

culate edge, and the mandible itself has a denticulate summit. These constitute the subfamily STEGOCEPHALINÆ.

The remaining species, with the base of the inner antennæ more elongate and slender (the second and third joints of these antennæ being much oblong, instead of transverse), are naturally distributed according to certain characters in the mandibles, the maxillipeds, and legs.

The LEUCOTHOINÆ are peculiar in having the *maxillipeds long and slender, and the inner lamellar process very small or obsolescent*; and some or all of the species have no mandibular molar prominence. The genus *Stenothoe* is of this subfamily, although peculiar in wanting the mandibular palpus. Only the first and second pairs of legs are prehensile.

The GAMMARINÆ, like the Leucothoinæ, have hands only to the first and second pairs of legs, and even these may be wanting. The mandible has a molar prominence, a doubly edged denticulate summit, a three-jointed palpus. The maxillipeds are rather stout, and the inner lamellar process is elongate.

The PONTOPOREINÆ, unlike the Gammaridæ, have the legs of the third and fourth pairs more or less prehensile; and the ISÆINÆ, have the legs of the fifth, sixth, or seventh pairs prehensile.

It is possible that a better knowledge of the characters of the mandibles in the Pontoporeinæ and Isæinæ may require a different arrangement of them. The genera of the former subfamily are known to us only from Krøyer's descriptions.

Among the *Gammarinæ*, there are two series of species, the *Amphithoe* series, having the superior antennæ simple; and the *Gammarus* series, having these organs appendiculate.

In the *Amphithoe* series, the genus *Amphithoe*, as at present adopted, includes all the species with the first and second pairs of legs subchelate, the posterior legs of ordinary length, the mandibles with a molar prominence. In *Acanthonotus* of Owen, the legs of the second pair have no trace of a hand; in *Ædicerus* of Krøyer, the posterior legs are very long, and the claw is obsolete; in *Microcheles*, Krøyer, the mandible has no molar prominence; in *Photis*, Krøyer, the fifth pair of legs is described as reversed, and the last pair of stylets as having one of the branches rudimentary. Other subdivisions have been proposed, but they are not accepted by Edwards; and, in fact, they were not instituted on characters of importance. *Pherusa* of Leach, distin-

guished only by the form of the hands, is united by Edwards to Amphithoe. *Melita* of Leach, based on the hand, the finger closing on the side instead of the edge, is also rejected. *Acanthosoma* of Owen, and *Iphimedia* of Rathke, characterized by having the superior antennæ shortest, have fallen back into Amphithoe. Some of these proposed genera, although instituted on unimportant characters, are still natural groups, and, as we show beyond, should be retained.

In the *Gammarus* series, the group *Gammarus* embraces, in the latest system, all the species with hands to the first and second pairs of legs; while *Alibrotus* (Edwards) has no hands to the four anterior legs. *Leptochirus* (Zaddach) is a new genus, in which the first pair alone is subchelate; and *Ischyrocerus* (Kröyer) differs from *Gammarus* in its elongate front, the antennæ being situated on its under side, one pair before the other. The genus *Mæra* of Leach, characterized by having one hand of the second pair very large and stout, and the other quite small, has been restored to *Gammarus* by Edwards. *Eusirus* of Kröyer scarcely differs from *Gammarus*: it has the four hands large and subequal, and of somewhat peculiar form, with large epimerals and reniform eyes; and it may be doubted whether it should be sustained.

In instituting the genera of *Gammarinæ*, certain important sources of distinction have been overlooked. The natural groups have in part been recognised, and have again been rejected for want of the sufficient characters which these means afford. These characteristics are found in the caudal stylets, the epimerals, and the organs of the mouth. The caudal stylets, especially the posterior pair, are highly distinctive, affording truthful lines of demarcation among natural groups, although organs seemingly unimportant. That this unimportance is not real, the connexion of these organs with the powers of locomotion in both the *Orchestidæ* and *Gammaridæ* fully evinces.

We may briefly review the forms in the posterior stylets occurring among these species.

1. *One-branched*, the branch very short, straight, with a few setules at apex and rarely elsewhere. This is the only form occurring in the *Orchestidæ*.

2. *One-branched*, the branch short and naked or nearly so, on rather a long base, the apex somewhat reflexed, and enclosing two exceedingly short but thickish spines, pointing upward or a little inward, and looking as if just emerging from the apex. This form is found

in the genus *Pyctilus* (Dana),—a genus closely resembling *Erichthonius* and possibly the same,—and also in *Darcothoe* (Dana).

3. *One-branched*, the branch naked and subulate, without spines at apex, or ending in a single spine, appearing as the continuation of the branch itself, and hardly as an added spine. Found in the genus *Stenothoe* (Dana).

4. *One or two-branched, the inner branch nearly or quite obsolete*; the other long, often very long and far exsert, furnished with short hairs, and unlike the branches of the first and second pairs of stylets. The long branch may be either cylindrical or lamellar, and when the latter, the edges may be ciliated. This form occurs in certain species of the genera *Amphithoe* and *Gammarus*.

5. *Two equal or subequal branches*, which are straight, either short or long, and end in short hairs, or more rarely with spines, these hairs or spines not reflexed like spines at the apex of the branches in the first and second pairs. A prominent division of *Gammarus* and also one of *Amphithoe* are thus characterized.

6. *Two equal or subequal branches*, the branches dissimilar and quite short; one of them, the outer, subconical and *biuncinate* at apex, the two reflexed hooks in the same longitudinal line; the other compressed, with a truncate extremity, and having a few minute hairs at apex. A prominent part of the genus *Amphithoe* has stylets of this kind; the form is not known to occur among the *Gammari*.

7. *Two subequal branches*, the branches similar, subulate, nearly straight, ending in a slender point, like the form in No. 3. Occurs in the genus *Leucothoe*.

The *epimerals* exhibit also wide variations, corresponding in part with the distinctions afforded by the stylets. These variations consist in the relative sizes of the fourth and fifth epimerals, and the form of the fifth.

In one large division of the genus *Amphithoe* (the same that is characterized by the sixth kind of posterior stylets), the *fifth epimeral is even larger than the fourth*, or, at least, not smaller, and instead of being subequally two-lobed, the posterior lobe is very small, and is on the posterior margin of the epimeral.

In other species of *Amphithoe*, characterized by posterior caudal stylets of a different kind, the *fifth epimeral is much smaller than the fourth*, and subequally two-lobed.

Some species of *Gammarus* have the fifth epimeral as large as the fourth, but it is subequally lobed, and does not resemble the form mentioned as occurring in certain *Amphithoe*. In other species the fourth is much smaller than the fifth, as in a part of *Amphithoe*.

There are thus good grounds for subdividing the accepted genera *Amphithoe* and *Gammarus*.

1. The species of *Amphithoe* with the fifth epimeral not smaller than the fourth, and its posterior lobe very small, and with the posterior caudal stylets two-branched, with one branch biuncinate (6th kind), may retain the name *Amphithoe*. The superior antennæ are usually the longest.

2. The species of the same genus with the fifth epimeral smaller than the fourth and subequally lobed, and with the posterior caudal stylets two-branched, the branches nearly similar and neither of them uncinata (5th kind), we call *Iphimedia*. The genus so called of Rathke embraces species of this kind; they generally have the superior antennæ shorter than the inferior. The genus *Acanthosoma* of Owen includes a species of the same group, and is of earlier date; but the name is unfortunately significant, as the existence of spines on the body is unessential; and it cannot, therefore, be accepted for the group.

3. The species having one branch of the posterior caudal stylets rudimentary, and, as in *Amphithoe*, no appendicular branch to the superior antennæ, make a third group; and this is the *Melita* of Leach, as we propose to sustain it. The character of the hands, mentioned by Leach, is of common occurrence, but we would not make it essential to the genus.

4. In the more characteristic group of the genus *Gammarus*, the posterior caudal stylets have two branches, like those in *Iphimedia*, the two being subequal and different in the apical setæ from those of the first or second pair; they are often much longer than occurs in *Iphimedia*, though not always so. This division includes the *Gammarus pulex*, and may well retain the old name *Gammarus*.

5. Another portion of the genus *Gammarus* has one branch of the posterior caudal stylets rudimentary, as in *Melita* of the *Amphithoe* series. These make the genus *Mœra*, Leach's species being included.

6. A third portion has the stylets quite simple, with the other characters stated under No. 2, page 904, the terminal branch being short, on a long base, and the apex reflexed, quite unlike the form in

Mæra. The species constitute our genus *Dercothoe*. The eye usually occupies a prominence projected forward on the side margin of the head. The fifth epimeral, in the species examined, is as long as the fourth, and subequally lobed. It is probable that all the species have the upper antennæ appendiculate. *Gammarus zebra* of Rathke* appears to be of this group. The hands of the second pair have a simple finger, and in this respect the genus differs from our *Pyctilus*, which has the stylets and general habit of *Dercothoe*. *Pyctilus* is near *Erichthonius* of Edwards, but it has the anterior epimerals of moderate size instead of obsolete; both males and females of this genus were observed, and in each the finger of the second pair of legs was bi-articulate.

In Krøyer's description of his genus *Photis*, he mentions that the fifth pair of legs is reversed, the claw being turned backward and very short. We look upon this apparently reversed position of the legs as of small importance. In *Amphithoe*, as the genus is here restricted, this reversion is common, and it may extend to the sixth and seventh pairs; in some, the claw is quite reversed, in others it points outward, and in others downward and outward; these various positions showing that the distinction is not generic. It appears to depend on a slight turning of the fifth joint of the legs, at its articulation with the fourth, and may be in part voluntary with the animal. This genus is near *Gammarus* in its antennæ, but has one branch of the posterior caudal stylets rudimentary, and the fifth epimeral as large as the fourth.

In the following synopsis of the Gammaridæ the distinguishing characteristics of the several genera are presented, and remarks are also added on different genera that are passed by without mention in the preceding pages.

I. PEDES 10 POSTICI NON PREHENSILES.

SUBFAM. 1. STEGOCEPHALINÆ.—Antennæ breves, superiores basi crassæ. Mandibulæ acie denticulatâ instructæ, palpo brevi, uniaarticulato, intus dentato. Epimeræ permagnæ.

* Faun. der Norwegens, 74, pl. 3, f. 4.

G. 1. *STEGOCEPHALUS*, Kröyer.*—Epimeræ 4tæ maximæ, 5tis parvis. Antennæ superiores appendiculatæ. Pedes 1mi 2di manibus carentes. [Pedes 5ti 3tii 4tique directione similes.]

SUBFAM. 2. *LYSIANASSINÆ*.—Antennæ breves, superiores basi crassæ. Mandibulæ apice parce dentatæ et cuspidatæ, acie vix instructæ palpo 2–3-articulato. Maxillipedes lamellis internis grandibus. Epimeræ permagnæ.

1. *Pedes 1mi 2dique non subchelati, 2dis parvulis interdum exceptis.*

G. 1. *LYSIANASSA*, Edw.—Antennæ superiores appendiculatæ.

G. 2. *PHLIAS*, Guérin.—Antennæ superiores non appendiculatæ.

2. *Pedes 1mi subchelati, 2dis non subchelatis.*

G. 3. *OPIS*, Kröyer.†—Antennæ superiores appendiculatæ. Pedes 1mi crassè chelati, 2di debiles.

G. 4. *URISTES*, Dana.‡—Antennæ superiores non appendiculatæ. Pedes 1mi subchelati, 2di articulo styliformi confecti.

3. *Pedes 1mi 2dique plus minusve subchelati.*

G. 5. *ANONYX*, Kröyer.§—Epimeræ permagnæ. Antennæ superiores appendiculatæ, basi breves. Maxillipedes lamellis internis grandibus. Styli caudales postici biramei, ramis subulatis.

G. 6. *UROTHOE*, Dana.—Epimeræ permagnæ, 5tis parvis. Antennæ 1mæ breviores, appendiculatæ, basi sat elongato. Styli caudales postici longi, biramei, ramis foliaceis, ciliatis. Mandibulæ palpo 3-articulato.

* Kröyer's Nat. Tids., iv. 150, 1842. "Caput oculis ut videtur destitutum."

† Tids., iv. 149. "Pedes 1mi paris chelis armati portentosæ magnitudinis. Reliqua cum genere Anonyce ferme conveniunt."

‡ Amer. J. Sci. [2], viii. 135. The genus *Stenia* is rejected.

§ Tids. ii. 256, and iv. 164.

The genus *Ephippiphora* of White (Ann. and Mag. N. Hist. [2], i. 226, 1848) has been but briefly described, and we cannot pronounce upon its exact relation to either of the genera of Lysianassinæ. The habit is like that of Anonyx, the epimerals large, the superior antennæ appendiculate, the posterior caudal stylets elongate as in Anonyx, and not short like the Orchestidæ. But the character of the termination of the four anterior legs is not stated, neither are they in view in the figure of the species on Plate 5 of the Zool. of the Erebus and Terror. This figure represents the fifth and sixth pairs of legs as rudimentary, or the basal joints twice as long as the following part, and the basal joint of the sixth smaller than that of the fifth or seventh.

SUBFAM. 3. LEUCOTHAINÆ.—Antennæ superiores basi plus minusve graciles. Maxillipedes elongati, angusti, articulo longo unguiformi confecti, *lamellis internis perbrevibus*. Mandibulæ sive palpigeræ sive non palpigeræ, processu molari carentes. [An semper?] Epimeræ magnæ.

G. 1. STENTHORE, *Dana*.—Epimeræ permagnæ, 4tæ maximæ, 5tæ parvulæ. Pedes 4 antici subchelati, 2dis validioribus. Antennæ superiores longiores, non appendiculatæ. Mandibulæ non palpigeræ, processu molari carentes. Styli caudales 1mi 2dique ramis bene subulati, 3tii simplicissimi, subulati, spinâ crassâ confecti.

G. 2. LEUCOTHORE, *Leach*.—Epimeræ magnæ, 5tæ parvulæ. Pedes 4 antici subchelati, 2dis validioribus. Antennæ superiores longiores, non appendiculatæ. Mandibulæ palpigeræ. Styli caudales toti biramei, ramis subulatis.

[Cujus sedis est *Microcheles*, Kröyer, † *Amphithoe* affinis, cui mandibulæ processu molari carentes: quoque *Amphithoe Marionis*, Edw., cui mandibulæ non palpigeræ.]

SUBFAM. 4. GAMMARINÆ.—Antennæ 1mæ basi graciles. Maxillipedes sat lati, lamellis internis sat elongatis. Mandibulæ acie denticulatâ instructæ et alterâ accessoriâ quoque processu molari et palpo 3-articulato. Pedes 10 postici non subprehensiles.

A. FRONS PRODUCTUS ET INFRA ANTENNIGERUS NON EST, ANTENNIS 1MIS
INFERIORIBUS NON ANTERIORIBUS.

1. *Styli caudales postici biramei, ramis subæquis.*

A. PEDES 2DI NON SUBCHELATI.

G. 1. ACANTHONOTUS, *Owen*.—Antennæ quatuor subæquæ, 1mæ non appendiculatæ. Epimeræ magnæ. Pedes 2di filiformes, manu omnino carentes, 1mi manu vix confecti.

G. 2. ALIBROTUS, *Edw*.—Antennæ 1mæ breves, appendiculatæ. Epimeræ magnæ. Pedes 1mi validi, non subchelati.

* Kröyer states that the *bi-articulate* finger of *Leucothoe* is not a true generic characteristic, and adds two species to the genus, one of which has this character imperfectly, and the other not at all (*Nat. Tids.*, iv. 141, 1842, and [2], i. 539, 1845). This character of the hand depends mainly on the prolongation of the inferior apex of the antepenult joint, which prolongation is variously developed in species of allied genera. They agree with *Leucothoe* in their peculiar slender maxillipeds; in the very small epimerals to the first segment, large fourth, and small fifth, sixth, and seventh; in the caudal stylets; the very short third joint of the superior antennæ, and other characters.

† *Tids.* [2], ii. 5.

G. 3. *LEPTOCHIRUS*, Zaddach.*—Antennæ 1mæ appendiculatæ. Pedes 1mi bene subchelati, 2di manu carentes.

B. PEDES 2DI 1MIQUE SUBCHELATI.

* Antennæ 1mæ non appendiculatæ.

G. 4. *IPHIMEDIA*, Rathke, † D.—Epimeræ magnæ, 4tæ maximæ, 5tis multo brevioribus et vix bilobatis. Styli caudales postici ramis duobus oblongis consimilibus apice setigeris et non uncinatis instructi. Antennæ 1mæ sæpius breviores.

G. 5. *ÆDICERUS*, Kröyer. ‡—*Iphimediæ* affinis. Pedes 7mi longissimi, fere filiformes. Antennæ 1mæ breviores.

G. 6. *AMPHITHOE*, Leach, D. §—Epimeræ magnæ, 5tæ maximæ, vix bilobatæ lobo posteriore minimo. Styli caudales postici ramis duobus brevibus dissimilibus instructi, ramo externo apice recurvatim bi-uncinato, interno compresso apice non spinuloso sed pilis parce ciliato. Antennæ 1mæ sæpissime longiores.

** Antennæ 1mæ appendiculatæ.

G. 7. *GAMMARUS*, Fabr., D. ||—Epimeræ sive mediocres sive breves. Styli cau-

* The genus *Leptochirus* is described by Zaddach (Syn. Crust. Boruss. Prodomus, 1844), as having no appendicular branch to the superior antennæ. But Fr. Müller states (Archiv für Naturgeschichte, 1848, xiv. 62) that there is a small one-jointed appendage in the *Leptochirus pilosus*. The legs of the second pair are described as having no proper hand, but terminating as in the genus *Talitrus*. May the form be female only?

† Beit. zur Fauna Norwegens, p. 85, Act. Leop. xx. *Dexamine* of Leach, may perhaps be included here.

The genus *Hyalæ* of H. Rathke (Fauna der Krym, Mem. Acad. Imp. St. Petersb., iii. 1837, p. 378, pl. 5) contains no characters in its description by this author which do not apply equally well to species of *Iphimedia*. The description is as follows:—

“Corpus elongatum, compressum. Antennæ inferiores superioribus aliquantulum longiores; earum quælibet e tribus articulis atque flagello composita. Oculi disciformes. Pedes 14; duo eorum paria antica chelis monodactylis complanatis, 2di paris multo majoribus. Stylorum abdominalium paria tria. Abdominis appendicula terminalis simplex, erecta, verruciformis.” The posterior stylets are two-branched, though short; and the species (*H. pontica*) is thus distinct from the *Allorchestes*.

‡ Tids., iv. 155, 1842. “Frons in rostrum producta, plus minus acutum obtusumve, semper vero nodo pellucenti, ovali, flavo-rubescente turgidum. Oculi nulli? Pedes 3tii 4tiq; paris validi, ungue instructi lato laminari, quod quoque usu venit 5to 6toque pari, quorum articulus 1mus dilatatus non est.”

§ Includes *Pherusa* of Leach.

|| *Amathia*, Rathke (Fauna der Krym, Mem. Acad. Imp. St. Petersb., iii. 1837, p.

dales postici 2dis non similes, ramis sæpe longis cum pilis raro spinulis ornatis, apice non uncinatis. Antennæ superiores sæpius longiores.

2. *Styli caudales postici sive ramo uno longo altero parvulo instructi, sive simplicissimi et apice non paulo reflexi.*

* Antennæ 1mæ non appendiculatæ.

G. 8. PHOTIS, *Kröyer*. *—Epimeræ magnæ, 5tæ 4tis non breviores et postice profundius excisæ. Styli caudales postici ramo interno rudimentario.

G. 9. MELITA, *Leach, D.*—Epimeræ 5tæ 4tis multo breviores (sic an semper?) Styli caudales uno ramo longo, sive subcylindrico sive foliaceo, altero brevi vel obsoleto. [Digitus in manus latus sæpe claudens.] Antennæ 1mæ sæpius longiores.

** Antennæ 1mæ appendiculatæ.

G. 10. MÆRA, *Leach, D.*—Epimeræ et styli caudales postici ac in *Melitâ*.

3. *Styli caudales postici simplicissimi, ramo uno brevi et nudo, apice paulo reflexo et spinas duas perbreves paulo exsertas gerente.*

G. 11. DERCOTHOE, *Dana*.—Epimeræ mediocres, 5tæ bene bilobatæ, 4tis sæpius vix breviores. Pedes 1mi 2dique digito uni-articulato confecti.

G. 12. PYCTILUS, *Dana* (Erichthonius, *Edw.*?)—Epimeræ mediocres vel breves, corpore lineari, subdepresso. Antennæ longæ, flagellis sat longis. Manus 1mæ articulis 4to 5toque sæpe instructæ, digito uni-articulato; 2dæ digito bi-articulato.

291, and *Beit. zur Faun. Norw., Act. Leop. xx.*), includes those Gammari that have the superior antennæ the shorter—not of itself a proper basis for a genus. The eye is described as reniform.

The genus *Eusirus* of *Kröyer*, which is very near *Gammarus*, has the hands of the two anterior pairs of legs large and equal, and the carpus is articulated with the upper margin of the hand near its middle. The eye is reniform. The superior antennæ have a short appendicular branch, consisting of a minute joint. “Mandibula parva, apice bifurco, dentato, flabello setarum marginis interioris, tuberculo molari transverso-elliptico dentibus minutissimis confectis formato; palpus triarticulatus duplam fere æquat mandibulæ longitudinem. Sex branchiarum paria in maribus (annuli thoracici 2di–7mi), 4 laminarum in feminis paria (annuli 2di–5ti).”—*Tids.* [2], i. 501.

* *Tids.*, iv. 155, 1842. “Pes 5ti paris recurvatus, inversus, ungue rudimentari. Epimera permagna, 5 paria anteriora ad marginem inferiorem setis sat longis instructa, 5tum eadem est ac 4tum altitudine, postice profundius excisum. Lamina terminalis interior pedis saltatorii 3tii paris rudimentaris.”

G. 13. (An hujus sedis?) *PARDALISCA*, *Kröyer*.*—Epimeræ breves. Pedes 1mi 2dique digito 2-articulato manuque 1-articulatâ instructi. Antennæ tenues, 1mæ appendiculatæ.

B. FRONS PRODUCTUS ANTENNASQUE 1MAS VERSUS EXTREMITATEM GERENS.

[AN SPECIES COROPHIDIS AFFINIORES.]

G. 14. *ATYLUS*, *Leach*.—*Iphimediæ* paulo affinis. Antennæ subpediformes, breviores, non appendiculatæ. Digniti 1mi 2dique uni-articulati.

