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Little attention has as yet been given to the plankton of the British Columbia coastal waters, the only references to the subject that I know of being those of Peck and Harrington¹ and Herdman,² both these papers referring to collections made in Puget Sound. It has seemed advisable, therefore, to place on record the following notes, since, even although they are based upon but a small number of collections, they represent a much more extensive area and add materially to our knowledge of the forms represented in the West Coast plankton. The occurrence of plankton in sufficient quantity to discolor the water over considerable areas is a well-known phenomenon, but in my experience it happens much more frequently in Pacific waters than in the Atlantic. In a voyage up the coast of British Columbia in September, 1912, several patches of "brown water" were observed, and the opportunities which presented themselves for obtaining samples of the plankton causing the discoloration were eagerly seized. Circumstances did not permit the examination of the collected material in the living condition, but it was preserved in formalin, and even although for various reasons it was necessary to postpone its examination until now, it was found to be still in excellent condition for the identification of its constituents.

1. The first patch of "brown water" examined was encountered in the northern part of the Gulf of Georgia, and while it was not convenient at the time to slow down the ship sufficiently for the use of a tow-net, I was able to secure some bucketfuls of the water and found the discoloration due to the enormous numbers of *Pyrrocystis*. The preserved material has unfortunately been lost, and I am unable to identify the form specifically, but the examination of the fresh material, made with a low power of the microscope, revealed practically nothing but this single form which must have been present in almost incalculable numbers, since the discoloured area was of very considerable extent. This was the only case observed in which the plankton

¹ J. I. Peck and N. R. Harrington—Observations on the Plankton of Puget Sound. Trans. N. Y. Acad. Sci. Acad. Sci. XVI. 1898.
² W. A. Herdman, J. C. Thompson and A. Scott—On the Plankton collected continuously during two traverses of the North Atlantic, etc., with an Appendix on dredging in Puget Sound. Trans. Liverpool Biol. Soc. XII. 1898.

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Notes on the Plankton of the British Columbia Coast

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causing the discolouration was practically monotonic; in all other cases I found it very varied as will be seen. My friend, Dr. McLean Fraser, informs me, however, that on two occasions he has observed the water of Departure Bay discoloured over large areas by a plankton which consisted almost entirely of a single species, in the one case an undetermined Dinoflagellate, and in the other a species of Noctiluca. With the latter form there was some admixture of diatoms, copepods, nauplii, etc., but the flagellate was estimated to form at least 95% of the entire material.

2. On September 11th a patch of "brown water" of some extent was encountered off the entrance to Esperanza Inlet, on the West coast of Vancouver I., and a collection made from it revealed a remarkable and interesting variety of forms.

The only Diatom observed was *Coscinodiscus*, which was not, however, present in any considerable numbers and is identified with some hesitation with *C. nobilis*, Grun. Of the Dinoflagellata, *Ceratium fusus* was quite common, while *C. furca* and *C. tripos*, though present, were very rare.

With the exception of these forms the plankton was entirely composed of animal forms. No Protozoa were observed, but of Coelentera, several forms were present. In the first place a few hydrothecae were obtained, in all cases quite empty but belonging apparently to at least two species of Campanularian hydroids. One of them I was not able to identify; the other, represented by hydrothecae whose length and breadth were about equal, which lacked any indications of dentations at the margin and were covered more or less abundantly with villosities, probably due to wear and tear, my friend, Dr. C. McLean Fraser, kindly informs me was probably *Obelia longissima*.

An Anthomedusan belonging to the genus *Rathkea* was present in considerable numbers. It is apparently *R. blumenbachii* (Rathke), a form originally described from the Black Sea, but held to be identical with *R. octopunctata* of the north Atlantic. It has recently been described by Bigelow,¹ 1913, from Behring Sea and probably has a circumpolar distribution.

