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Plankton from Christmas Island, Indian Ocean.—II.
On Copepoda of the Genera *Oithona* and *Paroithona*.
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(Plates XXVII.—XXXI.†)

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In a previous paper published in the Proceedings of this Society (1911, pp. 282-296), an account was given of the species of *Corycaeus* and *Corycella* found in a small collection of Plankton made in 1908 by Sir John Murray, K.C.B., F.R.S., and Dr. C. W. Andrews, F.R.S., at Christmas Island, in the Indian Ocean, and presented to the British Museum by Sir J. Murray. The following account deals with the species of *Oithona* and *Paroithona* found in the same collection.

* Communicated by Dr. W. T. CALMAN, F.Z.S.
† For explanation of the Plates see p. 193.

Of the genus *Oithona* eleven species were represented. Five of these,

| | |
|----------------------|--------------------|
| <i>O. plumifera,</i> | <i>O. robusta,</i> |
| <i>O. setigera,</i> | <i>O. nana,</i> |
| <i>O. linearis,</i> | |

are already known. The remaining six appear to be unknown and are described below under the following names:—

| | |
|----------------------|----------------------|
| <i>O. virida,</i> | <i>O. attenuata,</i> |
| <i>O. decipiens,</i> | <i>O. simplex,</i> |
| <i>O. fullax,</i> | <i>O. oculata.</i> |

The closely allied genus *Paroithona*, previously known from a single species in the N.E. Atlantic, is represented by a new species, *P. nulla*.

The fact that twelve species, out of the twenty contained in the two genera, were present will serve to illustrate the remarkable richness of the collection.

The number of gatherings in the collection was eight. Three of these were taken with nets of larger mesh than the rest, and contained only those species which exceeded 1 mm. in length. The smaller species, including all the new forms, were found exclusively in the other five.

Notes on the Species.

OITHONA SETIGERA Dana.

Found in five gatherings and was, next to *O. plumifera*, the commonest species of *Oithona*.

This species was described by Dana (8) in 1849, from specimens taken in the Pacific, and Giesbrecht (13) gave a complete diagnosis of it also from Pacific specimens. Most of the Christmas Island specimens could be recognised by their large size (1.6 to 1.7 mm., with a few as large as 1.9 mm.), and by the possession of well-marked clavate setæ, usually coloured red, on the outer edges of the second basal joints of the swimming-feet. In a few specimens, however, these setæ were long and slender and did not show signs of thickening. These specimens agree with *O. pelagica* which I described (11) from the west coast of Ireland, and also with *O. tropica* described by Dr. Wolfenden (17) from a single specimen from the Maldives. Other specimens showed a good deal of variation in the amount of the thickening, and in some instances the setæ on the fifth pair of feet were thickened and coloured.

As regards *O. tropica*, Wolfenden states that "the inner marginal bristles of the 2nd basals are not swollen as in *O. setigera*." In this sentence the word "inner" is evidently a clerical error for outer. The proportional lengths of the joints of the 1st antennæ, as given for *O. tropica*, differ from those found in *O. setigera*, but the difference can be explained by supposing the 3rd and 4th and the 6th and 7th joints, the segmentation

between which is imperfect, to be united and the 8th and 10th joints each to have been divided into two.

It seems, then, that *O. pelayica* and *O. tropica* cannot be maintained as species distinct from *O. setigera*, but the fact is worth noting that, in the N.E. Atlantic, *O. setigera*, whether the cause be racial or environmental, is not found with thickened setae, while in tropical regions these setae are almost always present.

In addition to the large form mentioned above there occurred a very few specimens of a form measuring from 1.20 to 1.26 mm. in length. These are the same size as, and, at first sight, look very like *O. plumifera*, but examination of the appendages shows that they agree with *O. setigera*. The setae of the basal joints of the swimming-feet are not thickened. There did not appear to be any specimens of intermediate size connecting the larger and smaller forms.

Distribution. North Atlantic, Gulf of Guinea, Mediterranean, Gulf of Suez, Indian Ocean, Pacific Ocean.

OITHONA PLUMIFERA Baird.

Present in all the gatherings and very common in most of them.

Almost all the specimens bore tufted plumose outer-edge setae on the 2nd basal joints of the first three pair of swimming-feet, and in the few cases where they were absent it seemed probable that the plumose tip of the seta had been broken off. The amount of feathering varied in different specimens. In most cases it was opaque and of a bright red colour; in others it was transparent and colourless and difficult to observe. In the 1st maxilla there was no seta on the 2nd inner lobe and the seta on the endopodite was very minute. The endopodite of the mandible bore only three setae. The size of the specimens varied from 1.20 to 1.37 mm.

Distribution. Mediterranean, Gulf of Guinea, Red Sea, Arabian Sea, Indian Ocean, Pacific Ocean, Gulf of California, off Cape of Good Hope.

OITHONA LINEARIS Giesbrecht.

This easily recognised species was present in six gatherings, being almost as common as *O. setigera*.

Distribution. Red Sea, Indian Ocean, Pacific Ocean.

OITHONA VIVIDA, sp. n. (Pl. XXVII. figs. 1-8.)

Female (fig. 4).—Length .68-.74 mm.; cephalothorax .37 mm.; abdomen .34 mm.; proportional lengths of abdominal segments and furca 15:40:22:18:17:15.

Rostrum (fig. 5) sharp-pointed and produced anteriorly, as in *O. plumifera* and *O. setigera*.

1st antenna (fig. 1) very slender, reaching to the genital openings; proportional lengths of antennal joints:

| | | | | | | | | |
|----|---|--------|----|----|-------|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11 | 9 | 8+3+10 | 17 | 53 | 11+23 | 5 | 9 | 10 |

There are two imperfect jointings close together in the centre of the third joint and another in the sixth; a row of minute spinules runs along the lower edge of the fourth and fifth joints.

2nd antenna large, robust, of the usual form.

Mandible (fig. 2) with very slender 2nd basal; endopodite with four small setæ, the two central ones being the shortest; exopodite with four large feathered setæ and one slender one.

1st maxilla (fig. 3).—1st inner lobe well developed with the usual setæ; 2nd inner lobe with one fine seta; 3rd inner lobe with three spines; endopodite comparatively large with three very small setæ; exopodite with four setæ.

2nd maxilla and maxillipede of the usual structure but comparatively short.