G. 15. *ISCHYROCERUS*, *Kröyer*.†—*Gammaro* paulo affinis. Antennæ pediformes, 1mæ appendiculatæ. Palpus mandibularis longus, articulo ultimo obovato. Pedes 2di *maris* manu validissimâ instructi. Digniti uni-articulati. Epimeræ mediocres.

II. PEDES 10 POSTICI PARTIM PREHENSILES.

SUBFAM. 5. PONTOPOREINÆ.—Pedes 3tii 4tique plus minusve prehensiles; 6 postici non prehensiles.

1. *Antennæ 2dæ inferiores et non posteriores.*

G. 1. *LEPIDACTYLIS*, *Say*.‡—Epimeræ magnæ. Antennæ superiores appendiculatæ, inferiores basi infra valde dilatato et partim dolabriformi. Pedes 4 antici filiformes; 3ti 4tique manu compressâ digitoque laminato instructâ; 5ti 6ti 7mique valde compressi, 7mis longioribus, articulis superne valde productis.

G. 2. *PONTOPOREIA*, *Kröyer*.§—Epimeræ magnæ. Antennæ superiores appendiculatæ. Pedes 1mi 2dique perbreves, robusti, 1mi manu latâ et ungue brevi confecti, 2di manu carentes; 3tii 4tique validi, manu articulo 4to dilatato instructâ, ungue conico aculeato; 7mi ungue vel articulo 6to rudimentario.

G. 3. *AMPELISCA*, *Kröyer*.||—Epimeræ magnæ. Antennæ graciles. Pedes 1mi

* Tids., iv. 153, 1842. "Caput crassiusculum." "Mandibula apice dilatata, quadridentata, palpo 3-articulato." "Pedes 3tii 4tique paris ungue sublaminari postice subtiliter serrulato." "Pedes spurii [abdominales] 2di et 3tii paris natatorii, reliqui saltatorii."

† Tids., iv. "Pedes spurii 4ti 5ti 6tique paris saltatorii; articulus basalis 6ti paris articulis terminalibus triplo vel quadruplo longior."

‡ Jour. Acad. Nat. Sci. Philad., i. 379. Here falls *Bellia* of C. Spence Bate (Ann. and Mag. Nat. Hist., 1851 [2], vii. 318).

§ Tids., iv. 152. "Pedes 5ti et 6ti paris recurvi, articulo 1mo parum modo dilatato ungue armati pusillo."

|| Tids., iv. 154. "Oculi simplices?" "Sextum pedum abdominalium par natatorium."

2dique manu nullâ subcheliformi; 3tiii 4tiq̄ue manu articulo 3tio instructâ, digito articulis 3 sequentibus formato, articulo ultimo vel ungue longissimo et gracillimo; 5ti 6tiq̄ue 5-articulati, ungue rudimentario recurvo, immobili (vel parum mobili). Styli caudales postici natatorii.

G. 4. PROTOMEDEIA, *Kröyer*.* — Corpus subdepressum, epimeris sat brevibus. Antennæ superiores appendiculatæ, inferiores pediformes, basi prælongo. Manus 3tiæ 4tæque articulis 3tio 4toque instructæ et digiti longi articulis sequentibus coalitis. Pedes 2di parvi, manu subcheliformi non instructi.

G. 5. AORA, *Kröyer*.† — Corpus subdepressum, epimeris sat parvis. Antennæ superiores longæ, appendiculatæ, inferiores subpediformes. Pedes 1mi 2dique manu subcheliformi, 1mis maximis, articulo 3tio posticè in apicem longissimum producto, manu angustâ, ungue fere lamellari. Manus 3tiæ 4tæque articulo 4to ovali instructæ digitis articulis 5to 6toque. Styli caudales saltatorii, 6tis 7mis setis non aculeis apice instructis.

2. *Antennæ 2dæ multo posteriores, fronte in rostrum producto.*

G. 6. ΠΡΟΧΟΣ, *Kröyer*.‡ — Epimeræ permagnæ. Pedes 1mi 2dique manu subcheliformi validâ instructi. Manus 3tiæ 4tæque articulis 3tio 4toque junctis instructæ, digitis 5to 6toque. Pedes 6ti multo longiores. Caput longum, triangulare, antice productum et acuminatum. Antennæ anteriores perbreves (capite breviores), elongate appendiculatæ; posteriores paulo longiores. Mandibulæ palpo longissimo. Segmentum caudale laminis constans duâbus.

SUBFAM. 6. ISÆINÆ. § — Pedes quatuor vel sex postici subprehensiles.

G. 1. ISÆA, *Edw.* — *Gammara* similis. Pedes 10 postici similes, articulo 5to apice dilatato et truncato, ungue in articuli 5ti extremitatem latiusculam claudente. Pedes 2di manu magnâ confecti. Antennæ superiores appendiculatæ.

G. 2. ANISOPUS, *Templeton*. — Pedes 4 postici ac in *Isæa*, validiores, articulo 5to apice inferiore dentato, ungue magno. Pedes 1mi tenues et breves; 2di manu angustâ; 3tiii manu grandiore; 4ti 5ti 1mis similes.

* Tids., iv. 154.

† Tids. [2], i. 335, 1845.

‡ Tids., iv. 150.

§ An genus *Laphystius* (*Kröyer*, Tids., iv. 156, 1842) *Isæinis* vel *Corophidis* affine. Species in *Sturiones Squalosve* parasitica! Descriptio sequens:—

“Corpus latum depressum, epimeris mediocribus, 4tis infra acutè productis. Caput transversum, rostratum. Antennæ sat breves, subulatæ, validæ; 1mæ validissimæ, anteriores, 2dæ posteriores. Mandibulæ palpo instructæ. Pedes 1mi gracillimi, manu lineari; 2di breves, manu validâ, ungue sublaminari. Reliqui decem pedes validi, subcheliformes, longitudine subæqui. Styli caudales debiles. Palpus maxillarum 1marum uniarticulatus.”

SUBFAMILY LYSIANASSINÆ.

Besides the size of the base of the superior antennæ, the Lysianassinæ appear to be peculiar in having the mandible very sparingly dentate at extremity, and pointed, instead of having a long and thin denticulate edge with a supplementary edge below. They are related to some of the genera of Pontoporeinæ. The epimerals in all the species are very large, and the body is much compressed. The eyes are usually reniform, and the superior antennæ are rather short and rarely without an appendicular branch. The species also differ from the Orchestiæ in not having a narrow horizontal piece in the shell in continuation of the epistome, directly over the mandible on either side of the head. Moreover, the epistome and upper lip are of different shape (see figures of Anonyx, on Plate 62).

LYSIANASSA? BRASILIENSIS.

Corpus valde compressum, epimeris pergrandibus. Oculi reniformes. Antennæ 1mæ breves, quartâ parte corporis breviores, flagello duplo longiore, quam basis fermè 10-articulato, appendice 7-articulatâ. Antennæ inferiores, dimidio corporis valde longiores, scepe reflexæ et sub epimeris celatæ, basi brevi, articulo basis penultimo crasso. Pedes 4 antici tenues; tertii quartis longiores; quinti sexti septimique consimiles, sensim increscentes, articulis primis margine postico serrulatis.

Body much compressed, epimerals very large. Eyes reniform. Superior antennæ short, less than a fourth of the body in length, flagellum twice as long as base, about ten-jointed, appendage seven-jointed. Inferior antennæ about two-thirds as long as body, often bent backward and concealed beneath the epimerals, the base short, and having penult joint of base very stout, four anterior feet similar, slender; third longer than fourth; fifth to seventh gradually increasing in length, posterior margin of first joint serrulate.

Plate 62, fig. 1 *a*, animal, enlarged; *b*, superior antenna; *c*, inferior antenna; *d*, leg of third pair; *e*, fifth pair; *f*, sixth pair.

Rio Janeiro, about the sand-beach near the Sugar Loaf.

Length about one-fourth of an inch. Colour a tinge of green. The head is scarcely longer than the first thoracic segment. The inferior antennæ have the flagellum more than three times the length of the base. The anterior feet are minutely hairy on the lower side, and the others somewhat less so. Caudal stylets of first pair are longest; second pair next longest; of third pair shortest, and not extending as far back as preceding. The branchial appendages of the third and fifth pairs are represented in figures *d* and *e*. No branchiæ were observed on the first, second, or seventh pairs; but there may be some doubt as to the absence from the second.

This species is peculiar in its concealing the flagella of the inferior antennæ beneath the epimerals; and as this character has not been mentioned of other species, it may be distinct in genus. No specimens are in our collections, and the author can cite for description only the notes and figures made by him when the specimens were collected. It is possible that the four anterior legs have very imperfect hands, and the species, on this account, may be nearer *Anonyx* than *Lysianassa*.

L. brasiliensis, DANA, Proc. Amer. Acad. Sci. Boston, ii. 208.

LYSIANASSA NASUTA.

Corpus valde compressum, epimeris pergrandibus. Oculi reniformes. Antennæ 1mæ breves, 2dis longiores, flagello ferme 7-articulato, appendice 3-4-articulatâ. Pedes antici, ungue triplo brevioribus quam articulus 5tus, articulo 5to oblongo, apice angustiore, setis dimidio articuli non longioribus. Pedes 2di articulo 5to spatulato apice rotundato, ungue terminali fere obsoleto, articulo 4to fere duplo longiore quam 5tus. Pedes 4 proximi infra setosi, setis longiusculis: 6 postici sensim incrementales, articulo 5to parvis 7mi gracilibus, setis semilati-tudine hujus articuli non longioribus.

Body much compressed, epimerals very large. Eyes reniform. Superior antennæ short, longer than the inferior, flagellum about seven-jointed, appendage three or four-jointed. Anterior feet with a small

claw, not longer than one-third of the fifth joint; this joint oblong, narrower at apex, setæ not more than half as long as the joint. Feet of second pair ending in a spatulate joint, which is rounded at apex and has an obsolescent claw at middle of apical margin. Third and fourth pairs of feet setose below, the setæ rather long; six posterior pairs gradually increase in length, the fifth joint of seventh pair slender, with the setæ hardly half the diameter of the joint in length.

Plate 62, fig. 2 *a*, animal, much enlarged; *b*, head (in which *t* is a keel on the front; *m*³, maxilliped; *p*, extremity of the anterior legs); *c*, posterior stylets and extremity of abdomen, in profile; *d, e*, mandible, in different positions; *f*, maxilla of first pair; *g*, *ibid.* of second pair; *h*, part of leg of first pair; *i*, *ibid.* of second pair; *k*, *ibid.* of third pair; *l*, *ibid.* of fifth; *m*, *ibid.* of seventh pair.

Rio Janeiro, Brazil.

Length of body, five lines. The fifth epimeral is about half as long as the fourth. The second joint of the superior antennæ is fully as long as broad, and stouter and longer than third; the appendage has the three joints oblong, and not very short as in the *brasiliensis*; it is nearly two-thirds as long as the flagellum. The flagellum of the antennæ consists of six or seven similar joints, which are nearly twice as long as broad. The epistome has a keeled projection which is very prominent, projecting obliquely upward with the extremity horizontally truncate (see fig. 2 *b*). The mandible has a subconical extremity, of a dark colour, which consists of a single tooth and one smaller on the side; behind this narrow part there is another small rounded process, which is also dark-coloured. Below the extremity there is a narrow line or crest of setæ; just below them is a small prominence, answering to the molar process, although imperfectly, of this character. The palpus is three-jointed, with very few setæ, and these apical; the inner surface of the last joint is minutely short hairy, as seen under a high magnifying power. The palpus of the inner maxillæ is dentate at summit, and but faintly two-jointed. The fifth joint of the first pair of legs is slightly longer than the fourth; the fifth joint of the second pair has stoutish setæ below, which increase in length to the subapical; on the upper side there is a

spot of very short setæ near middle. The posterior caudal stylets are two-branched, the branches equal, pointed, and naked.

GENUS URISTES (*Dana*).

Corpus compressum, epimeris latis. Antennæ mediocres; superiores basi crassæ, non appendiculatæ. Pedes antici subcheliformes; secundi vergiformes, articulo styliformi confecti; tertii quartique brevissimi; reliqui inter sese similes et longitudine mediocres.

Body compressed, epimerals broad. Antennæ of moderate length; the superior with a stout base, not appendiculate. Anterior feet subcheliform; second vergiform, ending in a long styliform joint; third and fourth very short; remaining similar, and of moderate length.

This genus is instituted for a species from the Antarctic seas. It is peculiar in the very short third and fourth pairs of feet, which are nearly concealed by the epimerals, while the others are of good size, and in the absence of an appendage to the superior antennæ. The anterior feet are rather slender, with the hand small; and the last joint of the second pair is long and slender. The antennæ are subequal, and the flagella of both pairs in the species examined are furnished with peculiar lateral processes.

The mandibles have a three-jointed palpus, a molar prominence, and a pointed dentate apex. The inner maxillæ have a broad, spinous apex, a slender appendage within, and a two-jointed appendage on the back, which has extremely short setæ at apex, and a few much longer on the first joint. The second maxillæ have the usual form.

The epimerals are very broad, and the anterior conceal the mouth organs in a lateral view. The abdomen terminates in an oblong seventh joint. The posterior stylets are rather long, and extend backward beyond the tips of the preceding pair, and about as far as the first pair.

URISTES GIGAS.

Antennæ subæquæ, crassiusculæ, 1mæ dimidio corporis breviores; flagello processibus obtusis infra breviter fimbriato, articulis brevissimis; 2dæ

parce longiores, flagello fere triplo longiore quam basis, articulis transversis, processibus minutis triangulatis supra ornato. Oculi reniformes. Pedes 1mi 2dis breviores, manu oblongâ, apice obliquè truncatâ, marginibus fere parallelis, digito parvulo; 2di 5-articulati, articulo ultimo elongate styliformi, acuto; 7mi 6tis paulo breviores. Segmentum abdominis antepenultimum posticè acutum.

Antennæ subequal, rather stout, not half as long as the body; the superior pair having the flagellum very short jointed and fringed below with short, obtuse processes; the inferior somewhat the longer, and flagellum having minute triangular processes along the upper margin. Eyes reniform. Anterior feet shorter than second pair, hand oblong, apex oblique, margins nearly parallel, finger short; second pair five-jointed, the last joint long styliform. The seventh pair shorter than sixth. Antepenult segment of abdomen acute behind.

Plate 62, fig. 3 *a*, animal, enlarged; *b*, mandible; *c*, *d*, maxillæ; *e*, maxillipeds; *f*, *g*, portions of superior and inferior antennæ.

Taken from the stomach of a fish, in the Antarctic seas.

Length, nine lines. The processes fringing the superior antennæ are obtuse and fleshy; otherwise the joints, which are very short transverse, are nearly naked. The processes on the margin of the inferior pair are attached only to alternate joints; they are acute at apex. The last joint of the second pair of feet is slender and pointed, exceeding the preceding joint in length. The first and second pairs are pubescent below. The third and fourth pairs are nearly concealed by the epimerals. The basal joint of fifth to seventh pairs is very large and serrulate behind. The claw is short, not half as long as the preceding joint. The maxillipeds terminate in a very stout spine or claw, and the joints are hairy along the inner margin, as well as at apex. The palpus of the mandible has a few setæ towards apex, which gradually increase in length to the apical, which is longest, though none are one-fifth as long as the palpus.

The four anterior epimerals on each side are very broad and sub-rectangular, with rounded angles; the fifth is two-thirds as broad as the fourth, and the following are a little smaller.

GENUS ANONYX, Kröyer.

ANONYX FUEGIENSIS.

Oculi reniformes. Antennæ 1mæ 2dis plus duplo breviores, articulis basis 2do 3tioque brevissimis, flagello longiore quam basis, 7-8-articulato. Antennæ 2dæ fermè dimidii corporis longitudine, basi brevi, articulis flagelli vix oblongis, setis brevibus. Pedes 4 antici parvuli, consimiles, antici parce minores, manu parvulâ, oblongâ, apice obliquâ, digito minuto. Pedes tertii quartique subæqui, setis articuli 5ti latitudine articuli multo brevioribus; 6ti 7mique æqui, articulo primo lato et posticè serrulato, setis perbrevibus. Abdominis segmentum ultimum oblongum, emarginatum.

Eyes reniform. Superior antennæ hardly half as long as inferior pair, second and third joints of base very short, flagellum longer than base, seven or eight-jointed. Inferior antennæ about half as long as body, base short, joints of flagellum hardly oblong (excepting near apex). Four anterior feet quite small, similar, the first pair a little the smaller, hand very small, oblong, oblique at apex, finger minute. Third and fourth pairs equal, the setæ very short, those of the fifth joint much shorter than breadth of joint. Sixth and seventh pairs nearly equal, first joint broad and serrulate behind, setæ very short. Last segment of abdomen oblong, emarginate.