This last remark is also applicable to the Siphonophore *Diphyes appendiculata* Eschscholtz, originally described² from the north Pacific, but also forming an important constituent of the plankton of the Mediterranean, *Diphyes tripartita* Costa being regarded as identical

with it by Schneider¹ and Vanhöffen.² It has also been taken off the north coast of Ireland and off East Spitzbergen. It was abundantly present in the plankton now being considered, but unfortunately the formalin, in which the material was preserved, produced complete disintegration of the colonies into their constituent parts, and circumstances did not permit of the study of the material while still alive. The form of the *Eudoxia* near *glyces* was, however, excellently preserved, and from these there can be no doubt that the form is identical with that described by Eschscholtz, although the serrations of the edges of the ridges are much less pronounced than in the examples figured by Huxley.³ The larvae of two species of Echinoderms occurred in moderate numbers, one being a *Pluteus* with broad flat arms, probable that of an Ophiuran, and resembling in general form that of *Ophioglypha texturata* figured by Mortensen,⁴ the other a large *Brachiolaria* with a circular adoral ciliated band. Neither of these forms can at present be referred to their adults.

A few examples of an unidentified Annelid larva were also obtained and a considerable number of Cyphonautes.

Especially interesting were the Crustacea, inasmuch as they excelled both in number and variety all the other groups. Of the Cladocera, two species were present, *Evadne nordmanni* Lovén and *Podon polyphemoides* Leuck, less abundantly.

Of Copepoda, by far the most abundant was *Acartia longiremis* Lilljeb., this constituting in bulk about one-third of the entire collection. Much less frequent, although still in fair numbers, was a form that I identify as *Centropages hamatus* (Lilljeb.) Giesbrecht, although the armature of the genital segment of the female does not quite correspond with accounts of that form, several rows of short setae occurring on the lateral portions of the dorsal surface of the segment, (fig. 1) in addition to the strong recurved ventral spine in front of the genital opening. The fifth thoracic feet in both sexes also depart slightly from described conditions, the internal projection of the second joint of the external ramus of the female being apparently longer than usual and denticulate (fig. 2), while in the male the terminal forceps of the right external ramus is somewhat longer and more curved and the spines of the left external ramus more reduced (fig. 3).

¹ K. C. Schneider. Mittheilungen über Siphonophoren, III, Zool. Anzeiger, XXI, 1898.

² E. Vanhöffen. Siphonophoren. Nordisches Plankton, 1906.

³ T. H. Huxley. Oceanic Hydrozoa. London.

⁴ Th. Mortensen. Nordisches Plankton IX.

¹ H. B. Bigelow—Proc. U. S. Nat. Mus. XLIV, 1913.

² Eschscholtz, System der Acalephen. Berlin, 1829.

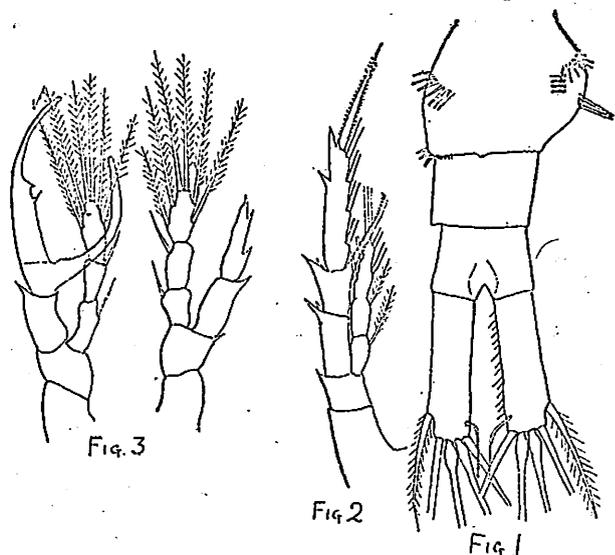


Fig. 1. Urosome of *Centropages hamatus* ♀ from the dorsal surface.
 Fig. 2. Fifth thoracic limb of *Centropages hamatus* ♀
 Fig. 3. Fifth thoracic limbs of *Centropages hamatus* ♂

Corycaeus affinis, n. sp.