1st foot (fig. 6): exopodite with 1.1.3 outer edge spines and 1.1.4 inner edge setæ, the seta on the inner edge of the 1st joint being very minute, terminal spine long and slender, longer than the exopodite; endopodite with 0.1.4 inner edge and 0.0.1 outer edge setæ.

2nd foot (fig. 7): exopodite with 1.1.3 outer edge spines and 1.1.4 inner edge setæ, seta on inner edge of 1st joint very minute, terminal spine longer than the exopodite and broader than in the 1st foot; endopodite with 1.2.4 inner edge and 0.0.1 outer edge setæ.

3rd foot (fig. 8): exopodite with 1.1.2 outer edge spines, the most distal very large, the rest very minute, and 1.1.4 inner edge setæ, terminal spine much longer than the exopodite; endopodite with 1.2.4 inner edge and 0.0.1 outer edge setæ.

4th foot rather small: exopodite appears to have 1.1.3 or 1.0.3 very minute slender outer edge spines and 1.1.4 inner edge setæ; endopodite with 1.2.3 outer edge and 0.0.1 inner edge setæ.

5th foot of usual form.

The possession of a pointed rostrum and of a large number of outer edge spines, though reduced in size, on the swimming-feet, and also the presence of a large endopodite on the 1st maxilla, places this species near to *O. robusta*, but the 1st antenna is of a different type and seems to be peculiar in not having a spine on the distal end of the 3rd (primitively 12th) joint. As *O. robusta* is the least specialised of the rostrate Oithonas, so *O. virida* seems to have taken the first step towards the reduction of the spines on the swimming-feet which is found in the other rostrate species.

Four specimens were found in one gathering.

OITHONA ROBUSTA Giesbrecht.

Found in four gatherings, a few specimens in each.

Distribution. Indian Ocean and Tropical Pacific.

OITHONA DECIPIENS, sp. n. (Pl. XXVIII. figs. 4-11.)

Female (fig. 7).—Length 56-62 mm.; cephalothorax 34 mm.;

abdomen (including Th. 5) .28 mm., proportional lengths of abdominal segments and furca 12:26:12:10:9:8. Rostrum (fig. 4) pointed, not visible in dorsal view, similar to that of *O. similis* but more hooked at the tip. Form of body slender.

1st antenna just reaches to the genital openings; proportional lengths of joints:

| | | | | | | | | |
|---------|--------------|---------|---------------|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| (16+16) | (3+10+13+12) | (14+14) | (14+15+15+16) | 12 | 28 | 10 | 12 | 14 |

the first four joints being subdivided by imperfect jointing in the proportions indicated; there is a small spine on the end of the 2nd joint.

2nd antenna very small.

Mandible (fig. 5): endopodite small with two setæ, exopodite with five setæ.

1st maxilla (fig. 6) small, endopodite without setæ.

2nd maxilla and maxilliped comparatively short and weak but of usual form.

1st foot (fig. 8): exopodite three-jointed with 1.0.2 outer edge spines and 0.0.4 inner edge setæ; endopodite two-jointed with 1.5 inner edge setæ and 1 outer edge seta.

2nd foot (fig. 9): exopodite with 1.1.2 outer edge spines and 0.1.5 inner edge setæ; endopodite with 1.2.4 inner edge and 0.0.1 outer edge setæ; an inner edge seta was found on the 1st basal of the 1st and 2nd feet, but not of the 3rd and 4th, an outer edge seta was present on the 2nd basals of all the swimming feet.

3rd foot (fig. 10): exopodite with 1.0.1 outer edge spines and 0.1.5 inner edge setæ; endopodite with 1.2.4 inner edge and 0.0.1 outer edge setæ.

4th foot (fig. 11): exopodite without outer edge spines and with 0.1.5 inner edge setæ; endopodite with 1.2.3 inner edge and 0.0.1 outer edge setæ.

5th foot of usual form.

This species resembles *O. similis* so closely that it is almost impossible to distinguish it without examination of the spines on the swimming-feet. It differs from that species in the absence of a spine on the 2nd joint of the exopodite of the 1st foot and in the presence of a spine on the corresponding joint of the 2nd foot. It also differs in not having an outer edge spine on the 3rd joint of the exopodite of the 4th foot, unless that spine may have been accidentally knocked off in all the specimens examined, as sometimes happens in the case of *O. similis*, and in having a well-developed spine on the centre of the outer margin of the 3rd joint of the exopodite of the 2nd foot, which in *O. similis* is only represented by a small tooth.

About thirty-five specimens were found in one gathering.

OITHONA FALLAX, sp. n. (Pl. XXVII. figs. 9-12; Pl. XXVIII. figs. 1-3.)

Female (Pl. XXVIII. fig. 3).—Length .88-.94 mm.; cephalo-

thorax 48 mm.; abdomen (including Th. 5) 42 mm.; proportional lengths of abdominal segments and furca 9:20:9:9:8:6.

Rostrum (Pl. XXVII. fig. 1) pointed, not visible in dorsal view, similar to that of *O. similis* and *O. decipiens*.

1st antenna reaches to the beginning of the genital segment; proportional lengths of joints:

| | | | | | | | | |
|---------|--------|---------|----|---------------|---------|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| (24+28) | (4+12) | (16+16) | 40 | (20+20+20+22) | (16+38) | 14 | 16 | 20 |

the first three and the 5th and 6th joints being subdivided by imperfect jointing in the proportions indicated.

2nd antenna slightly larger comparatively than in *O. decipiens*.

Mandible (Pl. XXVIII. fig. 2): endopodite with four setae.

1st maxilla: exopodite with three moderately strong terminal setae, endopodite with one small seta.

2nd maxilla and maxillipede of the usual type.

1st foot (Pl. XXVII. fig. 9): exopodite with 1.1.2 outer edge spines and 0.1.4 inner edge setae, terminal spine shorter than the exopodite; endopodite two-jointed with 1.5 inner edge and 1 outer edge setae.

2nd foot (Pl. XXVII. fig. 10): exopodite with 1.0.2 outer edge spines and 1.1.5 inner edge setae; the inner edge seta on the 1st joint is small; terminal spine approximately equal to the exopodite; there is a small tooth on the outer edge of the 3rd joint of the exopodite proximal to the first spine; endopodite with 1.2.4 inner edge and 1 outer edge setae.

3rd foot (Pl. XXVII. fig. 11): exopodite with 1.0.1 outer edge spines and 1.1.5 inner edge setae, inner edge seta on 1st joint small; there is a small tooth in the middle of the outer edge of the 3rd joint; terminal spine slightly longer than the exopodite.