Plate 62, fig. 4 *a*, animal, enlarged; *b*, mandible; *c*, *d*, maxillæ; *e*, maxillipeds; *e*¹, same, side view; *f*, front view of head, (showing the position of the mandibular palpi, *p*, *p*, against the face of the epistome *e*, either side of the middle, also the upper lip (*l*, labrum) below *e*, both the epistome and lower lip carinate; *md*, the mandibles; *m*³, the maxillipeds, with *t*, the lamellar processes of the basal joints between; *a*¹, *a*², the bases of the antennæ); *g*, side view of head, (showing *a*¹, superior antennæ; *a*², inferior antennæ, with *s*, a spinous process at the base of the antennæ, as seen also in fig. *f* and *i*; *e*, carinate part of the epistome; *l*¹, *l*², *l*³, *l*⁴, *l*⁵, *l*⁶, *l*⁷, *l*⁸, *l*⁹, *l*¹⁰, *l*¹¹, *l*¹², *l*¹³, *l*¹⁴, *l*¹⁵, *l*¹⁶, *l*¹⁷, *l*¹⁸, *l*¹⁹, *l*²⁰, *l*²¹, *l*²², *l*²³, *l*²⁴, *l*²⁵, *l*²⁶, *l*²⁷, *l*²⁸, *l*²⁹, *l*³⁰, *l*³¹, *l*³², *l*³³, *l*³⁴, *l*³⁵, *l*³⁶, *l*³⁷, *l*³⁸, *l*³⁹, *l*⁴⁰, *l*⁴¹, *l*⁴², *l*⁴³, *l*⁴⁴, *l*⁴⁵, *l*⁴⁶, *l*⁴⁷, *l*⁴⁸, *l*⁴⁹, *l*⁵⁰, *l*⁵¹, *l*⁵², *l*⁵³, *l*⁵⁴, *l*⁵⁵, *l*⁵⁶, *l*⁵⁷, *l*⁵⁸, *l*⁵⁹, *l*⁶⁰, *l*⁶¹, *l*⁶², *l*⁶³, *l*⁶⁴, *l*⁶⁵, *l*⁶⁶, *l*⁶⁷, *l*⁶⁸, *l*⁶⁹, *l*⁷⁰, *l*⁷¹, *l*⁷², *l*⁷³, *l*⁷⁴, *l*⁷⁵, *l*⁷⁶, *l*⁷⁷, *l*⁷⁸, *l*⁷⁹, *l*⁸⁰, *l*⁸¹, *l*⁸², *l*⁸³, *l*⁸⁴, *l*⁸⁵, *l*⁸⁶, *l*⁸⁷, *l*⁸⁸, *l*⁸⁹, *l*⁹⁰, *l*⁹¹, *l*⁹², *l*⁹³, *l*⁹⁴, *l*⁹⁵, *l*⁹⁶, *l*⁹⁷, *l*⁹⁸, *l*⁹⁹, *l*¹⁰⁰, *l*¹⁰¹, *l*¹⁰², *l*¹⁰³, *l*¹⁰⁴, *l*¹⁰⁵, *l*¹⁰⁶, *l*¹⁰⁷, *l*¹⁰⁸, *l*¹⁰⁹, *l*¹¹⁰, *l*¹¹¹, *l*¹¹², *l*¹¹³, *l*¹¹⁴, *l*¹¹⁵, *l*¹¹⁶, *l*¹¹⁷, *l*¹¹⁸, *l*¹¹⁹, *l*¹²⁰, *l*¹²¹, *l*¹²², *l*¹²³, *l*¹²⁴, *l*¹²⁵, *l*¹²⁶, *l*¹²⁷, *l*¹²⁸, *l*¹²⁹, *l*¹³⁰, *l*¹³¹, *l*¹³², *l*¹³³, *l*¹³⁴, *l*¹³⁵, *l*¹³⁶, *l*¹³⁷, *l*¹³⁸, *l*¹³⁹, *l*¹⁴⁰, *l*¹⁴¹, *l*¹⁴², *l*¹⁴³, *l*¹⁴⁴, *l*¹⁴⁵, *l*¹⁴⁶, *l*¹⁴⁷, *l*¹⁴⁸, *l*¹⁴⁹, *l*¹⁵⁰, *l*¹⁵¹, *l*¹⁵², *l*¹⁵³, *l*¹⁵⁴, *l*¹⁵⁵, *l*¹⁵⁶, *l*¹⁵⁷, *l*¹⁵⁸, *l*¹⁵⁹, *l*¹⁶⁰, *l*¹⁶¹, *l*¹⁶², *l*¹⁶³, *l*¹⁶⁴, *l*¹⁶⁵, *l*¹⁶⁶, *l*¹⁶⁷, *l*¹⁶⁸, *l*¹⁶⁹, *l*¹⁷⁰, *l*¹⁷¹, *l*¹⁷², *l*¹⁷³, *l*¹⁷⁴, *l*¹⁷⁵, *l*¹⁷⁶, *l*¹⁷⁷, *l*¹⁷⁸, *l*¹⁷⁹, *l*¹⁸⁰, *l*¹⁸¹, *l*¹⁸², *l*¹⁸³, *l*¹⁸⁴, *l*¹⁸⁵, *l*¹⁸⁶, *l*¹⁸⁷, *l*¹⁸⁸, *l*¹⁸⁹, *l*¹⁹⁰, *l*¹⁹¹, *l*¹⁹², *l*¹⁹³, *l*¹⁹⁴, *l*¹⁹⁵, *l*¹⁹⁶, *l*¹⁹⁷, *l*¹⁹⁸, *l*¹⁹⁹, *l*²⁰⁰, *l*²⁰¹, *l*²⁰², *l*²⁰³, *l*²⁰⁴, *l*²⁰⁵, *l*²⁰⁶, *l*²⁰⁷, *l*²⁰⁸, *l*²⁰⁹, *l*²¹⁰, *l*²¹¹, *l*²¹², *l*²¹³, *l*²¹⁴, *l*²¹⁵, *l*²¹⁶, *l*²¹⁷, *l*²¹⁸, *l*²¹⁹, *l*²²⁰, *l*²²¹, *l*²²², *l*²²³, *l*²²⁴, *l*²²⁵, *l*²²⁶, *l*²²⁷, *l*²²⁸, *l*²²⁹, *l*²³⁰, *l*²³¹, *l*²³², *l*²³³, *l*²³⁴, *l*²³⁵, *l*²³⁶, *l*²³⁷, *l*²³⁸, *l*²³⁹, *l*²⁴⁰, *l*²⁴¹, *l*²⁴², *l*²⁴³, *l*²⁴⁴, *l*²⁴⁵, *l*²⁴⁶, *l*²⁴⁷, *l*²⁴⁸, *l*²⁴⁹, *l*²⁵⁰, *l*²⁵¹, *l*²⁵², *l*²⁵³, *l*²⁵⁴, *l*²⁵⁵, *l*²⁵⁶, *l*²⁵⁷, *l*²⁵⁸, *l*²⁵⁹, *l*²⁶⁰, *l*²⁶¹, *l*²⁶², *l*²⁶³, *l*²⁶⁴, *l*²⁶⁵, *l*²⁶⁶, *l*²⁶⁷, *l*²⁶⁸, *l*²⁶⁹, *l*²⁷⁰, *l*²⁷¹, *l*²⁷², *l*²⁷³, *l*²⁷⁴, *l*²⁷⁵, *l*²⁷⁶, *l*²⁷⁷, *l*²⁷⁸, *l*²⁷⁹, *l*²⁸⁰, *l*²⁸¹, *l*²⁸², *l*²⁸³, *l*²⁸⁴, *l*²⁸⁵, *l*²⁸⁶, *l*²⁸⁷, *l*²⁸⁸, *l*²⁸⁹, *l*²⁹⁰, *l*²⁹¹, *l*²⁹², *l*²⁹³, *l*²⁹⁴, *l*²⁹⁵, *l*²⁹⁶, *l*²⁹⁷, *l*²⁹⁸, *l*²⁹⁹, *l*³⁰⁰, *l*³⁰¹, *l*³⁰², *l*³⁰³, *l*³⁰⁴, *l*³⁰⁵, *l*³⁰⁶, *l*³⁰⁷, *l*³⁰⁸, *l*³⁰⁹, *l*³¹⁰, *l*³¹¹, *l*³¹², *l*³¹³, *l*³¹⁴, *l*³¹⁵, *l*³¹⁶, *l*³¹⁷, *l*³¹⁸, *l*³¹⁹, *l*³²⁰, *l*³²¹, *l*³²², *l*³²³, *l*³²⁴, *l*³²⁵, *l*³²⁶, *l*³²⁷, *l*³²⁸, *l*³²⁹, *l*³³⁰, *l*³³¹, *l*³³², *l*³³³, *l*³³⁴, *l*³³⁵, *l*³³⁶, *l*³³⁷, *l*³³⁸, *l*³³⁹, *l*³⁴⁰, *l*³⁴¹, *l*³⁴², *l*³⁴³, *l*³⁴⁴, *l*³⁴⁵, *l*³⁴⁶, *l*³⁴⁷, *l*³⁴⁸, *l*³⁴⁹, *l*³⁵⁰, *l*³⁵¹, *l*³⁵², *l*³⁵³, *l*³⁵⁴, *l*³⁵⁵, *l*³⁵⁶, *l*³⁵⁷, *l*³⁵⁸, *l*³⁵⁹, *l*³⁶⁰, *l*³⁶¹, *l*³⁶², *l*³⁶³, *l*³⁶⁴, *l*³⁶⁵, *l*³⁶⁶, *l*³⁶⁷, *l*³⁶⁸, *l*³⁶⁹, *l*³⁷⁰, *l*³⁷¹, *l*³⁷², *l*³⁷³, *l*³⁷⁴, *l*³⁷⁵, *l*³⁷⁶, *l*³⁷⁷, *l*³⁷⁸, *l*³⁷⁹, *l*³⁸⁰, *l*³⁸¹, *l*³⁸², *l*³⁸³, *l*³⁸⁴, *l*³⁸⁵, *l*³⁸⁶, *l*³⁸⁷, *l*³⁸⁸, *l*³⁸⁹, *l*³⁹⁰, *l*³⁹¹, *l*³⁹², *l*³⁹³, *l*³⁹⁴, *l*³⁹⁵, *l*³⁹⁶, *l*³⁹⁷, *l*³⁹⁸, *l*³⁹⁹, *l*⁴⁰⁰, *l*⁴⁰¹, *l*⁴⁰², *l*⁴⁰³, *l*⁴⁰⁴, *l*⁴⁰⁵, *l*⁴⁰⁶, *l*⁴⁰⁷, *l*⁴⁰⁸, *l*⁴⁰⁹, *l*⁴¹⁰, *l*⁴¹¹, *l*⁴¹², *l*⁴¹³, *l*⁴¹⁴, *l*⁴¹⁵, *l*⁴¹⁶, *l*⁴¹⁷, *l*⁴¹⁸, *l*⁴¹⁹, *l*⁴²⁰, *l*⁴²¹, *l*⁴²², *l*⁴²³, *l*⁴²⁴, *l*⁴²⁵, *l*⁴²⁶, *l*⁴²⁷, *l*⁴²⁸, *l*⁴²⁹, *l*⁴³⁰, *l*⁴³¹, *l*⁴³², *l*⁴³³, *l*⁴³⁴, *l*⁴³⁵, *l*⁴³⁶, *l*⁴³⁷, *l*⁴³⁸, *l*⁴³⁹, *l*⁴⁴⁰, *l*⁴⁴¹, *l*⁴⁴², *l*⁴⁴³, *l*⁴⁴⁴, *l*⁴⁴⁵, *l*⁴⁴⁶, *l*⁴⁴⁷, *l*⁴⁴⁸, *l*⁴⁴⁹, *l*⁴⁵⁰, *l*⁴⁵¹, *l*⁴⁵², *l*⁴⁵³, *l*⁴⁵⁴, *l*⁴⁵⁵, *l*⁴⁵⁶, *l*⁴⁵⁷, *l*⁴⁵⁸, *l*⁴⁵⁹, *l*⁴⁶⁰, *l*⁴⁶¹, *l*⁴⁶², *l*⁴⁶³, *l*⁴⁶⁴, *l*⁴⁶⁵, *l*⁴⁶⁶, *l*⁴⁶⁷, *l*⁴⁶⁸, *l*⁴⁶⁹, *l*⁴⁷⁰, *l*⁴⁷¹, *l*⁴⁷², *l*⁴⁷³, *l*⁴⁷⁴, *l*⁴⁷⁵, *l*⁴⁷⁶, *l*⁴⁷⁷, *l*⁴⁷⁸, *l*⁴⁷⁹, *l*⁴⁸⁰, *l*⁴⁸¹, *l*⁴⁸², *l*⁴⁸³, *l*⁴⁸⁴, *l*⁴⁸⁵, *l*⁴⁸⁶, *l*⁴⁸⁷, *l*⁴⁸⁸, *l*⁴⁸⁹, *l*⁴⁹⁰, *l*⁴⁹¹, *l*⁴⁹², *l*⁴⁹³, *l*⁴⁹⁴, *l*⁴⁹⁵, *l*⁴⁹⁶, *l*⁴⁹⁷, *l*⁴⁹⁸, *l*⁴⁹⁹, *l*⁵⁰⁰, *l*⁵⁰¹, *l*⁵⁰², *l*⁵⁰³, *l*⁵⁰⁴, *l*⁵⁰⁵, *l*⁵⁰⁶, *l*⁵⁰⁷, *l*⁵⁰⁸, *l*⁵⁰⁹, *l*⁵¹⁰, *l*⁵¹¹, *l*⁵¹², *l*⁵¹³, *l*⁵¹⁴, *l*⁵¹⁵, *l*⁵¹⁶, *l*⁵¹⁷, *l*⁵¹⁸, *l*⁵¹⁹, *l*⁵²⁰, *l*⁵²¹, *l*⁵²², *l*⁵²³, *l*⁵²⁴, *l*⁵²⁵, *l*⁵²⁶, *l*⁵²⁷, *l*⁵²⁸, *l*⁵²⁹, *l*⁵³⁰, *l*⁵³¹, *l*⁵³², *l*⁵³³, *l*⁵³⁴, *l*⁵³⁵, *l*⁵³⁶, *l*⁵³⁷, *l*⁵³⁸, *l*⁵³⁹, *l*⁵⁴⁰, *l*⁵⁴¹, *l*⁵⁴², *l*⁵⁴³, *l*⁵⁴⁴, *l*⁵⁴⁵, *l*⁵⁴⁶, *l*⁵⁴⁷, *l*⁵⁴⁸, *l*⁵⁴⁹, *l*⁵⁵⁰, *l*⁵⁵¹, *l*⁵⁵², *l*⁵⁵³, *l*⁵⁵⁴, *l*⁵⁵⁵, *l*⁵⁵⁶, *l*⁵⁵⁷, *l*⁵⁵⁸, *l*⁵⁵⁹, *l*⁵⁶⁰, *l*⁵⁶¹, *l*⁵⁶², *l*⁵⁶³, *l*⁵⁶⁴, *l*⁵⁶⁵, *l*⁵⁶⁶, *l*⁵⁶⁷, *l*⁵⁶⁸, *l*⁵⁶⁹, *l*⁵⁷⁰, *l*⁵⁷¹, *l*⁵⁷², *l*⁵⁷³, *l*⁵⁷⁴, *l*⁵⁷⁵, *l*⁵⁷⁶, *l*⁵⁷⁷, *l*⁵⁷⁸, *l*⁵⁷⁹, *l*⁵⁸⁰, *l*⁵⁸¹, *l*⁵⁸², *l*⁵⁸³, *l*⁵⁸⁴, *l*⁵⁸⁵, *l*⁵⁸⁶, *l*⁵⁸⁷, *l*⁵⁸⁸, *l*⁵⁸⁹, *l*⁵⁹⁰, *l*⁵⁹¹, *l*⁵⁹², *l*⁵⁹³, *l*⁵⁹⁴, *l*⁵⁹⁵, *l*⁵⁹⁶, *l*⁵⁹⁷, *l*⁵⁹⁸, *l*⁵⁹⁹, *l*⁶⁰⁰, *l*⁶⁰¹, *l*⁶⁰², *l*⁶⁰³, *l*⁶⁰⁴, *l*⁶⁰⁵, *l*⁶⁰⁶, *l*⁶⁰⁷, *l*⁶⁰⁸, *l*⁶⁰⁹, *l*⁶¹⁰, *l*⁶¹¹, *l*⁶¹², *l*⁶¹³, *l*⁶¹⁴, *l*⁶¹⁵, *l*⁶¹⁶, *l*⁶¹⁷, *l*⁶¹⁸, *l*⁶¹⁹, *l*⁶²⁰, *l*⁶²¹, *l*⁶²², *l*⁶²³, *l*⁶²⁴, *l*⁶²⁵, *l*⁶²⁶, *l*⁶²⁷, *l*⁶²⁸, *l*⁶²⁹, *l*⁶³⁰, *l*⁶³¹, *l*⁶³², *l*⁶³³, *l*⁶³⁴, *l*⁶³⁵, *l*⁶³⁶, *l*⁶³⁷, *l*⁶³⁸, *l*⁶³⁹, *l*⁶⁴⁰, *l*⁶⁴¹, *l*⁶⁴², *l*⁶⁴³, *l*⁶⁴⁴, *l*⁶⁴⁵, *l*⁶⁴⁶, *l*⁶⁴⁷, *l*⁶⁴⁸, *l*⁶⁴⁹, *l*⁶⁵⁰, *l*⁶⁵¹, *l*⁶⁵², *l*⁶⁵³, *l*⁶⁵⁴, *l*⁶⁵⁵, *l*⁶⁵⁶, *l*⁶⁵⁷, *l*⁶⁵⁸, *l*⁶⁵⁹, *l*⁶⁶⁰, *l*⁶⁶¹, *l*⁶⁶², *l*⁶⁶³, *l*⁶⁶⁴, *l*⁶⁶⁵, *l*⁶⁶⁶, *l*⁶⁶⁷, *l*⁶⁶⁸, *l*⁶⁶⁹, *l*⁶⁷⁰, *l*⁶⁷¹, *l*⁶⁷², *l*⁶⁷³, *l*⁶⁷⁴, *l*⁶⁷⁵, *l*⁶⁷⁶, *l*⁶⁷⁷, *l*⁶⁷⁸, *l*⁶⁷⁹, *l*⁶⁸⁰, *l*⁶⁸¹, *l*⁶⁸², *l*⁶⁸³, *l*⁶⁸⁴, *l*⁶⁸⁵, *l*⁶⁸⁶, *l*⁶⁸⁷, *l*⁶⁸⁸, *l*⁶⁸⁹, *l*⁶⁹⁰, *l*⁶⁹¹, *l*⁶⁹², *l*⁶⁹³, *l*⁶⁹⁴, *l*⁶⁹⁵, *l*⁶⁹⁶, *l*⁶⁹⁷, *l*⁶⁹⁸, *l*⁶⁹⁹, *l*⁷⁰⁰, *l*⁷⁰¹, *l*⁷⁰², *l*⁷⁰³, *l*⁷⁰⁴, *l*⁷⁰⁵, *l*⁷⁰⁶, *l*⁷⁰⁷, *l*⁷⁰⁸, *l*⁷⁰⁹, *l*⁷¹⁰, *l*⁷¹¹, *l*⁷¹², *l*⁷¹³, *l*⁷¹⁴, *l*⁷¹⁵, *l*⁷¹⁶, *l*⁷¹⁷, *l*⁷¹⁸, *l*⁷¹⁹, *l*⁷²⁰, *l*⁷²¹, *l*⁷²², *l*⁷²³, *l*⁷²⁴, *l*⁷²⁵, *l*⁷²⁶, *l*⁷²⁷, *l*⁷²⁸, *l*⁷²⁹, *l*⁷³⁰, *l*⁷³¹, *l*⁷³², *l*⁷³³, *l*⁷³⁴, *l*⁷³⁵, *l*⁷³⁶, *l*⁷³⁷, *l*⁷³⁸, *l*⁷³⁹, *l*⁷⁴⁰, *l*⁷⁴¹, *l*⁷⁴², *l*⁷⁴³, *l*⁷⁴⁴, *l*⁷⁴⁵, *l*⁷⁴⁶, *l*⁷⁴⁷, *l*⁷⁴⁸, *l*⁷⁴⁹, *l*⁷⁵⁰, *l*⁷⁵¹, *l*⁷⁵², *l*⁷⁵³, *l*⁷⁵⁴, *l*⁷⁵⁵, *l*⁷⁵⁶, *l*⁷⁵⁷, *l*⁷⁵⁸, *l*⁷⁵⁹, *l*⁷⁶⁰, *l*⁷⁶¹, *l*⁷⁶², *l*⁷⁶³, *l*⁷⁶⁴, *l*⁷⁶⁵, *l*⁷⁶⁶, *l*⁷⁶⁷, *l*⁷⁶⁸, *l*⁷⁶⁹, *l*^{770</}

maxilla of first pair; m^2 , ibid. of second pair; m^3 , maxillipeds; n , o , parts below base of maxillipeds; t , lamellar processes of maxillipeds); h , same view, with the maxillipeds bent downward, out of place; i , process at base of inferior antennæ; k , part of flagellum of same; l , superior antennæ; l' , longer flagellum of same, from another specimen; m , part of leg of first pair; n , ibid. of fourth pair; o , ibid. of fifth pair; p , caudal segment.

Good Success Bay, Tierra del Fuego; collected in eight or ten feet water, being brought up on meat set as bait by Lieutenant Underwood.

Length, one-third to half an inch. Body very much compressed. Thoracic segments subequal. Third abdominal segment with the posterior apex rounded and prominent in a profile view; the last abdominal oblong and emarginate, and either side of the emargination it is acute, or bears a very minute spine.

The specimens had been put in alcohol before seen by the author and the natural colour could not be ascertained. Nearly all had a transverse band of bright red along the posterior margin of the thoracic and abdominal segments. The other characters of the specimens will be gathered from the figures, and the descriptions of them above.

Stenia magellanica, DANA, Proc. Amer. Acad. Sci., ii., 209. The genus *Stenia* is not sustained, on further examination of specimens. Moreover, as Edwards has named a *Lysianassa*, *L. magellanica*, (Ann. Sci. Nat. [3], ix, 398, 1848), we change the specific name to the more appropriate one of *fuegiensis*.

GENUS UROTHOE, Dana.

Epimeræ permagnæ, *5tis parvulis*. *Pedes 4 antici subchelati*. *Antennæ 1mæ breviores, appendiculatæ; 2dæ longæ*. *Maxillipedes longi et angusti, lamellis internis perparvis*. *Styli caudales postici biramei, prælongi, ramis foliaceis, ciliatis*.

Epimerals very large, fifth quite small. Feet of two anterior pairs subchelate. Superior antennæ shorter than inferior, appendiculate; inferior pair long. Maxillipeds narrow and long, with the inner lamellæ quite small. Caudal stylets of last pair two-branched, very long, branches foliaceous, ciliate.

The very small inner lamellar processes of the maxillipeds remove this genus widely from the other Lysianassinæ and ally them to the Leucothoinæ; yet the mandibles are of the Lysianassa type. The superior antennæ have the base considerably elongated, yet the first joint is rather stout. The large and long foliaceous posterior stylets distinguish the species readily from related genera. The feet of the second and third pairs, although not properly prehensile, are furnished with very stout finger-like spines on the penult and ante-penult joints; and the species have thus some relation to the *Pontoporeinæ*.

The caudal stylets of the first and second pairs have the branches straight subulate and naked. The caudal segment of the abdomen is elongate, and bisected longitudinally very nearly to its base. The six posterior legs are broad lamellar, especially the first, third, and fourth joints. The first and second pairs are similar to one another, and the hands are well made for prehension, although rather small.

UROTHOE ROSTRATUS.

Frons portentosè productus et lamellatus, apicem articuli antennarum 1marum 1mi attingens. Oculi rotundati. Articulus antennarum 1marum 1mus crassior, oblongus, 2dus paulo brevior, gracilior, flagello 12-articulato, appendice 8-articulato. Antennæ 2dæ dimidio corporis longiores, articulo basi penultimo setis crassis reversis armatis, flagello gracillimo, articulis longis. Pedes 1mi 2dique subæqui, manu paulo oblongâ, apice obliquè truncatâ. Pedes 3tii 4tique vix prehensiles, articulis penultimo et antepenultimo setis crassis fere digitiformibus armato. Pedes 7mi 6tis multo breviores. Styli caudales 2di breviores.

Front lamellately produced, even to apex of first joint of base of superior antennæ. Eyes round. First joint of superior antennæ rather stout, oblong, second joint more slender and a little shorter. Inferior pair longer than half the body, penult joint of base towards apex furnished with stout reversed setæ, flagellum very slender, joints long. Feet of first and second pairs subequal, hand a little oblong, obliquely truncate at apex. Feet of third and fourth pairs hardly prehensile, the penult and antepenult joint furnished with stout setæ a little like fingers. Feet of seventh pair quite short; much shorter than those of the sixth.

Plate 62, fig. 5 *a*, animal, enlarged; *b*, upper view of head; *c*, part of base of inferior antennæ; *d*, part of flagellum of same; *e, e'*, mandible in different positions; *f*, maxilla of first pair; *g*, maxillipeds; *g'*, same, more enlarged; *h*, leg of second pair; *i*, ibid. of third or fourth pair; *k*, ibid. of fifth pair; *l*, ibid. of sixth; *m*, ibid. of seventh pair; *n*, abdominal natatory; *o*, extremity of abdomen, upper view; *p*, stylets of second pair.

Sooloo Sea, Feb. 3, 1842.

Length three lines. The projecting front is rounded anteriorly, and the bases of the superior antennæ may be seen through it. The smaller branch of the superior antennæ is one-fourth shorter than the other. The flagellum of the second pair has the joint many times longer than broad and very slender; and near the apex of each there is a short process, a little vermiform in shape, which has an appearance of being three-jointed. The mandible is pointed at summit, and has two or three teeth. The palpus is three-jointed, the first joint very short, the second longer than the third, the third or last bears from an oblique space at apex a cluster of setæ nearly as long as the joint. The antepenult joint of the legs of the third and fourth pairs is quite short, being more than half shorter than the preceding. The bases of the last six legs are serrulate behind; and the joints below are serrate by the bases of the setæ, which setæ are stout and spiniform, but intermingled with long plumose hairs, on the fifth pair of legs especially. The claw of the fifth pair is a little nodulose along one side.

UROTHOE IRROSTRATUS.

U. rostrato similis. Frons non rostratus. Flagellum antennarum Imarum 6-7-articulatum basi brevius; appendix perbrevis, 2-3-articulata. Tarsi pedum 4ti et 5ti margine interno noduloso, fere arcuato.

Near the *rostratus*. Front not rostrate. Flagellum of the superior antennæ six or seven jointed, shorter than the base; appendage very short, two or three-jointed. Tarsi of feet of fourth and fifth pairs nodulose along inner side, this side somewhat arcuate.

Plate 62, fig. 6 *a*, anterior part of body, enlarged; *b*, part of the flagellum of inferior antennæ; *c*, extremity of leg of fourth pair; *d*, leg of fifth pair; *e*, extremity of same; *f*, extremity of body.

Sooloo Sea, with the preceding.

Length three lines. The occurrence of the individuals of this species with the preceding leads us to suspect that the two may be male and female. Yet the great difference in the front is not like any sexual difference hitherto noticed; moreover, the superior antennæ differ much.

SUBFAMILY LEUCOTHAINÆ.

GENUS STENOTHOE, Dana.

Epimeræ permagnæ, 4tæ maximæ, 5tis parvulis. Mandibulæ non palpi-geræ nec processu molari instructæ, apicali acie denticulatâ et alterâ accessoriâ. Maxillipedes angusti, oblongi, lamellis internis obsolescentibus. Pedes 4 antici manibus confecti, 2dis pervalidis. [Antennæ superiores paulo longiores.] Pedes 10 postici longitudine mediocres. Styli caudales 1mi 2dique biramei, ramis bene subulatis, 3tii simplicissimi, subulati.