This is a small form, the male measuring about 0.83 mm. in length, and it has the anterior division of the body clearly divided into four segments (Ce and Th₁, Th₂, Th₃ and Th₄, while the abdomen consists of two segments, genital and anal, exclusive of the furca. (The ventral keel is continued posteriorly into a beak-like prolongation overlapping the first thoracic segment (fig. 4), but the prolongation seems to be much less prominent than in the *rostratus* group, from which the present form also differs in the greater number of abdominal segments. Of these, the furca and anal segment together fall a little short of the length of the genital segment in both sexes, the proportions of the three parts, measured in five examples, being approxi-

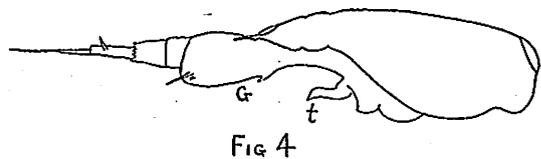


Fig. 4. Side view of *Corycaeus affinis*. t—tongue-like prolongation of ventral keel; G—genital segment.

mately 10:4:5.) The genital segment bears upon its ventral surface at the anterior border a simple, backwardly directed hook, and on each side, in the neighborhood of the genital pore in both sexes there is a simple seta, and medial to this a short spine (fig. 4). The first antennae are six-jointed, and do not present any distinctive features, but in the second antennae the terminal seta is much prolonged and decidedly curved and terminates in a blunt extremity (fig. 5). The seta on the second basal joint is a little shorter than that on the first joint and is finely serrate, whereas the latter is simple. The terminal joint of the exopodites of the 1-3 thoracic legs bears three setae of the usual form on its outer border, and the terminal seta of the second pair is straight and not curved inwards to any appreciable extent. (fig. 6). The endopodite of the fourth pair of thoracic legs is reduced to a small tubercle, which bears two long feathered setae, and in some examples is clearly divided into two portions. (fig. 7).

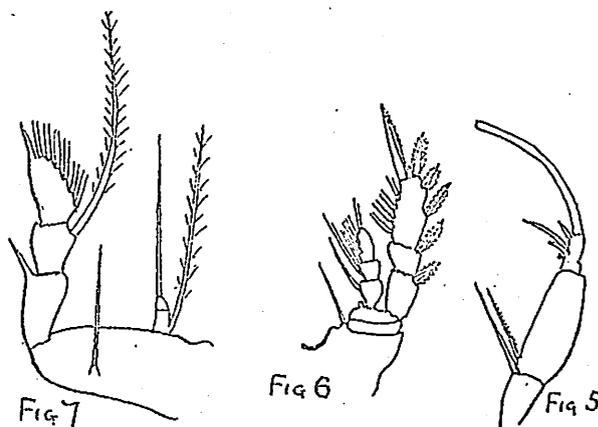


Fig. 5. Second antenna of *Corycaeus affinis* ♂
 Fig. 6. Second thoracic limb of *Corycaeus affinis* ♂
 Fig. 7. Fourth thoracic limb of *Corycaeus affinis* ♂

The two setae borne by the rudimentary endopodite of the fourth pair of legs indicate a close relationship of this species to *C. tenuis* Giesbr. and *C. lubbockii* Giesbr., both of which are Pacific forms, *tenuis* occurring in the equatorial region and *lubbockii* in the neighborhood of Hongkong.¹ From both these forms, however, *C. affinis*

¹W. Giesbrecht. Elenco dei Copepodi pelagici raccolti dal tenente di vascello G. Chierchia durante il viaggio della R. Corvetta "Vettor Pisani" negli anni 1882-1884, e dal tenente di vascello F. Orsini nel Mar Rosso, nel 1884. Atti Accad. Lincei Roma. Ser IV. VII. 1891.

different in the proportions of the urosome, the genital segment being slightly longer and the furcal limbs markedly shorter; thus, in *C. tenuis* the furca is twice and in *C. lubbockii* nearly three times as long as the anal segment, while in *C. affinis* the two segments have almost the same length, the furca being but slightly the longer. Furthermore, in *C. affinis* the furca and anal segment taken together are slightly shorter than the genital segment, while in *tenuis* and *lubbockii* their combined lengths markedly exceed that of the preceding segment. The absence of curvature in the terminal seta of the exopodite of the second pair of thoracic legs also distinguishes *affinis* from both the other species.

