an acutely pointed tip.

Length of adult female, 1.25 mm.

Locality, see p. 75.

The general form of the body, and especially the natatory character of the fifth and sixth thoracic legs, give this remarkable little Isopod a place in the *Munnopsidae*, but the latter family contains as yet no species in which the seventh thoracic legs are so reduced and the uropods of such a striking and peculiar form as in this species.

The rudimentary seventh thoracic legs are particularly noteworthy. In newly hatched Isopoda these limbs are absent, while the remaining six thoracic legs are present as unsegmented unarmed appendages. A later stage, still immature, shows the first six legs fully developed, while the seventh are still in a rudimentary condition. *Lipomera lamellata* permanently retains this stage in the adult, for it may here be

noted that several specimens carried eggs, and were at least sexually mature. I do not, however, regard it as a more primitive Munnopsid than any other described form, but rather as a very specialised species in which the post-larval character of the seventh legs is secondarily developed. Specialisation in the direction of reduction of size has, from the exigencies of reproduction, probably led to this arrest of development. A somewhat parallel instance is shown by *Munnella Danteci*, a species belonging to the family *Munnidae* and described by Bonnier from the Bay of Biscay. Here, however, the seventh thoracic legs are completely absent. The size of the species is 1.5 mm., and it is described as sexually mature.

The uropods may be compared to those of *Ilyarachna*, in which the basal joint has become enormously expanded and doubled on itself, at the same time losing its setae, while the terminal joint persists as the uniaarticulate small appendage tipped by a long seta, mentioned above as being on the ventral edge of the uropoda.

TRIBE EPICARIDA.

FAMILY BOPYRIDAE.

GENUS *Scyracepon*, nov.

Female.—

Body broadly oval in outline.

Cephalon simple, elliptical in shape, exhibiting no division into parts.

Mesosome with a dorsal boss on each of the last six segments.

Metasome distinctly segmented.

Legs terminating in a blunt short claw.

Pleopods biramous throughout, the rami coarsely pinnate on one edge.

Uropods uniramous, and coarsely pinnate like the pleopods.

Last marsupial plate tuberculose.

Male.—

Thoracic and first two pleon segments with a median ventral boss.

Pleon without appendages; the first three segments well marked off; remaining two fused with the telson.

Uropods absent.

Eyes present, but very small.

Scyracepon tuberculosa, sp. n.

Pl. XI., Figs. 9-12.

Female.—

Body (Fig. 9) large and, as usual, asymmetrical, broadly oval in outline.

Cephalon elliptical in shape, simple, not divided into parts.

Mesosome with a median dorsal boss on each of the last six segments, forming a well-marked acute carina along the whole body. The boss on the second segment is only faintly indicated. Those on the succeeding segments gradually increasing in size posteriorly, where they appear as very acutely pointed and long processes projecting dorsally. The appearance of the last four bosses is suggestive of the neural spines of the backbone of some vertebrate skeleton.

Metasome with all the segments distinctly defined.

Antennae and mouth parts not differing markedly from those of its allies *Cancricepon* and *Grapsicepon*.

Thoracic legs with the carpus and propodus having their inner edges somewhat acutely produced, the tips of the produced part slightly tuberculose; nail short, base greatly dilated.

The fifth, sixth and seventh thoracic limbs (Fig. 11) exhibit the same peculiar bulging of the margins of their second joints noted by Stebbing in *Tylokepon Bonnierei*. In *Scyracepon tuberculosa* the bulging is much more marked, and the papillae produced by the bulging have their tips slightly tuberculose.

Pleopods in all five pairs biramous, the rami very coarsely pinnate on one edge only, the other edge only showing slight irregularities of their contour. The pleopods gradually decrease in size posteriorly.

Uropods simple, rather longer than the last pleopods with their edges coarsely pinnate.

Marsupial plates as usual for the family with the last pair strongly tuberculose on their posterior half, their posterior margins slightly setose.

Length 10 mm., *breadth* 7 mm.

Male.—

Body (Fig. 10) about three times as long as broad, segments very well defined.

Cephalon semicircular in outline, partly surrounded by the first segment of the mesosome.

Eyes present but small.

Pleon with the first three segments distinctly defined and segmented off, last two fused with the telson.

All the thoracic and the first two segments of the pleon with a median ventral boss, that of the first thoracic segment rather pointed and small, those of the remaining segments having the appearance of evenly rounded, blunt knobs.

First and second antennae each three-jointed, the last joint tipped by a few setae.

Thoracic legs (Fig. 12) remarkably stoutly built and subcheliform; merus and carpus very small, with their edges somewhat produced, produced part tuberculose, and that of the carpus with a small spine; propodus remarkably dilated, its inner edge likewise produced into a strongly tuberculate angle; dactylus strongly recurved, provided with a secondary tooth.

Pleopods and uropods absent.

Length, 4 mm.

Host, *Scyramathia Carpenteri* (Norman).

Locality, see p. 78.

This large and striking form belongs to the *Ioniens*, one of the sub-divisions of the family *Bopyridae* made by Giard and Bonnier. The group is only found parasitic on *Brachyura*.

Scyracepon is distinguished from all the other members of the sub-division, by the possession of a medio-dorsal boss on each of the last six thoracic segments in the female, and by the partially segmented pleon without pleopods and the ventral bosses of the male.

The specific name alludes to the tuberculose last pair of marsupial plates.

Scyracepon tuberculosa is, as far as I am aware, the first member of the family found parasitic on any of the *Oxyrrhyncha*, though *Entione*, a genus of the allied family *Entoniscidae* has long been known from *Achaeus*, one of the genera of this sub-division of *Brachyura*. The phryxoid stage of this species was also met with on one *Scyramathia carpenteri*. It only differed from the adult in being much more symmetrical and in having only faint bosses on the last three thoracic segments.

ii.—THE ISOPODA OF BALLYNAKILL AND BOFIN HARBOURS.

Ballynakill Harbour is a long narrow inlet in the north of the county of Galway, between Clifden and Killary Bays; while Bofin Harbour is on the island of Bofin, one of a group of small islands off the entrance to Ballynakill Harbour. Descriptions and maps of these localities will be found in *Ann. Rep. Fish., Ireland, 1902-03, Pt. II., App., III., [1905]*. The maps are reprinted at the end of this paper.

This part of the paper deals with a list of thirty-seven species, thirty-three of which were actually taken in one or other of the two harbours under notice, while the remaining four have been taken in other harbours on the west coast, and are here included for convenience. They are indicated by being placed between brackets.

No records new to the British and Irish fauna are noted in the list, but the following species do not appear to have been hitherto recorded from the Irish coast :—

Leptognathia longiremis (Lilljeborg).
Paratanais Batei, Sars.
Anthura gracilis (Montagu).
Eurydice spinigera, Hansen.
Eurydice truncata (Norman).
Limnoria lignorum (Rathke).
Idotea neglecta, G. O. Sars.
Iaera marina (Fabricius).
Iaera Nordmanni (Rathke).
Munna Kröyeri, Goodsir.
Munna Fabricii, Kröyer.
Pleurogonium rubicundum, G. O. Sars.
Bopyrus squillarum, Latreille.
Bopyrina ciribii (Walz).

On the other hand, *Aapseudes hibernicus* and *Idotea metallica* have not yet been recorded from any part of the British Isles except the west coast of Ireland.

ORDER TANAIIDACEA.

FAMILY APSEUDIDAE.

GENUS *Aapseudes*, Leach.

Aapseudes hibernicus, Walker.

Pl. IX., Figs. 4-7.

BALLYNAKILL.—Common in dredgings from the muddy ground in Coastguard Bay in 5-8 fathoms. Also taken on one occasion in the channel off Ross Point.

BOFIN.—A single specimen was found under a stone on the shore of Port Island Bay in September, 1900.

It would be well to note certain differences between Walker's description and figures of this species and the present examples. In the first place, the fine granulations noticed by Walker on the proximal half of the inner side of the superior antenna are likewise to be found on the sides of the rostrum. It may be mentioned that one of these individuals had a distinct spine at the extremity of the rostrum, though otherwise agreeing well with Walker's description. The ocular lobes and eyes are placed immediately at the base of the superior

antenna, and not some little way below it, as in Walker's figure. The spine present on each side of the first free segment of the pereion seems to have a broader base in all my specimens than Walker's figure shows. The most important difference, however, to be noted is in the armature and structure of the second or fossorial legs. Walker's figure of these appendages shows the dactylus to be only about one-half as long as the propodus, the merus to have two spines on the inner distal corner, and the propodus and carpus to be devoid of spines on their outer margins. All the specimens examined differ from this, in having the dactylus well developed and quite as long as the propodus, in the merus having only one spine at its inner distal corner, and in the propodus possessing two, and the carpus one spine on their outer margins. Walker states in his paper that the spines on these appendages are apt to vary, differing in each leg of the type specimen. On my writing to him about these differences he very kindly informed me that the dactylus in the type was apparently very much worn though correctly figured. A figure of a second or fossorial leg is shown (Pl. IX., Fig. 4), as being the more typical form of the limb in the species. The males only differ from the females in having the first legs or chelipeds more stoutly built, though the armature is similar.

Along with several typical adult examples of this species occurred about a dozen small specimens, evidently immature, as indicated by the small number of joints in the flagella of the antennae (Pl. IX., Figs. 5-6). They all had the rostrum finely granulated.

The most notable difference between these immature forms and adult individuals is the absence in the former of a tubercle on the immoveable finger of the first legs (Pl. IX., Fig. 7).

Distribution.—This species as yet is only known from the west coast of Ireland. The type was found by Dr. Gamble under a stone between tide marks in Valentia Harbour. The species, unlike most members of the genus, is apparently quite a shore and shallow water form.

FAMILY TANAIIDAE.

GENUS *Leptochelia*, Dana.

Leptochelia dubia (Kröyer).

BALLYNAKILL.—Common at Ballynakill in dredgings from muddy ground in 5-8 fathoms.

BOFIN.—Common in dredgings from muddy parts of the harbour. Male specimens appear to be very rare, only two out of 106 collected being of that sex.

Distribution.—This species was first added to the British and Irish fauna by Walker, who records it from Valentia. Norman had, however, previously found examples in Birterbuy Bay, W. of Ireland, and at Falmouth, though they were not recorded till after Walker's paper had appeared. This form was also taken by the *Fingal* expedition in 1890, the exact locality being uncertain, and I have taken it in Galway Bay. The species has a very extensive range, having been recorded all along the Atlantic coast from Ireland to Teneriffe, from the Mediterranean, from the N.E. coast of America, and from Brazil, where the types originally were obtained.

[GENUS **Paratanais**, Dana.]

[**Paratanais Batei**, G. O. Sars.]

BALLYNAKILL AND BOFIN.—No record.

Examples referable to this species have been taken in some numbers in Galway Bay, off Black Head, Co. Clare, in 5-15 fath. of water.

Distribution.—Known from Falmouth Harbour and Plymouth Sound, Channel Islands, Firth of Clyde, Arran Island, Firth of Forth, and Loch Fyne. It does not seem to have been recorded before from Ireland. Outside Britain it is known from Norway, France, and the Mediterranean.

GENUS **Leptognathia**, G. O. Sars.

Leptognathia longiremis (Lilljeborg.)

BALLYNAKILL.—Only once taken, in January, 1902, in a bottom townet from Coastguard Bay to Green Rocks. The townet filled with sand.

BOFIN.—There are no records from Bofin.

In the nineteenth Report of the Fishery Board for Scotland, Pt. III., Dr. Scott records a species of *Leptognathia* under the name *L. longiremis* ? var. The present specimens agree absolutely with Scott's descriptions and figures, except that no females were noticed with a five-jointed superior antenna.

They differ, like Scott's, from *L. longiremis* as figured by Sars in the absence of a denticle on the lateral margins of the metasome, and, according to Scott, the males have the inner branch of the uropods only two-jointed. This *Leptognathia* is, according to Hansen, the true *L. longiremis*, Lilljeborg. The species described and figured under this name by Sars is distinct, and will be named *L. Sarsi* by Hansen (*vide* Ohlin, *Bih. K. Sv. Vet. Akad. Handl. Bd. 26, IV., No. 12*).

Distribution.—*L. longiremis* (Sars *nec.* Lilljeborg), has been found by Dr. Scott in Loch Fyne, Firth of Forth, and Moray Firth, and is known from Norway, Iceland, Denmark, and Greenland. *L. longiremis* (Lilljeborg) was found by Scott not uncommonly off Aberdeen. I have also taken it in Galway Bay.

GENUS **Tanaopsis**, G. O. Sars.

Tanaopsis laticaudata, G. O. Sars.

Pl. IX., Figs. 9-10.

BALLYNAKILL.—Not uncommonly met with in all parts of Ballynakill Harbour inside the Green Rocks. It occurred twice in bottom townets taken at night over the muddy part of Fahy Bay, and was also washed from a bottom townet in January, 1902, from Coastguard Bay to Green Rocks, which became filled with sand.

BOFIN.—No records.

The present species may be distinguished most easily among Tanaidae by the three spines which terminate the immoveable finger of the chelipeds. I can confirm Scott's observation as to the somewhat larger size of this species in reference to that which Sars states to be the average—one specimen measuring 4 mm., while several measure over 3 mm.

Male specimens do not seem to have been previously recorded. Like the males of the genus *Leptognathia*, they have the superior antenna (Pl. IX., Fig. 9), with a three-jointed peduncle and a four-jointed flagellum clothed with sensory hairs. The joints of the flagellum are subequal, and as long as the last peduncular joint. The metasome (Pl. IX., Fig. 10) is much more pointed in the males than in the females, and its extremity carries several long setae.

The chelipeds of the male are very similar to those of the female, but, again, like the males of *Leptognathia*, bear on the inside of the propodus a row of nine strong setae or spines. The two fingers of the hand are, moreover, equal in size, unlike the males of *Leptognathia*, where the immoveable one is shorter than the other one.

Distribution.—This species has been recorded from several localities in both E. and W. Scotland by Dr. Scott. Stebbing also records it from near Cumbræ, Firth of Clyde, and Norman from Birterbuy Bay, W. Ireland. I have also taken it in Galway Bay. It extends to the Mediterranean and to Norway.

ORDER ISOPODA.

TRIBE FLABELLIFERA.

FAMILY ANTHURIDAE.

GENUS **Anthura**, Leach.

Anthura gracilis (Montagu).

BALLYNAKILL.—A single male example was taken in Coastguard deep, 6 fath., June, 1902, and three females from Fahy Channel, off Ross Point, 3 fath., September, 1903.

BOFIN.—No record.

Norman and Stebbing, in their account of the Isopoda of the *Porcupine* Expedition, described the male of this species for the first time. Their male specimens were immature, and at the end of their description they predicted that the fully developed male would have the upper flagellum adorned by numerous bands of strong setae. This prediction was confirmed by Garstang, who recorded male examples with such a superior antenna at Plymouth. Garstang's specimens were, however, only 4-5 mm. in length, while the length of Norman and Stebbing's example, which they considered to be immature, was 8 mm. The present male individual is the same size as the last, but has the superior antenna greatly developed and very densely clothed with rings of setae.

Distribution.—This species has only been found up till now on the south coast of England, at Plymouth, Falmouth, and Torquay, and at Jersey. The present record, therefore, considerably extends its geographical range. The limited recorded distribution is rather remarkable, since on the south coast of England it is by no means rare.

FAMILY GNATHIIDAE.

GENUS *Gnathia*, Leach.

Gnathia maxillaris (Montagu).

BALLYNAKILL.—Both males and females are very common in dredgings all over the harbour, while the larvae of both sexes occur plentifully in townets taken at night.

BOFIN.—Very common everywhere, both in dredged material and in townets.

Larvae of this species are also occasionally found as external parasites of small fish, such as young coalfish, pollack, gurnard, and white or sea trout, from all of which species they have been taken at Ballynakill. Scott has also recorded them from the gills of the gurnard and lemon sole.

The colours exhibited by the larvae are often of an exceedingly striking nature. Two or three examples have been taken at Ballynakill of a vivid green colour, which is only partially dissolved out after more than twelve months' preservation in formalin.

Distribution.—Occurs commonly all round our coasts, and has also been taken abundantly in Norway, in the Kattegat, and off the coasts of France. It also extends to the Mediterranean.

FAMILY CIROLANIDAE.

GENUS *Cirolana*, Leach.*Cirolana borealis*, Lilljeborg.

Pl. IX., Fig. 8.

BALLYNAKILL.—Single specimens were found on two occasions on the shore between Coastguard Bay and Baracladdy; while in March, 1904, two specimens were dug out of sand on the same shore. In March, 1900, an example, 25 mm. in length, was found in the stomach of *Acanthias vulgaris*.

BOFIN.—No record.

For records from deep water see p. 63.

A few slight divergences from Sars' diagnosis and figures in these specimens call for some notice. The number of masticatory hooks in the maxilliped varies from one to three, and is not fixed at two, as Sars would seem to suggest.

The shape of the appendage to the second pleopod of the male is not exactly as Sars figures it. The appendage is a moderately stout rod, bifurcating near its extremity into two unequal processes tipped at their distal ends by a number of chitinous hooks or pads (see Pl. IX., Fig. 8). The appendage was, however, correctly figured by Hansen in his memoir on the family.

The basal lobe of the first maxilla cannot accurately be said to bear "plumose setae." It rather bears three strong spines, having a circle of dense setae about their centre. The size of the present specimens is rather larger than that given by Sars, some of them reaching a length of 30 mm.

Distribution.—This form is rather widely distributed round our coasts. It has been recorded from both the east and west coasts of Scotland by Scott, and from the Shetlands, Devon, Channel Islands and W. of Ireland by Norman. It was taken frequently by the *Harlequin* and *Fingal* expeditions off the west coast of Ireland in 1890-1891, at one station particularly, 28 mi. N.W. of Achill Head, when fish caught on long lines had hundreds of immense individuals of this species clinging to them. Indeed, when the lines were lifted, some of the fish (*Acanthias* and *Gadus aeglefinus*) were hardly more than bags of skin full of *Cirolanae*, which had penetrated through the natural orifices and eaten away the tissues (*teste* E. W. L. H.).

It is occasionally found parasitic on fishes. Scott records it from *Raia batis*, *Gadus virens*, *Brosmius brosme*, and *Conger vulgaris*, while it has also been taken from *Acanthias vulgaris* off the west coast of Ireland. It is also frequently found in the stomachs of rays and dogfish.

GENUS *Conilera*, Leach.*Conilera cylindracea* (Montagu).

BALLYNAKILL AND BOFIN.—There are no records of this species from these harbours, though a single male specimen, 16 mm. long, was taken 1 mi. N. by E. of Cleggan Head, Co. Galway, 21 fath., just at the entrance to Ballynakill Harbour, in the seas between the Bofin Archipelago and the mainland. I have also taken it on clean shelly ground on the inside of the Aran Islands, Galway Bay.

The stylet of the second pleopod of the male, unlike that of the preceding species, is a rather slender, simple, finely pointed rod.

Distribution.—This species is known from the coasts of Devon and Cornwall, from the Clyde, Skye, and Bantry Bay, Ireland. It also extends to the Mediterranean and Channel Islands. Norman notes the remarkable fact that the species is unknown from the east coast of England and Scotland, from Norway and from Denmark.

GENUS *Eurydice*, Leach.*Eurydice pulchra*, Leach.

BALLYNAKILL.—No record.

BOFIN.—A single specimen occurred on each of three occasions in July and September, 1899, and September, 1900, in townets taken at night in the outer harbour. They were all surface townets.

A single specimen was also met with in a townet taken in Achill Sound in April, 1899.

Distribution.—This species would not appear to be so common on the west coast of Ireland as it is in most other British localities. Indeed, during a period of five years only four specimens were met with. It extends from Norway to the coast of France, and also to the Mediterranean, where it has been recorded by Gourret.

Eurydice spinigera, Hansen.

BALLYNAKILL.—Was not actually met with in the harbour, but occurred on four occasions in surface townets at the entrance to the harbour.

BOFIN.—Taken on three occasions in surface townets at night in the outer harbour.