Epimerals very large, the fourth largest, fifth small. Mandibles without palpi, or molar prominence, having a denticulate edge at summit, and another inside just below summit. Maxillipeds narrow, oblong, the inner lamellar processes obsolescent. Feet of four anterior pairs ending in hands, those of second pair very stout. [Superior antennæ a little the longer.] Feet of ten posterior pairs of moderate size. Caudal stylets of first and second pairs with two subulate branches; of third pair simple and subulate.

The slender maxillipeds without the inner lamellar processes and the non-palpigerous mandibles, are alone sufficient to mark this genus as distinct from others to which it is related. The third and fourth epimerals are peculiarly large, and the following three quite small. The terminal edge of the mandible is denticulated; just below it on the inner surface there is a second prominent, thin edge, or process, as

in the Gammarinæ, much more finely denticulated; and below this, to one side, there are a few spines, and an oblong cluster or line of setæ. The usual prominence exists on the outer side; but the palpus is wanting. The inner maxillæ have a two-jointed palpus. The first and second caudal stylets have the branches slender acuminate, and end in an acute point without a distinct spine for the termination. The third pair has but a single branch, and this is without hairs, rather short, subconical, a little reflexed at apex, and ending in two very short spines, only seen under a high magnifier.

This genus is near *Leucothoe* in its outer maxillipeds, the very short third joint of the superior antennæ, and many other characters; and the absence of mandibular palpi seems not in this case, to be a characteristic of so high importance, but that the genera may be placed in the same subfamily.

STENOTHOE VALIDUS.

Maris:—*Epimeræ permagnæ, 5tæ perparvulæ. Oculi parvi, rotundati. Antennæ quatuor subæquæ, basi 2darum quam flagellum longiore, et fere duplo longiore quam 1marum basis, articulis flagelli oblongis, fere nudis. Pedes 1mi manu confecti parvâ oblongâ, marginibus paulo arcuatâ, digito longo, palmâ non excavatâ, longitudinali. Pedes 2di manu portentosæ magnitudinis, oblongâ, marginibus fere parallelis, apice inferiore unidentato dente obtuso, digito longo et crasso. Pedes 5ti 6ti 7miquæ subæqui, 5tis minoribus, articulo 1mo lato, 3tio sat lato, reliquis sat angustis, setis brevissimis, latitudine articuli 5ti plus quadruplo brevioribus.*

Feminæ:—*Basis antennarum 2darum flagellum longitudine fere æquans. Pedes 2di manu validâ confecti, oblongâ, supra arcuatâ, infra (palmâ) rectiusculâ, versus apicem dente parvo instructâ.*

Male:—Epimerals very large, fifth quite small. Eye small and round. The four antennæ subequal, base of inferior pair longer than flagellum and nearly twice as long as base of superior pair, joints of flagellum oblong, nearly naked. Feet of first pair furnished with a hand, which is oblong, arcuate above, and rather more so below, the palm nearly longitudinal and not excavate; the hand of second pair of very unusual magnitude, oblong, mar-

gins nearly parallel, an obtuse tooth at lower apex, finger long and stout. Feet of fifth, sixth, and seventh pairs subequal, the fifth smallest, first joint broad, third rather broad, the rest rather narrow, setæ exceedingly short, not one-fourth as long as breadth of joint.

Female.—Base of second antennæ as long as the flagellum. Feet of second pair having a stout hand, which is oblong, arcuate below, with the palm nearly straight, and armed with a small tooth towards apex.

Plate 63, figs. 1 *a* to *e*, *male*; *f* to *o*, *female*.—*a*, *male*, enlarged; *b*, part of flagellum of superior antennæ; *c*, maxillipeds; *d*, leg of first pair; *e*, *ibid.* of sixth pair.—*f*, *female*, enlarged; *g*, mandible; *h*, maxilla of first pair; *i*, part of maxilla of second pair; *k*, maxillipeds; *l*, hand of first pair of legs; *m*, *ibid.* of second pair; *n*, leg of seventh pair; *o*, caudal stylets and extremity of abdomen.

Rio Janeiro.

Length, three to four lines.

Male.—The penult joint of the base of the inferior antennæ is rather longer than the last, and is more than half the length of the flagellum. The carpus (or fourth joint) of the first pair of legs is triangular, with the lower apex obtuse; the third joint is much longer than the fourth, but similarly triangular, the lower apex being quite prominent; the finger is full two-thirds as long as the hand, and applies itself against the outer two-thirds (or three-fourths) of the lower margin, which is a little oblique. The hand of the second pair is truncate somewhat obliquely at apex, and is but little narrower in this part than behind, owing to the prominent tooth forming the lower apex of the extremity. The under side of the hand is in part pubescent. The finger is curved, and has two slight projections towards base on inner side. The third joint of the six posterior legs has the posterior apex triangulately prolonged, nearly as far as to apex of the fourth joint. The fifth joint in the sixth pair has seven or eight very minute setules, or sets of setules, on the inner margin.

Female.—The carpus of the hand of the first pair is rather longer than the third joint; the third joint has the lower apex very

much prolonged beneath the fourth joint. The carpus of the second pair has a narrow prolongation below, between the hand and the third joint; the third joint is not longer than the carpus; the hand is a little pubescent below. The caudal stylets, as in the other sex, have the branches subulate, and the extremity appears almost to be the continuation of the stylet instead of a separate spine; the first pair extends farther back than the second, and the second farther than the third; the branches of the first pair have two or three spinules on the upper side. The inner maxillæ have nearly the usual form (fig. 1 *h*). The inner lamellæ of the maxillipeds are not half as long as the first free joint of the maxilliped; the five joints of these organs have a few very short setæ on the inner side; and on the penult joint on the inner side near tip there is a thick pubescence.

SUBFAMILY GAMMARINÆ.

The mandibles in the Gammarinæ, unlike those of the Lysianassinæ, have a multidentate summit, and also, a broad inner lobe or process, arising from just below the apex, which is similarly dentate above. Below this lobe there is an oblong line or crest covered with curving setæ, and in some instances this surface is furnished with a series of subparallel, dentate lamellæ, approximately parallel to the lobe above. Below this, there is a broad molar tooth, with a scabrous or striated surface.

The carpus of the second pair of legs in the true Gammarinæ, as far as examined, is not so narrow and small as to be intercepted below by the fourth joint (that preceding), as happens in all the Orchestidæ, excepting a few Allorchestes; and this character as well as the oblong posterior stylets and the mandibular palpi, will generally distinguish those species having the superior antennæ the shorter from the Allorchestes.

GENUS IPHIMEDIA (*Rathke*), *D.*

Epimeræ magnæ, Atæ maximæ, 5tis valde brevioribus. Maxillipedes lati, lamellis internis grandibus. Styli caudales postici biramei, ramis oblongis consimilibus, apice setigeris et non uncinatis. Antennæ 1mæ sæpius breviores.

Epimerals large, the fourth largest, fifth small. Maxillipeds broad, the inner lamellæ large. Posterior caudal stylets two-branched, branches oblong, similar, setigerous and not uncinatè at apex. Superior antennæ usually the shorter.

The species of Iphimediæ are mostly found in the colder seas, and among them, there is a tendency towards spinose or nodose forms. They have generally the inferior antennæ the longer, though not so in all cases; moreover, these organs seem commonly to be nearly naked. The epimerals are usually large, but unlike Amphithoe, the fourth is the largest, and the fifth is abruptly very much shorter, hardly exceeding the sixth in length, and anteriorly it occupies usually a concavity in the posterior margin of the fourth epimeral. These species are hence widely diverse from those of the following group, and approximate to the *Lysianassinæ*.

The outer maxillipeds have commonly broad joints, with a terminal claw. The tarsi of the legs have often an inferior seta.

IPHIMEDIA SIMPLEX.

Corpus compressum, nudum. Oculi orbiculares. Antennæ fere nudæ; 2dæ dimidii corporis longitudine, basi brevi, minus dimidio flagelli, articulis flagelli transversis; 1mæ paulo breviores, basi vix breviorè quam basis 2darum, articulis paucis inter se remotis processu infra productis. Pedes toti breves. Manus prima sat parva, angusto-ovata, apice subacuta. Manus secunda (an feminæ?) valde minor, sed formâ similis. Pedes 3tii 4tique 2dis longiores, subæqui; 4 postici subæqui, articulo primo latissimo, margine postico obsoletè serrulato.

Body compressed, naked. Eyes round. Antennæ nearly naked; inferior pair half as long as body, base short, less than half the flagellum, joints of flagellum transverse; superior pair a little shorter than inferior, base scarcely shorter than base of superior, a few joints at remote intervals produced below. Feet all short. Hand of first pair moderately small, narrow ovate, apex subacute. Hand of second pair (female?) much smaller, but similar in form. Third and fourth pairs longer than second, subequal. Last two pairs subequal, first joint very broad, its posterior margin imperfectly serrulate.

Plate 63, fig. 2 *a*, animal, enlarged; *b*, superior antenna; *c*, part of flagellum of same towards extremity; *d*, *e*, mandible; *f*, inner maxilla; *g*, maxillipeds; *h*, part of leg of first pair; *i*, *ibid.* of third pair.

Collected at Hermite Island, by Lieutenant Case.

Length, four to five lines. Head longer than next segment, anterior margin of head in upper view, with a low angle at centre; four anterior epimerals on either side rounded. The first joint of base of superior antennæ is slightly the longest, and the third shortest; the flagellum is about two-thirds as long as the flagellum of the other pair. The joints of the flagellum are very short and prominent, those towards the base transverse, and those towards the extremity oblong. The hand of first pair is about twice as long as the carpus. The first joint of seventh pair has the posterior apex acute; the same in the preceding two pairs is obtuse.

The third pair of stylets extends backward, much beyond the second, and somewhat beyond the first pair; the two branches are similar and acuminate. The caudal segment is oblong and deeply cleft.

Amphithoe (Iphimedia) simplex, DANA, Proc. Amer. Acad. Sci., Boston, ii. 217.

IPHIMEDIA NODOSA.

Oculi rotundati. Corpus crassiusculum, testâ subcalcareâ, fronte minutè rostrato, abdomine subcarinato. Segmenta thoracis 4 antica marginibus integra, 5ta postice sinuosa et sequentia paulo dentata. Abdominis tria segmenta dorso dentata et latere sparsim acutè nodosa, sequentia nuda. Epimeræ tres anticæ integræ, obtusæ, quarta lata, posticè bi-dentata, tria sequentia brevia et posticè acuta. Articulus pedum sex posticorum primus subquadratus, et postice unidentatus, angulo postico acutus. Antennæ inferiores longiores, dimidio corporis breviores. Pedes nudi; 4 antici parvuli, manibus primis secundisque minutis; 4 sequentes paulo majores; 6 reliqui parce longiores, subæqui, articulo tertio triangulato, apice postico producto et acuto.

Eyes round. Body rather stout, shell subcalcareous, front with a

short, slender beak, abdomen subcarinate. Four anterior thoracic segments entire at posterior margin, fifth sinuous behind, and sixth and seventh sparingly dentate; first three abdominal segments dentate on the back, and sparingly acuto-nodose on the sides, the rest naked. Three anterior epimerals entire, obtuse, fourth bidentate behind, three following narrow and posteriorly acute. First joint of last six legs subquadrate, unidentate behind, and posterior angle acute. Inferior antennæ the longer, shorter than half the body. Legs naked; four anterior quite small, hands minute; next four larger; remaining six a little longer, subequal, third joint triangular, posterior apex being prolonged and acute.

Plate 63, fig. 3 *a*, animal, enlarged; *b*, upper view of head.

Hermite Island, Tierra del Fuego. Collected by Lieutenant Case.

Length, four lines. Thorax inflated. Abdomen subcarinate; the first three segments have a triangular tooth at middle on the back, and behind this two larger teeth (side by side), with truncate top. The head has a short linear obtuse beak. Base of superior antennæ much the shortest, the whole length of antenna about three-fourths the inferior pair. The four anterior feet are slender and much smaller than the following. The six posterior are rather short, terminal joint to which claw is articulated nearly cylindrical, claw short; third joint having the shape of a very obtuse-angled triangle, the obtuse angle at its apex, and the prolongation of the posterior apex in seventh pair, nearly as long as the joint; posterior angle of fourth joint also acute. The posterior stylets extend back nearly to same line with the first.

This species is allied to the *Acanthosoma hystrix* of Owen (Sir John Ross's Second Voyage in Search of a Northwest Passage, 4to., London, 1835, Appendix, p. xci. Pl. B, figs. 4, 5, 6, 7).

Amphithoe (Iphimedia) nodosa, DANA, Proc. Amer. Acad. Sci., ii. 217.

IPHIMEDIA FISSICAUDA.

Corpus compressum, epimeris magnis. Oculi reniformes. Segmentum

caudale fere usque ad basin fissum, et ad apices ambos emarginatum. Antennæ subæquæ; 1mæ parce longiores, dimidii corporis longitudine, basi valde brevior quam flagellum, et parce brevior quam basis 2darum, setis infra longiusculis; 2darum basis flagello multo brevior. Pedes antici parvuli, manu apice obliquâ et non latiore. Manus secunda mediocris, oblonga, infra ciliata, apice parce obliquo, digito brevi. Pedes 6 postici subæqui, non longi, setis brevibus. Styli caudales postici longi.

Body compressed; epimerals large. Eyes reniform. Caudal segment divided nearly to base, and each part emarginate at apex. Antennæ subequal; the superior sparingly the longer, half as long as body, base much shorter than flagellum and a little shorter than base of inferior pair, setæ of under side of antennæ rather long; base of inferior pair much shorter than the flagellum. Anterior feet small, hand oblique at apex and not broader. Hand of second pair moderately small, ciliate below, apex sparingly oblique, finger quite short. Six posterior feet subequal, rather short, setæ quite short. Posterior caudal stylets long.

Plate 63, fig. 4 *a*, animal, enlarged; *b*, *b'*, views of mandible; *c*, *d*, maxillæ; *e*, maxillipeds; *f*, caudal extremity; *g*, branchia.

Near Viña del Mar, nine miles north of Valparaiso; from pools of water among the rocks of the sea-shore at low tide, where it occurs concealed among the stones of the bottom.

The head is longer than the following segment. The fourth epimeral is broad, but the fifth and following are quite narrow. The last segment of the body has in the emargination of each apex a minute spine, besides two or three on the outer margin; the length of the segment is a little greater than the breadth, and the form nearly rectangular. The fourth abdominal segment has an indentation on the back, and the fifth is shorter than the sixth or seventh. The third pair of stylets extends rather farther back than the first pair, and considerably farther than the second pair. Branches of third pair oblong lanceolate; of first and second, linear.

The flagella of the antennæ are very slender terete, and the joints are but little oblong. The first two joints of the inferior pair are

together nearly as long as the third joint. The third and fourth pairs of feet are equal, and not shorter than seventh pair. The sixth and seventh equal; the fifth a little shorter. Maxillipeds hairy within and at apex. Mandibles with palpus, molar prominence and setæ, as usual; palpus three-jointed, second and third joints with long hairs on margin and apex. Branchiæ linear, not ciliated at apex.

Swims with great agility.

Amphithoe fissicauda, DANA, Proc. Amer. Acad. Sci., Boston, ii. 214.

IPHIMEDIA CAPENSIS.

Feminae?—*Oculi fere reniformes. Antennæ subæquæ, fere nudæ; 1mæ parce longiores, dimidii corporis longitudine, basi perbrevis, triplo brevior quam flagellum, articulis flagelli parce oblongis, alternis apice parce latoribus et setas stricte appressas articulo parce longiores infra gerentibus, setis aliis brevissimis; 2dæ basi brevi. Pedes 4 antici parvuli, manu oblongâ, marginibus fere parallelis, inferiore hirsuto, apice oblique truncatâ palmam efficiente, digito palmâ non longiore, palmâ fere nudâ, carpo oblongo, dimidii manus longitudine, infra obtuso et hirsuto. Pedes 4 postici subæqui, tenues, setis perbrevibus, articulo 5to angusto, setarum 7 paribus infra ornata, latitudine articuli breviorum, setis supernis breviores. Styli caudales spinulis numerosis ornati, ramis 1morum styliformibus, posticorum longiusculis, foliaceis, acuminatis, marginibus cum spinulis multis armatis.*

Female? — Eyes subreniform. Antennæ subequal, nearly naked; superior pair sparingly the longer, about half as long as body, base very short, about one-third as long as the flagellum, joints of flagellum sparingly oblong, the alternate a little broader at apex, and bearing two or three setæ longer than the joint, and close appressed to it, other setæ very short; base of second pair quite short. Feet of four anterior pairs quite small, hands oblong, margins nearly parallel, under margin hirsute, apex obliquely truncate, forming the palm, finger not longer than the palm, palm nearly naked, carpus oblong, half as long as the hand, obtuse below and hirsute. Feet of four posterior pairs subequal, slender, setæ all very short, fifth joint slender, setæ of lower margin in seven sets, and about

half as long as breadth of joint, those of the upper margin shorter. Stylets with numerous spinules, the branches of the first pair styli-form, those of the last pair rather long and narrow foliaceous, acuminate, margins edged with many spinules.

Plate 63, fig. 5 *a*, part of animal, enlarged; *b*, part of flagellum of superior antennæ; *c*, part of mandibular palpus; *d*, part of leg of first or second pair; *e*, *ibid.* of sixth pair; *f*, caudal extremity, showing caudal segment and posterior stylets; *g*, stylet of first pair.

Cape of Good Hope.

Length, four lines. The setæ of the six posterior legs are in numerous sets along the joints, although very short, and so also those of the stylets. The caudal segment is oblong, rounded and denticulate behind, and deeply cleft. Tarsus of leg of sixth pair about one-third as long as fifth joint. The hairs of the under side of the hand are as long as half the breadth of the hand.

This species is very near the *Gammarus Othonis*, Edwards (Ann. des Sci. Nat., xx. 373, pl. 10, f. 11, 12, 13, and Crust., iii. 50); but there is no appendage to the superior antennæ.

IPHIMEDIA PUGETTENSIS.

Oculi vix reniformes. Manus 2da mediocris, elongato-ovata, apice subacuta, infra supraque fere æque arcuata, infra hirsutiuscula, digito longo, carpo tertiâ parte manus vix longiore, infra sat angusto, obtuso, hirsuto. Articulus 3tius paris 7mi postice angusto-triangulate productus, 5tus gracilis, setis paucis, brevibus. Styli caudales longi, 1mi et 2di ultra 3tios paulo producti, ramis paris 1mi setis supra armatis.

Eyes hardly reniform. Hand of second pair of moderate size, elongato-ovate, subacute at apex, below and above nearly equally arcuate, below hirsute, finger long, carpus about one-third as long as the hand, below rather narrow, obtuse and hirsute. Third joint of leg of seventh pair narrow-triangulately produced behind, fifth slender, setæ few, short. Caudal stylets long, first and second pairs

reaching backward beyond the first, branches of first pair having five rather distinct setæ above.

Plate 63, fig. 6 *a*, anterior part of body; *b*, mandible; *c*, part of maxilliped; *d*, hand of second pair; *e*, third joint of seventh pair; *f*, extremity of same pair; *g*, caudal extremity.

Puget's Sound.

Length, three lines. The hands of the second pair of legs are about as long as the head; and the finger is about two-thirds the length of the hand. The mandibular palpus is set with longish hairs along the last two joints. The third joint of the posterior legs has three small tufts of very short hairs on the anterior margin (including the apical), and four on the posterior; the setæ are not as long as the breadth of the fifth joint. The posterior stylets are quite long; yet, the second pair extends beyond them, and the first pair beyond the second. The mandibles have a denticulated summit, and an inner denticulated summit lobe, with a prominent crest of setæ, and a large molar prominence, which is abruptly elevated on the lower side.

GENUS *ÆDICERUS*, Kröyer.

Iphimediæ pedibus quatuor anticis, stylis posticis, antennisque superioribus affinis. Pedes septimi valde elongati, tenues, fere filiformes. Epimeræ magnitudine mediocres, 5ta 4tis paulo brevioribus, lobis subæquis.

Allied to *Iphimedia* in the four anterior feet, posterior stylets, and the superior antennæ. Seventh pair of feet very long and slender, nearly filiform. Epimerals moderately broad, the fifth a little shorter than the fourth, bilobate, the posterior a little smaller than the anterior.

This genus was instituted by Kröyer with the following characteristic, in which some particulars not of generic importance are included:—

“Frons in rostrum producta plus minus acutum obtusumve, semper vero nodo pellucente, ovali, flavo rubescente turgidum. Oculi

nulli? Pedunculi antennarum longi, superiorum flagelli longitudinem æquantés vel superantes; antennæ superiores flagello appendiculari destitutæ. Pedes primi et secundi paris manu armati subcheliformi permagna. Pedes tertii quartique paris validi, ungue instructi lato, laminari; quod quoque usu venit quinto sextoque pari, quorum coxa vel articulus primus dilatatus non est. Pedes septimi paris longissimi, tenues, fere filiformes (coxa vel primo articulo excepto). Epimera mediocris magnitudinis, multis longisque armata setis marginis inferioris simplicibus; margo posterior quarti paris integra (non sinuato-excisa)." *Tids.*, iv. 156, 1842, 1843.

The mandible in our species has a three-jointed palpus, a dentate apex, the usual setæ below, and a molar prominence. The maxillæ are like those of Gammarus and Amphithoe. The maxillipeds have a spine or claw at apex. The superior antennæ are the shortest. No claw exists at the extremity of the seventh pair of legs.

ÆDICERUS NOVI-ZEALANDIÆ.

Antennæ 1mæ dimidio corporis breviores, teretes, flagello 14-articulato; 2dæ fere duplo longiores, basi duplo longiore quam basis 1marum, flagello fermè 21-articulato, fere duplo longiore quam basis, setis per brevibus. Pedes septimi corporis longitudine, extremitate styliiformes. Pedes 4 antici inæqui, manibus similes; manu primâ brevior; secundâ mediocri, fere nudâ, subovatâ, obliquo-truncatâ, palmâ valde obliquâ, fere rectâ. Pedes reliqui articulo primo sat angusti.

Superior antennæ not half as long as the body, terete; inferior pair nearly twice the longer, base twice as long as base of superior, flagellum about twenty-one-jointed, twice as long as base, setæ very short. Seventh pair of feet as long as body, styliiform at extremity; four anterior feet unequal, hands similar; hand of first pair smallest; of second pair of moderate size, broad subovate, nearly naked, obliquely truncate, palm oblique, very slightly excavate or nearly straight. Remaining pairs having the first joint rather narrow.