4th foot (Pl. XXVII. fig. 12): exopodite with 0.0.0 outer edge spines and 1.1.5 inner edge setae, inner edge seta on 1st joint small; terminal spine slightly longer than the exopodite; endopodite with 1.2.3 inner edge and 1 outer edge setae.

There is a well-developed outer edge seta on the 2nd basals of all the swimming-feet and an inner edge seta on the 1st basals.

5th feet of usual form.

This species, like *O. decipiens*, can with difficulty be distinguished from *O. similis* without examination of the swimming-feet. The shorter terminal spines and the presence of two outer edge spines on the 3rd joint of the exopodite of the 2nd foot and of a small inner edge seta on the 1st joints of the 2nd to 4th feet are the distinguishing characters which can be most easily observed.

Four specimens were found in three gatherings.

OITHONA NANA Giesbrecht.

Occurred in five gatherings, but in two only was it numerous.

Distribution. N. Atlantic, Mediterranean, Red Sea, Arabian Sea, Indian Ocean, Gulf of California, Cape of Good Hope.

OITHONA ATTENUATA, sp. n. (Pl. XXX. figs. 3-7.)

Female (fig. 5).—Length .88 mm.; cephalothorax .4 mm.; abdomen (including Th. 5) .48 mm., proportional lengths of abdominal segments and furca 16:8:8:6.5:8; furcal rami long and narrow, arrangement of setæ as in *O. nana*. Front of cephalon (fig. 3) slightly produced but not pointed.

1st antenna (fig. 4) reaches to the beginning of the genital segment; proportional lengths of joints:

| | | | | | | | | | | |
|----|----|---|----|----|----|----|---|---|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 16 | 28 | 9 | 19 | 31 | 10 | 10 | 8 | 8 | 11 | 9 |

Small spine on the end of the 3rd joint.

2nd antenna comparatively large, of the usual structure.

Mandible: 2nd basal with one stout terminal seta; endopodite large, rounded, with four setæ; exopodite with five setæ.

1st maxilla: structure not made out.

2nd maxilla and maxillipede as in *O. nana*.

Swimming-feet (figs. 6, 7) with three-jointed exopodites and endopodites; exopodites of 1st to 3rd feet with 1.1.3 outer edge spines; exopodite of 4th foot with 1.1.2 outer edge spines; terminal spines of 2nd and 3rd feet shorter than the exopodites; short strong seta on the inner edge of the 1st joint of the exopodites of the 2nd and 3rd feet, not seen on the 1st foot.

5th feet of the usual form.

This species is closely allied to *O. nana* and differs mainly in the long drawn-out abdomen and furca and in the longer 1st antenna.

A single specimen was found in the collection.

OITHONA SIMPLEX, sp. n. (Pl. XXIX. figs. 10-14; Pl. XXX. figs. 1, 2.)

Female (Pl. XXIX. fig. 11).—Length .38-.42 mm.; cephalothorax .24-.26 mm., abdomen (including Th. 5) .14-.16 mm. (Pl. XXIX. fig. 12), proportional lengths of abdominal segments and furca 7:21:9:7:3:7. Rostrum absent, front of cephalon (Pl. XXIX. fig. 10) rounded as in *O. nana*.

1st antenna (Pl. XXX. fig. 1) reaches to the beginning of the 2nd thoracic segment; proportional lengths of joints:

| | | | | | | | | | | |
|---|---|---|---|---|----|---|----|---|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 5 | 9 | 4 | 8 | 11 | 4 | 11 | 5 | 8 | 5 |

2nd antenna rather short and stout.

Mandible, 1st maxilla, 2nd maxilla, and maxillipede as in *O. nana*.

1st foot (Pl. XXX. fig. 2): exopodite three-jointed with 1.1.3 outer edge spines and 0.1.4 inner edge setæ, terminal spine longer than the exopodite; endopodite two-jointed with 0.5 inner edge and 0.1 outer edge setæ; process of the 2nd basal between the exopodite and endopodite rather large and acute.

[7]

2nd foot: exopodite three-jointed with 1.1.3 outer edge spines and 1.1.5 inner edge setae, inner edge seta on 1st joint very small, terminal spine shorter than the exopodite; endopodite three-jointed with 1.2.4 inner edge and 0.0.1 outer edge setae; outer edge seta present on 2nd basal, not seen on 3rd and 4th feet.

3rd foot (Pl. XXIX. fig. 13) similar to 2nd except for absence of outer edge seta on 2nd basal.

4th foot (Pl. XXIX. fig. 14): exopodite with 1.1.3 outer edge spines and 1.2.5 inner edge setae; the most distal outer edge spine is well developed, the others being small and slender; inner edge seta on first joint very small; terminal spine shorter than the exopodite; endopodite with 1.2.3 inner edge and 0.0.1 outer edge setae.

5th feet very small but appear to be of the usual form with one terminal and one basal seta.

Occurred in two gatherings, about twenty specimens.

In these gatherings it could be recognised by its small size and the shortness of the anal segment, less than the furca.

OITHONA OCOLATA, sp. n. (Pl. XXX. figs. 8, 9; Pl. XXXI. figs. 2-9.)

Female (Pl. XXXI. figs. 2, 3).—Length .9 mm.; cephalothorax .54 mm.; abdomen (including Th. 5) .36 mm.; proportional lengths of abdominal segments and furca 7:18:10:9:8:8; furcal rami about two and a half times as long as wide, with an outer edge seta situated in the middle of the outer margin. Rostrum absent, cephalon slightly produced into a rostral prominence in front of the antennae. The cephalic ganglia form a large bilobed mass, in front of which are situated, in the rostral prominence, a pair of small clear refractive areas.

1st antenna (Pl. XXXI. fig. 4) reaches to the 2nd thoracic segment; proportional lengths of joints:

| | | | | | | | | | | | |
|----|---|----|----|----|----|----|---|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 11 | 6 | 16 | 11 | 12 | 12 | 16 | 7 | 13 | 4 | 9 | 6 |

3rd joint with an imperfect jointing near its proximal end, 4th joint with a small spine distally on its upper margin.

2nd antenna of the usual form.

Mandible (Pl. XXXI. fig. 5): 2nd basal with two terminal (inner edge) spines and a small seta on its lower (inner) margin opposite the endopodite; endopodite sloped outwards, with three terminal and two inner edge setae; exopodite with two terminal and three inner edge setae.