This species may be distinguished from its congeners by the rather narrow and slightly emarginate posterior edge to the telson, armed at each side with two prominent spines, and also tipped with long plumose setae.

Distribution.—First described by Hansen in his monograph of the family, 1890, but the exact locality at which his specimens were captured is not given. It has since been recorded from the South of England by Stebbing and Norman.

All the above specimens were taken in surface townets. The species would therefore appear to be pelagic in habit.

***Eurydice truncata* (Norman).**

Pl. XI., Figs. 5-8.

BALLYNAKILL AND BOFIN.—Very commonly met with in townets at both places. It was especially abundant during the summer and autumn of 1900 in the seas round the island of Bofin.

This species belongs to the same section of the genus *Eurydice* as *E. inermis*, Hansen. Indeed it would seem to be very closely allied to this latter species. In view of the large number of specimens of *E. truncata* in my hands I am able to add a few particulars to the descriptions of Norman and Hansen. These concern chiefly the sexual differences exhibited by the species. In addition to the usual stylet on the inner lamella of the second pair of pleopods the males of *E. truncata* also exhibit a rather marked difference from the females in the superior antenna. In the latter, the superior antenna (Fig. 5) is short, and does not differ very greatly from the same appendage in *Eurydice pulchra*, except that it is somewhat more slender. In the adult males (Fig. 7), however, it is very much longer and more slender than in the female, due to the elongation of the joints of the flagellum. It extends to about the third or fourth segment of the mesosome, and is not as setose as usual, but has the terminal joint tipped by one very long fine seta. An exactly similar superior antenna is depicted for *E. orientalis* by Hansen, and I am convinced that males of *E. inermis*, when examined, will be found to show a similar sexual difference in these appendages. It may be noticed that *E. truncata*, *E. inermis*, and *E. orientalis* have the plumose setae which arm the posterior edge of the telson short and feeble, while *E. Grimaldii* and *E. spinigera*, which do not show any very marked sexual difference in the superior antenna, have these setae considerably stronger and longer.

Distribution.—This species was added to the British fauna by Norman for specimens from Shetland. It has since been taken off the west coast of Scotland and England by the *Knight Errant* and *Porcupine* expeditions, and also at Naples.

Most of the above specimens were captured in townets, and the species seems essentially pelagic in habit.

FAMILY *LIMNORIIDAE*.GENUS *Limnoria*, Leach.*Limnoria lignorum* (Rathke).

BALLYNAKILL.—This small species was found boring in the bottoms of two hulks moored in Ballynakill Harbour, which were beached for cleaning in February, 1904. It was also found in wooden oyster "caisses" staked at the head of Fahy Bay in 1903 and 1904.

BOFIN.—No record.

Distribution.—The species has a very extensive distribution in European and North American waters generally. In local distribution it appears to be capricious. For instance, while it is said to have destroyed some wooden piling at the Aran Islands, at the mouth of Galway Bay, it has not been observed to attack the oyster "caisses" which have for the last two years been staked at Ardfry, at the head of the bay.

FAMILY *SPHAEROMIDAE*.GENUS *Sphaeroma*, Latreille.[*Sphaeroma serratum* (Fabricius).]

BALLYNAKILL AND BOFIN.—No record.

This common Sphaeromid was not actually met with in either Ballynakill or Bofin Harbours. It was, however, found under stones at high water mark in Clifden Harbour, the next harbour to the south of Ballynakill Harbour, Co. Galway, and also under stones between tide-marks at Ardfry, near Galway.

Distribution.—Very plentiful everywhere round our coasts in shallow water. It is quite at home either in very brackish water or in localities where very little fresh water enters the sea. It extends to the coasts of France and the Mediterranean.

[*Sphaeroma Hookeri* (Leach).]

Though not found either at Ballynakill or Bofin, this species is included in the present list for specimens taken about two miles above Londonderry, on the banks of the River Foyle, in August, 1904.

Distribution.—Though never very plentiful it is rather widely distributed round our coasts, chiefly in brackish water. It has been recorded from Suffolk, Sussex, Belfast Lough, Strangford Lough, Clevedon, and the Channel Islands,

GENUS *Naesa*, Leach.*Naesa bidentata* (Adams).*Dynamene rubra*, Montagu.*D. viridis*, Leach.? *D. Montagui*, Leach.

BALLYNAKILL.—Under a stone, Ross shore, Ballynakill Harbour, January, 1903—one male.

From *Saxicava*-bored limestone, Black Rocks, Ballynakill Harbour, March, 1904—several males and females.

BOFIN.—No record.

The list of synonyms given above is indicative of the great variability in form and the sexual differences exhibited by the species. There is little doubt that *D. viridis* was founded on green *D. rubra*, and this view is strengthened by the fact that both species are recorded by Bate and Westwood as being taken together. Closer investigation and wider knowledge of the group as a whole have likewise shown that *Naesa bidentata*, Adams, is merely the male form of *D. rubra*, though the outward appearance of the two forms would not seem to support this view, so vastly different do they look.

I am further inclined to the view expressed by Mr. Stebbing, that *D. Montagui* of Leach is merely a young male of *N. bidentata* in which the backwardly directed processes of the sixth segment of the mesosome are just beginning to develop. Forms corresponding to all of the above supposed distinct species have been taken together.

A cryptoniscid larva closely corresponding to Sars' Cryptoniscid No. 2 (Crustacea, Norway, Vol. II.), was found attached to the ventral surface of the pleon of a female of this species. It differed chiefly from Sars' figures in having the cephalosome broader and more semicircular. I am not aware that any *Epicarida* have ever been found on members of this family before.

Distribution.—*Naesa bidentata* is of constant occurrence in shallow water round our coasts. It also extends to the Channel Islands and the Mediterranean.

GENUS *Cymodoce*, Leach.*Cymodoce truncata* (Montagu).

BALLYNAKILL.—Taken on one occasion only, in March, 1901, from a *Saxicava*-bored limestone boulder.

BOFIN.—Taken on two occasions in 1899, viz., off the Gun Rock in 16 fath., and in the outer harbour between tide marks.

Distribution.—This species is quite a common one round our coasts in shallow water. It also occurs in the Mediterranean.

TRIBE VALVIFERA.

FAMILY IDOTEIDAE.

GENUS *Idotea*, Fabricius.*Idotea baltica* (Pallas).

BALLYNAKILL AND BOFIN.—Common everywhere on *Laminaria* and seaweeds generally. Often taken at the surface in a coarse meshed net towed rather rapidly.

The stylet of the second pair of pleopods in the male is not at all constant in the relation which it bears to the length of the pleopod itself. Sars describes it as "not extending to the end of the inner plate," but in one single haul I have found some males in which the stylet was quite as long as the lamella of the pleopod, and others in which it was very little more than three-quarters of that length. Similar variations in the proportional length of the stylet were noticed in *I. neglecta*.

Young examples of this species are difficult to distinguish from such species as *I. pelagica*, *I. granulosa* and *I. viridis*, in which the telson has a very similar shape.

Distribution.—Very widely distributed everywhere round our coasts in littoral waters, and extending from European waters generally to the North Atlantic coast of America.

Idotea pelagica, Leach.

BALLYNAKILL AND BOFIN.—Not infrequently met with among fixed and floating algae.

Distribution.—Dr. Norman, in a recent paper on the British members of the family *Idoteidae*, states that this species is rather scarce on all our coasts. It is recorded by him from S.W. Ireland, and also from Aberdeen. Outside British and Irish waters it is only known from Norway and the north coast of France.

Idotea granulosa, Rathke.

BALLYNAKILL.—Only twice taken, in both cases from *Laminaria*.

BOFIN.—Occurred on two occasions in gatherings from *Laminaria*.

Distribution.—This species has probably been overlooked several times in consequence of its resemblance to young forms of *I. baltica*. It has been recorded by Walker from Bray, Dungarvan, Valentia and Dalkey, in Ireland, and by Norman from Northumberland and Berehaven. Outside the British Isles it is only known from Norway, where it occurs sparingly.

***Idotea viridis* (Slabber).**

BALLYNAKILL AND BOFIN.—Not uncommonly met with in both harbours in gatherings from *Laminaria* and *Zostera*.

I have recently taken this species in considerable numbers in a saleen on the shores of Kilronan Harbour, Aran Islands. The bottom of the saleen consisted of a soft mud with *Ulva* growing in profusion over it.

Distribution.—This form was first recorded as British by Walker, who took it at Valentia. It has since been recorded by Norman from two localities in the South of England, and also from the Channel Islands. It is likewise found off Norway, Holland and France; in all cases in quite shallow water.

***Idotea neglecta*, G. O. Sars.**

BALLYNAKILL.—Taken on one occasion only in the hollowed out stems of dead *Laminaria* dredged in 5 fath. Several specimens were all crowded together in such hollowed stems.

BOFIN.—A single specimen only, met with at the surface among floating weed.

This is a species of *Idotea* recently detected by Sars off the coast of Norway. It resembles *I. baltica* in many respects, but even at its very largest size it never shows any signs of the tridentate telson characteristic of *I. baltica*.

The examples noted above agree well with Sars' description, and figures, except in the length of the stylet proportionately to the second pair of pleopods in the male. In all the males I have examined, this stylet was longer proportionally than in Sars' figures, being at least three-quarters of the length of the lamellae of the pleopods, and sometimes even more than this. There seems to be a rather distinct carina running down the whole length of the telson.

Distribution.—This species was recently added to the British fauna by Scott. Previously it was only known from Norway. Scott, however, records it from the Moray Firth, and Norman has also noted its occurrence at Shetland, Falmouth, and Plymouth.

***Idotea emarginata* (Fabricius).**

BALLYNAKILL AND BOFIN.—With *I. baltica* this species is the commonest Isopod met with in both harbours. It occurs most commonly among *Laminaria*, and is to be met with at the surface among floating weed of all kinds.

The differences between this form and *I. metallica*, with which it has been confounded by Gourret, are enumerated under the latter species.

Distribution.—This species is very generally distributed all round our coasts, and occurs also off Norway and the Kattegat.

Idotea metallica, Bosc.

BALLYNAKILL.—No record.

BOFIN.—One male and one female specimen were taken in July, 1900, at the surface between Inisgort and the Gun Rock.

In the *Annales du Musée d'Histoire naturelle de Marseilles*, T. IV., 1891, Gourret describes and figures a species of *Idotea* which he calls *I. emarginata* (type, Fabricius). From his descriptions and figures it is certain that he was really dealing with the present species. In colour, form and habit, the two agree in every way.

I. metallica may be distinguished from *I. emarginata* very readily by the presence of a small supplementary segment between the cephalon and the first segment of the thorax. Further, the telson in *I. emarginata* is, as its name implies, emarginate on its posterior edge, while *I. metallica* has this edge of the telson straight. The male stylets of the second pair of pleopods in the male are longer than the lamellae of the pleopods in *I. metallica*, and shorter in *I. emarginata*. Finally, the colour of the two forms affords a ready means of distinction. *I. metallica* is a uniform dark steel blue colour, while *I. emarginata* is variously coloured and mottled. Dr. Scharff, of the Museum of Science and Art, Dublin, very kindly sent me the specimen of *I. metallica* taken by Haddon in 1890 off Achill Head, to compare with the present specimens.

Distribution.—This species has only once previously been taken in British waters, Haddon having taken a single specimen from the surface off Achill Head, in 1890, during the cruise of the *Fingal*. Dr. Norman has recently recorded this specimen in his paper on the British species of *Idotea*. The species is, however, very common in the Mediterranean, and is also known from N.E. America. Its general habitat would seem to be among floating colonies of *Cirripedia* or on floating timber covered with barnacles. It is a purely oceanic species, and its occurrence at Bofin is probably due to its having floated in on some timber.

Idotea linearis (Pennant).

BALLYNAKILL AND BOFIN.—Very commonly met with in both harbours.

Distribution.—Though generally widely distributed round our coasts, this species, curiously enough, does not occur off the Norwegian coasts. It would seem to be confined to the British Isles and the Mediterranean.

TRIBE ASELLOTA.

FAMILY IANIRIDAE.

GENUS *Ianira*, Leach.*Ianira maculosa*, Leach.

BALLYNAKILL.—A single specimen was taken in June, 1902, from Coastguard Deep, 6 fath.

BOFIN.—No record.

Distribution.—This species has a very wide geographical distribution, extending along the coasts of Europe from Norway to France, and it is also known from Greenland. It is quite a common form round our coasts.

GENUS *Iaera*, Leach.*Iaera marina* (Fabricius).

Pl. IX., Fig. 11.

BALLYNAKILL.—Rather common under stones between tide marks, especially at those points where a stream of fresh water enters the bay.

BOFIN.—No record.

The difference which separates this species from *I. Nordmanni* are enumerated under the latter species.

Distribution.—This form has rather a wide range of geographical distribution, having been found on the Atlantic coast from Norway to France, the British Isles, Greenland, and the Atlantic coast of North America.

It is quite commonly met with all round our coasts, occasionally in company with the next species.

Iaera Nordmanni (Rathke).

Pl. IX., Fig. 12.

BALLYNAKILL.—Taken in company with the last species, under stones between tide marks.

BOFIN.—Several examples were met with in 1899 under stones between tide marks, in the outer harbour.

This species is very closely allied to the last, and has doubtless by many writers been confounded with it. There are, however, a few well marked characters by which it may be distinguished from *I. marina*. It is of rather smaller size than the latter, and is shorter and proportionally broader. Moreover, it has a regular and dense armature of strong and short bristles, whereas *I. marina* has a few short simple setae on the lateral edges of the segments of its body.

The inferior antenna in *I. Nordmanni* is scarcely more than one-third of the total length of the body, while in *I. marina* it reaches to more than half that length. The uropods in the latter species are not nearly as rudimentary as in *I. Nordmanni*. The males are very readily distinguished by the extent of the male operculum and the shape of its middle piece. In *I. marina* the male operculum entirely covers the pleopods and the middle piece (to quote Sars) "forming at the end, on each side, a rather large expansion terminating in a hook-like anteriorly curving point." In *I. Nordmanni*, on the other hand, the male operculum scarcely more than half covers the pleopods, and the middle piece is long and narrow, with no lateral expansion.

Figures of the middle piece of the male operculum of both *I. marina* and *I. Nordmanni* are shown (Pl. IX., Figs. 11-12). They are drawn to the same scale, and are taken from specimens of nearly equal size. Sars, in his account of the crustacea of Norway, is of opinion that the form figured by Spence Bate and Westwood under *I. Nordmanni* is really the male of *I. marina*. From this opinion I find it necessary to dissent. In the general proportions of the body, and especially in the length of the inferior antenna, Bate's figures agree essentially with *I. Nordmanni*, while his figure of the ventral view of the metasome, P, and the enlarged figure of the male operculum itself, P¹, definitely prove that he was dealing with Rathke's species, and not with *I. marina*.

Distribution.—Owing probably to its confusion with *I. marina*, this species has not been very frequently recorded from our coasts. It was found by Spence Bate at Plymouth, and Langland Bay, South Wales. Scott has taken it in Loch Fyne, in Scotland, while Walker and Hornell record it from the Channel Islands. It was first found by Rathke in the Caspian Sea.

FAMILY MUNNIDAE.

GENUS *Munna*, Boeck.

Munna Krøyeri, Goodsir.

BALLYNAKILL.—A single example taken on each of two occasions at the north entrance to the harbour, 7 fath.

BOFIN.—A single specimen was taken in June, 1899, in the outer harbour.

This species, the member of the genus most commonly met with in British waters, is at once distinguished by the peculiar hook-like appearance of the uropods.

Distribution.—First described by Goodsir from specimens found in the Firth of Forth; this species has since been met with at Cumbrae (Dr. Robertson), in the Firth of Clyde (Hoyle), Northumberland coast, Plymouth, Salcombe, and the Channel Islands.

It also occurs off Norway and the Kattegat.

Munna Fabricii, Kröyer.

BALLYNAKILL.—Met with twice in 1903, once in a dredge in Coastguard Deep, 6 fath., and once at the north entrance to the harbour, 7 fath.

BOFIN.—No records.

This species may be distinguished from its northern congeners, except *M. palmata*, by the structure of the superior antenna, which has the flagellum four-jointed, the two central joints being rather long and subequal and the last joint very small. *M. palmata* has a superior antenna of similar structure, but is at once distinguished by its relatively shorter and stouter inferior antenna and its much more strongly built legs.

Distribution.—It is now only for the second time recorded from British and Irish waters. It was first discovered off Greenland by Kröyer, and has since been taken off Finmark and Norway, Iceland and Spitzbergen. It has also been recorded by Harper from the N.E. coast of America. It thus has a very extended somewhat Arctic distribution. Walker has recorded it from the Liverpool Bay area, in 1889.

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

BALLYNAKILL.—Taken rather abundantly in Coastguard Deep, both in the shelly and muddy parts, in 6-8 fath.

BOFIN.—No records.

I agree with Canon Norman in regarding *Leptaspidia*, Bate and Westwood, as a synonym of this genus, and would suggest that the genus was founded on male examples of *Pleurogonium*. Males are not nearly so broad proportionally as females, and the anterior four segments of the mesosome are not so closely fused together.

Distribution.—This species was added to the British list by Canon Norman, who records having taken it at Cumbræ. Dr. Scott has since recorded it from two or three more Scottish localities—Firth of Forth, Aberdeen, and off Montrose.

Outside the British Isles it is only known from Norway.

TRIBE ONISCOIDA.

FAMILY *LIGIIDAE*.GENUS **Ligia**, Fabricius.**Ligia oceanica** (Linn.)

BALLYNAKILL AND BOFIN.—Common everywhere under stones at high water mark.

Distribution.—This species has a geographical range extending to all European countries which border on the Atlantic. In the Mediterranean it is replaced by *Ligia italica*.

* See also p. 81.

TRIBE EPICARIDA.

FAMILY BOPYRIDAE.

GENUS *Bopyrus*, Latreille.

Bopyrus squillarum, Latreille.

PALLYNAKILL.—Taken on one occasion only from under the carapace of the common prawn, *Palaemon serratus*, from Coastguard Deep.

BOFIN.—No record.

Distribution.—Perhaps the commonest Epicarid found in British and Irish waters. It is only known to infest *Palaemon serratus* and the allied species, *P. squilla* and *P. Fabricii*.

It has been recorded from Plymouth and the Exe estuary, from Cornwall and from the Channel Islands, though it must be very much commoner than the scanty records would suggest. I have found it remarkably prevalent on prawns captured at Ardfry, at the head of Galway Bay.

GENUS *Bopyrina*, Kossmann.

Bopyrina virbii (Walz).

BALLYNAKILL.—No record.

BOFIN.—A single specimen, rather mutilated, from *Hippolyte varians*, 1900.

Distribution.—Stebbing, in his History of Crustacea, records this species from *Hippolyte varians* taken at Ilfracombe. This record is, therefore, the second one for British and Irish waters. It is found also in the Mediterranean. The original host on which it was found is *Hinnolyte viridis*. Bonnier, on the principle of one species of parasite to one species of host has recently named the *Bopyrina* from *H. varians* *B. Giardi*. The points of difference between the latter and *B. virbii* do not seem worthy of emphasis by a separate specific name.

[GENUS *Pseudione*, Kossmann.]

[*Pseudione Hyndmanni* (Bate and West).]

BALLYNAKILL AND BOFIN.—No record.

Several specimens of this species have been taken at various points in Galway Bay, infesting *Eupagurus bernhardus*.

Distribution.—First recorded from Ireland by Bate and Westwood. It has since been recorded from Norway by Sars, and from the Firth of Clyde by Scott. The latter states that his specimen was taken from *Hippolyte varians*. This would appear to be somewhat remarkable, since *Pseudione* was only known previously from the group *Anomura* and the Lower *Macrura* like *Callianassa*.

GENUS *Pleurocrypta*, Hesse.*Pleurocrypta galatheae*, Hesse.

BALLYNAKILL.—A single specimen from *Galathea squamifera*, taken in Coastguard Deep, 7 fath., April, 1900, and another from the same host in March, 1901.