Plate 63, fig. 7 *a*, male, enlarged; *b*, mandible; *c*, *d*, maxillæ; *e*, extremity of maxilliped; *f*, lip; *g*, hand of first pair; *h*, caudal extremity.

Bay of Islands, New Zealand; in small pools on the rocky shores near Cororatika. Collected in March, 1840.

Length, two lines. Colour, greenish. Males and females were found in contact. Eye nearly round. Flagellum of the superior antennæ with oblong slender joints, and each has two or three short setæ at apex, about as long as width of joint, and appressed to the joint. The third and fourth joints of base of inferior pair are subequal. The joints of the flagellum are not as long as in the other pair; the setæ are about as long as width of joints. In the females, the antennæ are a little shorter than in the figure (which represents a male), and the setæ are not as long.

The hand of the second pair has one or two minute setæ at apex, and a few others similar on the palm. The finger when shut leaves a small space between it and the hand. These hands have their back toward the observer in a side view of the animal (fig. 7 *a*), and only when detached is it possible to have the direct side view in figure *g*.

The caudal stylets are slender, and naked, except under a high magnifying power, when a few very minute setæ are distinguished. The posterior pair is somewhat elongate, and all the stylets extend back about the same distance. The third pair is about half as long as the first, and the two branches are subulate. The body is naked.

GENUS AMPHITHOE (*Leach*), *Dana*.

Epimeræ magnæ, 5tæ Atis non breviores, bilobatæ, lobo posteriore minimo vel fere obsoleto. Styli caudales postici biramei, ramis perbrevibus, uno (externo) sæpe subconico, apice bi-unguiculato, unguibus recurvatis, altero lamellato, apice sæpius paulo ciliato et non spinuloso.

Epimerals large, those of fifth segment not shorter than those of fourth, two-lobed, posterior lobe very small or nearly obsolete. Caudal stylets of posterior pair two-branched; branches very short, the outer often subconical, and at apex bi-unguiculate, claws recurved, other branch small lamellar, usually ciliate at extremity and not spinulous.

The epimerals in the true Amphithoe are large, the fifth the largest,

and the species thus differ widely from the Gammari and other related genera. The two branches of the first and second pairs of stylets in the species are usually very nearly similar, and are furnished nearly alike with spinules. But in the *A. brevipes* (in which the lower antennæ are subpediform), one of the branches is styliform, and the other lamellar, the latter being placed with an edge upward, and edged above with numerous spines.

The inner lamellar process of the second joint of the maxillipeds is usually very long, reaching sometimes nearly to the base of the last joint of these organs, and its margin is often furnished with a row of spinules. The mandibular palpi are three-jointed, the first joint short, and the last about as long as the preceding; there are longish setæ at apex and below, which setæ are setulose. The tarsus of the legs has often (if not always) the seta of the under side obsolete. Other characters will be gathered from the details given under some of the species.

The *females* may generally (always?) be distinguished by their having the fingers of the hands short (not shorter than half the hand), and the two pairs subequal.

It may be that species exist having the posterior stylets and epimerals of *Amphithoe* with the superior antennæ of *Gammarus*; and, if so, it may be a question whether the character of the antennæ should not be disregarded, and all be included with *Amphithoe*.

AMPHITHOE RUBELLA.

Corpus crassiusculum, epimeris latis. Antennæ 1mæ dimidio corporis longiores, articulo 2do valde longiore, flagello fere duplo longiore quam basis, fermè 14-articulato, articulis longis, setis perpaucis, brevibus; 1mæ 2dis breviores, basi valde longiore quam basis 1marum, articulo quarto longiore et flagellum fere æquante. Manus prima parva, oblonga, angusta, apice angustiore. Manus secunda valida, lata, subrectangulata, apice (palmâ) transverso, parce excavato, angulo infero prominulo et acuto, digito mediocri. Pedes 3tii 4tique breves; 6ti 7mique subæqui, 5tis valde brevioribus, setis sparsis, articulo primo latiusculo.

Body rather stout, epimerals broad. Superior antennæ longer than

half the body, second joint much the longest, flagellum nearly twice as long as base, about fourteen-jointed, joints long, setæ very few and short; inferior pair shorter than superior, base much longer than base of superior, fourth joint longest, and about as long as flagellum. Anterior hands small, oblong, narrow, narrower at apex. Hands of second pair stout, broad subrectangular, transverse at apex, the palm being apical, little excavate and unevenly so, inferior angle prominent and acute, finger moderately large. Third and fourth pairs of feet quite short; sixth and seventh subequal, fifth much shorter, setæ very few, rather short, basal joint a little broad, proportionably broadest in fifth pair.

Plate 64, fig. 1 *a*, animal, enlarged; *b*, part, more enlarged; *c*, extremity of sixth pair of legs; *d*, extremity of abdomen.

Sooloo Archipelago. Dredged up in six and a half fathoms water, February 2, 1842.

Length, three lines. Colour, reddish. The superior antennæ three-fourths as long as body; third basal joint half the preceding in length. The third joint of inferior pair is about one-third whole length of antenna. Joints of flagellum of superior antenna long; of inferior pair about half as long as in superior. The finger of the large hand shuts against the terminal transverse margin, not fitting close to it; just above the lower angle there is a small obtuse prominence, and about this angle and the palm there are a few very short setæ. The carpus has a very narrow process below, between the hand and the third joint. The small hand has the apex obliquely truncate to form the palm, and the finger is a little longer than this margin, so as to project beyond; the superior and inferior margins are about parallel. Apices of the caudal stylets nearly in same line.

The fifth pair of legs and also the sixth had the extremity inverted in the specimen figured.

A. rubella, DANA, Proc. Amer. Acad. Sci., ii. 215.

AMPHITHOE ORIENTALIS.

Antennæ 1mæ longiores, corpore paulo breviores, flagello prælongo, plus
235

duplo longiore quam basis, articulis oblongis, setis paucis, inferioribus partim strictè appressis et articulo vix brevioribus, reliquis divaricatis et dimidio brevioribus; 2dæ paulo breviores, basi longo, parce brevioris quam flagellum, setis longiusculis, articulis flagelli non brevioribus. Oculi fere rotundati. Pedes 1mi parvuli, manu oblongâ, marginibus fere parallelis, apice (instar palmæ) truncato et infra obtuso, digito palmâ longiore, carpo manu paulo brevioris et vix latiore. Pedes 2di validi, manu subovatâ, supra arcuatâ, infra (palmâ) rectiusculâ, setis palmæ perbrevis, paucis, digito longo, carpo brevi, infra angustè producto, articulo tertio infra rectangulato. Pedes 6ti 7miquè articulo 3tio angusto, setis articuli 5ti longiusculis, dimidio articuli paulo brevioribus.

Superior antennæ the longer, a little shorter than the body, flagellum very long, joints oblong, setæ few, part on under side close appressed and but little shorter than the joints, others divaricate and much shorter. Inferior pair but little the shorter, base long, somewhat shorter than the flagellum, setæ longish, not shorter than joints of flagellum. Eyes nearly round. Anterior feet small; hand oblong, margins nearly parallel, apex truncated and forming the palm, finger longer than the palm. Carpus a little shorter than the hand and hardly broader. Hand of second pair very stout, subovate, arcuate above, straight below, this part (or the palm) a little raised towards apex and furnished with a few quite short setæ, finger long, carpus quite short, not oblong, a very narrow process below between hand and third joint, third joint rectangulate below. Feet of sixth and seventh pairs with the third joint narrow, setæ longish, those of fifth joint shorter than half the length of the joint.

Plate 64, fig. 2 *a*, head, much enlarged; *b*, leg of first pair; *c*, *ibid.* of second pair; *d*, *ibid.* of fourth pair; *e*, seventh pair; *f*, posterior caudal stylets, side view.

From floating kelp, off Manilla, Philippine Islands.

Length, two and a half to three lines. The third and fourth joints of the base of the inferior antennæ are subequal, the setæ of the fourth half as long as the joint. Carpus of the first pair of legs arcuate

below, and both the lower side of carpus and of hand hirsute; upper margin naked, excepting a hair or two on hand. The tarsus of the following legs has no seta below.

AMPHITHOE TONGENSIS.

Corpus compressum, nudum, epimeris latis. Antennæ 1mæ corpore breviores, basi fere duplo brevioribus quam flagellum, flagello fere 40-articulato, setis brevibus; 2dæ paulo breviores, basi longiore quam basis 1marum et flagellum 2darum fere æquantes, setis flagelli inferis longitudine articularum longioribus. Manus quatuor non multo inæquæ, fere semi-ellipticæ, dorso rectiusculæ; 1mæ paulo minores; 2dæ mediocres, apice angustæ, infra hirsutæ, palmâ obliquâ, digito dimidio manus brevioribus, carpo infra breviter producto et perangusto sed non acuto. Pedes 6 postici valde inæqui, sensim increscentes.

Body compressed, naked, epimerals broad. Superior antennæ shorter than the body, base nearly half shorter than flagellum, second joint longest, flagellum about forty-jointed, setæ short; inferior pair a little shorter, base sparingly longer than base of superior, and about half as long as the whole antenna, inferior setæ of the flagellum longest, longer than the joints. Hands but little unequal, and similar, nearly semi-elliptical, back almost straight; first pair the smaller; second pair more oblong, narrow at apex, hirsute below, palm oblique, finger small, not half as long as hand, carpus produced below, process short and quite narrow, but not acute. Posterior six feet very unequal, gradually increasing in length.

Plate 64, fig. 3 *a*, animal (in part), enlarged; *b*, *c*, portions of antennæ.

Tongatabu, Pacific; along the shores of coral islets, in shallow water, among sea-weed.

Length, six lines. Inferior antennæ two-thirds as long as superior. Second joint of superior antennæ the longest; joints of flagellum oblong, a little smaller towards base, setæ not as long as the joint and alike on the two sides. Joints of flagellum of inferior pair nearly

terete; the setæ of the outer side are shorter than the joints; those of the inner longer than the joints. The hands of the two pairs are very similar, and those of the first pair about half the length of those of the second. The finger is scarcely half as long as hand; the hand is densely hairy at apex and on the inner margin, the hairs being hardly longer than breadth of hand. The third and fourth pairs of feet are subequal. The fifth pair is small. The first joint of the last three pairs is quite broad. The abdomen is without a spine or acute process on the back.

The specimen was probably a female.

A. tongensis, DANA, Proc. Amer. Acad. Sci., Boston, ii. 216.

AMPHITHOE PEREGRINA.

Feminæ?—*Corpus gracile, epimeris latiusculis, margine sparsim ciliatis. Antennæ 1mæ fermè dimidii corporis longitudine, articulo primo longiore, flagello duplo longiore quam basis, 12-articulato, articulis parce oblongis, setis brevibus; 2dæ fere dimidio breviores, basi longiore quam basis 1-marum, articulo tertio longiore, flagello 6-articulato, subulato, paulo breviorè quam basis. Manus prima et secunda subæquæ, parvulæ, oblongæ, infra arcuatæ, digito minuto. Pedes tertii quartique subæqui, non breviores, articulo primo latissimo; reliqui 6 non longi, sensim parce increscentes, setis minutis, articulo primo lato.*

Female?—Body somewhat slender, epimerals rather broad, edged with four or five short setæ, fifth pair large. Superior antennæ about half as long as body, first joint longest, flagellum twice the length of the base, twelve-jointed, joints sparingly oblong, setæ short; inferior pair nearly half shorter, base longer than base of superior pair, third joint longest, flagellum six-jointed, subulate, a little shorter than base. Hands of first and second pairs of feet quite small and nearly equal, oblong, arcuate below, finger minute. Third and fourth pairs of feet subequal, not shorter than second, first joint very broad. Remaining six rather short, increasing slightly in length from fifth to seventh, setæ minute, first joint broad.

Plate 64, fig. 4 *a*, animal, enlarged; *b*, outline of eye.

Among the roots of floating *Fucus* (*Macrocystis*), at sea, thirty miles southwest of Valparaiso.

Length, three lines. Colour, greenish. The animal had generally its abdomen curved beneath and the dorsal line of thorax nearly straight (as in the figure). The eyes are round, and the circumferential row contains about twenty lenses. The anterior thoracic segments shortest. Abdomen seven joints, the third longest. Terminal stylets short, extending back beyond second pair, and the second pair slightly beyond the first. Third joint of superior antennæ very short and almost like one of the joints of the flagellum. First joint of third and fourth pairs of legs very broad; the next joint is articulated with the posterior apex of this joint, and the inner apex is prominent and rounded. The first joint of the following pairs is broad ovate, being broadest at base.

We suspect, from the position of the legs and a comparison with other species, that the fifth and sixth legs in the specimen examined were inverted at extremity, the tarsus being reversed; but the specimen was lost with the Peacock, and we cannot verify this suspicion.

AMPHITHOE BREVIPES.

Feminæ:—*Corpus compressum, epimeris latis, 5tis subquadratis. Oculi rotundati. Antennæ 1mæ dimidio corporis paulo longiores, articulo primo longiore, flagello plus duplo longiore quam basis, fere nudo, setis latitudine articuli vix longioribus; 2dæ 1mis fere dimidio breviores basi multo longiore quam basis 1marum, articulis tertio quartoque subæquis, flagello multo brevior quam basis, hirsuto. Manus quatuor subæquæ, parvulæ, subrectangulatæ, hirsutæ, apice transversæ, digito minuto. Pedes 5ti 6ti 7mi sensim incrementes, setis sat brevibus. Pedes tertii quartique subæqui, articulo primo latissimo.*

Maris:—*Manus secunda valida subovata, supra arcuata, infra (palma) rectiuscula setis paucis brevibus, prope apicem internum dentem minutum gerens, digito longo.*

Female:—Body compressed, epimerals broad, the fifth pair subquadrate. Eyes round. Superior antennæ about half as long as body, first joint longest, flagellum more than twice as long as base, nearly

naked, setæ hardly longer than breadth of joint; inferior pair half shorter than the superior, base longer than in superior, third and fourth joints subequal, flagellum much shorter than base, hirsute. The four hands subequal, quite small, subrectangular, apex truncate, finger minute. Feet of third and fourth pairs with the first joint quite broad; fifth, sixth, and seventh gradually increasing in length.

Male.—Hand of second pair large, subovate, above arcuate, below (palm) nearly straight, with a few setæ, and near apex a minute acute tooth, finger long.

Plate 64, fig. 5 *a*, female, much enlarged; *b*, *c*, side and front view of head (showing *a*¹, *a*², antennæ; *l*, labrum; *md*, mandible; *m*¹, *m*², first and second maxillæ; *m*³, maxillipeds); *d*, posterior caudal stylet; *e*, mandible; *f*, maxilla of first pair; *g*, *ibid.* of second pair; *h*, maxillipeds; *i*, hand of female of first or second pair; *k*, first pair of male; *l*, second pair of male; *m*, leg of seventh pair; *n*, caudal stylet of first or second pair.

Near Hermite Island, Tierra del Fuego; brought up with kelp, in five fathoms water, by Lieutenant Case, January 27, 1839.

Length, nine lines. In an upper view the front margin of the head is straight, in a side view there is a slight prominence just before the eye. The legs of the fifth pair have the tarsus inverted, and the following tarsi point usually outward. The last abdominal segment is short triangular and very obtuse. The posterior stylets project a little beyond this segment; the other pairs reach to the same distance backward. The flagellum of the inferior antennæ is tapering, and but little longer than fourth joint of base. The claw in the four hands of females closes against the terminal margin. In the male, the finger of the second pair shuts against the inferior surface, reaching nearly to base of hand; but the hands of the first pair are very nearly like those of the female. The carpus in the male second pair is very short, transverse, with the lower side prolonged and narrow, but not appressed at all to base of hand. The finger is much curved.

A female carried a large number of young between her legs, which

were perfect in the number of thoracic legs; the superior antennæ in them had *six* joints, and the inferior *four*.

A. brevipes, DANA, Proc. Amer. Acad. Sci., Boston, ii. 216.

AMPHITHOE BRASILIENSIS.

Tongensi affinis. Corpus compressum, epimeris latis. Antennæ 1mæ dimidio corporis multo longiores, flagello prælongo, tenuissimo, setis perbreuibus; 2dæ paulo breviores, hirsutæ, basi vix brevior quam flagellum, articulis flagelli versus basin vix oblongo, setis inferis plus duplo longioribus. Manus quatuor subæquæ, 1mæ paulo minores supra parce arcuatæ, infra rotundatæ, hirsutæ, palmâ obliquo-transversâ, digito dimidii manus longitudine; 2dæ mediocres, hirsutiores, apice obliquè truncatæ et infra acutæ, palmâ vix excavatâ, longe hirsutâ, carpo infra latiusculo dense hirsuto, articulo 3tio infra rotundato. Pedes 3tii 4tique setis sparsis articulo parce brevioribus.

Near the *A. tongensis*. Body compressed, epimerals large. Superior antennæ much longer than half the body, flagellum very long and slender, setæ quite short. Inferior pair a little shorter than superior, hirsute, base hardly shorter than flagellum, joints of flagellum towards base slightly oblong, setæ of lower side more than twice as long as those above. The four hands subequal; first pair the smallest, slightly arcuate above, rounded below, and hirsute, palm obliquo-transverse, finger half as long as hand. Hands of second pair of moderate size, more hirsute than preceding, obliquo-transverse at apex, palm hardly excavate, long hirsute, acute at lower limit, carpus broad, produced below, and densely hairy. Setæ of legs of third and fourth pairs few, nearly as long as joint.

Plate 64, fig. 6 *a*, animal, enlarged; *b*, part of flagellum of superior antennæ; *c*, ibid. of inferior, from basal half; *d*, ibid., from towards apex; *e*, *e'*, mandible, in different positions; *f*, maxilla of first pair; *g*, ibid. of second pair; *h*, maxillipeds; *i*, part of leg of first pair; *k*, ibid. of second pair; *l*, ibid. of fourth; *m*, outer branch of first pair of stylets; *n*, posterior stylet.

Rio Janeiro, Brazil.

Length of body, eight lines. This species is very near the *tongensis*, from the island of Tongatabu; but as our figure of that species was made on the spot, and the specimen is not in the collections, we cannot make a comparison throughout. The outer branch of the stylets of the first pair has seven spines above, besides the apical, and its basal part four or five. The leg of the fifth pair, in our specimens, has the tarsus turned upward, and in those of the sixth and seventh, it is turned outward.

AMPHITHIOE FILICORNIS.

Feminae:—*Antennæ corpore vix breviores, flagellis tenuissimis, setis perbrevis et perpaucis, 1mæ paulo longiores, flagello plus triplo longiore quam basis, articulis oblongis, setis articularum alternantium inferis longioribus; 2darum basi flagellum duplo longius. Pedes 4 antici subæqui et consimiles; 2di paulo majores, manu mediocri, marginibus parce arcuatis et bene hirsutis, apice oblique truncato, angulo infero subacuto, palmâ vix excavatâ, digito brevi, carpo parce oblongo, infra latè producto et multo hirsuto, articulo 3tio apice inferiore triangulato. Pedes 10 postici pilosi, setis sat longis; 6ti 7mi subæqui.*

Female:—*Antennæ* hardly shorter than the body, the setæ few and very short, the flagella very slender, superior a little the longer, flagellum more than three times as long as base, joints oblong, setæ on under apex of every other joint a little longer than on the others. Inferior pair of antennæ having the flagellum twice as long as the base. Four anterior feet subequal and similar; hands of second pair a little the larger, of moderate size, margins sparingly arcuate and very hairy, especially below, apex obliquely truncate, inferior angle subacute, palm hardly excavate, finger short, carpus sparingly oblong, the part below, between third joint and hand, rather broad and dense hairy, third joint at inferior apex triangular. Ten posterior feet pilose, setæ rather long; sixth and seventh pairs subequal.

Plate 65, fig. 1 *a*, female, enlarged; *b*, part of flagellum of superior antennæ; *c*, mandible; *d*, leg of second pair; *e*, stylet of posterior pair; *f*, head and antennæ of a young individual; *g*, fifth leg of same.

Rio Janeiro.

The legs of the last three pairs have the claw turned outward; the setæ are very slender and fully as long as half the fifth joint; and at the apex of this joint there is a large cluster of them. The setæ on the upper apex of the joints of the superior flagellum are not longer than the breadth of the joint; and below, on alternate joints, they have the same length, while on the others they are twice as long. Both pairs of antennæ have a naked appearance.

GENUS GAMMARUS (*Fabricius*), *Dana*.

Antennæ superiores appendiculatæ. Styli caudales postici ac in Iphimediâ, sæpe longiores. Epimeræ 5tæ 4tis plus minusve breviores, bilobatæ, lobis subæquis.

Superior antennæ appendiculate. Caudal stylets of last pair as in *Iphimedia*, often longer. Epimerals of fifth segment more or less shorter than fourth, bilobate, lobes subequal.

All the following species have the superior antennæ the longer. The branches of the posterior stylets are without spines, and furnished with only a few hairs in all the species, excepting one from Puget's Sound; in this, one of the branches, the stouter one, bears spines, though still different from the branches of the preceding pairs; and the other or thinner branch, has only short hairs.

The true Gammari have generally smaller epimerals than the *Amphithoe*, and differ from them widely in the non-uncinate posterior stylets, and in the fifth epimerals not larger than the fourth, and subequally bilobate. They approach most nearly to the *Iphimediæ*, from which they differ mainly in the absence of the appendage from the superior antennæ in the latter. If this appendage is not accepted as a generic distinction, the groups may properly have a subgeneric relation. *Melita* and *Mæra* also will have a like relation.

1. *Abdominis segmenta dorso plus minusve spinulosa aut denticulata.*

GAMMARUS ASPER.

Corpus crassiusculum, epimeris latis, 5tis vix brevioribus quam 4tæ, seg-

mentis abdominis totis ad dorsum inæquè denticulatis. Oculi subrotundati. Antennarum bases longi, subæqui, articulis flagellorum oblongis, setis non brevioribus, articulo basis 1marum primo crasso, secundo tenui, fere duplo longiore, tertio valde brevior, appendice 3-articulatâ: antennæ 2dæ dimidio corporis parce longiores, basi tenuissimo, articulis 2 ultimis subæquis, flagello basi paulo brevior. Pedes primi parvuli, manu minutâ, oblongâ, attenuatâ; secundi plus duplo longiores, infra valde hirsuti, manu grandi, angusto-oblongâ, marginibus fere parallelis, palmâ valde obliquâ, digito dimidio brevior quam manus.