1st maxilla (Pl. XXXI. fig. 6): 1st inner lobe well developed, of the usual form, 2nd inner lobe with one strong seta, 3rd inner lobe with three terminal and one lateral setae; endopodite moderately large, bent outwards, with two lateral and two terminal setae; exopodite large, with four terminal setae, the outermost being slightly the largest.

2nd maxilla and maxillipede (Pl. XXX. fig. 8) of the usual form but rather short.

1st foot (Pl. XXXI. fig. 7): exopodite with 1.1.3 outer edge spines and 1.1.4 inner edge setæ, the inner edge seta on the 1st joint being very small; terminal spine shorter than the exopodite; endopodite with 1.1.4 inner edge and 0.0.1 outer edge setæ; there is a distinct tooth between the terminal and the outer edge seta; inner edge seta on the 2nd basal longer than the first two joints of the endopodite.

2nd and 3rd feet (Pl. XXXI. figs. 8, 9) with 1.1.3 outer edge spines and 1.1.5 inner edge setæ, the inner edge seta on the 1st joint being very small; terminal spine of 2nd foot a little longer than the exopodite and of 3rd foot about equal to it; in both cases it is considerably longer than the endopodite; inner edge seta on 1st basal of 3rd foot and outer edge seta on 2nd basal, both these setæ being absent from the 2nd foot.

4th foot (Pl. XXX. fig. 9): exopodite with 1.1.2 outer edge spines and 1.1.5 inner edge setæ, the inner edge seta on the 1st joint being very small, terminal spine slightly longer than the exopodite; endopodite with 1.2.3 inner edge and 0.0.1 outer edge setæ; 1st basal with inner edge seta, 2nd basal with outer edge seta.

5th foot small, with two terminal setæ and one at its base.

This species is closely allied to *O. rigida*, differing mainly from it in the greater length of the terminal spines of the swimming-feet. In *O. rigida*, as figured by Giesbrecht (14) and also by Cleve (7), these spines are shorter than the terminal joints of the exopodites. Another difference is the comparatively large size of the inner edge setæ on the 1st joints of the exopodites in *O. rigida*. In *O. oculata* they are very small. In size and appearance and in the proportional lengths of the abdominal segments and antennal joints the two species agree very closely.

Common in one gathering, a single specimen in another.

Genus PAROITHONA.

This genus was described in 1908 (10) from specimens taken in deep water off the west coast of Ireland, only one species having been met with until the Christmas Island collections yielded a second representative. The genus is closely allied to *Oithona*, and is distinguished mainly by having a two-jointed endopodite on all the swimming-feet and by the form of the mandible palp. It is questionable whether the differences which separate it from some species of the genus *Oithona* are any greater than those which separate *O. nana* from such species as *O. plumifera* and *O. setigera*, but the occurrence of a second species, closely resembling that first described, is in favour of the retention of the genus.

PAROITHONA PULLA, sp. n. (Pl. XXIX. figs. 1-9; Pl. XXXI. fig. 1.)

Female (Pl. XXIX. fig. 1).—Length 40-43 mm.; cephalo-thorax 23 mm.; abdomen (Pl. XXIX. fig. 3) (including Th. 5) 19 mm., proportional lengths of abdominal segments and furca 8:20:9:11:6:6. Rostrum absent, front of cephalon (Pl. XXXI. fig. 1) rounded as in *O. lebes*. Furca with the two longest setæ superposed on the inner half of the terminal margin.

1st antenna (Pl. XXIX. fig. 2) reaches to the end of the 2nd thoracic segment; proportional lengths of joints:

| | | | | | | | | | | |
|---|---|---|---|---|----|---|---|---|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 5 | 9 | 5 | 7 | 12 | 4 | 7 | 4 | 4 | 6 |

The 3rd joint is divided into two by a partial jointing, and there appears to be a small spine on the end of the 4th joint.

2nd antenna (Pl. XXIX. fig. 5) rather small and slender, two-jointed.

Mandible (Pl. XXIX. fig. 4): second basal with a single large terminal spine on the inner lobe and a much smaller spine some distance away on either side of it; endopodite bent outwards, with two terminal and two much smaller lateral setæ; exopodite with four subequal setæ.

1st maxilla: structure not properly made out.

2nd maxilla and maxillipede as in *P. parvula*, of the usual *Oithona* structure but rather small.

1st foot (Pl. XXIX. fig. 6) with two-jointed exopodite and endopodite, the division between the 2nd and 3rd joints of the exopodite being only faintly indicated; exopodite with 1.1.2 outer edge spines and 0.1.4 inner edge setæ, the terminal spine considerably longer than the exopodite; endopodite with 1.4 inner edge and 0.1 outer edge setæ; 1st basal with an inner edge and 2nd basal with an outer edge seta.

2nd to 4th feet with three-jointed exopodites and two-jointed endopodites.

2nd foot (Pl. XXIX. fig. 7): exopodite with 1.1.2 outer edge spines and 0.1.5 inner edge setæ, terminal spine longer than the exopodite; endopodite with two inner edge, one terminal and one outer edge setæ on the distal end of the 2nd joint; no setæ seen on the basal joints.

3rd foot (Pl. XXIX. fig. 8): exopodite with 1.0.1 outer edge spines and 0.1.5 inner edge setæ; there is a small tooth on the middle of the outer edge of the 3rd joint; terminal spine very slender, longer than the exopodite; endopodite as in 2nd foot; 2nd basal with an outer edge seta, no seta on 1st basal.

4th foot (Pl. XXIX. fig. 9): exopodite with 0.0.1 outer edge spines and 0.0.5 inner edge setæ, terminal spine longer than the exopodite; endopodite as in 2nd and 3rd feet except for a stout feathered seta on the inner edge of the 1st joint; 2nd basal with an outer edge seta, no seta on 1st basal.

5th foot very small with a short terminal and a basal seta.

Four specimens were found in one gathering.

This species seems to agree in appearance with *Oithona hebes*, but differs in the jointing and spination of the swimming-feet. In structure it is separated from *Paroithona parvula*, which it closely resembles, by the reduction in number of the setae on the endopodites of the swimming-feet. Not much reliance can be put on the presence or absence of setae on the basal joints of the swimming-feet, as they may have been overlooked in the descriptions of both species.

The following is an attempt to draw up a diagnostic table of the species of *Oithona* and *Paroithona* of which a recognisable description exists, which will assist in the identification of the species described above. The number following each name refers to the paper in which it was first described.