BOFIN.—No record.

The first of the above two specimens was much smaller than the second, and appeared to agree in all respects with *Pleurocrypta longibranchiata* as re-described recently by Sars. The larger specimen was, however, undoubtedly referable to *Pleurocrypta galatheae*. Messrs. Giard and Bonnier have already suggested that the former species is in reality only a younger stage in the development of the latter species, but Sars rejects this suggestion. From a study of the above two specimens, I am inclined to agree with Messrs. Giard and Bonnier, more especially as it would be most remarkable for two species of a single genus to infest the same species of host.

Distribution.—Not uncommonly met with on the south coast of England and north coast of France, infesting *Galathea squamifera*. It has been recorded from the Shetland Islands by Norman, and is also known from Norway.

GENUS *Athelges*, Hesse.*Athelges paguri*, Rathke.

BALLYNAKILL.—A single specimen from a Pagurid, in March, 1902, from the east of Black Rocks.

BOFIN.—No record.

Distribution.—The host of this species is *Eupagurus bernhardus*. Scott has recorded the occurrence of this species in Loch Fyne and Gulland Bay, while Spence Bate received specimens from Strangford Lough, Ireland, Polperro, Cornwall, and St. Andrews. It is therefore well distributed round our coasts. It extends to Norway, Kattegat and Skagerack, and the French coast.

What appears to be the same species has since been met with in Galway Bay infesting both *Anapagurus laevis* and *Eupagurus Prideauxi*.

Epicarida Larvae.

Besides the adult *Epicarida* noted above numerous larval forms belonging to the genus *Microniscus* were of constant occurrence in townets both at Ballynakill and Bofin. They could not with certainty be referred to any species of adult Epicarid, and they are merely noted below with a few remarks on some of the forms taken. Sars has shown that the genus

Microniscus must no longer be regarded as the type of a separate family of *Epicarida*, but that it merely represents the transitory larval stages of the different families of the group. Giard and Bonnier, however, still hold that it represents a distinct family.

Two types of larvae are commonly met with in townets : one, identical with or very closely allied to *Microniscus calani* described by Sars, and now regarded by him as the type of the larvae of the family *Bopyridae*, and another, which he looks upon as the typical larva of the family *Cryptoniscidae*. Both types of larvae are met with off Bofin and Ballynakill.

Bopyridae.—The larvae belonging to this family which occurred in the collection are nearly all referable to *Microniscus calani*. They occur commonly all the year round, very frequently attached to copepods.

Cryptoniscidae.—Most of the larvae of this family which occurred seem to agree with that form described and figured by Sars in his account of the Crustacea of Norway, Vol. II., Isopoda, Pl. 92, Fig. 2. Some, however, are also referable to *Cryptothir balani*.

The occurrence of a Cryptoniscid larva on a member of the family *Sphaeromidae* calls for some note. No *Epicarida* have previously been noted from this family, though Sars has found them in the allied family *Aegidae*, while they are also known from the *Idoteidae*. A single specimen of a Cryptoniscid larva was found attached to the under surface of the telson of *Naesa bidentata* taken from bored limestone in Ballynakill Harbour. It was of the usual shape, with the cephalon evenly rounded in front and semicircular in shape. Neither the basal joint of the antennule nor the coxal plates appeared to be pectinate. Eyes were absent. The outer uropod was about one half the length of the inner, and both were tipped with rather long setae. The antennules reached to about the second thoracic segment. Its length was .8 mm.

iii.—ISOPODA FROM THE ATLANTIC SLOPE OFF THE WEST COAST OF IRELAND.

The area explored by the *Helga* with bottom nets extends seawards as far as the 500 fath. line. Between this and the 1,500 fath. line nets have only been used at some distance from the bottom, the maximum depth to which they have been sunk being 1,000 fath. It is naturally the bottom nets which have provided the bulk of the isopod material; and though the shoreward limit of the area of exploration here discussed ranges into littoral water of less than 20 fathoms, the gatherings made between 100 and 500 fath. are responsible for the most interesting records. This is by no means surprising, since here the *Helga* was working over practically virgin ground.

The records include the ten new species described in Part I., and the following fourteen, which are now for the first time noted as occurring within the British and Irish area :—

Typhlotanais tenuicornis, G. O. Sars.
Typhlotanais Richardi, Dollfuss.
Caecognathia stygia (G. O. Sars)?
Aega arctica, Lütken.
Cymodoce granulatam, M.-Ed.
Munna limicola, G. O. Sars.
Ischnosoma bispinosum, G. O. Sars.
Desmosoma lineare, G. O. Sars.
Eurycope latirostris, G. O. Sars.
Eurycope megalura, G. O. Sars.
Eurycope producta, G. O. Sars.
Pleurocryptella formosa (G. and B.).
Asconiscus simplex, G. O. Sars.
Notophryxus sp.

The following, already known from the waters of Great Britain, are now recorded from Irish localities :—

Leptognathia breviremis (Lilljeborg).
Aega ventrosa, M. Sars.
Aega crenulata, Lutken.
Cirolana Hanseni, Bonnier.
Paramunna bilobata, G. O. Sars.
Pleurogonium inerme, G. O. Sars.
Eugerdia tenuimana, G. O. Sars.
Eurycope phallangium, G. O. Sars.
Aspidophryxus peitatus, G. O. Sars.

Four species, not yet known from Great Britain, are recorded from additional localities in Irish waters, viz. :—

Apseudes spinosus (M. Sars).
Apseudes grossimanus, Norman.
Calathura brachiata (Stimpson).
Munnopsus Murrayi, Walker.

These, with the ten new species and the fourteen now for the first time recorded from within the limits of Norman's "British" area, make a total of twenty-eight species which, within that area, have so far been met with only off the west coast of Ireland.

Of the littoral species dealt with in Part II. only six occur also in the deep water list, namely :—*Gnathia maxillaris*, *Cirolana borealis*, *Eurydice truncata*, *Idotea metallica*, *Ianira maculosa* and *Munna Krøyeri*—a circumstance which affords a clear illustration of the difference between the littoral and deep-water Isopodan fauna.

Altogether, forty-nine species are noted in this part of the paper, which number, allowing for the six common to shallow and deep water and including three species noted from the

east coast but not occurring in the west coast collections (see p. 80), makes a total of eighty-three species represented in our collections from littoral and deep waters.

At present the complete British and Irish marine list comprises one hundred and thirty-five species, while one hundred and twenty have been recorded by Sars from Norway.

In all probability many more Norwegian forms will be found to extend to the west of Ireland, since, as far as at present known, the fauna of that region approximates in Isopoda to that of Norway more than to that of the other parts of the British and Irish area.

ORDER TANAIIDACEA.

FAMILY APSEUDIDAE.

GENUS *Apsuedes*, Leach.

Apsuedes spinosus (M. Sars).

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, 320 fath., August, 1903, townet on trawl.—One, male, 10 mm.

50 mi. W.N.W. of Tearaght, Co. Kerry, 375 fath., November, 1904, dredge.—One.

Porcupine Bank, Lat. 53° 1' N., Long. 14° 34' W., 293 fath., May, 1905, townet on trawl.—Two.

Norman and Stebbing, in their account of the *Apsseudidae* of the *Porcupine* Expedition, state that the front margin of the carpus of the first gnathopods is armed with two teeth. Sars' figures of this appendage, in his account of the Crustacea of Norway, show two larger and a third small tooth on the front margin of the carpus. The present specimen shows three well developed teeth on that joint.

Distribution.—This appears to be only the second record of the species for British and Irish waters, the *Porcupine* having obtained a single female example off the S.S.W. of Ireland at 725 fathoms.

It is found abundantly off the Norwegian coast, and has also been recorded from Finmark, Sweden, Denmark, and the Bay of Biscay.

Apsuedes grossimanus, Norman.

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, February, 1903, 320 fath., townet on dredge.—One mature male, 10 mm., and two immature females, 4 mm.

The small females only differ from the description given by Norman and Stebbing (*Trans. Zool. Soc.*, 1886) in the fewer number of joints in the flagella of the antennae and in the proportionally rather shorter antennal scale, characters of undoubted immaturity. The male specimen, which measured 10 mm., agrees perfectly with the above-mentioned description.

Distribution.—This species was first discovered by the *Porcupine* Expedition in 90 fathoms off the S.W. of Ireland. Its rediscovery off the W. coast after a lapse of twenty-five years is interesting.

It is also known from the coasts of Portugal in 740 fathoms, where it was taken also by the *Porcupine*, and from the Bay of Biscay, where the *Travailleur* expedition obtained it. Lo Bianco records two specimens from the Mediterranean. The species seems to have a wide vertical range, 90-740 fathoms.

Its geographical distribution at present confines it to the N.E. Atlantic Slope and Mediterranean.

FAMILY TANAIDAE.

GENUS *Typhlotanais*, G. O. Sars.

Typhlotanais tenuicornis, G. O. Sars.

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, 320 fath., February, 1903, townet on trawl.—One female.

Distribution.—This is the first record of the species for the British and Irish area, and, indeed, up till now it has only been taken off the coasts of Norway in depths from 60-120 fathoms.

The genus *Typhlotanais* until quite recently was unrepresented in the British and Irish fauna, though no fewer than nine species were known from Norwegian waters. However, in 1897 Walker recorded the genus (giving no species) from Valencia Harbour, while Scott (19th Rep. Fish. Board, Scot.) recorded *T. brevicornis* from 50-55 fathoms, 13 mi. N.E. of Buckie, on the E. coast of Scotland. *T. tenuicornis* is now recorded, while a new species of the genus, also from British waters, is recorded below.

Typhlotanais Richardi, Dollfuss.

HELGA.—77 mi. W. of Achill Head, Co. Mayo, 382 fath., August, 1901, townet on dredge.—Two.

The two specimens which I refer to this species agree perfectly with Dollfuss' description except that the first free segment of the mesosome is only one-fifth instead of one-third the length of the cephalosome, and is rather deeply emarginate on its anterior border.

Distribution.—Previous to the above record, only known from a single specimen taken at the Azores by the *Hirondelle*.

Typhlotanais proctagon, Tattersall.

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to a trawl.—Twenty-four females, 4-6 mm.

Fifty mi. W.N.W. of Tearaght, Co. Kerry, 320 fath., February, 1903, townet on trawl.—Four females, 4-6 mm.

Distribution.—These are the only records so far of this species. It is a moderately deep-water form, the localities from which it was taken having depths of 200 and 320 fathoms. Indeed, all the species of the genus with a ventral spine on the second segment of the thorax seem to inhabit deeper water than those in which the spine is absent.

GENUS **Leptognathia**, G. O. Sars.**Leptognathia breviremis** (Lilljeborg).

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, 320 fath., February, 1903, townet on trawl.—One female.

Distribution.—This species has already been recorded from Plymouth by Norman, and from Moray Firth, Loch Fyne, Firth of Forth, and off Aberdeen, by Scott. It has also been taken in the course of the International investigations at 150 fathoms, half way between the Orkneys and the coast of Norway, in some sand which came up in a "bottom" townet.

Outside British and Irish waters the species is known from Norway, Sweden, and the Kattegat.

ORDER **ISOPODA**.

TRIBE FLABELLIFERA.

FAMILY **ANTHURIDAE**.GENUS **Calathura**, Norm. and Stebb.**Calathura brachiata** (Stimpson).

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up by a townet attached to a trawl.—One female.

77 mi. W. of Achill Head, 382 fath., August, 1901, townet on trawl.—Two females.

I agree with Norman and Stebbing in regarding the *Calathura norvegica* of Sars as synonymous with this species.

Distribution.—The geographical distribution of this species is somewhat remarkable for its extent. It has been found on the east coast of America, Norway, and at six different stations during the *Porcupine* expedition, extending from the seas between the Shetlands and Faroe to the Bay of Biscay. Its bathymetrical range is likewise considerable, it having been obtained at practically all depths between 20 and 1,360 fathoms.

Since the *Porcupine* expedition *C. brachiata* has not been recorded from British and Irish waters.

FAMILY GNATHIIDAE.

GENUS *Gnathia*, Leach.

Gnathia maxillaris (Montagu).

HELGA.—40 mi. W. by S. of Cleggan Head, Co. Galway, 74 fath., July, 1901, mid-water townet, 35 fath.—One larva.

60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to a trawl.—Eleven males.

50 mi. W.N.W. of Cleggan Head, Co. Galway, 120 fath., July, 1903, townet on trawl.—Two males and four females.

50 mi. W.N.W. of Slyne Head, 112 fath., August, 1904, townets on trawl.—One female.

30 mi. W.N.W. of Cleggan Head, Co. Galway, 70 fath., August, 1904, townet at bottom.—Four larvae.

Porcupine Bank, lat. 53° 1' N., long. 14° 34' W., 293 fath., May, 1905, townet on trawl.—One male and three larvae.

Distribution.—The occurrence of this species at so great a depth as 293 fathoms is noteworthy, and I am not aware that it has ever before been recorded from a greater depth than 100 fathoms. The specimens taken at 199 and 293 fathoms, which were all males, agreed with specimens found in shallow water, especially in the areolation of the dorsal surface.

GENUS *Caecognathia*, Dollfuss.

Caecognathia stygia (G. O. Sars). ?

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to the back of a trawl.—One larval female.

Caecognathia stygia was described by G. O. Sars from specimens taken during the Norwegian North Atlantic Expedition. The present specimen agrees in all respects with Sars' figure of the larva of this species. Larval *Gnathia* of all species are very much alike, though the adults are readily distinguishable, but the species under consideration is one of the very few blind members of the genus, so that the identification of the larva is thus very much facilitated.

Distribution.—This form is only known from great depths in the Arctic Ocean, where the Norwegian North Atlantic expedition obtained the type specimens. The present record, therefore, indicates a considerable southern extension of its geographical range.

FAMILY AEGIDAE.*

GENUS *Aega*, Leach.

Aega arctica, Lütken.

HELGA.—50 mi. W.N.W. of Eagle Island, Mayo, 388 fath., August, 1904, dredge.—One.

Distribution.—This is the first record of this species for British and Irish waters. It nowhere appears to be common. Only a single specimen is known from Norway. It has been obtained off Greenland and Iceland, and has therefore, up till the present been considered essentially an arctic form.

Aega orenulata, Lütken.

HELGA.—30 mi. N. by W. of Eagle Island, 242 fath., February, 1905, dredge.—One.

Distribution.—This species has only once previously been recorded from British waters, namely, by Matthews, for a specimen procured off Aberdeen. It is known from Norway, Iceland, and Greenland, and is, therefore, essentially an Arctic form. Its occurrence off the west coast of Ireland indicates a considerable southern extension of its range.

Aega ventrosa, M. Sars.

HELGA.—48 mi. W.N.W. of Tearaght, Co. Kerry, November, 1904, 337 fath., townet on trawl.—One.

50 mi. W.N.W. of Tearaght, Co. Kerry, February, 1905, 350 fath., townet on trawl.—One.

Distribution.—Norman, in his recent summary of the British (including Irish) members of this genus, gives only one locality in the British area at which this species has been taken, namely, to the west of the Shetlands, by the *Porcupine* in 1869. The present records therefore indicate a considerable southerly range in its geographical distribution. It is known from Norway, Sweden, and Greenland, in depths from 250-300 fath.

* *Rocinela Dumerilii*, see p. 80.

FAMILY *CIROLANIDAE*.GENUS *Cirolana*, Leach.*Cirolana borealis*, Lilljeborg.

HELGA.—30 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1901, 74 fath., dredge.—One.

60 mi. W. of Achill Head, August, 1901, 199 fath., townet on trawl.—Thirteen, small.

50 mi. W.N.W. of Cleggan Head, Co. Galway, May, 1904, 120 fath., townet on trawl.—One.

81 mi. W. $\frac{1}{2}$ N. of Eagle Island, Co. Mayo, August, 1904, 220 fath., townet on trawl.—One.

50 mi. W.N.W. of Slyne Head, 112 fath., August, 1904, townets on trawl.—Two.

80 mi., same course, same date, 180 fath., townet on trawl.—Three.

Distribution.—This species has a very extensive geographical distribution. It is known from both sides of the Atlantic, as well as from the Mediterranean. Its vertical range is very great also, extending from low water mark (see p. 43) to 800 fathoms.

Cirolana Hanseni, J. Bonnier.

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, townet on trawl.—One.

77 mi. W. of Achill Head, 382 fath., August, 1901, townet on trawl.—Six.

Distribution.—Norman has recently recorded this species from three places, all near to each other, to the N.W. of the Butt of Lewis, Scotland. These are the only hitherto known British localities. Bonnier's specimen was taken in the Bay of Biscay. The present records, therefore, from an intermediate station, fill up to some extent the gap which exists in its known geographical range.

GENUS *Eurydice*, Leach.*Eurydice Grimaldii*, Dollfuss.*E. elegantula*, Hansen.

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, February, 1903, 320 fath., townet on trawl.—Two.

54 mi. W. of Eagle Is., Co. Mayo, 220 fath., August, 1904, townet at 220 fath.—One.

54 mi. W.N.W. of Tearaght, Co. Kerry, 454 fath., November, 1904, townet on dredge.—One.

50 mi. W. by N. of Tearaght, Co. Kerry, 360 fath., May, 1905, townet on trawl.—One.

Porcupine Bank, Lat. $53^{\circ} 25' N.$, Long. $13^{\circ} 17' W.$, 116 fath., May, 1905, coarse townet at surface.—One.

Same station, coarse townet at bottom.—One.

Porcupine Bank, Lat. $53^{\circ} 7' N.$, Long. $15^{\circ} 6' W.$, 860 fath., May, 1905, coarse townet at surface.—One.

Distribution.—Walker records this species from 14-16 fath., in Killybegs Harbour, Co. Donegal. It is also known from the west of Scotland, Lat. $58^{\circ}-60^{\circ} N.$, Long. $5^{\circ}-14^{\circ} W.$, and from off Cadiz in 227 fath. of water.

Eurydice truncata (Norman).

HELGA.— $11\frac{1}{2}$ mi. W. of Achill Head, May, 1904, coarse townet at 15 fath.—Five.

10 mi. off Tearaght, Co. Kerry, November, 1904, coarse townet at surface.—Nine.

Distribution.—The records of this species are enumerated on p. 45. It would seem to be quite a common species on the west coast of Ireland.

FAMILY SPHAEROMIDAE.

GENUS **Cymodoce**, Leach.

Cymodoce granulatum, M.-Ed.

HELGA.—30 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1901, 74 fath., townet on dredge.—Five, females.

40 mi. W.N.W. of Cleggan Head, Co. Galway, November, 1904, 74 fath., from a bored limestone boulder brought up by the dredge.—Seven males and three females.

20 mi. N. by W. of Eagle Island, Co. Mayo, November, 1904, 72 fath., from bored limestone.—One male and two females.

Distribution.—This species would appear to be rarer than *C. truncata*. It is now added to the British and Irish list, having previously only been taken in the Mediterranean.

FAMILY ANCINIIDAE.

GENUS *Bathycopea*, Tattersall.*Bathycopea typhlops*, Tattersall.

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to the back of a trawl.—Two females.

77 mi. W. of Achill Head, 382 fath., August, 1901, townet on trawl.—Two.

50 mi. W.N.W. of Tearaght, Co. Kerry, 320 fath., February and August, 1903.—Six males and females.

54 mi. W.N.W. of Tearaght, Co. Kerry, 454 fath., November, 1904, townet on trawl.—Three.

50 mi. W. by N. of Tearaght, Co. Kerry, 360 fath., May, 1905, townet on trawl.—One.

Distribution.—These are the only records known for this species. The bottom in all cases consisted of fine sand.

It is to be regretted that the locality of *Ancinus depressus*, Leach, is unknown. It would have been interesting to have compared the habitats of the two forms.

The *Serotidae*, the nearest allies to this species, save *A. depressus*, are all but one (*S. carinata*) southern hemisphere forms. They are confined for the most part to the Antarctic area, and those species which occur nearer the tropics are all found in deep water. It is, therefore, decidedly interesting to record a very closely allied form from the northern hemisphere.