Body rather stout, epimerals broad, but fifth slightly shorter than fourth; abdominal segments unequally denticulate on back margin. Eye subrotund. Antennæ having the bases long, subequal, and the joints of the flagella oblong, and setæ not shorter than the joints; superior pair with the first joint of base quite stout, second slender, nearly twice as long as first, the third much shorter, appendage three-jointed. Inferior antennæ about half as long as body, base very slender, the last two joints subequal, flagellum a little shorter than base. Anterior feet very small, hand minute, oblong, attenuate. Second pair more than twice the length of the first, dense hirsute below; hand oblong, margins nearly parallel; palm much oblique, finger half the length of the hand; carpus shorter than the hand.

Plate 65, fig. 2 *a*, animal, enlarged, the superior antennæ, posterior feet, and posterior stylets mutilated; *b*, portion of superior antennæ; *c*, *ibid.* of inferior; *d*, part of hand of second pair; *e*, part of palpus of mandible.

Dredged up in six and a half fathoms, Sooloo Archipelago, February 2, 1842.

Length six lines. The denticulation on the back of the abdomen is irregular, and is not confined to the posterior margin of the segments. The first joint of the superior antennæ is twice as stout as the following. The first two joints of the inferior pair are very short, the first projects below the second to about half the length of the latter. The setæ of the organs are mostly about twice as long as the diameter of the joints. The hand of the first pair is nearly a fourth narrower than that of the second. The hand of the second is hirsute in many

tufts on both margins, but especially the lower. The third and fourth pairs of feet are about equal. The basal joints of the following are oblong, with the posterior margins serrulate, and a few minute setæ on the anterior margin. The setæ of the other joints are short, and in a few tufts, two or three to inside of joint.

The small size of the mandibular palpus in this species and the following is peculiar.

Gammarus asper, DANA, Proc. Amer. Acad. Sci., Boston, 209.

GAMMARUS SULUENSIS.

Feminæ:—*Abdominis segmenta primum secundumque dorso in marginem posticum 2-3-dentata, quartum etiam 2-acute. Oculi subrotundati. Antennæ 1mæ fere corporis longitudine, flagello longiore quam basis, articulis oblongis, setis non brevioribus, appendice brevissimâ, 3-articulatâ; 2dæ fere dimidio breviores, flagello plus dimidio brevioribus quam basis, basi parce brevioribus quam basis 1marum. Pedes 4 antici subæqui, parvi, 1mi minores; manibus paulo oblongis, apice recte truncatis, infra brevissimè pubescentibus, digito parvulo, marginibus manus 2dæ fere parallelis. Pedes sex postici paulo inæqui, setis paucis remotis, brevibus, ad pedis extremitatem longiusculis. Styli caudales æque producti. [An femina G. asperi?]*

Body rather stout. First and second abdominal segments having the posterior margin on the back two to three-dentate, fourth also two-acute. Eyes subrotund. Superior antennæ as long as body, flagellum longer than base, its joints oblong, the setæ as long as the joints, appendage very short, three-jointed; inferior pair nearly half shorter, flagellum not half as long as base, base hardly as long as base of superior pair. Four anterior feet subequal, small, first pair the smaller, hands a little oblong, straight, truncate at apex, below very short pubescent, margins of hand of second pair nearly parallel, finger very small. Six posterior feet a little unequal, setæ few, remote, rather long at the base of the claw.

Plate 65, fig. 3 *a*, animal, enlarged; *b*, *b'*, mandible, in different positions; *c*, *c'*, inner maxillæ, *ibid.*; *d*, second pair of maxillæ; *e*, maxillipeds; *f*, part of superior antennæ.

Sooloo Sea; from a small island off the harbour of Soung; among sea-weed floating off the shore.

Length, four to five lines. The flagellum of the inferior antennæ consists of about five joints, and is but little longer than preceding basal joint. The joints of the flagellum of the superior pair are about three times as long as their breadth, and the setæ have the same length nearly; the flagellum is neatly terete, and the number of joints fourteen or more. The first joint of base of inferior pair has the process of the lower apex projecting beyond the extremity of the second joint; this second joint is about as long as broad.

The finger in each hand is not longer than the transverse apical margin. [The hands of the second pair may be much larger and of very different characters in male individuals.] Third and fourth pairs equal, long and slender. Basal joint of remaining pairs oblong, and posterior margin serrulate.

The stylets are all long, and extend equally far backward; the last or seventh joint of abdomen is short and slender in lateral view, with a few setæ at tip.

It is barely possible that the *G. suluensis* may be female of the *asper*. They are alike in the very slender mandibular palpi without a ciliated arrangement of hairs on the apical joint.

Gammarus suluensis, DANA, Proc. Amer. Acad. Sci., ii. 210.

GAMMARUS ALBIDUS.

Feminæ:—*Epimeræ mediocres*. *Abdominis segmenta primum secundum quartumque dorso 1-2-spinosa*. *Antennæ 1mæ dimidio corporis valde longiores, basi brevioribus quam flagellum, articulo 2do paulo longiore; flagello fere 21-articulato, articulis oblongis, setis vix brevioribus, appendice brevi, 3-articulatâ; 2dæ tenuissimæ, fere dimidio breviores, flagello brevioribus quam basis, fere 8-articulato. Pedes 4 antici subæqui, parvuli, manu oblongâ, apice fere rotundatâ, infra dense hirsutâ; manu secundâ paulo longiore, digito parvulo. Pedes 6 postici subæqui, setis numerosis, latitudine articuli 5ti paulo longioribus.*

Maris:—*Pedes 2di validi, manu oblongâ, basi paulo angustiore, marginibus fere parallelis, infra setis perbrevis paucis, apice oblique*

truncato palmam efficiente, palmâ paulo excavatâ et angulo infra finiente, digito dimidii manus longitudine.

Female.—Epimerals moderately large. A small spine or two on back of first, second, and fourth abdominal segments. Superior antennæ nearly three-fourths the body in length, base shorter than flagellum, second joint a little the longest, flagellum about twenty-one-jointed; inferior very slender, nearly half shorter than the superior, flagellum shorter than base, about eight-jointed. Four anterior feet subequal, hands quite small, oblong, apex somewhat rounded, rather dense hirsute below, and also on carpus, the second pair a little the longer, finger small. Six posterior feet subequal, setæ numerous, rather longer than the diameter of the fifth joint.

Male.—Feet of second pair stout, hand large, oblong, narrower at base but margins nearly parallel, lower margin with a few very short setæ, apex obliquely truncate forming the palm, palm a little excavate and ending below in an angle, finger half as long as hand.

Plate 65, fig. 4 *a*, animal (female), enlarged; *b*, *c*, portions of antennæ; *d*, hand of second pair in male.

Tongatabu, in shallow waters of the lagoon, among sea-weed.

Length, five lines. Colour of back, nearly white. The head is nearly as long as high, and about twice as long as first thoracic segment. The third joint of base of superior antennæ is half shorter than preceding; the last joint of base of inferior pair a little shorter than the preceding, and the prolonged lower apex of first joint extends to apex of second joint; this second joint is not longer than broad; the flagellum is about as long as last two basal joints. The hand of second pair in male has a few setæ at intervals on both upper and lower margin; the finger when closed leaves a space between it and the palm; the fourth joint is very small and narrow triangular, subacute below, situated between the lower part of the preceding, and the hand; this preceding joint is subtriangular, subacute above and below, and about as long as broad. The third and fourth pairs of feet are slender and rather long. The last three pairs have short setæ on margins of first joint; the setæ of the other joints are in tufts, of which there are three or four on the opposite sides of each joint.

The stylets are all long; the first pair extends a little beyond the others.

Gammarus albidus, DANA, Proc. Amer. Acad. Sci., ii. 210.

2. *Abdomen dorso non spinulosum nec dentatum.*

GAMMARUS TENUIS.

Gracilis, epimeris angustis. Caput fronte laterali prominulum. Oculi rotundati, parvi. Antennæ 1mæ corpore paulo breviores, teretes, tenuissimæ, articulo primo longo, secundo duplo longiore quam tertius; flagello basi parce longiore, 14-articulato, setis longioribus quam articuli, appendice brevissimâ. Antennæ 2dæ valde breviores, setis longioribus; basi valde longiore quam basis 1marum, articulis 2 ultimis longis, subæquis, precedentibus perbrevibus; flagello 5-articulato, non longiore quam articulus basalis ultimus. Pedes antici mediocres, manu oblongâ, apice paulo latiore et paulo obliquè truncatâ palmam efficiente, palmâ non excavatâ, angulo infra finiente, digito mediocri; secundi dimidio minores. Pedes sex ultimi valde inæqui, 7mi 6tis multo longiores, setis sparsis, longiusculis.

Slender, epimerals narrow. Front margin of either side of head a little prominent. Eye round, small. Superior antennæ somewhat shorter than the body, very slender, terete, first joint longer than third, and second twice longer, flagellum slightly longer than the base, fourteen-jointed, setæ longer than joints, appendage very short. Inferior antennæ much shorter, setæ longer, base much longer than base of superior, last two joints long and subequal, the preceding very short, flagellum five-jointed, not longer than last basal joint. Anterior feet of medium size, hand oblong, somewhat larger towards apex and obliquely truncate, margins setose in tufts, an angle at lower limit of truncation, palm not excavate, finger about half as long as hand. Second pair much smaller than first. Last three pairs of feet very unequal in length, seventh very much longer than sixth pair.

Plate 65, fig. 5 *a*, animal, enlarged; *b*, part of palpus of mandible; *c*, hand of first pair.

Sooloo Sea, in six and a half fathoms water. Collected, February 2, 1842.

Length, three lines. The epimerals are very short, the anterior not larger than the fifth pair, the fifth smaller than the fourth. The inferior antennæ are about three-fourths the length of the superior, and the setæ below are much longer than in that pair. The first basal joint has the inferior apex projecting and subacute. The hand of the second pair of legs is half shorter and narrower. The third and fourth pairs of feet are subequal. The fifth is less than half the seventh. The first and second pairs of stylets extend back the same distance; the third pair is furnished with some short hairs and no spinules.

Gammarus tenuis, DANA, Proc. Amer. Acad. Sci., ii. 211.

GAMMARUS FURCICORNIS.

Gracilis, epimeris angustis; sparsim pubescens. Caput fere oblongum, fronte laterali non prominente. Antennæ 1mæ corpore breviores, articulo 1mo crasso, oblongo, 2do paulo longiore, 3tio brevi; flagello terete, parce longiore quam basis, fermè 14-articulato, sparsim setuloso; appendice dimidio brevior, 5-articulatâ. Antennæ 2dæ valde breviores, basi vix brevior quam basis 1marum, articulis 3tio 4toque longis, subæquis; flagello parce longiore quam articulus 3tius, 7-10-articulato. Pedes 1mi parvuli, manu subovatâ; 2di validi, manu latâ et oblongâ, trapezoideâ, infra setigerâ, apice parce latiore et fere rectè truncatâ palmam efficiente, palmâ non excavatâ, carpo transverso, subrectangulato. Pedes 6 postici subæqui, 7mi paulo longiores, setis numerosis, breves. Styli caudales postici longissimi.

Slender, epimerals narrow; body sparsely pubescent. Head about as long as high; lateral margin in front not prominent. Superior antennæ shorter than the body, first joint very stout, oblong; second slender, a little longer; third short; flagellum terete, a little longer than the base, about fourteen-jointed, sparsely setulose, appendage half shorter than flagellum, five-jointed. Inferior pair much shorter than superior, the base of same length nearly as in that pair, third

and fourth joints long, subequal; flagellum but little longer than third joint, seven to ten-jointed. First pair of feet small, hand subovate; second pair stout, hand nearly trapezoidal, broad and oblong, a little broadest at apex, and truncate a little obliquely, below setulose, palm not at all excavate, finger half as long as hand. Three posterior pairs subequal, the last little the longest, tufts of setæ numerous, short. Posterior stylets quite long.

Plate 65, fig. 6 *a*, animal, enlarged; *b*, part of flagellum of superior antennæ.

Sooloo Sea; from shores of a small island off the harbour of Soung; collected, February 5, 1842.

Length, three lines. This species is peculiar in its very stout first basal joint of the superior antennæ, the long appendicular branch, and the long posterior stylets, which extend back much beyond the preceding. The setæ on the flagellum of the superior antennæ are about as long as the joints. The anterior hands are about as long as the joint next preceding (carpus), and both have short, stiff hairs on the margins. The finger of the hand of second pair folds against the terminal margin, and does not project below it. The third and fourth pairs of legs are slender and subequal. The basal joint in the last three pairs is narrow oblong, and serrulate behind. The first and second pairs of stylets extend nearly to the same distance back, the third pair much farther.

In a profile view, a few scattered short hairs are seen over the back of the animal.

Gammarus furcicornis, DANA, Proc. Amer. Acad. Sci., ii. 211.

GAMMARUS TENELLUS.

Maris:—*Gracilis, epimeris totis angustis. Oculi rotundati, parvuli. Antennæ 1mæ dimidii corporis longitudine, articulo primo non crasso, secundo valde longiore, flagello parce longiore quam basis, setis perbrevis; appendice fere dimidio brevior. Antennæ 2dæ tenuissimæ, breves, basi paulo brevior quam basis 1marum, flagello non longiore quam articulus precedens. Pedes 1mi parvuli, manu subovatâ, dorso*

rectiusculâ; 2di validi, manu latâ subrectangulatâ, basi paulo angustiore, apice fere rectè truncatâ, sparsim setulosâ, palmâ non excavatâ, angulo infra finiente; articulo 4to transverso, angustissimè triangulato. Pedes 6ti 7mique subæquis, 7mi parce breviores, setis inferis paulo sparsis, sat brevibus, supernis minutissimis. Styli caudales postici longi, ultra 2dos multo producti.

Slender, epimerals quite narrow. Eyes round, small. Superior antennæ about half as long as body, first joint not stout, second very long, flagellum little longer than base, setæ very short, appendage half shorter than flagellum. Inferior antennæ very slender, short, base a little shorter than base of superior pair, flagellum not longer than preceding joint. Anterior feet quite small, hand subovate, back nearly straight; second pair stout, hand broad, subrectangular, at base a little narrower, at apex nearly straight truncate, sparsely setulose, palm not excavate and ending below in an angle, carpus transverse, very narrow triangular. Sixth and seventh pairs subequal, the last little the shorter, setæ rather sparse, and shortish, those on upper margin of joints very minute. Last pair of caudal stylets quite long, extending much beyond second.

Plate 65, fig. 7 *a*, animal, enlarged; *b*, part of flagellum of superior antennæ; *c*, hand of first pair; *d*, part of leg of sixth pair; *e*, extremity of abdomen, with stylets of first and second pairs.

From coral reefs of Viti Lebu, Feejee Islands.

Length, four lines. The head is rather small, as long as broad, the mouth organs not prominent below. The caudal segment oblong, with two or three setæ at extremity, nearly as long as the segment. The hand of the anterior feet is ciliate below. The third and fourth pairs of feet are remarkably slender. The length of the hand of second pair is one and a half times the breadth. The setæ or hairs of the fifth joint of the sixth pair are in three tufts (exclusive of the apical), the tufts but little divaricate, longer than breadth of joint. The tarsus has a seta below, and another on one side towards apex.

Gammarus tenellus, DANA, Proc. Amer. Acad. Sci., Boston, ii. 212.

GAMMARUS FUEGIENSIS.

Feminae:—*G. tenello affinis*. *Pedes tenues*. *Antennæ 1mæ graciles, dimidio corporis longiores, basi longo, longiore quam flagellum, infra setoso, articulo 2do multo longiore, flagello 16-articulato, articulis oblongis, setis paucis, non brevioribus, vix divaricatis, appendice 4-articulatâ; 2dæ breviores, basi non brevioribus quam 1marum basis, articulis 2 penultimis subæquis, flagello 5-articulato, vix longiore quam articulus precedens. Pedes 4 antici parvuli, subæqui; 1mi paulo majores, manu oblongâ, marginibus fere parallelis, hirsutis, apice obliquè truncato, digito 1morum parce longiore quam palma, carpo paulo brevioribus et non latiore quam manus. Pedes 6 postici valde inæqui, 7mi 6tis multo longiores, setis paucis brevibus, articulo 1mo angusto. Styli caudales postici apicem 2dorum non attingentes; 2di 1mique spinâ prælongâ ad basis apicem armati.*

Female:—Near *G. tenellus*. Superior antennæ slender, longer than half the body, base quite long, longer than flagellum, setose below, second joint much the longest, flagellum sixteen-jointed, joints oblong, setæ few, not shorter than joints, and hardly divaricate, appendage four-jointed; second pair shorter than first, base not shorter than base of first pair, its last two joints subequal, flagellum five-jointed, but little, if any, longer than preceding joint. Four anterior feet with the hands quite small, narrow oblong, the margins nearly parallel, hirsute, obliquely truncate at apex, finger of first pair slightly longer than palm, carpus shorter, and hardly broader than hand. Last three pairs of legs very unequal, seventh pair much the longest. Stylets of last pair not extending as far back as second or first pair; first and second with a very long spine at apex of base, which is a little shorter than branches.

Plate 65, fig. 8 *a*, animal, enlarged; *b*, part of flagellum of first pair; *c*, appendage of first pair; *d*, extremity of second pair; *e*, part of leg of first pair; *f*, *ibid.* of second pair; *g*, *ibid.* of third or fourth; *h*, caudal extremity in profile.

Feejee Islands.

Length, three and a half lines. The bases of the antennæ, which

are nearly four times as long as the head, have longish hairs below. The setæ of the ten posterior legs are few, and on the third or fourth legs, are about half as long as the fourth or fifth joints; on the fifth to seventh legs, half shorter. The hairs of the hands are as long as the breadth of the hand.

This species may possibly be the female of the *G. tenellus*. Yet this seems improbable, since, in that species, the sixth pair of legs is longer than the seventh, and the stylets of the last pair extend much beyond the second.

GAMMARUS QUADRIMANUS.

Gracilis, epimeris angustis. Antennæ 1mæ dimidii corporis longitudine, basi paulo longiore quam flagellum, articulis primo secundoque longis, subæquis, tertio perbrevis, flagello pubescente, setis longioribus quam articuli, vix divaricatis, appendice dimidio flagelli parce longiore. Antennæ 2dæ breviores, basi brevioribus quam basis 1marum, flagello perbrevis. Pedes 1mi parvuli, manu oblongâ, infra hirsutâ, basi angustiore. Manus 2dæ æquæ, validissimæ, subquadratae, apice transversæ, digito immobili spiniformi, acuto, palmâ transversâ, prominenter 3-dentatâ, digito palmâ vix longiore. Pedes 4 postici subæqui, 7mis parce brevioribus, articulis apice postico dense hirsutis, setis aliis brevibus.

Slender, epimerals narrow. Superior antennæ half as long as the body, base a little longer than the flagellum, first and second joints long, subequal, third very short, flagellum pubescent, setæ longer than joints, and hardly divaricate, appendage rather longer than half the flagellum. Inferior pair shorter, base shorter than base of superior pair, flagellum very short. First pair of feet quite small, hand oblong, hirsute below, narrower at base. Hand of second pair equal, very large, subquadrate, apex transverse, a spiniform acute immoveable finger, palm three-dentate, teeth prominent, finger hardly longer than palm. Two posterior pairs subequal, the seventh a little the shorter; the joints at their posterior apices densely hirsute, other setæ short.

Plate 65, fig. 9 *a*, animal, enlarged; *b*, portion of flagellum of superior antennæ; *c*, extremity of anterior pair of feet, more enlarged; *c'*, same, of size corresponding to fig. *a*; *d*, tarsus of leg of fourth pair,

much enlarged; *e*, leg of seventh pair; *f*, stylet of second pair; *g*, ibid. of third pair.

From the coral reefs, Feejee Islands.

The flagellum of the inferior antennæ is about as long as penult joint of base, it is hairy like the flagellum of the superior pair. The hand of the second pair of feet is naked, excepting a minute tuft of setæ on the lower margin near base of thumb. The third and fourth pairs of feet are very slender, and as long as the second. The fifth is about as long as the fourth, and shorter than the sixth. The sixth and seventh have a few setæ on the inner margin of the joints, and thick tufts at the posterior apices. The tarsus has a tooth above extremity, and a seta below.

The stylets extend but little backward of the apex of the abdomen. The first and second pairs have about four short stoutish setæ in a series along the abdomen, the upper side of each branch, and three or four at apex, one of which is half as long as the branch. The branches of the third pair are straight and equal, and furnished with longish slender hairs at apex.

GAMMARUS BRASILIENSIS.

Maris:—*Epimeræ sat magnæ, 5tæ 4tis multo breviores. Antennæ 1mæ 2dis duplo longiores, corpore fere dimidio breviores; basi paulo brevior quam flagellum, flagello multi-articulato, articulis transversis, setis numerosis, latitudine articulorum non brevioribus, appendice parvulâ; 2dæ basi 1marum parce longiores, flagello dimidio basis parce longiore. Pedes 1mi parvuli, manu subovatâ, infra hirsutâ, carpo non brevior; 2di pervalidi, manu subovatâ, infra plus arcuatâ et dense elongato-pilosâ, palmâ non excavatâ, carpo transverso, infra perangusto. Setæ pedum 10 posticorum breves, semilatitudine articuli 5ti vix longiores; pedes 4 postici subæqui, articulo 1mo perlato. Styli caudales 1mi 2di 3tiique subæqui.*

Feminæ:—*Pedes 2di parvuli, manu oblongâ, subovatâ, infra pilosâ, carpo vix oblongo, articulo 3tio infra rectangulato.*

Male:—*Epimerals large, fifth much shorter than fourth. First pair of antennæ twice as long as second, about half as long as body, base a little shorter than flagellum, flagellum consisting of numerous*

short transverse joints, setæ many and as long as diameter of joints, appendage very small and short; second pair but little longer than base of first, flagellum but little longer than half the base. Anterior feet quite small, hand subovate, hirsute below, carpus not shorter. Feet of second pair very stout, hand large, subovate, more arcuate below and densely furnished with long slender hairs, palm not excavate nor limited. Setæ of ten posterior pairs short, about half as long as width of fifth joint, rather numerous. The three pairs of caudal stylets subequal.

Female.—Hands all small, second pair a little the larger, subovate, below hirsute, carpus hardly oblong, third joint rectangulate below.