1. Rostrum present.

A. Rostrum antero-ventrally directed, visible in dorsal view.

a. Exop. of 1st foot with 1.1.2 outer edge spines.

aa. 2nd basals of swimming-feet with plumose setae; length 1.0-1.5 mm.

O. plumifera (1).

bb. 2nd basals with smooth setae; length 1.0-1.16 mm.

O. atlantica (11).

b. Exop. of 1st foot with 1.1.3 outer edge spines.

aa. Exop. of 4th foot with 0.0.1 outer edge spines; length 1.25-1.35 mm.

O. frigida (15).

bb. Exop. of 4th foot with 1.1.3 outer edge spines; length .68-.74 mm.

O. vivida.

cc. Exop. of 4th foot with 0.0.2 outer edge spines; length 1.2-1.9 mm.

O. setigera (8).

B. Rostrum ventrally directed, not visible in dorsal view.

a. Exop. of 1st foot with 1.0.2 outer edge spines; length .56-.62 mm.

O. decipiens.

b. Exop. of 1st foot with 1.1.2 outer edge spines.

aa. Exop. of 2nd foot with 1.0.1 outer edge spines; length .73-.8 mm.

O. similis (6).

bb. Exop. of 2nd foot with 1.0.3 outer edge spines; length .88-.94 mm.

O. fallax.

c. Exop. of 1st foot with 1.1.3 outer edge spines.

aa. Exop. of 4th foot with 1.1.2 outer edge spines.

α. Rostrum long, slender, straight; length 1.65 mm.

O. robusta (13).

β. Rostrum short, curved; length .7 mm.

O. brevicornis (13).

bb. Exop. of 4th foot with 0.0.1 outer edge spines; length 1.07-1.12 mm.

O. linearis (12).

2. Rostrum absent.

A. Endop. of 2nd-4th feet three-jointed.

a. 5th foot with one terminal seta.

aa. 4th foot with 1.1.3 outer edge spines; length .38-.42 mm.

O. simplex.

bb. 4th foot with 1.1.2 outer edge spines.

α. Cephalothorax much longer than abdomen; length .55 mm.

O. hebes (13).

β. Cephalothorax slightly longer than abdomen; length .50-.53 mm.

O. nana (13).

γ. Cephalothorax shorter than abdomen; length .88 mm.

O. attenuata.

[11]

- b. 5th foot with two terminal setae.
- aa. Mandible with large spines on 2nd basal; length .64 mm. *O. minuta* (16).
- bb. Mandible with small spines on 2nd basal.
- a. Terminal spines of exopodites of swimming-feet very long; length .9 mm. *O. oculata*.
- β. Terminal spines of exopodites of swimming-feet shorter than the 3rd joint; length .76-.85 mm. *O. rigida* (14).
- B. Endop. of all swimming-feet two-jointed (Genus *Paroithona*).
- a. Exop. of 4th foot with 1.1.1 outer edge spines; length .46 mm. *P. parvula* (10).
- b. Exop. of 4th foot with 0.0.1 outer edge spines; length .40-.43 mm. *P. pulla*.

I have omitted from the table *O. challengerii* (3) (4), *O. spinifrons* (2), *O. spinirostris* (5), *O. helgolundica* (5), and *O. pygmaea* (2). The identity and probable synonymy of these species have been fully discussed by various writers and it is unnecessary to consider them further.

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EXPLANATION OF THE PLATES.

All the figures have been drawn with the aid of a camera lucida.

PLATE XXVII.

- Fig. 1. *Oithona vivida* ♀, 1st antenna.
 2. " " mandible palp.
 3. " " 1st maxilla.
 4. " " dorsal view.
 5. " " cephalon, lateral view.
 6. " " 1st foot.
 7. " " 2nd foot.
 8. " " 3rd foot.
 9. *Oithona fallax* ♀, 1st foot.
 10. " " 2nd foot.
 11. " " 3rd foot.
 12. " " 4th foot.

PLATE XXVIII.

- Fig. 1. *Oithona fallax* ♀, cephalon, lateral view.
 2. " " mandible palp.
 3. " " dorsal view.
 4. *Oithona decipiens* ♀, cephalon, lateral view.
 5. " " mandible palp.
 6. " " 1st maxilla.
 7. " " dorsal view.
 8. " " 1st foot.
 9. " " 2nd foot.
 10. " " 3rd foot.
 11. " " 4th foot.

PLATE XXIX.