TRIBE VALVIFERA.

FAMILY IDOTEIDAE.

GENUS *Idotea*, Fabricius.*Idotea metallica*, Bosc.

HELGA.—30 mi. W.N.W. of Tearaght, Co. Kerry, August, 1903, from floating colonies of *Lepas fascicularis*.—One female, 19 mm.

40 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1903, same habitat.—One, female, 10 mm.

For some notes on this species with reference to its confusion with *I. emarginata*, see p. 50. The colour of the above two specimens was a dark steel blue.

Distribution.—See p. 50.

Idotea sp.

HELGA.—2½ mi. E. of Clare Island Light, 20 fath., July, 1901, mid-water townet, 10 fath.—One, 2 mm.

50 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, 120 fath., townet on trawl.—One, 2 mm.

Both of these specimens, which are referable to the same species, are immature, and their specific identity is a matter of some doubt.

FAMILY *ARCTURIDAE*.GENUS *Astacilla*, Cordiner.***Astacilla longicornis* (Sowerby).**

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, townets on trawl.—One large female, 22 mm., and several young of both sexes.

50 mi. N.W. by W. of Cleggan Head, Co. Galway, September, 1901, 120 fath., Agassiz trawl.—Six, females.

20 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1902, 72 fath., dredge.—Two females, 22 mm., and several young.

Porcupine Bank, 135 fath., August, 1904, townet on trawl.—One.

Also taken in a trawl off Dungarvan, 32 fath., March, 1904.

Porcupine Bank, Lat. 53° 12' N., Long. 13° 57' W., 93 fath., May, 1905, townet on dredge.—One.

50 mi. W. by N. of Tearaght, Co. Kerry, 360 fath., May, 1905, townet on trawl.—One.

The changes which this species undergoes during the growth to the full adult form render the identification of small specimens exceedingly difficult.

In small specimens, 4 mm. in length, the middle segment of the mesosome is only equal to the preceding part of the body, whereas in full grown individuals it is about twice as long. Moreover, the first joint of the flagellum of the inferior antenna is scarcely equal in length to the remaining joints combined, and bears only one olfactory filament.

In larger specimens, from 6-8 mm., the middle segment of the mesosome has become proportionally longer, and is now about one and a half times as long as the preceding part of the body. The first joint of the flagellum of the inferior antenna has increased in like manner, but is not yet twice as long as the remaining joints combined. The number of olfactory filaments on the superior antenna is now five.

Full-grown specimens agree very well with the diagnoses given in Sars' Crustacea of Norway.

Sars gives the length of the adult female as 20 mm., and males half that size. Three females in the present collection measured 22 mm. in length, while one male was at least 12 mm. Males of 10 mm. have the flagellum of the inferior antenna exactly as in Bate and Westwood's figure of *A. gracilis*, which is now regarded as the male of *A. longicornis*. Males of 12 mm., however, agree with the definition of the species given by Sars.

Distribution.—This species is commonly distributed in shallow water round the shores of the British Isles and of Norway. It is also recorded from the Kattegat and Iceland.

No specimens have previously been recorded from so great a depth as 199 fathoms, but the examples noted above from this depth could not be distinguished from specimens taken in shallower water.

***Astacilla intermedia* (Goodsir).**

A. affinis, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., townet on trawl.—One.

50 mi. W.N.W. of Cleggan Head, Co. Galway, September, 1901, 120 fath., Agassiz trawl.—One.

50 mi. W.N.W. of Cleggan Head, Co. Galway, July and August, 1903, and May, 1904, 120 fath., townets on trawl.—Several.

80 mi. W.N.W. of Cleggan, Co. Galway, 185 fath., May, 1905, townet on trawl.—One.

Dr. Norman has recently stated that Sars' *A. affinis* is identical with the earlier described *A. intermedia* of Goodsir, and I here follow his lead. The present examples, which I refer with some doubt to this species, agree in the main with Sars' diagnoses, except that the flagellum of the superior antenna is only as long as, instead of twice as long as, the two preceding joints.

Distribution.—This species was first recorded by Goodsir from the Firth of Forth. Norman has recently recorded it from Durham and S.W. Ireland, while Dr. Scott notes it from Fair Island between Orkney and Shetland.

At the last of the above localities, off Cleggan Head, Co. Galway, this species would seem to be by no means rare. -

GENUS *Arcturella*, G. O. Sars.*Arcturella dilatata*, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, Co. Mayo, August, 1901, 199 fath., townet on trawl.—Six females and seven males.

The seven male examples which I have referred to this species are very much more tubercular than Sars' figures would seem to indicate. They have the middle segment of the body covered by regularly arranged tubercles very much like those in *Astacilla granulata*, only not so numerous. I at first thought they were *Astacilla granulata*, but they are true *Arcturella*, as evidenced by the structure of the maxillipedes, first legs and antennae. This fact, coupled with the circumstance that they were all males, and were found in company with *A. dilatata* females, has led me to regard them as the males of the latter species rather than describe them as a new species. They only measure 3 mm. in length.

Distribution.—This species has a rather extended distribution in moderately shallow water, being known from Norway, the Kattegat, British Isles, and the Mediterranean. It was first recorded for Britain by Dr. Robertson, who found it at 20 fath., near the Isle of Arran, Firth of Clyde. Dr. Scott has recently recorded it from Fair Island, between Orkney and Shetland. These are the only two records from British waters, but the species was obtained as far back as 1885 by the Royal Irish Academy Expedition of that year. The exact locality is not available. The species does not seem to have been previously recorded from so great a depth as 199 fathoms.

TRIBE ASELLOTA.

FAMILY IANIRIDAE.

GENUS *Ianira*, Leach.*Ianira maculosa*, Leach.

HELGA.—60 mi. W. of Achill Head, Co. Mayo, August, 1901, 199 fath., townets on trawl.—Several.

20 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1902, 72 fath., townet on trawl.—One.

50 mi. W.N.W. of Cleggan Head, Co. Galway, July and August, 1903, and May, 1904, 120 fath., townets on trawl.—Several.

Off Rathlin Island, Co. Antrim, May, 1904, 115 fath., townets on dredge.—Five.

81 mi. W. $\frac{1}{2}$ N. of Eagle Island, Co. Mayo, August, 1904, 220 fath., townets on trawl and dredge.—Two.

50 mi. W.N.W. of Eagle Island, Co. Mayo, August, 1904, 388 fath., dredge.—One.

50 mi. W.N.W. of Slyne Head, Co. Galway, 112 fath., August, 1904, trawl.—One.

33 mi. W. $\frac{1}{4}$ S. of Tearaght, Co. Kerry, 129 fath., November, 1904, trawl and townets on trawl.—Two.

Dingle Bay, 26 fath., March, 1904, townets on trawl.—One.

80 mi. W.N.W. of Cleggan Tower, Co. Galway, 185 fath., May, 1905, townet on trawl.—One.

50 mi. W. by N. of Tearaght, Co. Kerry, 360 fath., May, 1905, townet on trawl.—Three.

Porcupine Bank, Lat. 53° 20' N., Long. 13° W., 164 fath., May, 1905, townet on trawl.—Two.

Distribution.—The species is quite a common one round our coasts and the coasts of Europe. I am not aware that it has previously been recorded from a depth of over 200 fathoms.

GENUS *Ianiropsis*, G. O. Sars.

Ianiropsis breviremis, G. O. Sars.

HELGA.—70 mi. S.W. of Fastnet, 70 fath., August, 1903, Garstang net, 20 fath.—One, 1 mm.

The single small example which I have referred to this species is evidently immature. The characters of the uropods, however, point to its identity with the *Ianiropsis breviremis* of Sars. The eyes present rather a peculiar appearance, due, no doubt, to immaturity. The full amount of pigment characteristic of the adult has not yet been developed. In consequence the true visual elements are not masked, and are seen to the number of eleven, grouped together to form the eye.

Distribution.—This species was first recorded for the British and Irish area by Walker, who took it at Valencia on the shore. It has since been recorded by the same author from the Liverpool Bay area. Outside Britain it is only known from the coasts of Norway and Sweden.

The species has up till now only been met with in littoral waters, hence it is somewhat surprising to find it 70 mi. from land. Its ally, *Ianira maculosa*, has, however, quite as wide a distribution, and there is nothing to suppose that this species, when more fully known, may not have a similarly wide range.

FAMILY MUNNIDAE.

GENUS **Munna**, Boeck**Munna Kröyeri**, Goodsir.

HELGA.—Off Rathlin Island, Co. Antrim, May, 1904, 115 fath., townet on dredge.—Two.

Distribution.—See p. 52. It has not previously been recorded from depths of over 100 fathoms.

Munna limicola, G. O. Sars.

HELGA.—Porcupine Bank, Lat. 53° 1' N., Long. 14° 34' W., 293 fath., May, 1905, townet on trawl.—Three.

Distribution.—This species has not previously been taken outside Norwegian waters, where it occurs rather frequently in from 60 to 300 fathoms. Its geographical range is thus considerably extended by its occurrence on the Porcupine Bank.

GENUS **Paramunna**, G. O. Sars.**Paramunna bilobata**, G. O. Sars.

HELGA.—50 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, 120 fath., townet on trawl.—Two.

Distribution.—This species was first recorded from British waters by Norman in 1894, from specimens obtained at Cumbrae, Firth of Clyde, 1888. Previous to this it had only been known from Norway, but Scott has since recorded it from the Firth of Forth and the Firth of Clyde. These records, together with the present one, considerably extend the geographical range of the species.

The depth, 120 fath., at which the above example was taken, is the greatest as yet known for the species, Sars finding it commonly at depths of 20-40 fath., more rarely as deep as 100 fath. It is interesting to note Scott's record of this species from the stomachs of Haddock (19th Report Fishery Board of Scotland, Pt. III., 1900).

GENUS **Pleurogonium**, G. O. Sars.**Pleurogonium inerme**, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to the back of a trawl.—Two males.

Distribution.—This species appears to be nowhere very commonly found. Sars has taken it sparingly off the coast of Norway in depths of from 60-150 fath., and it has also been recorded from the Kattegat by Meinert. Dr. Robertson dredged it at Cumbrae, Firth of Clyde, while Dr. Scott records its capture from the Firth of Forth, Moray Firth, and from 45 fathoms off Aberdeen.

It has not been as yet found off the English coast, and the present record is the first from Irish waters.

GENUS **Metamunna**, Tattersall.**Metamunna typica**, Tattersall.

HELGA.—50 mi. W.N.W. of Cleggan Head, Co. Galway, 120 fath., July, 1903, townet on trawl.—One female.

Porcupine Bank, Lat. 53° 20' N., Long. 13° W., 164 fath., May, 1905, townet on trawl.—One.

Distribution.—So far only known from the west coast of Ireland, this species has its nearest allies in forms found off Norway and Scotland.

FAMILY **DESMOSOMIDAE**.GENUS **Desmosoma**, G. O. Sars.**Desmosoma lineare**, G. O. Sars.

HELGA.—77 mi. W. of Achill Head, Co. Mayo, 382 fath., August, 1901, townet on dredge.—One.

Distribution.—Previous to the above record, only known from the coasts of Norway in 30-100 fath. Its geographical distribution and vertical range are both, therefore, considerably extended by its occurrence off the west coast of Ireland.

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

HELGA.—77 mi. W. of Achill Head, Co. Mayo, 382 fath., August, 1901, townet on dredge.—One.

Distribution.—Norway generally, from 50 to 250 fath., and the Skagerack. Now recorded from the British and Irish area for the first time. Lo Bianco has also recorded it from the Mediterranean.

Ischnosoma Greeni, Tattersall.

HELGA.—77 mi. W. of Achill Head, 382 fath., August, 1901, townet on trawl.—Three.

60 mi. W. of Achill Head, 199 fath., August, 1901, washed from sand brought up in a townet attached to trawl.—One.

Distribution.—As yet only known from the above records.

The genus has a very wide geographical and vertical distribution, being known from all the oceans at depths extending to 2,000 fathoms. The North Atlantic Ocean claims four of the species, *I. bispinosum*, *I. quadrispinosum*, *I. spinosum* and *I. Greeni*, the first two off the coast of Norway, the third off the Azores, and the last off the west coast of Ireland.

GENUS **Eugerda**, Meinert.**Eugerda tenuimana**, G. O. Sars.*

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in a townet attached to trawl.—Three males.

The three male specimens captured were all more or less badly damaged, but as far as their condition permits examination, agree well with Sars' description.

Distribution.—This species has quite recently been added to the British and Irish list by Dr. Scott from specimens captured at 150 fath., half way between the Orkneys and Norway, in the course of the International investigation. The bottom townet on that occasion came up with a considerable quantity of sand in it, which on being sifted yielded this species amongst many others, either very rare or new to our fauna. The present specimens were likewise washed from sand brought up in a townet attached to the back of a trawl.

Besides the two British records mentioned above this species is only known, rather sparingly, from the coasts of Norway and from the Mediterranean, where Lo Bianco has recently taken it.

FAMILY **MUNNOPSISIDAE**.†GENUS **Munnopsis**, M. Sars.**Munnopsis oceanica**, Tattersall.

HELGA.—40 mi. N. by W. of Eagle Island, Co. Mayo, August, 1904, large townet working at 750 fath., and thence to the surface.—One male, 7 mm.

50 mi., same course, May, 1905, Petersen trawl at 1,150 fath.—One.

* See also p. 81.

† *Pseudarachna hirsuta*, see p. 81.

Distribution.—This species is as yet only known from the above record. Like its congeners, *M. Murrayi* and *M. longicornis*, it is oceanic in habitat. It is probably confined to the deeper waters of the ocean.

Munnopsis Murrayi, Walker.

Pl. V., Fig. 8.

HELGA.—50 mi. N. by W. of Eagle Island, Co. Mayo, August, 1904, 1,000 fath., large townet fishing at 1,000 fath., and thence to the surface.—Two females, 7 mm.

40 mi., same course, 670 fath., November, 1904, same net worked at 600 fath., and thence to the surface.—One, 7 mm., and two fragments.

54 mi. W.N.W. of Tearaght, Co. Kerry, 454 fath., November, 1904, same net at 350 fath.—One, 7 mm.

Same place, February, 1905, townet on trawl.—Two, 7 mm.

40 mi. N. by W. of Eagle Island, Co. Mayo, 670 fath., February, 1905, townet at 630 fath.—Two.

Outside Porcupine Bank, 860 fath., May, 1905, Petersen trawl at ca. 700 fath.—Fourteen.

50 mi. N. by W. of Eagle Island, Co. Mayo, 1,200 fath., May, 1905, Petersen trawl at 1,150 fath.—Five.

I have given reasons (p. 24) for the retention of this species in the genus *Munnopsis* at least for the present. A figure of the mandible of *M. Murrayi* (Pl. V., Fig. 8) is given for comparison with that of *M. oceanica*. The present examples agree well with Walker's descriptions, as far as their very damaged condition will allow. The sexual differences could not be made out owing to the state of the specimens.

Distribution.—This species has been recently described by Walker from specimens taken by the *Oceana* in deep water off the west coast of Ireland in November, 1898. It is one of the few truly oceanic Isopods, and though pelagic in habitat it would seem to be confined to the deeper waters of the ocean. It is at present only known from the west coast of Ireland.

GENUS **Munnopsoides, Tattersall.**

Munnopsoides Beddardi, Tattersall.

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in a townet attached to trawl.—Two.

77 mi. W. of Achill Head, Co. Mayo, 382 fath., August, 1901, townet on dredge.—Five.

Distribution.—As yet only known from the above records from the west coast of Ireland. The only other member of the genus, *M. australis*, was taken by the *Challenger* near Kerguelen, in the Southern Ocean. The geographical range of the genus is therefore very considerable.

GENUS *Ilyarachna*, G. O. Sars.

Ilyarachna Plunketti, Tattersall.

HELGA.—60 mi. W. of Achill Head, Co. Mayo, 199 fath., August, 1901, washed from sand brought up in a townet attached to trawl.—One hundred.

77 mi. W. of Achill Head, 382 fath., August, 1901, townet on dredge.—Six.

81 mi. W., $\frac{1}{2}$ N. of Eagle Island, Co. Mayo, 220 fath., August, 1904, townets on trawl.—One.

48 mi. W.N.W. of Tearaght, Co. Kerry, 337 fath., November, 1904, townet on trawl.—One.

54 mi. same course, date and net, 454 fath.—Two.

Distribution.—The above records are all that are at present known for the species.

This appears to be the first record of any member of the genus *Ilyarachna* for British waters, though three species are known from the coast of Norway and the Arctic Seas. A fourth species, *I. polita*, has been described from the Bay of Biscay by Bonnier, while Beddard described *I. quadrispinosum* from the *Challenger* collections. The latter species belongs to the Southern ocean, but all the remaining species are N. Atlantic forms.

GENUS *Eurycope*, G. O. Sars.*

Eurycope phallangium, G. O. Sars.

HELGA.—Porcupine Bank, Lat. 53° 1' N., Long. 14° 34' W., 293 fath., May, 1905, townet on trawl.—One.

Distribution.—This species has only been twice recorded from British and Irish waters, Scott having noted it from the Firth of Forth and Loch Fyne. It is very common off the Norwegian coast in 50 to 300 fathoms, and has also been taken in the Skagerack.

Eurycope latirostris, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in townet attached to back of trawl.—Two hundred and fifty.

Porcupine Bank, Lat. 53° 1' N., Long. 14° 34' W., 293 fath., May, 1905, townet on trawl.—One.

* *Eurycope mutica*, see p. 82.

All the specimens were damaged, and for the most part mere legless hulls. The identification, therefore, rests on the body only, but the agreement is so close that there is no doubt that they belong to this species.

Distribution.—This species is recorded from British waters for the first time. Previously it had only been found by Sars in 150-200 fath. off Norway. Its geographical range is thus greatly extended.

Eurycope megalura, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in townet attached to trawl.—Forty-nine.

Unfortunately all the specimens taken came up as bare hulls only, all the appendages of the anterior part of the body having been lost.

Distribution.—This species was previously only known from the coasts of Norway, where Sars had taken it at Hardanger and Stavanger Fjords in depths varying from 150 to 200 fath. It is now for the first time added to the British and Irish fauna.

Eurycope producta, G. O. Sars.

HELGA.—77 mi. W. of Achill Head, Co. Mayo, 382 fath., August, 1901, townet on dredge.—Sixteen.

Distribution.—Not previously recorded out of Norway, this species is now added to the British and Irish list.

Eurycope longipe Tattersall.

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, 350 fath., February, 1905, townet on trawl.—Six.

54 mi. W.N.W. of Tearaght, Co. Kerry, 454 fath., November, 1904, townet on dredge.—One.

These are as yet the only known localities for this species. Like its near ally, *E. gigantea*, it would appear to be a deep water form.

GENUS *Lipomera*, Tattersall.

***Lipomera lamellata*, Tattersall.**

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in townet attached to trawl.—Eleven, 1.25 mm.

Distribution.—This is as yet the only known locality for the species.

TRIBE EPICARIDA.

FAMILY BOPYRIDAE.

GENUS *Pleurocryptella*, Bonnier.*Pleurocryptella formosa* (Giard and Bonnier).

HELGA.—West of Porcupine Bank, Lat. 53° 7' N., Long. 14° 50' W., 500 fath., May, 1905, trawl.—Two, from *Ptychogaster formosus*, A. M.—Ed.

Distribution.—The type and only previously known specimen of this species was found on *Ptychogaster formosus* dredged by the *Talisman* in 450 fathoms near the Canary Islands.

FAMILY DAJIDAE.

GENUS *Aspidophryxus*, G. O. Sars.*Aspidophryxus peltatus*, G. O. Sars.*

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., from the peduncle of the left antennule of *Mysidopsis didelphys*.—One.

50 mi. W.N.W. of Slyne Head, Co. Galway, August, 1904, 112 fath., townet on trawl, from the dorsal surface of *Mysidopsis didelphys*.—One.

This species has only once previously been taken on *Mysidopsis didelphys*, Sars, curiously enough, having found a specimen attached exactly as in the first of the above records, to the basal joint of the peduncle of the left antennule.