Plate 65, fig. 10 *a*, male, enlarged; *b*, part of flagellum of superior antennæ; *c*, part of mandibular palpus; *d*, part of leg of fourth pair; *e*, hand of second pair of female, much enlarged; *e'*, same, magnified to correspond with the male, fig. *a*.

Rio Janeiro, Brazil.

Length, four lines. Seventh pair of legs not shorter than sixth.

3. *Antennæ 1mæ breviores.*

GAMMARUS PUGETTENSIS.

Epimeræ magnæ, 5tæ 4tis multo breviores. Segmentum abdominis 4tum dorso acutum. Antennæ 1mæ 2dis multo breviores et tenuiores, articulo basis 2do brevior quam 1mus, flagello fere 20-articulato, nudiusculo, appendice brevi, 5-6-articulatâ; 2dæ crassæ, dimidio corporis breviores, basi longo, fere nudo, articulis 2 ultimis subæquis, flagello paulo longiore quam articulus precedens, fere 10-articulato, articulis non oblongis. Pedes 4 antici majusculi, manibus subæquis, latis, infra hirsutiusculis, apice oblique truncatis, palmâ parce excavatâ. Pedes 4 postici subæqui, setis brevibus, paucis. Styli caudales postici prælongi, ramo externo crasse styliiformi, brevissime spinigeri, altero tenuiore, piloso.

Epimerals large, fifth much shorter than fourth. Fourth segment of abdomen acute above. Superior antennæ much shorter and more slender than inferior, second joint of base shorter than first, flagel-

lum nearly twenty-jointed, almost naked, appendage short, five to six-jointed; second pair quite stout, not half as long as body, base long, nearly naked, last two joints subequal, flagellum a little longer than preceding joint, about ten-jointed, joints not oblong. Four anterior feet rather small, hands subequal, broad for the length, partly short hirsute below, apex obliquely truncate, palm a little excavate, lower angle rounded, finger not longer than palm. Sixth and seventh pairs of legs subequal, setæ few, short. Posterior caudal stylets quite long, projecting much beyond the second, outer branch very stout and bearing some very short spinules, the inner more slender and pilose.

Plate 66, fig. 1 *a*, animal, enlarged; *b*, part of flagellum of superior antennæ with the appendage; *c*, same flagellum, towards apex; *d*, part of flagellum of second pair, inner side; *e*, leg of second pair; *f*, part of hand in oblique position; *g*, part of palpus of mandible.

Puget's Sound, Western America.

Length of body, nine lines. The figure probably represents a female. In the natural position of the hands (shown in fig. 1 *a*), the back of the hand is towards the observer, and the actual outline shown in (fig. 1 *e*) is not easily obtained without separating the leg from the body. The mandibular palpus has the inner side of the last joint pectinate with short setæ. The inner side of the flagellum of the inferior antennæ is covered with short hairs, about as long as the joints. The second pair of stylets projects hardly as far as the first, and about to middle of branches of last pair. The legs of the fifth pair have the tarsus reversed in the specimen, as shown in the figure.

APPENDIX TO GENUS GAMMARUS.

GAMMARUS? PERUVIANUS.

Corpus compressum; epimeris latis, 5tis multo brevioribus quam 4tæ. Antennæ 1mæ corpore parce breviores, 2dis fere duplo longiores, basi brevioribus quam flagellum, articulis tribus subæquis, secundo paulo lon-

giore, setis brevibus; 2dæ basi 1marum parce longiores, basi paulo longiore quam flagellum, articulo quarto valde longiore. Manus prima parva, apice parce latior, obliqua. Manus secunda mediocris, subovata infra sparsim setosa, palmâ non excavatâ, digito brevisculo. Pedes 6 postici sensim parce increscentes, non longi, setis brevibus, articulo primo latissimo. Styli caudales secundi ultimos non superantes.

Body compressed, epimerals large, the fifth much shorter than fourth. Superior antennæ little shorter than body, nearly twice as long as the inferior pair, base shorter than flagellum, the three joints subequal, second somewhat the longest, setæ short; inferior pair hardly longer than base of superior, base longer than flagellum, fourth joint of base longest. Hand of first pair small, slightly broader at apex and oblique. Hand of second pair moderately large, subovate, base below sparsely setose, palm not excavate, finger rather short. Posterior six feet not long, slightly longer from fifth to seventh pair, setæ short, first joint very broad. Second pair of caudal stylets hardly reaching as far as first.

Plate 66, fig. 2 *a*, animal, enlarged; *b*, mandible, in a position not showing the molar prominence; *c*, maxilla of first pair; *d*, *ibid.* of second; *e*, maxillipeds.

Island of San Lorenzo, Peru; among sea-weed along the sea-shore.

Length, five to six lines. Colour, violet or violet-brown. The head but little longer than following segment. Caudal segment half as long as posterior caudal stylets, bifid, and very moveable. Base of inferior antennæ quite slender, and nearly as long as first two joints of superior pair. Joints of flagellum of either pair, a little oblong, setæ few and short. Hand of first pair of feet not twice longer than broad, finger hardly half as long as hand, preceding joint densely hirsute below, not shorter than hand. Hand of second pair more than twice longer than broad, a few short setæ at apex, as well as some slender hairs on inferior side, preceding joint subtriangular, hardly longer than broad, second and third joints slightly oblong, subequal. Third and fourth pairs of legs subequal, about as long as seventh pair, basal joint narrow; fifth pair shortest and basal joint nearly rotund. Inner apex of third joint in last three pairs prolonged and acute; a few short setæ at apex of joints; claw about one-third as long as pre-

ceding joint. First and third pairs of stylets, extend equally far backward, the second pair less far. The mandibles have a three-jointed palpus, and the last joint is falciform and short pectinate on the under side,—a common characteristic of the Gammarii. The appendage to the superior antennæ, if one exists (as we suspect), was overlooked. If absent, the characters are those of an Iphimedia, although more like Gammarus in habit. The maxillipeds are hairy within, and have a long spine or claw at apex. The species is near the *G. brasiliensis* in many characters.

Amphihoe peruviana, DANA, Proc. Amer. Acad. Sci., Boston, ii. 215.

GAMMARUS? PUBESCENS.

Corpus compressum, sparsim pubescens, epimeris sat magnis. Oculi subreniformes. Segmentum corporis caudale brevius, emarginatum. Antennæ 1mæ dimidio corporis longiores, 2dis fere duplo longiores basi vix breviora quam flagellum, articulis primo secundoque subæquis, longis, setis numerosis longiusculis; 2dæ densè hirsutæ, basi 1marum paulo longiores, basi fere duplo longiore quam flagellum. Pedes 1mi parvuli, manu angustâ, supra rectiusculâ, apice angustiore, infra hirsutâ. Manus secunda grandis, oblonga, supra rectiuscula, versus apicem angustans, infra hirsuta et obsolete erosa, palmâ fere longitudinali, non excavatâ, digito mediocri. Pedes 6 postici sat longi, subæqui, setis rigidis, articulo 1mo lato.

Body compressed, sparsely pubescent, epimerals large. Caudal segment small, emarginate. Superior antennæ nearly three-fourths as long as the body, and almost twice as long as the other pair, base hardly shorter than the flagellum, first and second joints subequal, long, setæ numerous, longish; inferior pair densely hirsute, base much longer than flagellum, and shorter than base of superior pair. Anterior feet small, hand narrow, nearly straight above, narrowing towards apex, hirsute below. Hand of second pair oblong, large, of same form as hand of first pair, hirsute below, palm nearly longitudinal, not excavate nor limited by a tooth or spine, finger of moderate length. Six posterior feet rather long, subequal, setæ rigid, first joint broad.

Plate 66, fig. 3 *a*, animal, enlarged; *b*, mandible; *c*, *d*, maxillæ; *e*, maxillipeds; *f*, lip; *g*, anterior feet, more enlarged.

Coral reef of Pitt's Island, the northern of the Kingsmills. Collected, April 30, 1841.

Length, four lines. Greenish or nearly colourless. The third joint of the superior antennæ is half as long as the second. The setæ of the joints of the flagellum are rather longer than the joints. As to the existence of an appendage, we are not certain. The inferior antennæ are little longer than half the superior, the base is about as long as first two joints of the superior. The upper side of this pair, to apex, is densely hirsute; the flagellum is but little longer than the last joint of base. The hand of the first pair of legs is hardly one-fourth the width of the hand of the second, but the form is nearly the same. The second has a few setæ at apex, and at a point above a short distance from the apex; and the finger closes against the under surface, which is a little uneven, and hirsute in tufts. The finger is half as long as the hand; the carpus is acute below, and hardly longer than broad. Third and fourth pairs equal and similar; sixth and seventh pairs about equal, the sixth shorter; there are tufts of short bristles on the edges; the basal joint is large, especially of seventh pair, and serrulate behind. The second pair of stylets extends a little farther back than the first. The third was mutilated in the specimen.

Amphithoe pubescens, DANA, Proc. Amer. Acad. Sci., ii. 214.

GAMMARUS? INDICUS.

Feminæ:—*Epimeræ mediocres*. *Segmentum abdominis quartum posticè acutum*. *Antennæ 1mæ inferioribus duplo longiores, corpore paulo breviores, basi breviorè quam flagellum, articulo primo longiore, setis numerosis breviusculis: 2dæ tenues, basi 1marum paulo longiores, basi vix longiore quam flagellum*. *Manus 1ma 2daque parvæ, oblongæ, supra rectiusculæ, apice angustiores, infra hirsutæ, digito mediocri*. *Pedes 3tii 4tiq̄ue tenues, 5tis vix breviores, 6ti 7miquè subæqui, 5tis longiores, articulo 1mo latissimo, setis brevibus præter apicales longas*. *Styli caudales postici 2dos vix superantes*.

Female.—Epimerals of moderate size. Fourth segment of abdomen acute behind. Superior antennæ twice longer than inferior, a little shorter than the body, base shorter than flagellum, first joint the longest, setæ numerous, rather short; inferior pair slender, but little longer than base of superior pair, base hardly longer than flagellum. Hand of first and second pairs of feet small, oblong, above nearly straight, narrowing to apex, hirsute below, finger of moderate length. Third and fourth pairs of feet slender, hardly shorter than fifth. Sixth and seventh subequal, longer than fifth, first joint very broad, setæ short, excepting the apical, which are long. Posterior stylets hardly extending beyond second pair.

Plate 66, fig. 4 *a*, animal, enlarged; *b*, portion of superior antennæ; *c*, leg of second pair; *d*, extremity of posterior pair.

Shores of a small coral island, in the Balabac Passage, north of Borneo. Collected, February 9, 1842.

Length, four lines. Body moderately slender, naked. Base of inferior antennæ shorter than first two joints of superior pair. Setæ of flagellum of superior pair about as long as joints, those of the inferior side a little the longest. Finger of four anterior feet about half as long as hands, shutting against inferior margin. Basal joint of fifth pair of legs nearly orbicular; setæ of the six posterior legs numerous, and rather long at apex of joints, especially at apex of joint preceding claw; setæ of inner margin in short tufts of three or four to each, not as long as diameter of joint. Caudal stylets rather long, all extend back the same distance.

GENUS MELITA (*Leach.*), *D.*

Epimeræ 5tæ 4tis multo breviores. Styli caudales postici ramo uno elongato alteroque perbrevis vel obsolete instructi. Antennæ superiores sæpius longiores, non appendiculatæ.

Epimerals of the fifth segment much shorter than those of the fourth. Caudal stylets of third pair having one long branch, and another very small or obsolete. Superior antennæ usually the longer, not appendiculate.

In accepting of Leach's genus *Melita*, we do not include among its characters, that upon which it was especially based by Leach, the peculiarity of the hand, as this cannot be deemed a generic characteristic, unless sustained by other differences. The caudal stylets afford a much more important distinction. In this peculiarity, they are near the genus *Mæra*, of Leach, and would hardly be separated from that group, unless we esteem the absence of an appendage to the superior antennæ a generic distinction. The close similarity of the *Gammarus Dugesii*, Edwards, to the *Melitæ* throws some doubt on this point. Still, for the present, we follow the usual method, and keep them distinct. Leach's species is described as having no such antennary appendage, and we observed none on specimens of the species below, two of which were figured, one a male, the other a female (if not a different species); we have not the specimens for verification. The one supposed to be a female, has the hand of *Melita*, that is, the finger closes upon the lateral surface of the hand; in the other, the hand had the ordinary form, the finger being articulated with the apex, and closing against the inferior margin.

MELITA TENUICORNIS.

Maris:—*Epimeræ latiusculæ. Antennæ tenues; 1mæ dimidio corporis longiores, basi paulo breviorè quam flagellum, articulo secundo valde longiore, flagello terete, setis verticillatis, tenellis, articulos longitudine parce superantibus; 2dæ parce breviores, basi longiore quam flagellum et longiore quam basis 1marum, articulis tertio quartoque subæquis. Manus prima parvula, obovata, margine hirsuta, digito minuto sub apice affixo. Manus secunda oblonga, subelliptica, dorso rectiuscula, infra densè hirsuta, palmâ non excavatâ, digito majusculo. Pedes tertii quartique breves; sex postici subæqui, quinto parce minore, setis brevibus.*

Feminæ?—*Setæ antennarum bene divaricatæ. Manus 2da mediocris, elongato-obovata, apice parce obliqua, digito brevi, in manus superficiem lateralem claudente. Styli caudales 2di breves, postici simplices, elongati, ramo subcylindrico, setis brevibus ornato.*

Male:—*Epimerals rather broad. Antennæ slender; superior pair longer than half the body, base a little shorter than the flagellum,*

second joint much the longest, flagellum terete, setæ verticillate, slender, and slightly longer than the joints; inferior pair a little the shorter, base much longer than flagellum and also exceeding in length the base of the superior pair, third and fourth joints subequal. Hand of first pair very small, obovate, margin hirsute, finger minute, and articulated to the hand below the apex. Hand of second pair oblong, subelliptical, back much flattened, densely hirsute below, palm not excavate, finger rather large. Feet of third and fourth pairs short; posterior six subequal, the fifth pair a little the smallest, setæ short.

Female?—Setæ of antennæ very nearly at right angles with the joints. Hand of second pair of moderate size, long obovate, apex sparingly oblique, finger short, shutting against lateral surface of hand. Stylets of second pair short; posterior pair long, simple, the branch subcylindrical and furnished with short setæ.

Plate 66, fig. 5 *a*, animal (*male*), enlarged; *b*, *c*, maxillæ; *d*, part of flagellum of exterior antennæ; *e*, anterior foot; *f*, part of second pair.—*g*, *female*, enlarged; *h*, part of flagellum of superior antennæ; *i*, *k*, maxillæ; *l*, maxillipeds; *m*, hand of first pair.

Bay of Islands, New Zealand; found along the shores between low and high water level.

Male.—Length, four and a half lines. Second joint of superior antennæ full twice the length of the third. Flagellum evenly terete and joints oblong, the setæ forming a whorl at apex of each joint. Flagellum of inferior pair a little longer than third or fourth basal joint, hairs as in superior pair. Hand of first pair with the apex rounded, not longer than preceding joint, which is a little narrower and is hirsute below. Hand of second pair about twice longer than broad, and having the finger articulated with its apex, the preceding joint transverse, clasping base of hand, yet but little prolonged below and hirsute; the next preceding subtriangular, with the apical the broadest side of the triangle; this side has near centre an angle, and the lower apex is acute. The first joint of fifth pair of feet is rather narrow; of the two following much broader. The first pair of stylets extends a little beyond the second pair. The stylets of the last pair were broken off in the specimen examined.

Female?—Length, four lines. Colour, greenish. The flagellum of the superior antennæ is slender terete and consists of fifteen to twenty oblong joints, which have a whorl of setæ at apex a little longer than the joints, the setæ standing very nearly at right angles with the organ. The inferior antennæ are about three-fourths as long as the superior; the third and fourth joints are long, the third slightly the longer; the flagellum is hardly longer than this joint; the first joint is acute below at apex. The finger of the anterior hands is articulated with the middle of the apical margin, and the hand is naked or nearly so. The hands of the second pair have the apex slightly prominent; the finger is half as long as the hand; the hand is naked. The third and fourth pairs are very slender and about equal. The last pair of stylets is longer than the first, and the second pair is not half as long as either. The maxillipeds terminate as usual in a stout and long spine.

Amphithoe tenuicornis, DANA, Proc. Amer. Acad. Sci., ii, 215, male; *A. (Melita) inequistylis*, D., ibid., 214, female.

GENUS MÆRA (*Leach*), D.

Gammaro Melitæque affinis. Styli caudales postici sæpius valde elongati, ramo uno longo, altero brevissimo vel obsoleto. Epimeræ parvæ. Antennæ Imæ appendiculatæ.

Near *Gammarus* and *Melita*. Caudal stylets of last pair usually much elongate, one branch long, the other very short or obsolete. Epimerals small. Superior antennæ appendiculate.

The males in *Mæra* of Leach, as this genus is characterized by him, have one hand very much larger than the other. We do not regard this character as the prominent distinction, and adopt another one pertaining to the stylets.

In each of the three species here mentioned, the first four or five joints of the abdomen have the posterior margin more or less dentate.

MÆRA VALIDA.

Gracilis, epimeris angustis. Oculi rotundati. Antennæ tenuissimæ;

Imæ corporis longitudine, basi vix breviorè quam flagellum, articulo secundo valde longiore quam primus, appendice brevi, 3-5-articulatâ; 2dæ paulo breviores, basi parce longiore quam basis 1marum, flagello dimidio breviorè. Pedes antici parvuli; secundi paris manus dextra validissima, basi latè rotundata, apice superno non prominente, rectangulato, digito immobili longo, crasso; manus sinistra parvula, ciliata, angusta, acuminata. Pedes 6 postici subsetosi. Styli posteriores longissimi, setulosi, primis vel secundis fere duplo longiores.

Slender, epimerals narrow. Eyes round. Antennæ very slender; superior as long as body, base scarcely shorter than flagellum, second joint much longer than first, appendage short, three to five-jointed; inferior pair a little the shortest, base a little longer than base of superior pair, flagellum half shorter than base. Anterior feet quite small. Right hand of second pair very large, broadly rounded at base, upper apex not projecting, rectangular, immoveable finger long and stout; left hand very small, narrow and narrowing to apex, ciliate. Six posterior feet subsetose. Posterior stylets very long, nearly twice as long as either of the other pairs.

Plate 66, fig. 6 *a*, animal, enlarged; *b*, left hand of second pair; *c*, part of flagellum of superior antennæ.

Singapore; brought up with coral, in ten feet water.

Length, nearly three lines. This species has more slender antennæ than the following; the flagellum of the inferior pair is short; the large hand is very broadly rounded at base; the small hand narrows to apex, instead of being truncate. The setæ of the six posterior legs are in a few uneven tufts, and at apex of joints. The second joint of base of superior antennæ is much more than twice the length of the third. The hairs of the flagellum are as long as three diameters of the organ. The large hand is naked, except one or two minute setæ at the upper apex. The part of the hand with which the finger articulates is not at all raised, and the upper angle of the hand is rectangular. The preceding joint is very narrow and is much prolonged downward, close to the hand; the next preceding is prolonged upward, and also clasps the base of the hand, projecting above the following. The third and fourth pairs of legs are similar, slender, subequal.

G. (Mæra) validus, DANA, Proc. Amer. Acad. Sci., Boston, ii. 212.

MÆRA SETIPES.

Gracilis, epimeris angustis. Oculi rotundati. Antennæ corporis longitudine; 1mæ paulo longiores, basi brevior quam flagellum, articulo secundo parce longiore quam primus, appendice 5-articulatâ; 2dæ basi longiore quam basis 1marum, flagello brevior quam basis. Pedes 1mi parvuli; manus 2da dextra valida subtriangulata, basi angusta, manus sinistra parvula, apice parce latior, paulo obliquè truncata. Pedes sex postici subæqui, sextis parcè longioribus, setis brevibus, articulo tertio posticè serrato.

Slender, epimerals narrow. Eyes round. Antennæ as long as body, the superior a little the longer, base shorter than flagellum, second joint sparingly longer than first, appendage five-jointed; inferior pair with the base longer than base of superior pair, flagellum shorter than base. Anterior feet quite small. Right hand of second pair very large, subtriangular, narrow at base; left hand very small, narrow at base, with an obliquely truncate apex. Six posterior feet subequal, the sixth pair slightly the longest, joints with short setæ, the third joint serrate behind.

Plate 66, fig. 7 *a*, animal, enlarged; *b*, small hand of second pair.

Shores of Harbour of Rio Janeiro, among the sea-weed near the fort, not far from Praya Grande.

Length, four lines. The posterior thoracic segments are longer than the preceding. The first joint of base of the inferior antennæ has a prolonged lower apex, nearly as long as next joint. The small hand of second pair has the truncation of apex but little oblique, and slightly convex. The third joint of six posterior legs is stout, and has three distinct serratures on the posterior margin, where the setæ originate.

G. (Mæra) setipes, DANA, Proc. Amer. Acad. Sci., ii. 213.

MÆRA ANISOCHIR, *Krøyer*.

Plate 66, fig. 8 *a*, animal, enlarged; *b*, hand of second pair; *c*, leg of first pair in female; *d*, leg of second pair, *ibid.*; *d'*, same, of size to correspond with 8 *a*.

This species, from Rio Janeiro, is very near the *setipes*, but differs in having the setæ or hairs of the legs longer and more slender, and the third joint of the six posterior legs not serrated behind for the setæ; the superior antennæ are rather shorter than the body. Length nearly six lines. Some of the hairs of the six posterior legs are longer than the fourth joint.

Gammarus anisochir, KRÖYER, Tids. [2], i. 283.

G. (Mæra) pilosus, DANA, Proc. Amer. Acad. Sci., ii. 213.

GENUS DERCOTHOE, *Dana*.

Epimeræ mediocres, 5^{tæ} subæquè bilobatæ, 4^{tis} vix breviores. *Margo frontis lateralis juxta oculos sæpe valde saliens*. *Styli caudales postici simplicissimi, sat longi, ramo brevi, subconico, apice paulo reflexo e quo spinis duabus brevissimis exsertis*. *Antennæ superiores sæpius longiores, appendiculatæ*.

Epimerals moderately large, fifth nearly equally two-lobed, and hardly shorter than fourth. The lateral margin of the front which bears the eye often very salient. Posterior caudal stylets quite simple, rather long, branch short, with a reflexed apex bearing two very short spines. Superior antennæ usually the longer, appendiculate.

The posterior stylets are like those of *Pyctilus*, and unlike those of any of the preceding genera. The carpus in the legs of the first pair is often as long as the hand, and sometimes longer. The two very short spines at the apex of the posterior stylets are full half as broad as long.