I. C. Thompson¹ has recorded the occurrence at Port Townsend of two species of Corycaeus, *C. pellucidus* and *C. obtusus*. The latter is at once distinguishable from *affinis* by its possession of but a single seta on the rudimentary endopodite of the fourth pair of thoracic legs. What the form recorded as *pellucidus* may be is uncertain, since Dana's original description of the species, based mainly on the occurrence of a beak-like prolongation of the ventral keel, does not differentiate it from several other species that show the same peculiarity. (Of the later authors who have recorded its occurrence, Lubbock and Thompson simply mention it without any description, and Bate in the 'Challenger' Reports describes a *pellucidus* which may or may not be identical with Dana's form, but at all events differs from *affinis*, markedly in the form of the second antennæ which approximates that shown by *C. rostratus* Claus.) Bate, indeed, gives this last name as a synonym of *pellucidus*, but owing to the uncertainty that exists as to what *pellucidus* really is the identification of *rostratus* with it seems unadvisable, and *affinis* must also be regarded as distinct and closely related, apparently, to *tenuis* and *lubbockii*.

A single sample of a fourth Copepodan species was observed, this individual belonging to the Harpacticid genus *Idya*. It seemed to be closely related to, if not identical with, *I. furcata* (Baird) Sars, but its preparation was not quite successful, and the identity, consequently, not fully established.

And finally, mention should be made of a Copepodan metanoplus that occurred in considerable numbers. In details of form this larva resembled so closely that of *Calanus finmarchicus* (*Cetochilus septentrionalis*) described by Grobben² that it must be referred to that species, even although no adults were obtained in this particular collection. They were observed, however, in collections taken at

¹ Proc. Liverpool Biol. Soc. XII, 1898, p. 87.

² C. Grobben. Arb. Zool. Inst. Wien. III. 1881.

other stations along the Vancouver coast and have also been recorded by Thompson as occurring at Port Townsend.

Two Amphipodan species occurred represented by three examples, which my colleague, Dr. A. G. Huntsman, has kindly examined for me. He reports that two of the examples belong to *Hyperoche* sp?, probably closely related to *H. Kroeyeri* Sars, though the exact determination of the species cannot be ascertained until more mature examples are obtained. The other form, represented by a single small female, is probably to be referred to *Parathemisto japonica*.

Of the higher Crustacea, a number of larval forms were obtained, these including a small number of Calyptopis larvæ, to whose parentage no clue was obtained, no adult Schizopods being captured. Of Brachyuran larvæ, a late Megalopa stage was observed and also a number of examples of a Porcellanid Zoea, readily recognizable as such by the exceedingly long rostral spine.

3. The third patch of "brown water" examined was encountered about 3½ miles off Amphitrite Point, Vancouver Island. It contained a much greater variety of protophytic forms than was observed in the collection just described, and in addition to the same species of Coscinodiscus, *C. nobilis*, a number of other diatoms occurred, such as *Diatoma elongatum* in considerable quantity and species of Nitzschia and Synedra. A Thalassiosira, perhaps *T. gravida* Gran., was present in small numbers, a Melosira in much greater abundance and two species of Chaetoceras. One of the forms belonging to this last genus is *C. decipiens* Cleve, characterized by the cells being broadly oblong in front view, the foramina almost slit-like and slightly constricted in the middle, the chromatophores numerous and scattered through the cell, though frequently more or less massed together, and the setæ of each pair both projecting in the sagittal plane. The other species is probably *C. constrictum* Gran., although the absence of examples with spores made the distinction from *C. lacinosum* Schutt a little uncertain. The cells were quadrate in front view, the foramina concave, lanceolate or in some cases almost oval, the sutures very distinct; the chromatophores, two in number, lay close to the valves, and one seta of each pair projected in the sagittal plane while the other was curved so as to lie in the transverse plane. A few examples of *Bacteriastrum furcatum* Shad. were also observed. Two species of Rhizosolenia, *R. setigera* Bright and *R. alata* Bright. occurred in small numbers as well as examples of a large Biddulphia, possibly a variety of *B. aurita* Lyngb., noticeable on account of the length of the angular processes of the valves, the mound-like projection between them surmounted by two strong filaments of attachment, and the large number of small chromatophores scattered through the cell. Finally a single

example was noted of a form which seems to be referable to the genus *Stephanopyxis*, and there were also two other species, which probably from lack of the necessary literature, it was not possible to identify.