Distribution.—Scott has recorded this species from deep water to the east of Arran, Firth of Clyde, and the Upper Loch Fyne, the hosts being *Erythroops serrata* and *E. elegans*. This is the only record of the species from British and Irish waters previous to the present one. It is not uncommonly met with off the coasts of Norway, the only other known locality for this form.

GENUS *Notophryxus*, G. O. Sars.*Notophryxus* sp.

HELGA.—50 mi. W.N.W. of Tearaght, Co. Kerry, February, 1905, 350 fath., townet on trawl.—One.

The specimen was found attached to the outside of the brood pouch of *Pseudomma calloplura*. It was only a very young stage, and could not be referred definitely to any species. It is probably an example of *N. clypeatus*, Sars, which is known from *Pseudomma roseum*.

* See also p. 82.

GENUS *Heterophryxus*, G. O. Sars.*Heterophryxus appendiculatus*, G. O. Sars.

Pl. XI., Figs. 1-4.

Locality.—Latitude, 47° 14' N., longitude 7° 58' W., July, 1900. One specimen free in a bottle which contained *Euphausia Mülleri** taken at the above position in the Bay of Biscay, in a townet hauled from 25 fath. to the surface, by Dr. Fowler.

Sars' example of this species, on which he founded the genus, was taken from the back of the carapace of *Euphausia pellucida*. The present example was not found attached to any particular host, but free in the bottom of a bottle containing only *Euphausia Mülleri* and some larval Euphausians. It is, therefore, practically certain that it came from the same host as Sars' specimen.

The individual examined by Sars was already mounted on a slide when it reached his hands, so that he was unable to examine it as closely as he desired. I am not able to add very much to his description, but a few points are worthy of note.

The fifth pair of feet in the female differ remarkably from the remaining four. Instead of being, like the latter, imperfectly developed, short, blunt appendages on the lateral edges of the body, they project out behind as long and prominent appendages consisting of a basal part and a bifurcate extremity. These appendages (Pl. XI., Figs. 1-2) appear in the present example to have the basal part relatively longer and more slender than Sars' figure would indicate. There would seem to be a joint just where the bifurcate extremity joins the basal part, while the outer of the two forks is also articulated to the inner one near the junction with the main part of the appendage.

The male was attached to the female by a narrow twisted fleshy cord (Pl. XI., Fig. 2) just as is described for *Aspidophryxus peltatus*. Messrs. Giard and Bonnier are of the opinion that this cord, in the latter species, belongs to a parasitical copepod found occasionally on the same host as the Epicarid above mentioned. I am, however, entirely of the opinion expressed by Sars, that this cord is part of the genital apparatus of the female, since in the present specimen of *Heterophryxus appendiculatus*, the male was distinctly found clinging to it.

On detaching the male two well-developed overlapping plates (Pl. XI., Fig. 2) are seen to project posteriorly from the under side of the body between the large fifth pair of legs.

* *E. Mülleri*, Claus, (= *Thysanopoda bidentata*, G. O. Sars) is one of the species into which Hansen (*Bull. Mus. Oceanograph. Monaco*, No. 42, 1905, p. 11) has shown the *E. pellucida* of Sars' Challenger Report to be divisible. The host of the type specimen of *Heterophryxus*, having been taken off the Cape Verde Islands, may probably have been *E. Mülleri*.

The male (Pl. XI., Fig. 3) presents an appearance on the whole agreeing with that of *Aspidophryxus peltatus*, except that the metasome shows absolutely no traces of segmentation. No uropods could, however, be detected under a high power of the microscope. The legs (Pl. XI., Fig. 4) agree exactly with those figured by Sars for the last-named species. The antennae appear to be rather rudimentary compared with those of other genera of the family.

Distribution.—The type specimen was taken during the *Challenger* expedition attached to an *Euphausia pellucida* captured off the Cape Verde Islands. Till quite recently this was the only known specimen. Lo Bianco has, however, recorded numerous examples from the same host caught in the Mediterranean, while Dr. Fowler's specimen comes from the Bay of Biscay. The distribution of the form is therefore subtropical, East Atlantic and the Mediterranean.

FAMILY CRYPTONISCIDAE.

GENUS *Asconiscus*, G. O. Sars.

Asconiscus simplex, G. O. Sars.

HELGA.—60 mi. W. of Achill Head, August, 1901, 199 fath., washed from sand brought up in townet attached to the back of trawl.—One male, 1.5 mm.

The single male example agreed in all respects, as far as could be seen, with Sars' figures. It was not found associated with any host, but the only known host of the species, *Boreomysis arctica*, occurred in the same haul.

Distribution.—This is the first occurrence of the species in British and Irish waters, and, indeed, the first record out of Norway, its only previously known locality. A considerable extension of its geographical distribution is therefore made by its capture off the west coast of Ireland.

FAMILY BOPYRIDAE.

GENUS *Scyracepon*, Tattersall.

Scyracepon tuberculosa, Tattersall.

HELGA.—48 mi. W.N.W. of Tearaght, Co. Kerry, 337 fath., November, 1904, trawl.—Four adult and one phryxoid stage from *Scyramathia Carpenteri*.

Distribution.—This is as yet the only known record for the species.

Epicarid larvae.

Epicarid larvae belonging to both the *Bopyridae* and the *Cryptoniscidae* are of frequent occurrence in the townets taken at off-shore stations off the west coast of Ireland.

BOPYRIDAE.

Larvae belonging to this family occurred at the following stations. They are nearly all referable to *Microniscus calani*.

HELGA.—40 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1901, 78 fath., townet.—One.

10 mi. W. by S. of Cleggan Head, Co. Galway, July, 1901, 60 fath., townet.—Two.

2½ mi. N. ¼ W. of Rinivyle Point, Co. Galway, July, 1901, 24 fath., townet.—Two.

2½ mi. N. ¼ W. of Rinivyle Point, Co. Galway, August, 1901, 25 fath., townet.—One (blind).

10 mi. W.N.W. of Cleggan Head, Co. Galway, September, 1902, townet at surface.—Three.

30 mi. W.N.W. of Cleggan Head, Co. Galway, September, 1902, townet at surface.—One.

30 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, townet at surface.—One free and two on Copepods.

20 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, townet at 60 fath.—Three.

10 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1903, townet at 25 fath.—Several.

The larva taken at the fifth of the above stations was blind. One of those taken at the ninth station which otherwise agreed well enough with *M. calani*, had the eyes very black and the uropods strongly setose, each branch carrying in addition to numerous small setae, one very long and strong seta. The remainder all agreed fairly well with *M. calani*.

CRYPTONISCIDAE.

Larvae belonging to this family occurred at the following stations:—

HELGA.—10 mi. W. by S. of Cleggan Head, Co. Galway, July, 1901, 60 fath., townet.—Three.

2½ mi. N. ¼ W. of Rinivyle Point, Co. Galway, July, 1901, 24 fath., townet.—Three.

Same course, date and depth, townet at surface.—One.

30 mi. W.N.W. of Cleggan Head, Co. Galway, August, 1901, 74 fath., townet on dredge.—Three.

Same place and date, townet at bottom, 74 fath.—One.

40 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, townet at 90 fath.—One.

20 mi. W.N.W. of Cleggan Head, Co. Galway, July, 1903, townet at 30 fath.—Three.

Same station and date, townet at 60 fath.—One.

All the above Cryptoniscid larvae appear to be identical with *Cryptothir balani*.

iv.—ISOPODA FROM THE EAST COAST OF IRELAND.

The notes which follow must be regarded as an addendum to the preceding parts of the paper, since several of the species here mentioned are not discussed (in relation to their occurrence within the British and Irish area) in the observations offered at pp. 38 and 57. *Eurycope mutica* is an addition to the British and Irish list; *Pseudarachna hirsuta* and *Rocinela Dumerilii* have not previously been recorded from Irish localities; while it may be taken as certain that the list of east coast forms given below leaves much to be desired in the way of completeness.

Rocinela Dumerilii (Lucas).

16½ mi. S.W. of Coningbeg Light, Co. Wexford, 40 fath., May, 1905, townet on trawl.—One, immature.

Distribution.—This species has recently been added to the British and Irish list by Norman for a specimen taken off Plymouth. It is also known from the Mediterranean, and has, apparently, a more southern distribution than *R. damnoniensis*.

Cirolana borealis, Lilljeborg.

Lambay Deep, 39-60 fath., February and July, 1902, January, 1903, and June, 1904.—Six large specimens.

Off S. W. of Isle of Man, 36-39 fath., May, 1905.—One

Eurydice pulchra, Leach.

Skerries Bay, surface, July, 1902, with floating algae.—One.

Idotea baltica (Pallas).

South of Lambay, 10-13 fath., January, 1902.—Three.
Dublin Bay, 4 fath., March, 1904, and February, 1905.—Twenty.

Idotea neglecta, G. O. Sars.

South of Lambay, 10-13 fath., January, 1902.—Two.
Dublin Bay, 4 fath., March, 1904.—Three.

Idotea emarginata (Fabricius).

Dublin Bay, 4 fath., March, 1904.—One.

Idotea linearis (Pennant).

Lambay Deep, 48-60 fath., July, 1902.—One.

Off Clogher Head, July, 1902, 29-36 fath.—One.

Off Dundalk Bay, 14-16 fath., May, 1903, and February, 1905.—One.

Inside Burford Light, Dublin Bay, November, 1903.—One.

Dublin Bay, 4 fath., March, 1904.—One.

Astacilla longicornis (Sowerby).

16 mi. off Clogher, 29-36 fath., 1902.—Three males, 10 mm.

S.W. of Clogher, 12-19 fath., 1902.—One male, 10 mm., and one young.

7 mi. S.E. of Carlingford Bar, 21-23 fath., April, 1903.—One female, 15 mm.

Off Rockabill, 31-35 fath., April, 1903.—One male, 10 mm.

S.W. of Clogher, 7-12 fath., 1903.—One male, 10 mm.

Off Carlingford Lough, 32 fath., February, 1905.—One.

S.W. of Isle of Man, 40 fath., February, 1905.—Nine.

Off S.W. of Isle of Man, 36-39 fath., May, 1905.—One.

Ianira maculosa, Leach.

2 mi. outside Kish Lighthouse, 20-23 fath., April, 1903.—One.

2-8 mi. off Lambay, 21-25 fath., April, 1903.—Several.

14 mi. off Clogher, 29-30 fath., April, 1903.—Seven.

Lambay Deep, 44 fath., June, 1904.—Three.

At each of the above localities the trawl came up full of *Alcyonium digitatum*, and the *Ianira* were in each case found in numbers clinging to the colonies.

Munna Krøyeri, Goodsir.

Lambay Deep, 44 fath., June, 1904.—One.

Pleurogonium rubicundum, G. O. Sars.

Off Clogher Head, 12-14 fath., June, 1904.—Four.

Off S.W. of Isle of Man, 34-37 fath., May, 1905.—Thirty-one.

Eugerdia tenuimana, G. O. Sars.

Off S.W. of Isle of Man, 34-37 fath., May, 1905.—Six.

Pseudarachna hirsuta, G. O. Sars.

Off S.W. of Isle of Man, 34-37 fath., May, 1905.—Six.

Distribution.—This species was added to the British and Irish list by Scott for a single specimen taken in Moray Firth. Otherwise it is only known from the Christiania Fiord, Norway, in about 30 fathoms.

Eurycope mutica, G. O. Sars.

Off S.W. of Isle of Man, 34-37 fath., May, 1905.—Four.

Distribution.—Now recorded for the first time from British and Irish waters. Hitherto it has only been met with in shallow water off the coast of Norway.

Aspidophryxus peltatus, G. O. Sars.

Off S.W. of Isle of Man, 40 fath., February, 1905.—Two, hosts uncertain, but both *Erythrops serrata* and *Mysidopsis didelphys* occurred in the same haul.

v.—SOME NOTES ON THE GEOGRAPHICAL DISTRIBUTION OF
BRITISH AND IRISH ISOPODA.

The British and Irish Isopodan fauna appears to be a curious mingling of boreal and southern forms together with a percentage of species as yet only known from our waters. Considering only marine forms and excluding the whole tribe *Oniscoidea*, which only contains one British marine species, *Ligia oceanica*, there are altogether 134 known British and Irish species of Isopoda. Arranged in tribes and compared with a boreal fauna like that of Norway, and a southern fauna like that of the Mediterranean, we get the following result in tabular form :—

Tribe.	Total British and Irish Species.	Total British and Irish Species found in Norway.	Total British and Irish Species found in Mediterranean.	Total Common to all three.
Tanaidacea, . . .	27	10	9	4
Fiabellifera, . . .	39	14	19	7
Valvifera, . . .	17	10	8	3
Asellota, . . .	23	23	4	3
Epicarida, . . .	19	13	3	1
Total, . . .	134	69	43	18

That is, out of a total British and Irish species of 134, 69 are found in Norway, 43 in the Mediterranean, while only 18 are common to the fauna of all three regions.

Subtracting from all three totals those species which are common, we get the figures—

116, 51, 25,

or, the British and Irish Isopodan fauna is made up of, roughly, one-half boreal, and one-quarter southern types, and one-quarter representing forms at present only known from British and Irish waters.

An almost precisely similar result is obtained when we consider the British species of *Mysidae* in the same manner. The figures for the *Mysidae* read :—

Total British and Irish.	Total British and Irish known from Norway.	Total British and Irish known from Mediterranean.	Total British and Irish common to all three.
55	29	17	5

Again, subtracting the species that are common to all three faunas, the figures read :—

50, 24, 12,

i.e., the British and Irish *Mysidae* are made up of, roughly, one-quarter southern, one-half boreal and one-quarter of forms not yet known outside our area.

The *Euphausiidae* are not included in the above considerations of the British and Irish Schizopodan fauna for the obvious reason that their active swimming habits and development by pelagic free-swimming larval forms do not allow them to be compared with forms of a bottom haunting mode of life, reproducing by direct development. But taking two groups of Crustacea, as is done above, whose habits are to some extent identical and whose modes of reproduction are essentially the same, it is at least interesting to find that they give practically similar results. It is true that the *Mysidae* have greater powers of locomotion than the Isopoda, and may therefore be expected to be more widely distributed, but the *Mysidae*, though, with the possible exception of *Heteromysis*, none appear to be absolutely pelagic, are essentially bottom haunting forms rather than permanently pelagic or oceanic, and seem comparable in this respect to the Isopoda. It will be interesting to see whether these results are borne out by the consideration in like manner of the British and Irish Cumacea and Amphipoda, or, indeed, of any other group with comparable habits and life history.

The curious mingling of boreal and southern types in the British and Irish Isopoda is further illustrated when we consider the various families of this group. The whole of the tribe *Asellota* would appear to be an almost purely boreal one, since only four species are known from the Mediterranean, and

three are common to the three faunas. The family *Sphaeromidae*, on the other hand, is entirely unknown in Norwegian and boreal waters generally, though in the Mediterranean it is represented by numerous species. Both groups are well represented in the British and Irish fauna, the former by thirty-two and the latter by seven species.

In the genera of the *Tanaidacea* we may again notice this fact. *Apeudes* has eight species in the Mediterranean and only one in Norway. *Typhlotanais* and *Leptognathia*, on the other hand, have nine and six species, respectively, in Norway, and only one each in the Mediterranean. All three are well represented in our fauna—*Apeudes* by six, *Typhlotanais* by four, and *Leptognathia* by five species, respectively. The following tables, one for each tribe, show the known distribution of all British and Irish marine Isopoda :—

ORDER TANAIDACEA.

	N. B. America.	Greenland.	Spitzenbergen and Kara Sea.	Iceland.	Norway.	Sweden.	Denmark.	Belgium.	N. Coast of France.	Bay of Biscay.	Atlantic Coast of Spain and Portugal.	Mediterranean.	Black Sea.
<i>Apeudes taipa</i> ,
" <i>Latreilli</i> ,
" <i>hibernicus</i> ,
" <i>spinosus</i> ,
" <i>simplicirostris</i> ,
" <i>grossimanus</i> ,
<i>Sphyrapus malleolus</i> ,
" <i>tudes</i> ,
<i>Tanais cavolinii</i> ,
" <i>Dulongii</i> ,
<i>Leptocheila Savignii</i> ,
" <i>dubia</i> ,
<i>Alaotanais serratispinosus</i> ,
" <i>laevispinosus</i> ,
<i>Paratanais Batei</i>
<i>Leptognathia longiremis</i> ,
" <i>Lilljeborgi</i> ,
" <i>brevimana</i> ,
" <i>rigida</i> ,
" <i>breviremis</i> ,
<i>Tanaopsis laticaudata</i> ,
<i>Typhlotanais brevicornis</i> ,
" <i>tenuicornis</i> ,
" <i>proctagon</i> ,
" <i>Richardi</i>
<i>Strongylura arctophylax</i> ,
<i>Pseudotanais forcipatus</i> ,

TRIBE *Flabellifera*.

	N. B. America.	Greenland.	Spitzbergen and Kara Sea.	Iceland.	Norway.	Sweden.	Denmark.	Belgium.	N. Coast of France.	Bay of Biscay.	Atlantic Coast of Spain and Portugal.	Mediterranean.	Black Sea.
<i>Anthura gracilis</i> , ..	+												
<i>Calathura brachiata</i> , ..	+												
<i>Paranthura nigropunctata</i> , ..													
<i>Gnathia maxillaris</i> , ..													
<i>G. oxyurea</i> , ..													
<i>G. formica</i> , ..													
<i>Caecognathia stygia</i> , ..													
<i>Aega pæra</i> , ..	+												
<i>ventrosa</i> , ..		++											
<i>tridens</i> , ..			+										
<i>Stromii</i> , ..													
<i>rosacea</i> , ..													
<i>monophthalma</i> , ..													
<i>crenulata</i> , ..													
<i>arctica</i> , ..													
<i>Rocinea danmoniensis</i> , ..													
<i>Dumerilli</i> , ..													
<i>Sycenus infelix</i> , ..	++												
<i>Cirolana borealis</i> , ..													
<i>Hanseni</i> , ..													
<i>cranchii</i> , ..													
<i>Comilera cylindracea</i> , ..													
<i>Eurydice pulchra</i> , ..													
<i>truncata</i> , ..													
<i>Grimaldii</i> , ..													
<i>spinigera</i> , ..													
<i>isernii</i> , ..													
<i>Limnoria ligacrum</i> , ..	+												
<i>Sphaeroma serratum</i> , ..													
<i>rugicauda</i> , ..													
<i>Sphaeroma Hookeri</i> , ..													
<i>Nassa bidentata</i> , ..													
<i>Cymodoce truncata</i> , ..													
<i>granulatum</i> , ..													
<i>Campecopea hirsuta</i> , ..													
<i>Bathycopoea typhlops</i> , ..													
<i>Anilocra physodes</i> , ..													
<i>asilus</i> , ..													
<i>Nerocila neapolitana</i> , ..													

TRIBE *Valvifera*.

	N. B. America.	Greenland.	Spitzbergen and Kara Sea.	Iceland.	Norway.	Sweden.	Denmark.	Belgium.	N. Coast of France.	Bay of Biscay.	Atlantic Coast of Spain and Portugal.	Mediterranean.	Black Sea.
<i>Idotea baltica</i> , ..	+												
<i>granulosa</i> , ..													
<i>neglecta</i> , ..													
<i>viridis</i> , ..													
<i>pelagica</i> , ..													
<i>emarginata</i> , ..													
<i>metallica</i> , ..	+												
<i>linearis</i> , ..													
<i>Zenobiana prismatica</i> , ..													
<i>Stenosoma lanciferum</i> , ..													
<i>acuminatum</i> , ..													
<i>Arcturus hystrix</i> , ..		+											
<i>Arcturella dilatata</i> , ..													
<i>danmoniensis</i> , ..													
<i>Astacilla longicornis</i> , ..													
<i>intermedia</i> , ..													
<i>Deahayesii</i> , ..													

TRIBE *Asellota*.