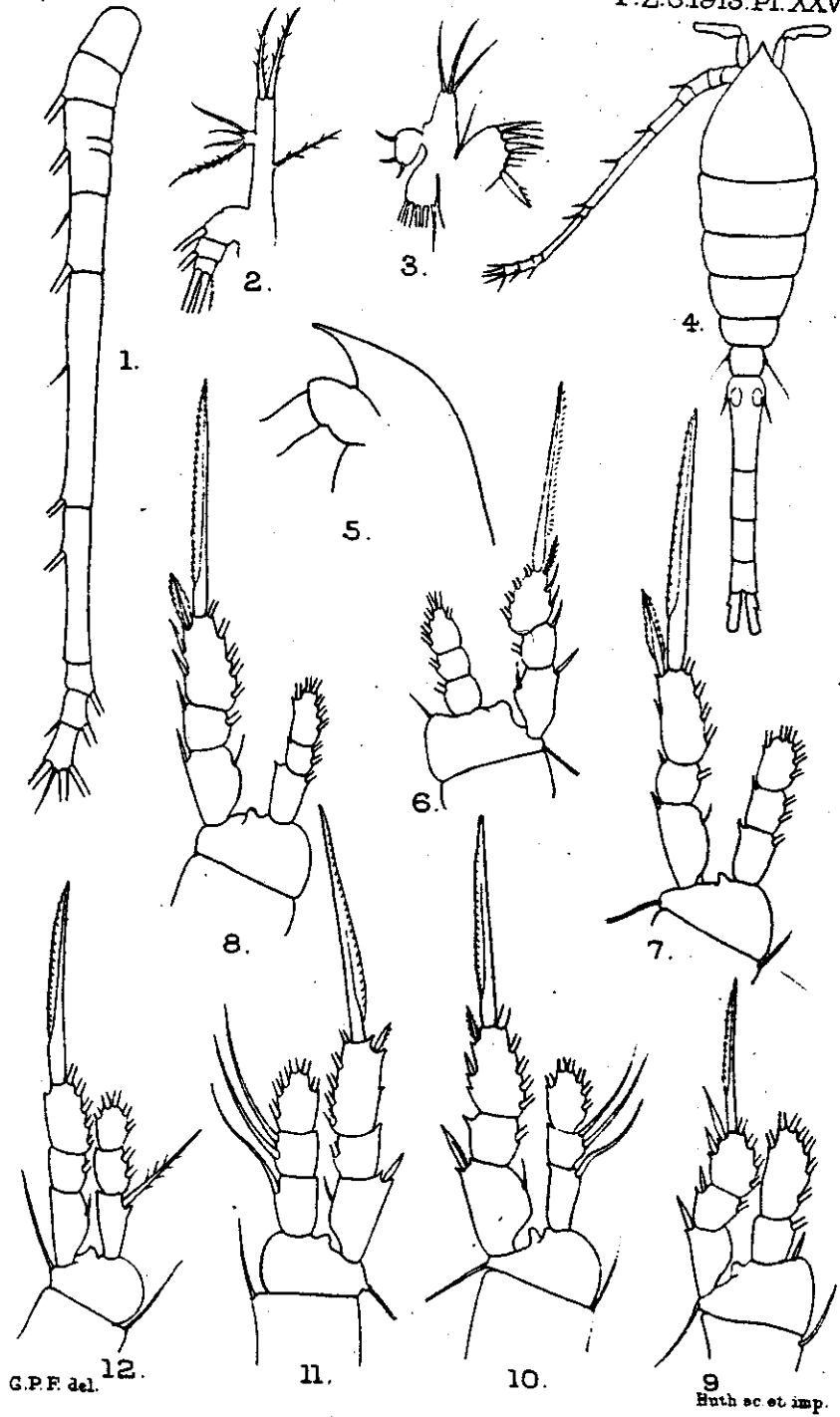
- Fig. 1. *Paroithona pulla* ♀, dorsal view.
 2. " " 1st antenna.
 3. " " abdomen.
 4. " " mandible palp.
 5. " " 2nd antenna.
 6. " " 1st foot.
 7. " " 2nd foot.
 8. " " 3rd foot.
 9. " " 4th foot.
 10. *Oithona simplex* ♀, cephalon, lateral view.
 11. " " dorsal view.
 12. " " abdomen.
 13. " " 3rd foot.
 14. " " 4th foot.

PLATE XXX.

- Fig. 1. *Oithona simplex* ♀, 1st antenna.
 2. " " 1st foot.
 3. *Oithona attenuata* ♀, cephalon, lateral view.
 4. " " 1st antenna.
 5. " " dorsal view.
 6. " " 3rd foot.
 7. " " 1st foot.
 8. *Oithona oculata* ♀, maxillipede.
 9. " " 4th foot.

PLATE XXXI.

- Fig. 1. *Paroithona pulla* ♀, cephalon, lateral view.
 2. *Oithona oculata* ♀, dorsal view.
 3. " " lateral view.
 4. " " 1st antenna.
 5. " " mandible palp.
 6. " " 1st maxilla.
 7. " " 1st foot.
 8. " " 2nd foot.
 9. " " 3rd foot.



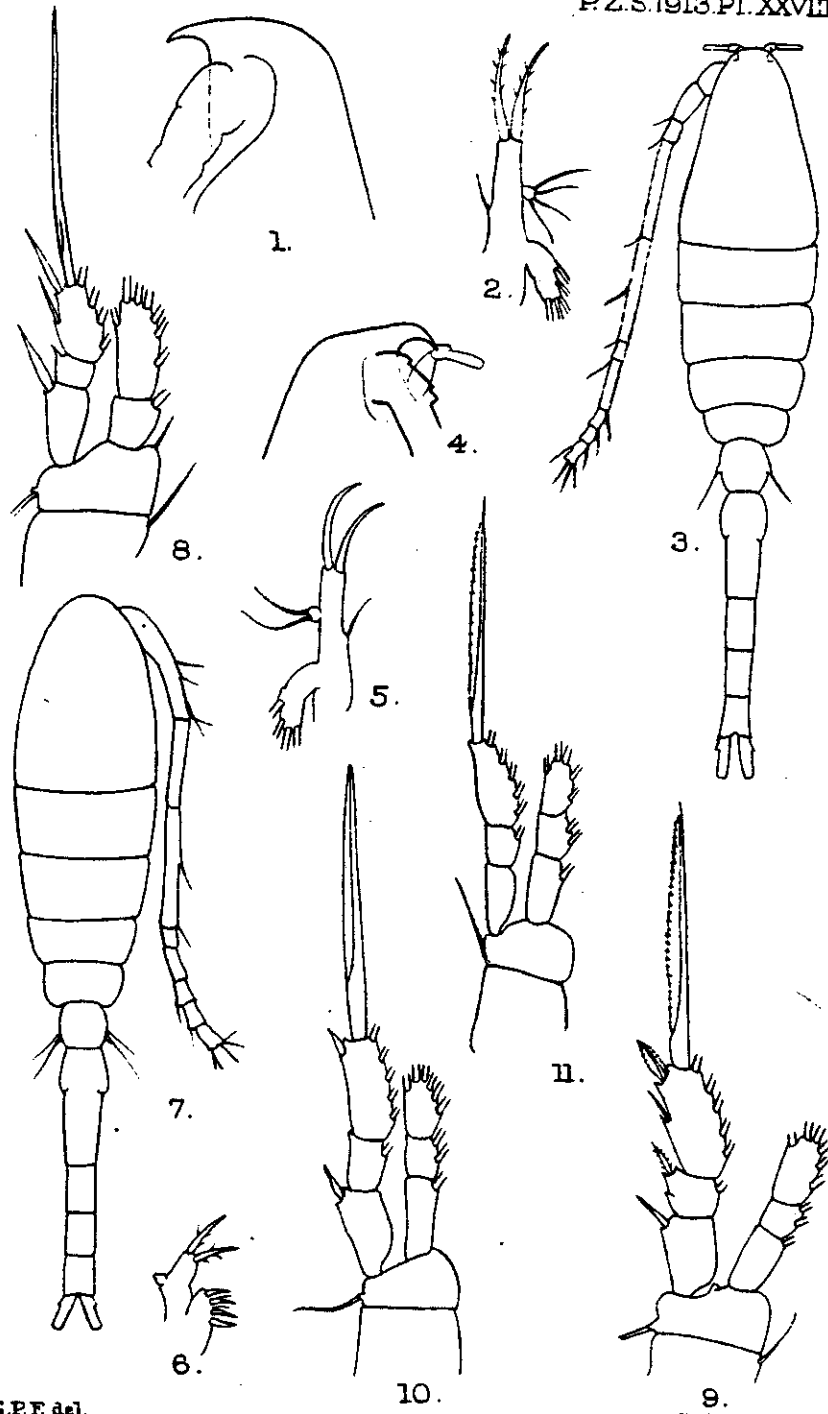
G.P.F. del. 12.