Like the Diatoms, the Dinoflagellates were also well represented as far as variety was concerned, although none of the species occurred in any special abundance. The commonest form was *Prorocentrum micans* Ehr. and others observed were *Dinophysis norvegica* C. and L., *D. lacis*, C and L, with the cytoplasm packed with highly refractive spherical granules, *Peridinium divergens*, and a form which seems to be closely related to, if not identical with Bergh's *Proto-peridinium pellucidum*. *Ceratium fusus* was not uncommon, and a single example of *C. tripos* was seen, belonging to a variety in which the posterior horns are very short and directed almost straight outwards, without any noticeable curvature.

Of higher forms, mention may be made of an Anthomedusan that was present in considerable numbers, and represents a hitherto unknown species. A description of it has been drawn up by Dr. H. B. Bigelow and will appear as a separate contribution in these Proceedings.

The crustacea were less abundantly represented than in the collection from Esperanza Inlet, but two forms of Cladocera were again present, *Evadne nordmanni* and a Podon, which in this case, however, was *P. leuckartii*. Of the Copepoda, the most abundant form was again *Acartia longiremis*, but it is interesting to note that a few individuals of *Calanus finmarchicus* (Gunner) Boeck were also observed. *Paracalanus parvus* Claus was represented by numerous examples and occasional individuals of *Centropages hamatus*, *Corycaeus affinis* and a form which apparently represents a new genus and species belonging to the family Pontellidae.

Paralabidocera n. g.

Cephalic region provided with lateral hooks and with two strong triangular rostral processes. Dorsal eyes well developed, each with a single cuticular lens, somewhat larger in the male than in the female. Ventral eye present, but destitute of a cuticular lens. Last thoracic segment not fused with the preceding one, its lateral lobes hardly pointed in the female, but markedly so on the right side in the male. Abdominal region consisting of three segments in the female and four in the male, the genital segment being only very slightly asymmetrical, as are also the furcal rami in the male. Anterior antennae reaching to beyond the last thoracic segment, 25-jointed, several of the joints being, however, fused in the female so that the total number cannot

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be counted; in the male the right antenna is slightly dilated in its middle part but does not bear any denticulate grasping lamella. Posterior antennae with the inner ramus nearly or quite as long as the outer one, which is confluent with the second basal joint.

Masticatory portion of the mandible with 5 teeth, of which the 3rd and fourth are bicuspid, the others simple. The outer ramus of the 1st-4th thoracic limbs 3-jointed, the inner ramus of the 1st limb 3-jointed and that of the 2nd and fourth limbs 2-jointed. Fifth limb in the female almost symmetrical, with both inner and outer rami, each consisting of a single joint; in the male asymmetrical, the right one being larger than the left, with no inner ramus and a simple single-jointed outer ramus.

Paralabidocera amphitrites n. sp.

The individuals upon which this species is founded were three in number two females and one male. Many additional examples were found, which from the general form of the body, the arrangement of the eyes and other particulars were evidently identical, but immature, and not presenting in all respects the characters that may be regarded as adult. Neither of the presumably adult females carried ova or spermatophores, and there is consequently a possibility that even they had not quite reached the adult stage. This possibility, however, seems so slight that it may be disregarded.

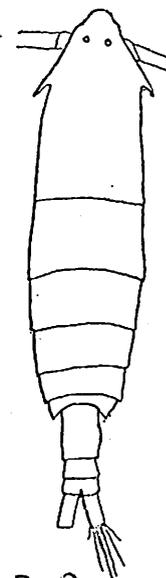


FIG 8

Fig. 8. *Paralabidocera amphitrites*, from dorsal surface.

The length of the male is 2.53 mm. The rostral processes are well developed and form a pair of triangular processes, attached to the rostral region by a broad flattened base, and terminating in a sharply pointed apex. The lateral hooks of the cephalic region are well-developed, resembling those found in the genus *Pontella* (fig. 8).