	N. E. America.	Greenland.	Spitzbergen and Kara Sea.	Iceland.	Norway.	Sweden.	Denmark.	Belgium.	N. Coast of France.	Bay of Biscay.	Atlantic Coast of Spain and Portugal.	Mediterranean.	Black Sea.
Ianira maculosa,	+	+	+	+	+								
Ianiropis breviremis,													
Iaera marina,	+	+	+	+	+								
" nordmanni,													
Munna Fabricii,	+	+	+	+	+								
" Kroyeri,													
" limicola,													
" Boeckii,													
Paramunna bilobata,													
Metamunna typica,													
Pleurogonium rubicundum,													
" spinosissimum,				+	+								
" inerme,													
Leptaspidia brevipes,													
Macrostylis spinifera,													
Desmosoma lineare,													
Ischnosoma bispinosum,													
" Greeni,													
Eugerdia tenuimana,													
Echinopleura aculeata,													
Munnopsis oceanica,													
" Murrayi,													
Munnopsoides Beddardi,													
Ilyarachna Plunketti,													
Pseudarachna hirsuta,													
Eurycope phallangium,													
" megalura,													
" latirostris,													
" producta,													
" longipes,													
" mutica,													
Lipomera lamellata,													

TRIBE *Epicarida*.

	N. E. America.	Greenland.	Spitzbergen and Kara Sea.	Iceland.	Norway.	Sweden.	Denmark.	Belgium.	N. Coast of France.	Bay of Biscay.	Atlantic Coast of Spain and Portugal.	Mediterranean.	Black Sea.
Bopyrus squillarum,													
Bopyroides hippolytes,													
Bopyrina virbil,													
Pleurocrypta galathea,													
" marginata,													
Pleurocryptella formosa,													
Athelges paguri,													
Pseudione hyndmanni,													
" affinis,													
" confusa,													
Gyge branchialis,													
Ione thoracicus,													
Phryxus abdominalis,	+	+	+										
Scyrracepon tuberculosa,													
Aspidophryxus peltatus,													
Asconiscus simplex,													
Clypeoniscus Hanseni,													
Cryptothir balani,													
Litiopsis pygmaea,													

It will be seen from these tables that no fewer than twelve species of British and Irish Isopoda are also known from the N.E. coast of America, their distribution having in many cases been traced step by step from Norway to America by way of the Arctic Ocean, e.g., *Calathura brachiata*, *Aega psora*, *Munna Fabricii*, and *Phryxus abdominalis*. On the other hand, the extension to America of such a type as *Leptochelia dubia*, unknown from any waters north of Ireland, but traced all the way from there southward to the Mediterranean and the Azores, would seem to have taken a southern route across the narrow strip of ocean between Senegambia and Brazil, where it is also known, and so up to the N.E. coast of North America. We may here note as of interest that the large family *Cymothoidae*, while represented in the Mediterranean by numerous species and generally distributed in tropical and subtropical waters, is entirely unknown from boreal waters, and only three species approach anywhere near to the British and Irish area, *Anilocra asilus* and *A. physodes* having been recorded from the Channel Islands by Koehler and Norman respectively, while *Nerocila neapolitana* has been found by Norman at Plymouth. This is the more remarkable since these Isopods are parasites on fishes, and would thus seem to have ample opportunity for wide and extended distribution.

With regard to the new forms described in Part I., most of them are only specifically distinct from Norwegian or Mediterranean forms. *Munnopsoides Beddardi*, however, has its nearest ally in a species known from the Pacific near Australia, while *Bathycopea typhlops* would appear to be the representative in the northern hemisphere of the essentially southern and Antarctic genus *Serolis*.

EXPLANATION OF PLATES.

PLATE I.

Typhlotanais proctagon, sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " lateral view of anterior end.
 Fig. 3. " cheliped.
 Fig. 4. " second leg.
 Fig. 5. " third leg.
 Fig. 6. " fifth leg.
 Fig. 7. " seventh leg.
 Fig. 8. " seventh leg of another specimen, distal joints enlarged.
 Fig. 9. " inferior antenna.

PLATE II.

Cymodoce truncata (Montagu).

- Fig. 1.—Gravid female, dorsal view.
 Fig. 2. " " superior antenna.
 Fig. 3. " " inferior antenna.
 Fig. 4. " " mandible.
 Fig. 5. " " first maxilla.
 Fig. 6. " " second maxilla.
 Fig. 7. " " maxilliped.
 Fig. 8. " " first leg.
 Fig. 9. " " uropod, ventral view.

PLATE III.

Bathycopea typhlops, gen et sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " inferior antenna.
 Fig. 4. " mandible.
 Fig. 5. " first maxilla.
 Fig. 6. " second maxilla.
 Fig. 7. " maxilliped.
 Fig. 8. " first leg.
 Fig. 9.—Male, second leg.
 Fig. 10.—Female, second leg.
 Fig. 11. " fifth leg.
 Fig. 12.—Male, inner lamella of second pleopod.
 Fig. 13.—Female, epimera of second and third thoracic segments from below showing the ventral prolongation of the anterior edge which is present on all the epimera but the first.

PLATE IV.

Ischnosoma Greeni, sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " first leg.
 Fig. 4. " second leg.
 Fig. 5. " fourth leg.
 Fig. 6. " posterior end of another specimen showing uropoda.

PLATE V.

Munnopsis oceanica, sp. n.

- Fig. 1.—Male, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " mandible.
 Fig. 4. " maxilliped.
 Fig. 5. " first leg.
 Fig. 6. " fifth leg.
 Fig. 7. " uropod.

Munnopsis Murrayi, A. O. Walker.

- Fig. 8.—Male, mandible.

PLATE VI.

Munnopsoides Beddardi, gen. et sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " mandible.
 Fig. 4. " first maxilla.
 Fig. 5. " second maxilla.
 Fig. 6. " maxilliped.
 Fig. 7. " first leg.
 Fig. 8. " fifth leg.

PLATE VII.

Ilyarachna Plunketti, sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " inferior antenna, basal joints.
 Fig. 4. " first leg.
 Fig. 5. " second leg.
 Fig. 6. " fifth leg.
 Fig. 7. " seventh leg.
 Fig. 8. " uropod.
 Fig. 9. " operculum.

PLATE VIII.

Lipomera lamellata, gen. et sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " superior antenna and peduncle of inferior antenna.
 Fig. 3. " first maxilla.
 Fig. 4. " second maxilla.
 Fig. 5. " maxilliped.
 Fig. 6. " first leg.
 Fig. 7. " second leg.
 Fig. 8. " fifth leg.
 Fig. 9. " sixth leg.
 Fig. 10. " seventh leg.
 Fig. 11. " uropod, folded as attached to body.
 Fig. 12. " uropod, opened out.
 Fig. 13. " operculum.
 Fig. 14.—Male, operculum.

PLATE IX.

Metamunna typica, sp. n.

- Fig. 1.—Female, dorsal view.
 Fig. 2. " first leg.
 Fig. 3. " uropod.

Apsuedes hibernicus, A. O. Walker.

- Fig. 4.—Female, second leg.
 Fig. 5.—Young specimen, superior antenna.
 Fig. 6. " " inferior antenna.
 Fig. 7. " " cheliped.

Cirolana borealis, Lilljeborg.

- Fig. 8.—Male, stylet of second pleopod.

Tanaopsis laticaudata, G. O. Sars.

- Fig. 9.—Male, superior antenna.
 Fig. 10. " metasome, dorsal view.

Iaera marina (Fabricius).

- Fig. 11.—Male, operculum.

Iaera Nordmanni (Rathke).

- Fig. 12.—Male, operculum.

PLATE X.

Eurycope longipes, sp. n.

- Fig. 1.—Male, dorsal view.
 Fig. 2. " superior antenna.
 Fig. 3. " mandible.
 Fig. 4. " mandibular palp.
 Fig. 5. " maxilliped.
 Fig. 6. " first leg.
 Fig. 7. " uropod.
 Fig. 8. " operculum.

PLATE XI.

Heterophryxus appendiculatus, G. O. Sars.

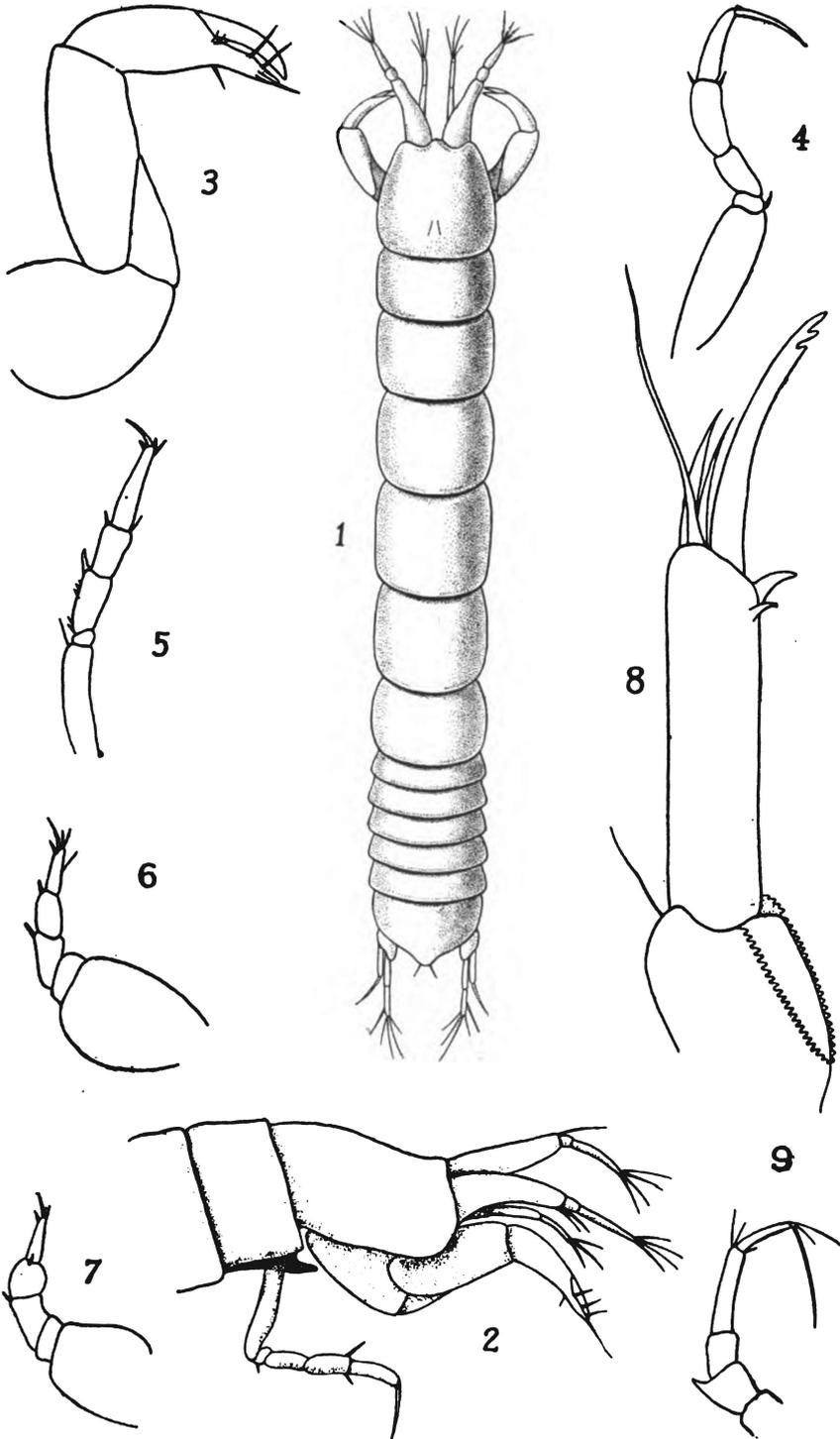
- Fig. 1.—Female, dorsal view.
 Fig. 2. " posterior end after removal of male.
 Fig. 3.—Male, dorsal view.
 Fig. 4. " first leg.

Eurydice truncata (Norman).

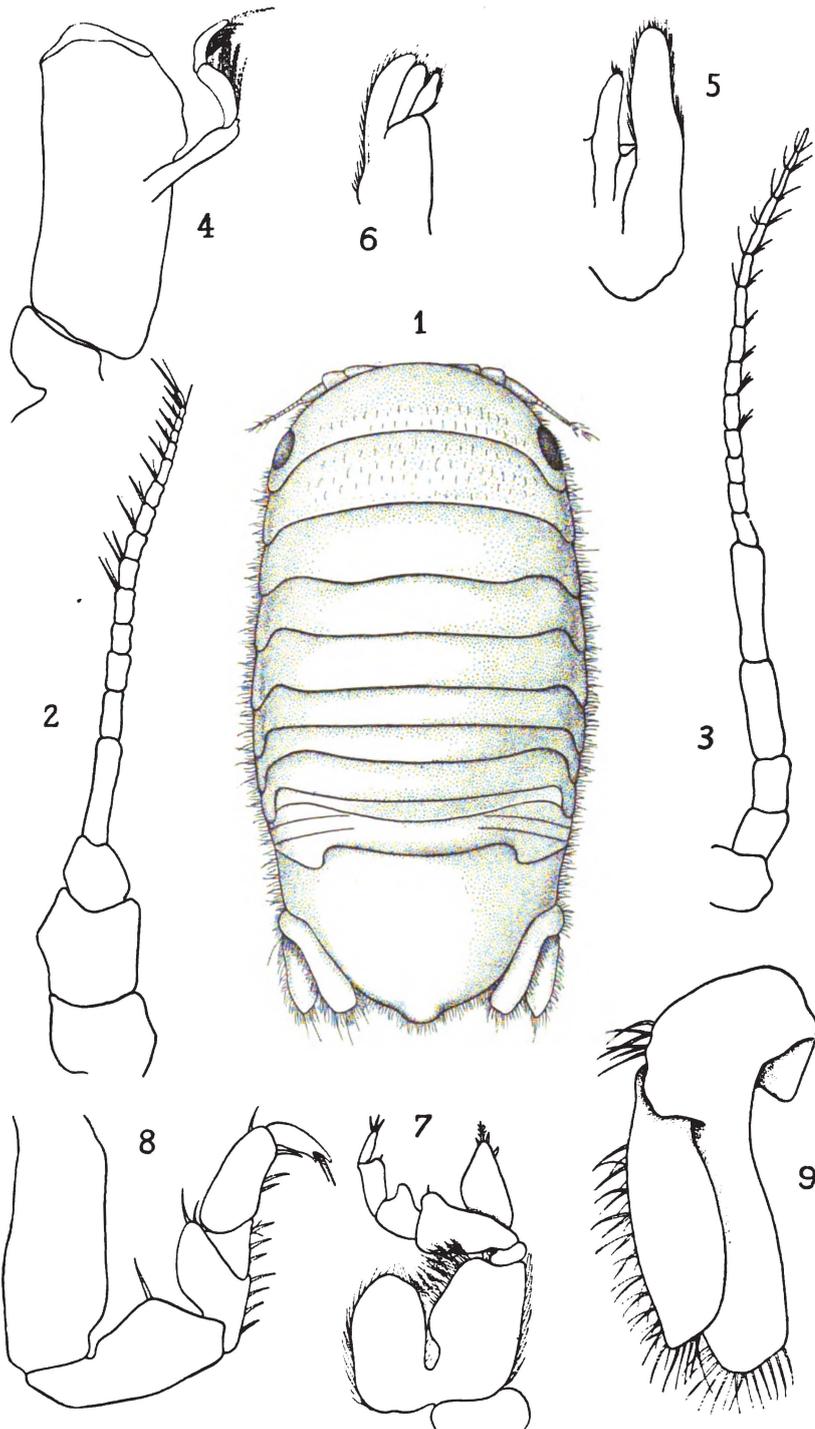
- Fig. 5.—Female, superior antenna.
 Fig. 6.—Young male, superior antenna.
 Fig. 7.—Adult male, superior antenna.
 Fig. 8.—Telson.

Scyrraepon tuberculosa, gen. et sp. n.

- Fig. 9.—Female, dorsal view.
 Fig. 10.—Male, dorsal view.
 Fig. 11.—Female, fifth leg.
 Fig. 12.—Male, first leg.

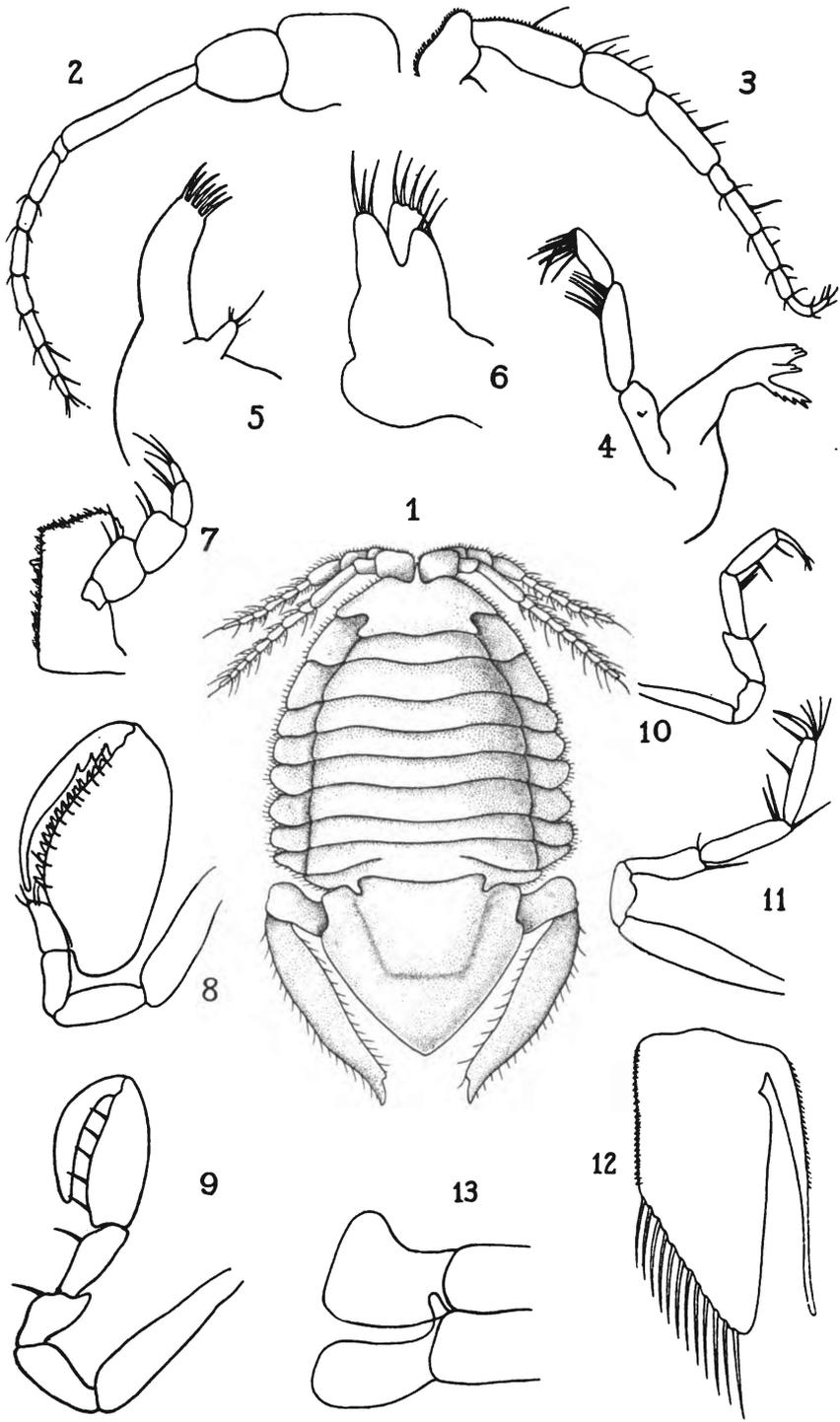


Typhlotanais proctagon.