11.

10.

9
Huth sc. et imp.

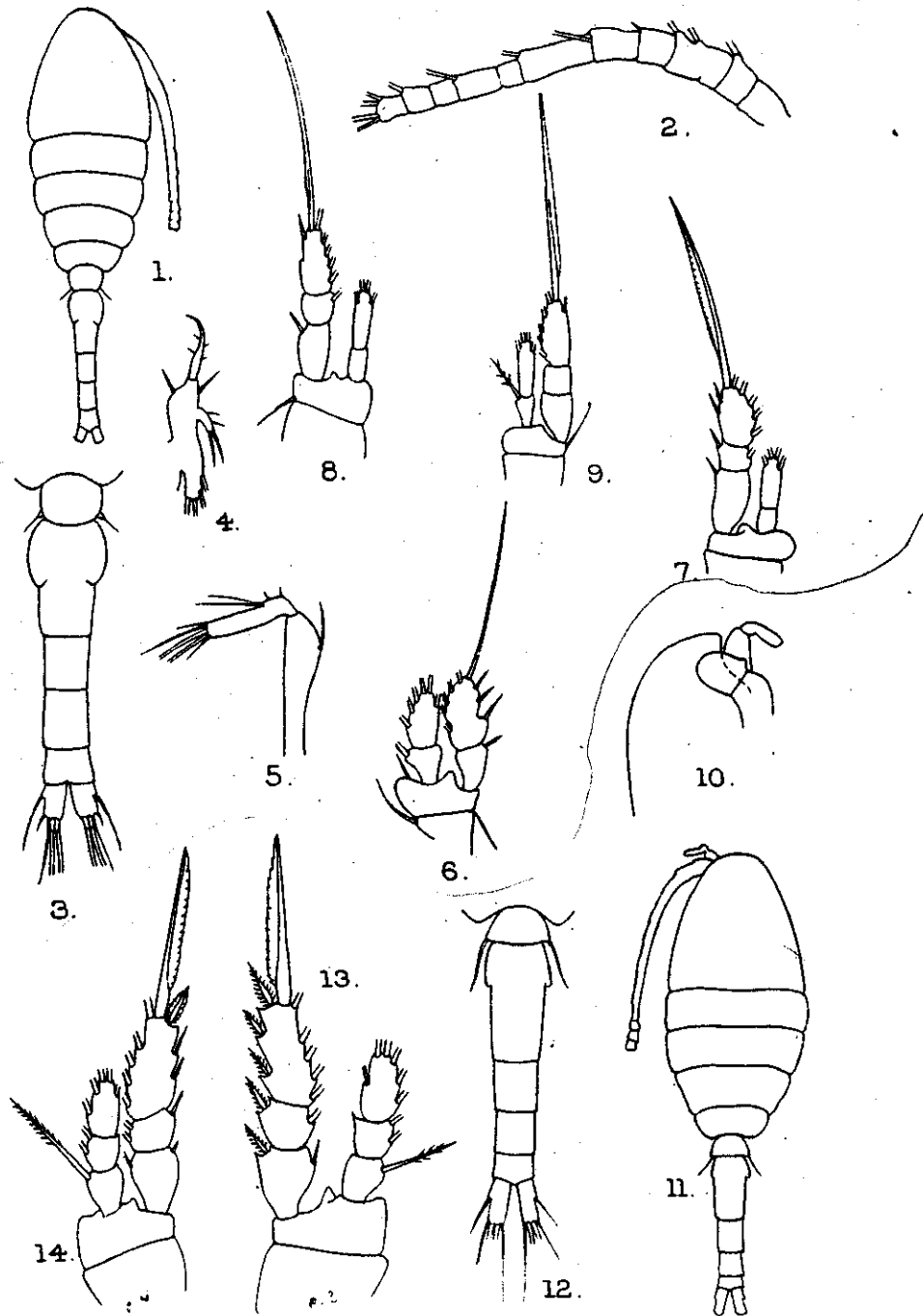
1-8. OITHONA VIVIDA 9-12. O. FALLAX.



G.P.F. del.

Huth sc. et imp.