In the female, the cuticular lenses of the dorsal eyes are small and are separate from one another by about three times their diameter. The ventral eye is well-developed, but lacks a lens. The anterior antennae extend backwards to the level of the second abdominal segment and are probably 25-jointed, though so much fusion has occurred between the more proximal joints that not more than 22 could be distinguished; the 24th and 25th were fused, the latter being greatly reduced in size. The posterior antennae have the general Pontellid form, but are characterized by the large size of the outer ramus, which is quite as long as the inner one; the latter is almost completely fused with the distal basal joint, a faint line on the inner surface being the only indication of a separation. The mandible (fig. 9) has the distal basal limb decidedly belled out upon its outer

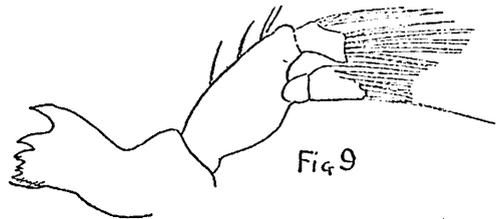


Fig. 9. Mandible of *Paralabidocera amphitrites* ♀

side, and the terminal portion of the outer ramus is bowed outwards so that the inner surface of the indistinctly separated joints look distally as well as inwards; the masticatory portion bears only five teeth, of which the first and second are widely separated and simple, while the remaining three are more closely set and the third and fourth bicuspid; two rows of small setae occur at the base of the fifth tooth and a longer seta arises from the posterior border a little lateral to the base of the fifth tooth. The maxilla resembles closely that figured by Giesbrecht for *Pontella lobiancoi*¹, the most noticeable differences being that the proximal group of setae on the fused $B_1 + R_1 + R_2$ consists of three instead of four setae. The two maxillipeds resemble so closely those figured by Giesbrecht for *Labidocera wollastoni*² as to need no further description.

¹W. Giesbrecht, Copepoda. Fauna n. Flora Golfes von Neapel. XIX. 1892. pl. XXIV, fig. 22.

²L.c. Pl. XXIII, figs. 10 and 20.

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The last thoracic segment is narrow but quite distinct from the preceding one; its lateral lobes symmetrical and terminating in an acute angle, but not prolonged into well-marked expansions (fig. 8). The outer rami of the 1st-4th thoracic limbs are 3-jointed, the inner ramus of the 1st limb is 3-jointed (fig. 10), but those of the 2nd-4th limb are 2-jointed. The 5th limb (fig. 11) is symmetrical on the two sides, the proximal basal joints are united in the medial line and the

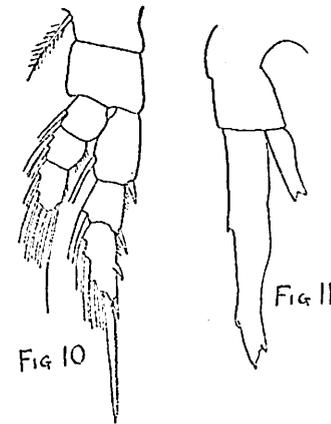


Fig. 10. First thoracic limb of *Paralabidocera amphitrites* ♀

Fig. 11. Fifth thoracic limb of *Paralabidocera amphitrites* ♀

distal basal bears upon its posterior surface a single feathered seta attached about half way between the proximal and distal borders and extending only a short distance beyond the latter. The outer ramus is single-jointed and is almost straight; it terminates in a pointed projection, a smaller tooth occurring at the inner side of its base, while two small teeth are borne upon the outer border. The inner ramus is also single-jointed and articulates with the distal basal joint; it is also almost straight, is belled out on its inner border proximally, terminates into two short teeth and is a little less than one-third the length of the outer ramus.

Male.—The head region of the male resembles that of the female except that the lenses of the dorsal eyes are considerably larger. The left first antenna is very similar to that of the female, but the right one (fig. 12) is considerably modified. The basal joints are broader and there is no fusion of joints, except a partial fusion of 1st and 2nd, so that all the twenty-five joints of which the limb is composed can be readily distinguished. The 3rd-5th joints are narrow, and each bears three aesthetascs (all of which are not shown in the figure): a

constriction occurs between the 8th and 9th joints and the succeeding joints become gradually longer and up to about the 14th and 15th gradually wider also, the width of the limb at this region being about twice what it was at the constriction between the 8th and 9th joints. The 18th and 19th joints are at least twice the length of the 17th and the 19th bears upon its outer distal border a spine-like prolongation almost as long as the 20th joint; the middle dilatation may be regarded as ceasing with the 19th joint, and beyond this there are six joints forming the terminal portion of the limb, the last of them, the 25th, being very small, but distinctly separated from the preceding one. There is no angulation and no denticulate grasping lamellæ were present on any of the joints.