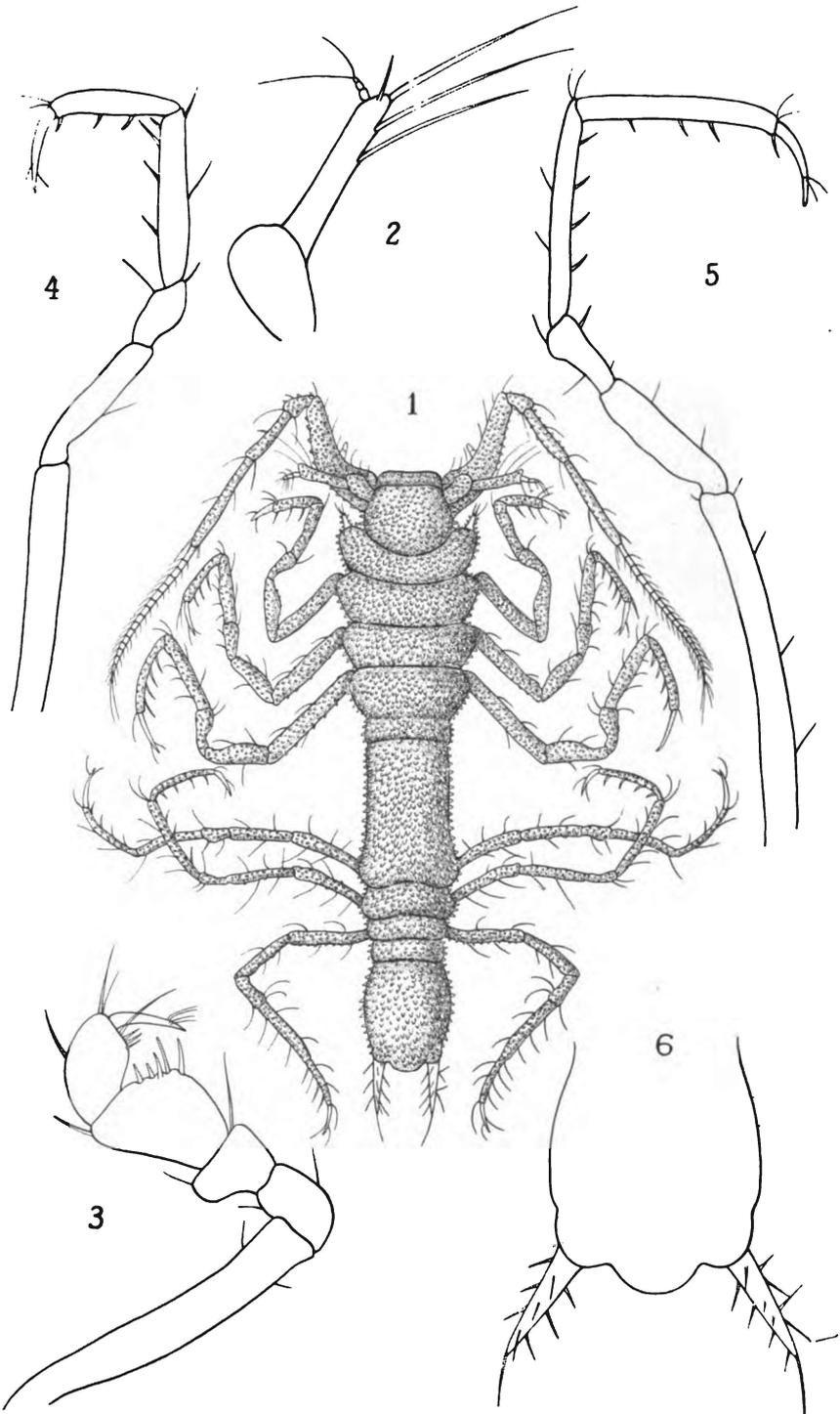
W. M. T. } del.
G. M. W. }

Cymodoce truncata



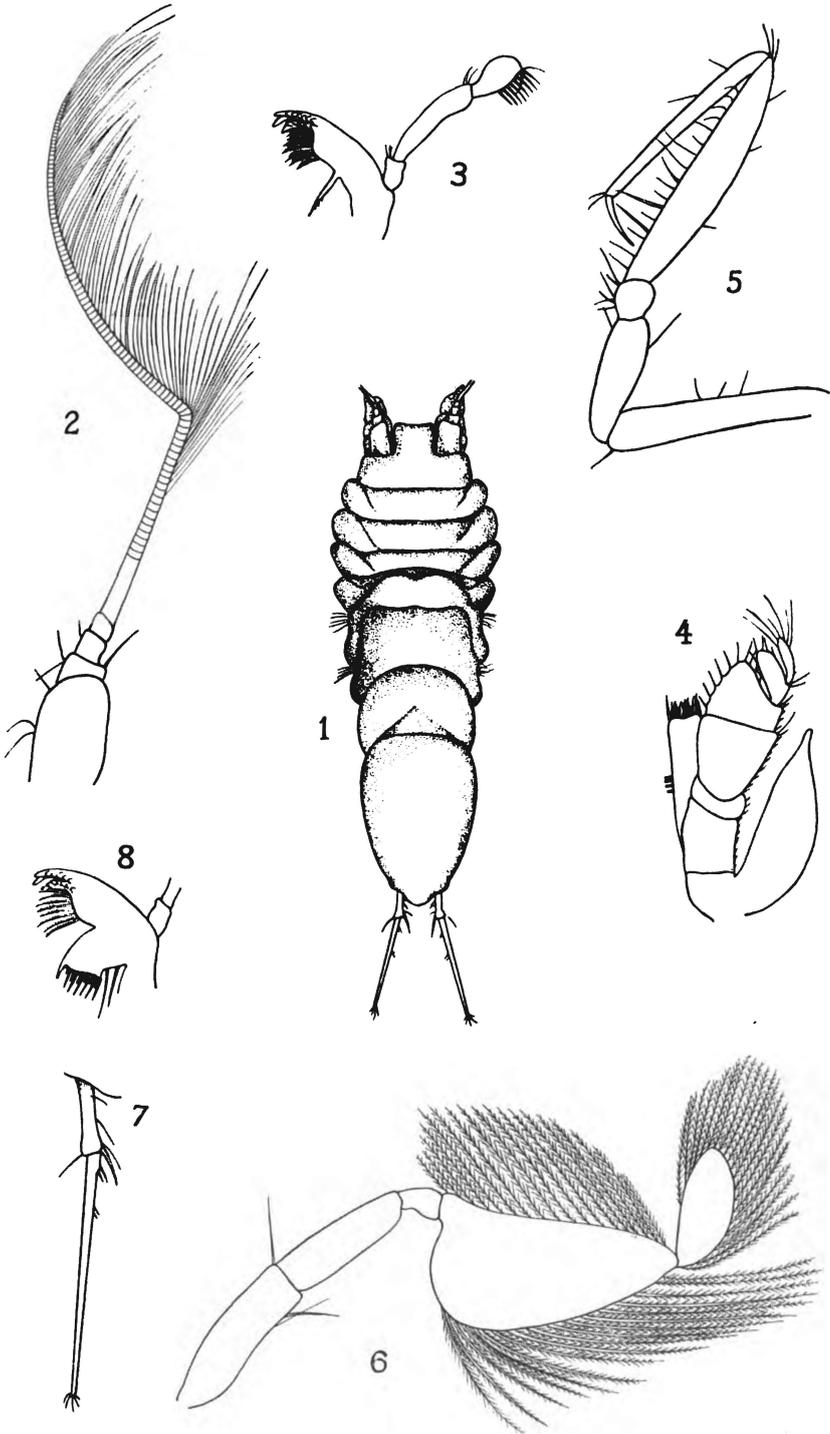
W. M. T. } del.
G. M. W. }

Bathycopea typhlops.



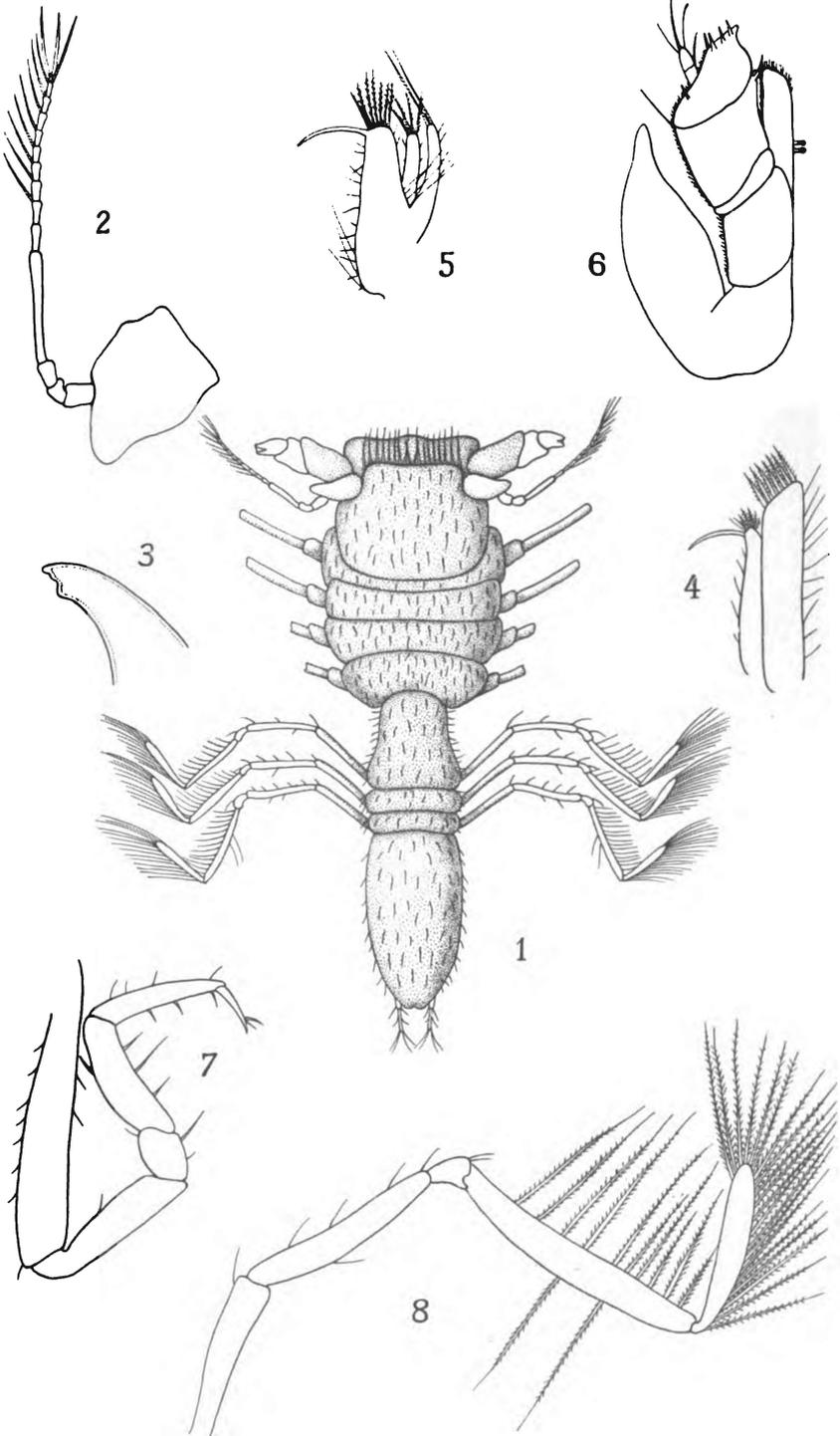
W. M. T. } del.
C. M. W. }

Ischnosoma Greeni.



W. M. T. }
G. M. W. } del.

1-7, *Munnopsis oceanica*.
8. *Munnopsis Murrayi*.

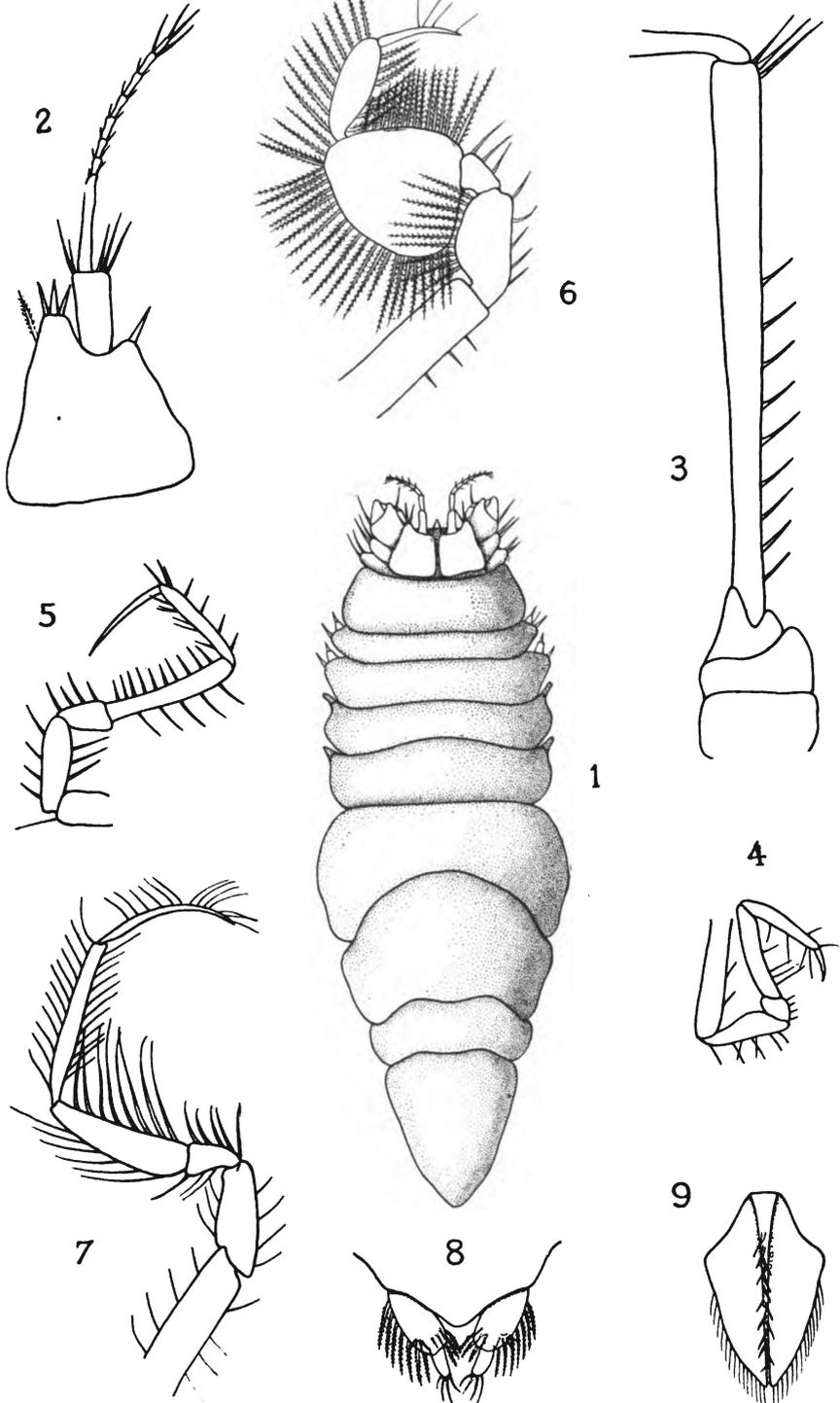


W. M. T. } del.
G. M. W. }

Munnopsoides Beddardi.

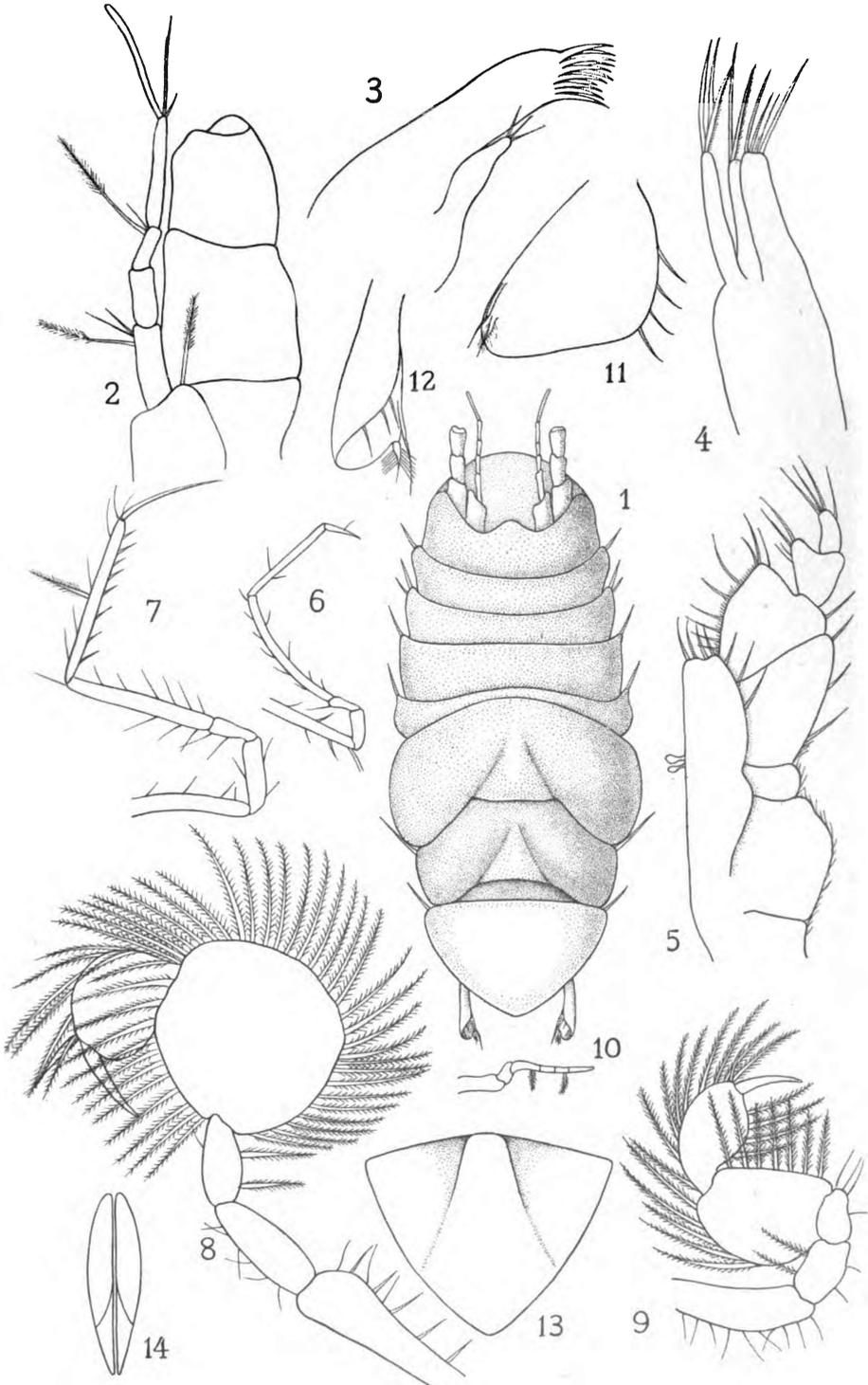
Il. '04,

PL. VII.