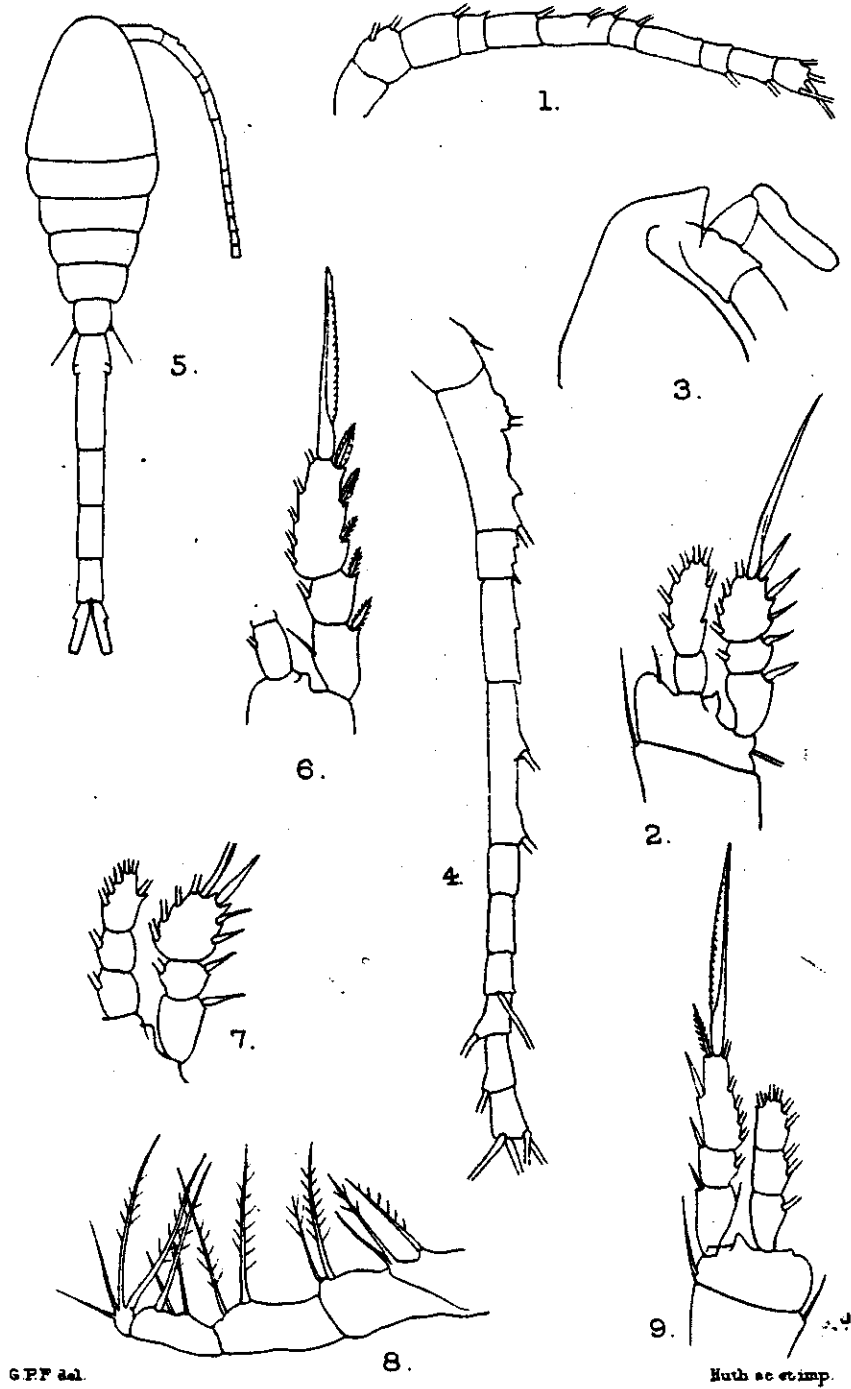
1-3. OITHONA FALLAX. 4-11. O. DECIPENS.



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Euch. sc. et imp.

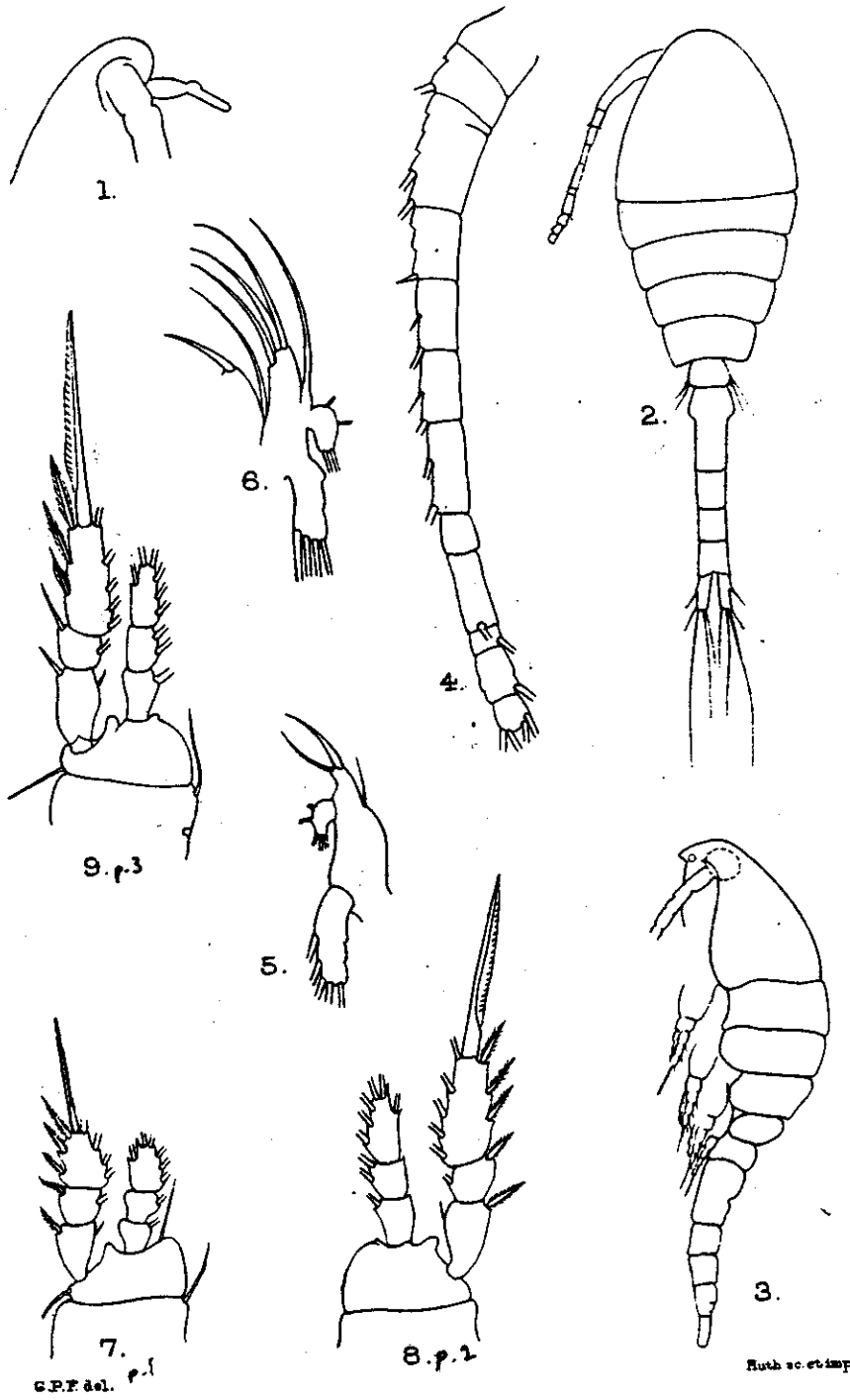
1-9. PAROITHONA PULLA. 10-14. OITHONA SIMPLEX.



G.F.F. del.

Huth sc et imp.

1,2. OITHONA SIMPLEX. 3-7. O. ATTENUATA.
8,9. O. OCVLATA.



1. PAROITHONA PULLA. 2-9. OITHONA OCULATA.