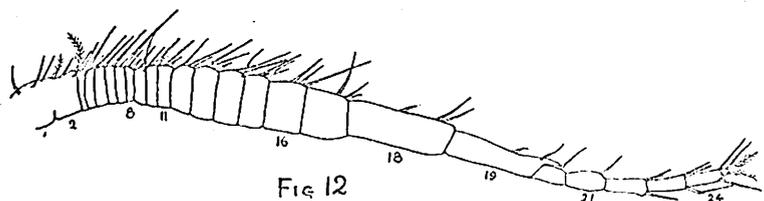


Fig. 12. Right first antenna of *Paralabidocera amphitrites* ♂

The last thoracic segment is asymmetrical, its left lateral lobe resembling that of the female, while on the right side it is prolonged backwards as a pointed process that reaches to about the middle of the first abdominal segment. The fifth thoracic limbs (fig. 13) are also asymmetrical to the extent that one is longer than the other and terminates in three sharp points, while the other has only two smaller terminal points. Both consist of but one single-jointed ramus and there is no indication of the chelate condition occurring in Labidocera.

The abdomen consists of four segments, (fig. 14) the first being slightly asymmetrical. The furcal rami are symmetrical and setose on their medial borders; their length is twice their greatest breadth.

4. The fourth patch of "brown water" examined, was encountered off the Escalante Rocks, Nootka Sound, Vancouver Island, and its constituents are for the most part identical with forms described from patches 3 and 2. *Coscinodiscus nobilis* was rare, *Ceratium fusus* frequent, and *C. furca* occasional, but there was by no means so great a variety of protophytic forms as was seen in the other patches. The medusa, *Rathkea blumenbachii*, was again present in considerable numbers, and *Diphyes appendiculata* was represented by a few examples as was also the Brachiolarian larva observed in patch 2. The Crustacea, as usual, were well represented; *Evadne Nordmanni* was observed and more rarely Podon (species undetermined). Of the Copepoda,

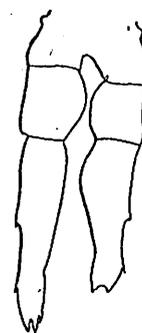


Fig 13

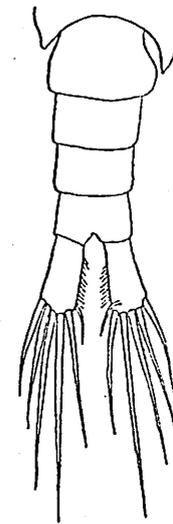


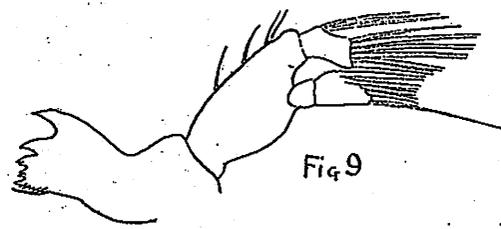
Fig 14

Fig. 13. Fifth thoracic limbs of *Paralabidocera amphitrites* ♂

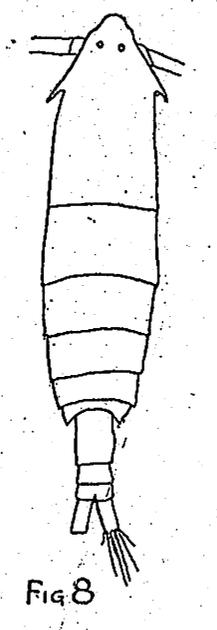
Fig. 14. Urosome of *Paralabidocera amphitrites* ♂

the most abundant species was again *Acartia longiremis* and with it was associated less abundantly *Calanus finmarchicus*, *Paracalanus parvus*, *Centropages hamatus*, and *Corycaeus affinis*. Barnacle larvae were also frequent and Schizopod larvae occasional, while a couple of examples of an undetermined Brachyuran were also captured.