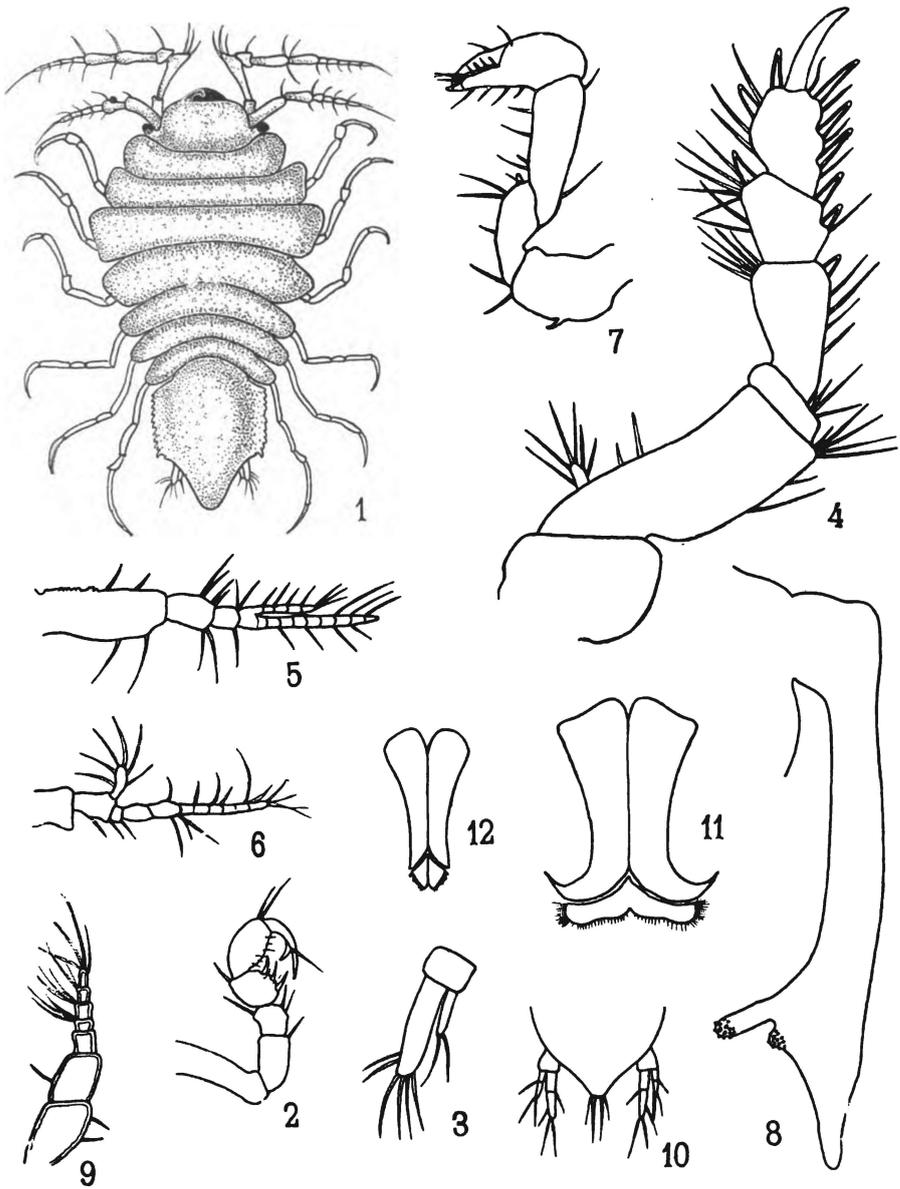
W. M. T. } del
G. M. W. }

Ilyarachna Plunketti.



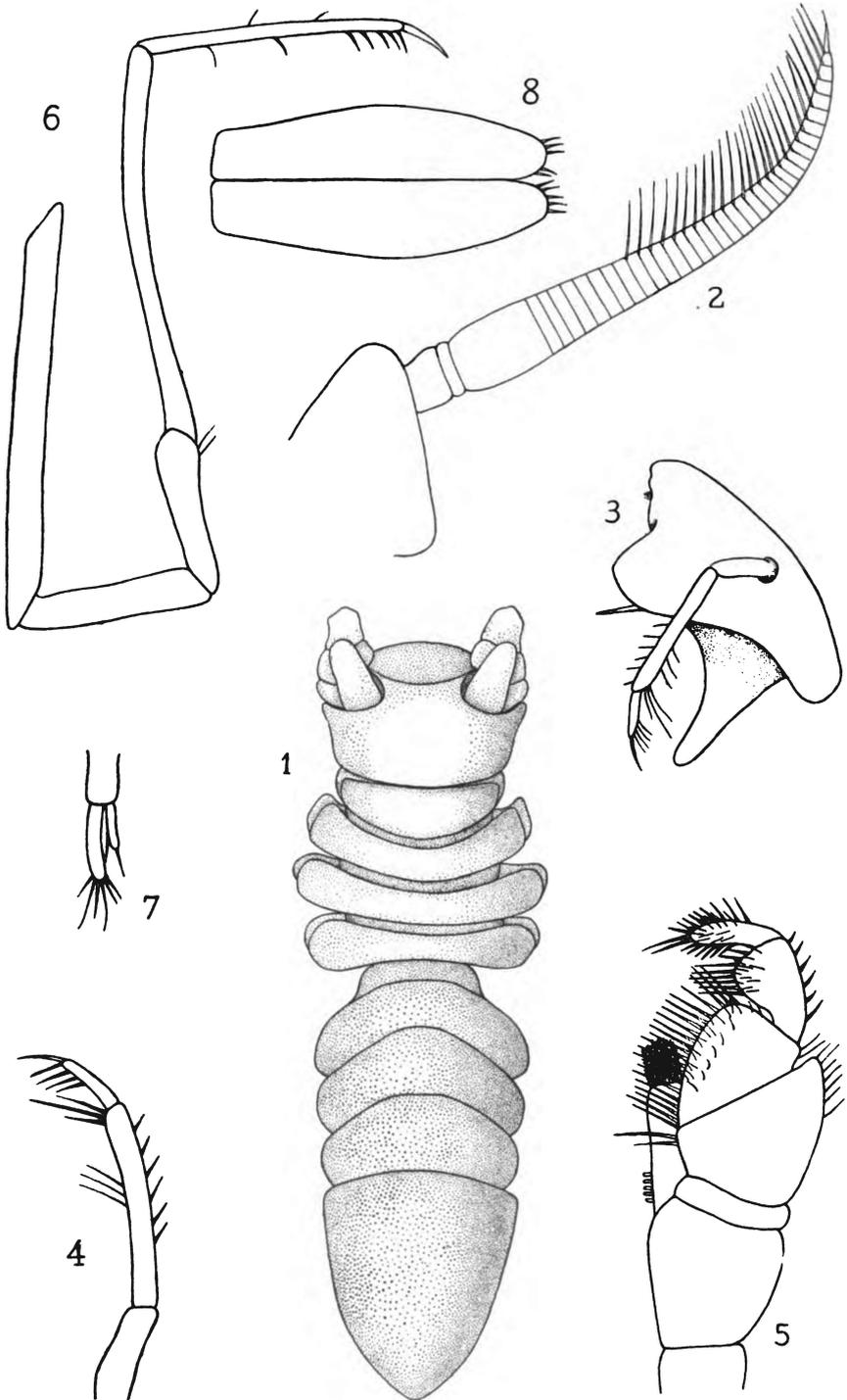
W. M. T. } del.
C. M. W. }

Lipomera lamellata.



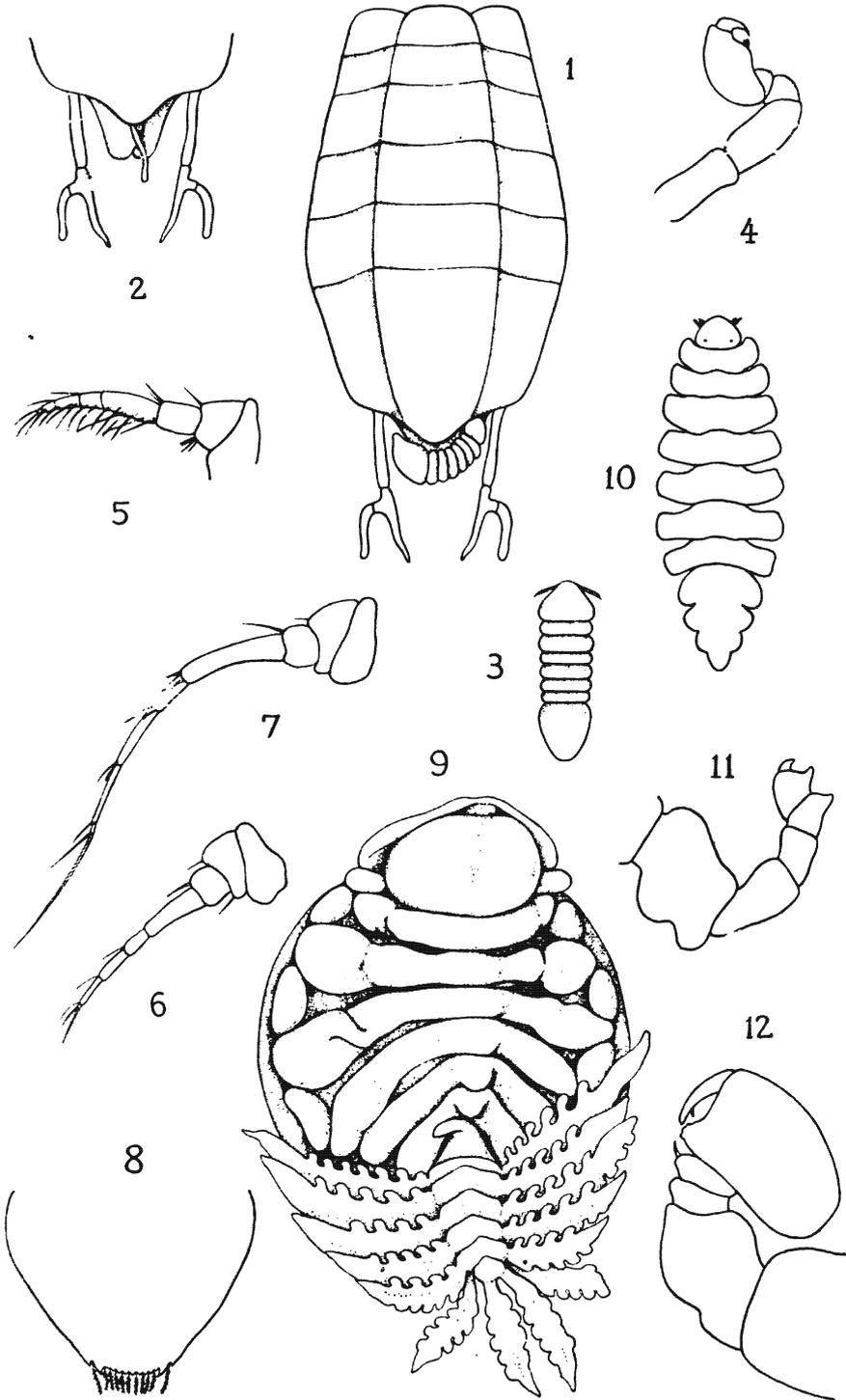
W. M. T. | del
G. M. W. |

1-3, *Metamunna typica*. 9, 10, *Tanaopsis laticaudata*.
 4-7, *Apseudes hibernica*. 11, *laera marina*.
 8, *Cirolana borealis*. 12, *laera Nordmanni*.



W. M. T. } del.
G. M. W. }

Eurycope longipes.



W. M. T. } del.
C. M. W. }

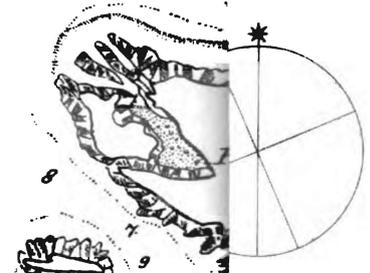
1-4, *Heterophryxus appendiculatus*.

5-8, *Eurydice truncata*.

9-12, *Scyracepon tuberculosa*.

10

7



S. ENT

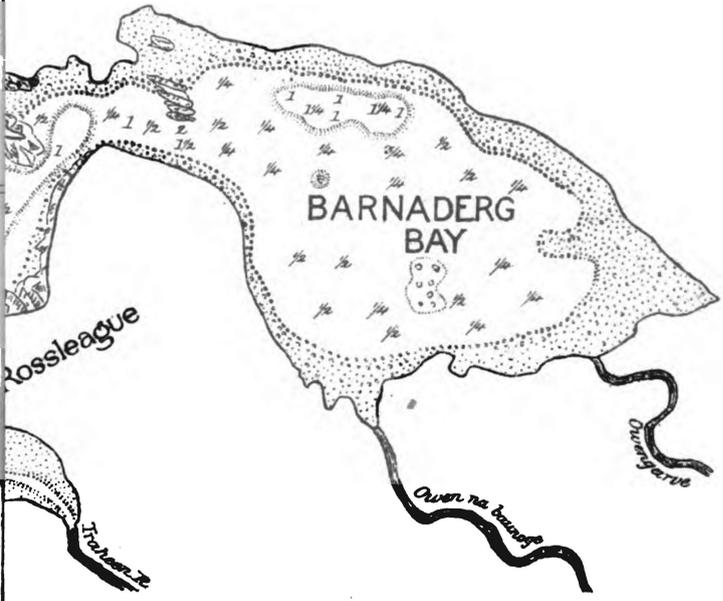
Derryover Quay

Leckn

Dawros R.

Dawros-more

B



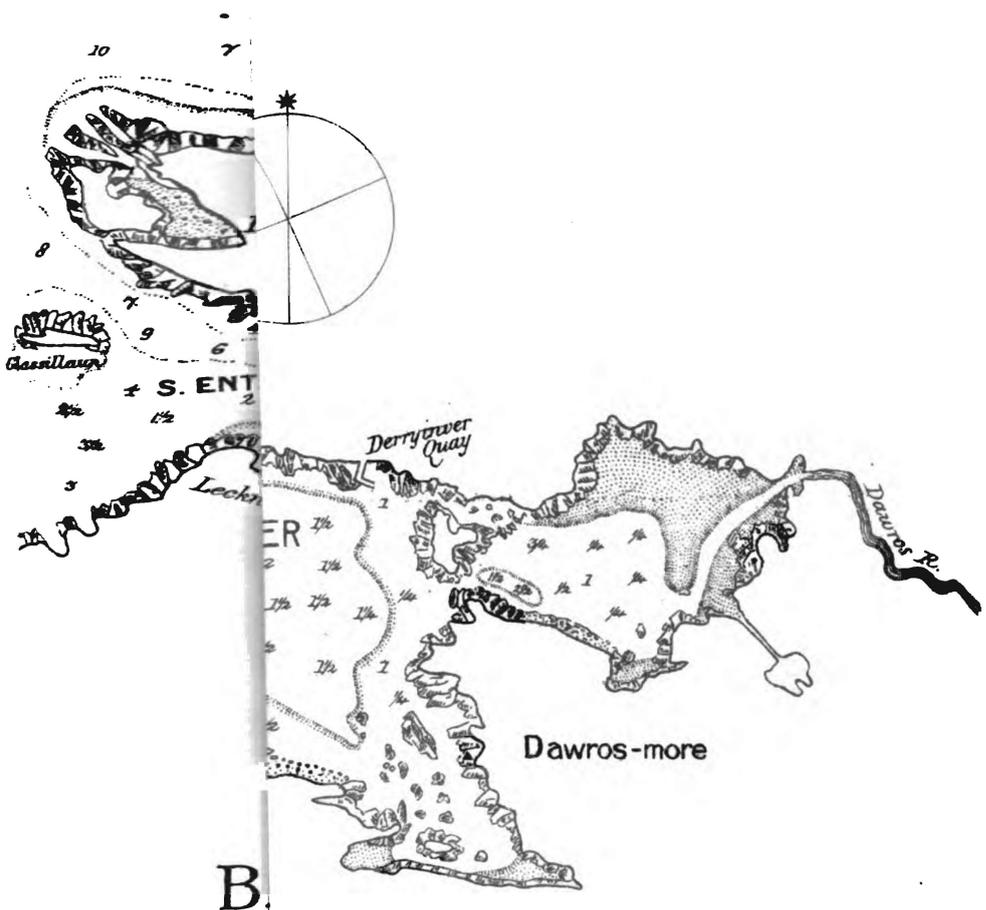
BARNADERG BAY

Rossleague

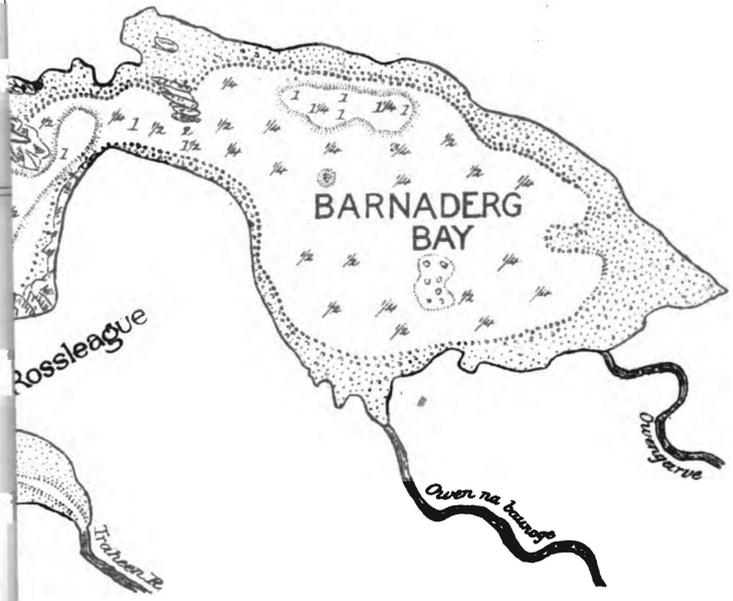
Trahan R.

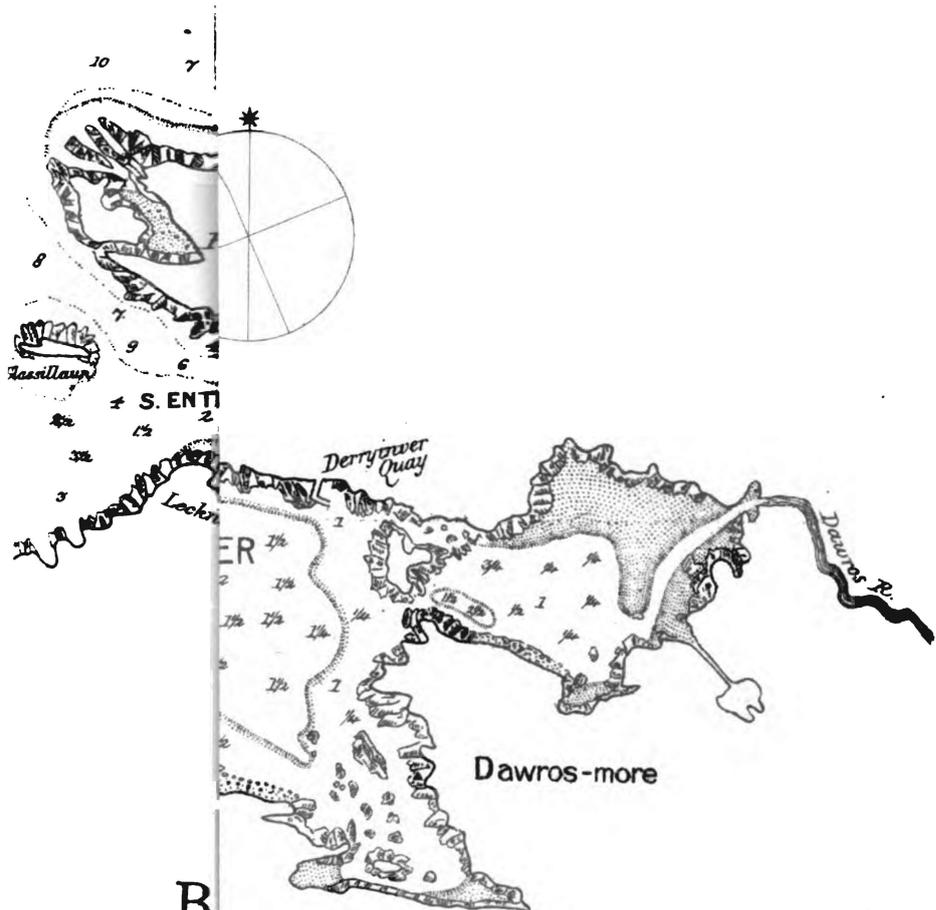
Owen na h-ainn

Ounagerrve



B.





B.