5. For comparison with the above records, an account may be given of two surface gatherings taken during the same voyage, but from water that showed no signs of colouration, in which, that is to say, there was no special concentration of the plankton. The first of these was a gathering taken off Rose Spit at the northern end of the Queen Charlotte Islands, August 25th, 1912. Its most abundant constituents were diatoms, a species of *Nitzschia* being particularly frequent, far surpassing any other form in numbers. With it, scattered representatives of other genera occurred, those recognized being *Diatoma elongatum*, *Asterionella*, two species of *Coscinodiscus*, a *Biddulphia* (probably *B. mobiliensis*), a *Melosira*, *Chaetoceras decipiens* and *Rhizosolenia alata*. Three species of Dinoflagellates were noted, all belonging to the genus *Ceratium*, *C. fusus*, *C. tripos*, and *C. furca*; the *fusus* being the most frequent. Rare examples of the Silicoflagellate *Distephanus speculum* were seen, and also of the Tintinnode, *Cytarocythis denticulata* C and L. A single example of the Brachiolarian



McMurry Fig 2.
Hugh
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x
Thra Fig 5

McMurr Fig 1.
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mentioned as occurring in the second and fourth patches of "brown water" was noted and also a few Cyphonautes and a fair number of *Oikopleura dioica*.

Of Crustacean forms, there were observed a single individual of Podon, whose species was undetermined, and the following Copepoda, none of which were in any great numbers; *Pseudocalanus elongatus* Boeck, the form identified with *Centropages hamatus*, *Tortanus discaudatus* Thomps. and Scott, *Acartia longiremis* and *Oithona similis* Claus. Numerous Copepod nauplii and immature forms were also present, as well as occasional barnacle larvæ and numerous ova that were taken to be of some Schizopodan form. A late Peneid metazoa was also seen and two young Brachyurans which were not identified. In this gathering the only teleostean ova obtained were present; they were few in number and could not be identified.

6. The second gathering that may be used for comparison was taken eight miles off Hudson Bay Passage, Dixon Entrance, B. C., August 25th, 1912. In marked contrast to gathering 5, this one was almost destitute of diatoms, only rare examples being noticed of a form which seemed to be a Rhizosolenia, but which could not be definitely identified. Flagellate and Protozoan forms were also almost wanting, an occasional Noctiluca being the only one observed. On the other hand, a broad armed Pluteus similar to that mentioned as occurring in gathering 2 was quite frequent and a single example of an Auricularia was also seen. An occasional Cyphonautes occurred and also a few examples of *Oikopleura dioica*.

Of Crustacea in addition to a small number of Cirrhipede larvae and an occasional Evadne and Podon, mature individuals of the following species of Copepoda were observed; *Pseudocalanus elongatus*, *Centropages hamatus*, *Paralabidocera amphitrites*, *Tortanus discaudatus*, *Acartia longiremis*, and *Oithona similis*. The most abundant constituents of the gathering, however, were ova of two kinds; one variety was the same as those ova obtained in gathering 5 and identified as belonging to some Schizopodan form, while the second variety, less numerously represented, was only about half the size of the other, and possessed a greatly corrugated chorion.

From these observations fragmentary though they be, it would seem that the "brown water" plankton does not, as a rule, differ qualitatively from that distributed in a more diffuse manner in the neighboring areas. The brown patches merely represent aggregations of the ordinary plankton, produced perhaps by the local action

of winds and currents, an approach to a monotonic condition being indication possibly of a reproductive rhythm such as that which produces the vernal maximum of plankton protophytes.

The similarity of the planktonic constituents of British Columbian waters to those of the North Atlantic is very striking, the great majority of the forms being specifically identical with those occurring in the latter area. This is probably to be explained on the basis of a circumpolar distribution of the majority of the forms concerned, although the possibility should not be neglected that in the case of some forms the similarity may be due to a former circumpolar distribution under different climatic conditions. In other words, it is possible that certain forms may occur upon both the eastern and western coasts of Canada, between certain latitudes, and not on the intervening northern coasts, being isolated detachments of species which in earlier times possessed a circumpolar distribution. There are some indications that such a condition occurs, but until a thorough knowledge of the zoology of our arctic waters is obtained, they can be regarded only as pointing to a possibility.