The name of the genus, from *δερκω*, to look, alludes to the projection forward of the eyes on a prominence of the front margin either side of the head,—a frequent, if not universal, characteristic of the species.

DERCOTHOE EMISSITUS.

Corpus gracile. Caput oblongum, lateribus antice valde productum. Antennæ setosæ; 1mæ dimidio corporis vix longiores, articulis 1mo 3tioque subæquis, 2do longiore, flagello non longiore quam basis, fermè 7-articulato, terete, appendice 3-articulatâ; 2dæ breviores, basi vix breviorè quam 1marum basis, articulis 3tio 4toque subæquis, 2do brevi, flagello breviorè quam basis, fermè 7-articulato. Pedes 1mi parvuli, manu perangustâ; 2di validi, manu grandi subovatâ, sparsim setosâ, supra parce arcuatâ, palmâ non excavatâ, setarum fasciculis brevium ornatâ, digito mediocri. Pedes 6 postici sensim increscentes, setis paucis; 5ti 4tis breviores.

Body slender. Head oblong, with an ocular prominence on front margin either side. Antennæ setose; the superior hardly longer than half the body, first and third joints subequal, second longer, flagellum not longer than base, about seven-jointed, appendage three-jointed; inferior shorter, base about as long as base of superior pair, third and fourth joints subequal, second short, flagellum shorter than base, about seven-jointed. Anterior feet quite small, and hand very narrow; second pair strong, the hand large subovate, sparsely setose, above sparingly arcuate, palm not at all excavate, finger half as long as hand. Six posterior feet gradually increase in length, setæ few, the fifth pair shorter than fourth.

Plate 66, fig. 9 *a*, animal, enlarged; *b*, head, more enlarged; *c*, portion of flagellum of superior antennæ; *d*, leg of fourth pair; *e*, ibid. of fifth.

Sooloo Archipelago; in six and a half fathoms water. Collected, February 2, 1842.

Length, four lines. The projection on either side containing the eye is about half as long as first basal joint of superior antennæ. The flagellum of the superior pair consists of oblong terete joints; the setæ of the under side are longest, being three or four times as long as the diameter of the joints; and this is true also of the flagellum of the

inferior pair. The hand of the second pair has the finger folding against the very oblique under margin. There are small tufts of short hairs on inner and lower margin of hand as well as at apex, besides two or three setæ on the back margin. The penult joint is transverse, very narrow and obtuse below, and closely applied to the hand. The preceding is quite small, but a little oblong. The posterior six legs have the first joint subovate, with the posterior margin entire, but one or two minute setæ near apex. The legs are nearly naked. The stylets extend back, nearly the same distance.

Gammarus emissitius, DANA, Proc. Amer. Acad. Sci., ii. 211.

Female of D. emissitius?—Figures 10 *a, b, c, d, e*, Plate 66, represent parts of a female (a specimen with eggs below the venter), which we suspect may be of the above species. This is inferred from its occurrence at the same locality with the *emissitius*, and from the form of the legs of the second pair. Fig. 10 *a*, represents the anterior part of the body; *b*, fourth leg; *c*, part of seventh; *d*, caudal extremity with the three pairs of stylets; *e*, last pair in profile. The eye-projection of the lateral margin of the head is quite salient, but rounded. The anterior legs have the fourth joint as broad as the fifth and twice as long; it is broadest at middle and narrows regularly (not with a curve) towards base and apex, the under side being low triangulate, and the upper slightly arcuate. The fifth joint is narrow at base, and gradually widens, being also widest near middle or beyond it; the lower margin is rounded, the upper nearly straight. The lower side of both joints is hirsute. The finger is short, and the palm (or the margin against which it closes) is oblique transverse, and without any angle or spine at its termination. The leg of the second pair has the fourth joint broad like the fifth, but hardly half as long; the two are articulated with one another by the whole breadth of the extremity of the fourth or base of the fifth. The fifth is quite oblong, and has either margin a little arcuate, the lower the most so; the palm is oblique, and without a limiting angle below. The finger is about one-third as long as the hand. The fourth and fifth joints have tufts of setæ below, but none hardly as long as the breadth of the joints. The setæ of the following legs are few and short, hardly as long as breadth of fifth joint, and they are very slender. The third joint of the third or fourth pair is narrow. The caudal stylets have somewhat lamellar

branches; those of the first pair are a little unequal, the outer branch being the longer, and having three unequal stoutish setæ at apex and two near the inner margin, the shorter having a longish seta at apex; the branches of the second pair are subequal, with two or three unequal setæ at apex. The last pair has two or three spines on side of basal part, and none on the branch except the apical spines. The inner margin of the outer branch of the first pair of stylets is very minutely serrulate, and both margins of the inner branch, as well as inner margin of base.

The first joint of the last six pairs of legs is very broad, that of the fifth pair as broad nearly as long.

DERCOTHOE SPECULANS.

Gracilis; epimeris minoribus, margine sparsim ciliatis. Caput parce oblongum. Antennæ subæquæ, infra setosæ, dimidio corporis longiores, flagellis non longioribus quam bases, teretibus, articulis oblongis; 1marum articuli 2dus 3tiusque subæqui, 1mus brevior; 2darum articulus 4tus 3tio longior. Pedes 1mi 2dis paulo minores, manu carpoque simul sumtis ellipticis, et infra hirsutis, manu vix oblongâ, parce brevioribus quam carpus. Pedes 2di validi, manu angustè subellipticâ, infra supraque arcuatâ, apice basique angustâ, palmâ non excavatâ, hirsutâ, carpo triangulato, infra manum tenuiter producto, hirsuto, processu ad manum non appresso, digito longiusculo. Pedes 3tii 4tique æqui, breves, articulo 1mo fere rotundato; 5ti 4tis vix longiores; 4 postici subæqui, 7mis longioribus, articulo 1mo oblongo, setis sparsis.

Slender; epimerals small, margin sparsely hairy. Head slightly oblong. Antennæ subequal, longer than half the body, setose below, flagella not longer than the base, terete, joints oblong, second and third joints of superior pair subequal, the first shorter; fourth of inferior pair longer than third. Anterior feet but little smaller than second pair, the hand and carpus taken together elliptical in outline and below hirsute, the hand hardly oblong, slightly shorter than carpus. Second pair large, hand narrow subelliptical, above and below arcuate, at apex and base narrow, palm not excavate, hirsute, carpus subtriangular, slenderly produced below the hand, but process not appressed to hand, finger rather long. Third and

fourth pairs of legs equal, first joint nearly round; fifth pair scarcely longer than fourth; sixth and seventh long and subequal, the seventh somewhat the longest, first joint oblong, setæ few.

Plate 67, fig. 1 *a*, animal, enlarged; *b*, part of flagellum of superior pair; *c*, ibid. of inferior pair; *d*, side view of head; *e*, extremity of third or fourth pair of legs; *f*, caudal stylet of last pair; *g*, leg of second pair; *h*, mandible.

Sooloo Archipelago; dredged up in six and a half fathoms, February 2, 1842.

This species has some resemblance to the *D. emissitius*, from the same locality. But they differ in the four anterior legs, the two pairs of hands being peculiar in form, and nearly alike in size. The finger of the first pair of legs is about as long as the fifth joint, and this joint is but little longer than broad. The superior antennæ are about three-fifths as long as the body, and the inferior are of the same length, though having a longer base. The third and fourth pairs of legs are peculiar in having the basal joint nearly circular, and broader than the same joint in the following three pairs, which is oblong. The first pair of stylets extends beyond the apex of the second, and the second beyond the third. The eye projects nearly half the length of the first joint of the superior antennæ. The appendage to the superior antennæ was overlooked (if one exists), when the drawings were made in the Sooloo Sea; the specimens are now mutilated in this part.

Amphithoe peculiarans (by mistake for *specularans*), DANA, Proc. Amer. Acad. Sci., ii. 213.

DERCOTHOE? HIRSUTICORNIS.

Feminæ:—*Epimeræ sat magnæ*. *Caput lateribus anticè valde productum*. *Antennæ infra bene setosæ; 1mæ dimidio corporis breviores, flagello basin longitudine fere æquante, articulo basis primo vix brevior quam tertius, appendice 3-articulatâ; 2dæ paulo breviores, articulis basalibus quatuor subæquis, 4to longiore, 1mo brevior, flagello brevior quam basis. Pedes 4 antici parvuli, 4ti 3tiis crassiores; 6 postici sensim increscentes, setis brevibus, sparsis.*

Female:—Epimerals rather large. Head with each side in front produced into a prominence containing the eyes. Antennæ with rather long setæ arranged along the lower side; the superior not half as long as body, first joint of base not longer than third, flagellum nearly as long as the base, appendage three-jointed; inferior pair shorter, four basal joints subequal (the last longest, and the first shortest), flagellum shorter than base. Four anterior feet small; fourth stouter than third; three posterior pairs gradually increasing in length, setæ short, few.

Plate 67, fig. 2, animal, enlarged.

From the Island Enchados, Bay of Rio Janeiro, Brazil; found among the Serpulas of the shores.

Length, three to four lines. Colour, transverse bands of yellow and black or brownish black. The projection containing the eyes is two-thirds as long as the first basal joint of the superior antennæ. The first basal joint of the inferior antennæ has the lower apex prolonged and acute, the process being nearly as long as second joint. The second pair of stylets extends a little farther back than the first or third, branches of first pair a little shorter than base. The first joint of the legs of the fifth and sixth pairs is very broad, and nearly circular in form; that in the seventh pair is narrower. The tarsi are all short. The specimen appeared to contain eggs along the venter.

Gammarus hirsuticornis, DANA, Proc. Amer. Acad. Sci. Boston, ii. 210.

GENUS PYCTILUS, Dana.

Epimeræ sat breves. Pedes 1mi 2dique prehensiles, reliqui non prehensiles, secundarum digito 2-articulato, manu 1-articulatâ. Antennæ elongatæ, secundæ subtus primas affixæ. Styli caudales postici ac in Dercothoe.

Epimerals of moderate size. First and second pairs of feet prehensile, the rest not prehensile, finger of second pair two-jointed, hand one-jointed. Antennæ elongate; second pair inserted below the first. Caudal stylets as in *Dercothoe*.

The genus is near *Erichthonius* (Edwards), if not identical with it. The stress which is laid by M. Edwards on the rudimentary character of the epimerals of the anterior thoracic segments, and his reference of his species to the Corophidæ or gressorial Amphipods, lead us to doubt the identity. The posterior stylets have the same form as in *Dercythoe*, and the form of the head, the projecting eyes, and general habit, are nearly as in that genus. The approximation is so close, that the genera are evidently of one and the same group; we have no evidence in the antennæ, caudal stylets, or legs, that the species in any case are gressorial. The antennæ are slender, with long flagella. The epimerals are broader than in some Gammari. The caudal stylets are rather long.

Krøyer observes that a species of *Erichthonius* is male of a *Podocerus*, the *Podocerus* being the female form. If this be a fact, the *Erichthonii* are quite distinct from the *Pyctili*. For a female *Pyctilus*, bearing eggs, has been observed by the author, which has the same form of hands as is characteristic of the group *Erichthonius*. Moreover, the posterior caudal stylets of *Pyctilus* are unlike those of *Podocerus* and any related genus. The form in *Erichthonius* has not been particularly described.

In this genus as well as the preceding, the first joint of the legs of the fifth and sixth pairs is very broad, while that of the seventh is narrow.

The name of the genus *Pyctilus* is from *πυκτης*, a boxer, and alludes to the very large and well-formed hands of the species.

PYCTILUS MACRODACTYLUS.

Corpus gracile, epimeris mediocribus, capite oblongo, fronte laterali saliente. Antennæ elongatæ: 2dæ corpore breviores, articulis tertio quartoque subæquis, longis, flagello paulo brevioribus quam basis, fermè 10-articulato, setis perbrevibus. Pedes antici parvuli, manu carpoque simul sumtis angusto-ellipticis, breviter hirsutis, manu brevioribus quam carpus, digito parvo. Manus secunda validissima, paulo <-forma, digito immobili valde elongato, simplice, acuto, manu ultra hujus digiti basin elongate productâ, digito mobili longiore quam manus, articulis ejus elongatis, subæquis, intus sparsim et breviter hirsutis. Pedes 3tii 4tique subæqui. Pedes 6 postici sensim incrementos, articulo quinti paris primo postice acutè producto.

Body rather slender, epimerals of moderate size; head oblong, the front margin of either side with a projection, containing the eye. Antennæ elongate, inferior pair shorter than the body, third and fourth joints long, subequal, flagellum a little shorter than base, about ten-jointed, setæ very short. Anterior feet small, the hand and carpus together narrow elliptical in outline, short hirsute, finger small. Hand of second pair very stout, <-shape, the immoveable finger being very much elongate, simple, and pointed, and the hand projecting very far beyond its base, moveable finger very long, longer than hand, the joints nearly equal in length, and sparsely short hirsute. Third and fourth pairs of feet subequal; fifth pair with first joint having a narrow acute prolongation behind.

Plate 67, fig. 3 *a*, animal, enlarged; *b*, hand of first pair of feet; *c*, hand of second pair.

East Indies, in the Sooloo Sea.

The large hand of this species with the closed finger is about as long as the head and three anterior thoracic segments. The immoveable finger is rather longer than the part of the hand projecting beyond its base. The moveable finger is twice as long as the other, and when closed, the apex of its first joint reaches to apex of immoveable finger, and the whole of the second joint extends back along the length of the immoveable finger. The setæ within are in a few tufts. The two hands of this second pair are equal.

The superior antennæ have the second joint of base longest. [The flagellum was mutilated in the specimen examined.] The base of the inferior pair much exceeds in length the base of the superior. The epimerals have the margins rounded. The first joint of fifth pair of legs has a tooth-like projection to posterior margin: this pair is about half as long as seventh pair. There are but few setæ.

Erichthonius? macrodactylus, DANA, Proc. Amer. Acad. Sci., Boston, ii. 218.

PYCTILUS PUGNAX.

Antennæ 1mæ basi flagellum longitudine fere æquante. Manus secunda validissima oblonga, marginibus parallelis, digito immobili brevi, et

apice bi-dentato, manu ultra hujus digiti basin parce productâ; digito elongato, articulo primo paulo longiore, intus parce eroso et sparsim breviterque setuloso.

Superior antennæ having the base about as long as the flagellum.

Hand of second pair of feet very large, oblong, dorsal and inferior margins parallel, thumb short and bi-dentate at apex, hand produced but little beyond base of this finger; finger very long, the first joint the longer, sparingly erose within, and bearing a few minute and short setæ.

Plate 67, fig. 4 *a*, hand of second pair, enlarged; *b*, part of mandible, in one view; *c*, caudal extremity of body; *d*, caudal stylet of last pair, in profile.

Same locality as last.

The moveable finger in this species is five or six times as long as the immoveable finger, and has a bi-dentate apex; the immoveable finger is not half as long as the distance from its base to the articulation of the hand with the carpus. The finger closes up nearly as in the preceding. There are a few short setæ upon the outside of the immoveable finger. The mandible has a three-jointed palpus, the last joint of which bears a few short, scattered hairs. The stylets of the first pair extend beyond the others; the outer branch is narrow lamellar, with three or four unequal setæ at apex, and one or two a little distance back; the inner branch is slender styliform, and has a single longish seta or spine at the extremity. The second and third pairs are subequal, the third the shorter and much stouter at base. There is a very short caudal segment (seventh abdominal) which has its medial portion protuberant and of a triangular form, the parts outside of this with a few very short stiff hairs. The form of the first joint of the fifth pair of legs is the same as in the *macrodactylus*.

Erichthonius pugnaz, DANA, Proc. Amer. Acad. Sci., Boston, ii. 213.

PYCTILUS BRASILIENSIS.

Feminæ:—*Epimeræ sat breves. Margo capitis lateralis saliens. Pedes*

antici majusculi, articulis 4to 5toque latis simulque sumtis elongato-ellipticis et infra hirsutis, 4to paulo longiore, apice inferiore rotundato, 5to parce oblongo, digito paulo brevior quam articulus 5tus (manus). Pedes 2di validissimi, manu (articulo 4to) crassissima, oblonga, digito immobili crasso, sat brevi (dimidio articuli 5ti brevior), bidentato, extremitate manus ultra hujus digiti basin non producta, articulo 5to percrasso, fere duplo longiore quam 6tus, infra multo piloso, pilis latitudine articuli non brevioribus. Pedes 5ti sat breves, pilis longiusculis, paucis, articulo 1mo fere orbiculari; 7mi articulo 1mo angusto.

Epimerals of moderate size. Lateral margin of head salient. Feet of first pair rather large, fourth and fifth joints broad, and taken together oblong oval, below hirsute, fourth joint a little the longer, rounded at lower apex, fifth a little oblong, finger a little shorter than fifth joint (hand). Feet of second pair very stout, the hand (fourth joint) very large, oblong, immoveable finger stout, rather short, bidentate, the extremity of the hand not extended beyond base of this finger, fifth joint thick, nearly twice as long as the sixth, below much hirsute, hairs as long as breadth of joint. Feet of fifth pair rather short, first joint nearly orbicular, hairs longish, few; first joint of seventh pair narrow.

Plate 67, fig. 5 *a*, part of body, enlarged; *b*, leg of first pair; *c*, *ibid.* of second pair; *d*, *ibid.* of fifth pair; *e*, *ibid.* of seventh pair; *f*, caudal extremity; *g*, stylet of second pair; *h*, *ibid.* of last pair, more enlarged.

Dredged with the anchor in the harbour of Rio Janeiro.

Length, three lines. The epimerals of the thorax are distinct, and the second and third are nearly as long (vertically) as broad. The finger of the first pair of legs is fine serrulate within, and at apex of hand there are hairs as long as the finger. The finger of the second pair has some hairs near its extremity, which are as long almost as the finger. The fifth joint, where it articulates with the hand, is more than half the breadth of the hand. The six posterior legs have longish hairs towards apex of joints, with some others on the inner margin, which are quite short. The tarsi have no seta below towards apex. The branches of the first pair of stylets have about four short, stoutish setae on the margin, besides the apical.

SUBTRIBE III. HYPERIDEA.

THE Hyperidea are oceanic species, and are mostly found remote from the land. They seldom have the body much compressed, and the epimerals are small. The variations they present have much wider limits than among the Gammaridea. In the latter, the head is almost identical throughout the groups, in general form as well as type; while, in the Hyperidea, this segment takes many shapes, among the species, and may even have a beak as long as the body. There is also a much greater diversity among the legs than occurs in other Amphipods. The five posterior pairs may be slender, and of the ordinary unguiculate character, or hands of strange shapes may be developed on either of these pairs excepting the last; or, again, the last three pairs of legs may be obsolescent, except the basal joint, which is extraordinarily enlarged, so as to become a kind of operculum for covering the venter. The abdomen also has its modifications: for besides the ordinary character, it possesses the power, in some species, of folding itself up against the venter, and acting unitedly with the operculiform basal joints of the three posterior pairs of legs, it closes up the under surface of the body, making it like a box, with every limb shut up within. The antennæ have, too, their diversities. The superior pair may be either obsolescent, or much elongated; and the inferior pair, although ordinarily extended in the usual manner, are sometimes folded up, and thus concealed either side of the head. The stylets are usually lamellar, and sometimes quite broad.

The large eyes are the most striking feature in the animals. They may cover with facets the whole head, with, perhaps, only a narrow medial line bare; and, in one genus, the rounded mass of pigment makes one large eye within. In some of the Hyperidea, there appear to be two spots of pigment, of different colour, either side of the middle, as in the *Anchylomera purpurea*, which has one mass of red, and another of green (fig. 9, Plate 68), the former narrow and acuminate below, the latter broad ovoidal.

The Hyperidea are, therefore, those species among the Amphipoda, in which nature indulges in her widest diversities of development, just as with the Maioids and Leucosoids among the Brachyura; and, on

the contrary, the Gammaridea, in analogy with the Cancroids, have a staid, uniform habit and structure. And we observe also, that the species are more numerous among the Gammaridea and Cancroids, than among the Hyperidea and Maioids or Leucosoids.

Many of the diversities mentioned are of subordinate importance in classification, as they do not affect the general grade or habits of the species. The distinction between the species which have the second pair of antennæ extended, and those with these organs folded up and concealed either side of the head or thorax—a characteristic nowhere else observed among Amphipods—is of high importance. The enlargement, also, of the first or second of the three posterior pairs of legs, and its modification so as to give one or both of them the power of grasping, bestow upon such species a character and habit quite diverse from those in which these legs are slender, vergiform, and unguiculate in the usual way. These legs appear to be used for grasping in coition. In consideration of these differences, we distribute the Hyperidea into three families.

Fam. I. HYPERIDÆ.—Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6ti 7mique formâ longitudineque mediocres, 5tis 6tisve non percrassis nec prehensilibus.

Fam. II. PHRONIMIDÆ.—Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6tive sive crassi sive elongati, sæpius prehensiles, quoque 3tii 4tique sæpe prehensiles.

Fam. III. TYPHIDÆ.—Antennæ 2dæ sub capite thoraceve celatæ et sæpius replicatæ. Abdomen in ventrem sæpe se flectens. Pedes 6 postici interdum abbreviati, articulo 1mo operculiformi, interdum longitudine mediocres.

The two families, Hyperidæ and Phronimidæ, correspond to the Hypérines Ordinaires, of Edwards (Crust., iii. 74), and the Phronimadæ, of Gray (Cat. Brit. Crust. Brit. Mus., p. 56); the Typhidæ to the Hypérines Anormales of Edwards (Crust. iii. 94), or Typhidæ, of Gray (Cat. Brit., etc.), and the Vibilinæ, to the Hypérines Gammaroides, of Edwards (Crust., iii. 72).

FAMILY I. HYPERIDÆ.

THE Hyperidæ pertain to three subfamilies:—one having the body Gammaroid in form, and the maxillipeds with a short palpus; in the others, the maxillipeds are wholly without a palpus; one has the body stout and tumid, and the mandibular palpus slender; another has the body more slender or narrow, and the mandibular palpus very broad and short. In the two former, the masses of pigments in the head are two or four in number; in the last, as far as observed, there is but a single mass.

The species in this family differ widely in the development of the antennæ, the superior pair being sometimes obsolescent, and often both pairs short, while sometimes each has a long slender flagellum exceeding the body in length. Species having a long flagellum when adults, are sometimes wholly destitute of the flagellum before reaching maturity.

These subfamilies and their genera may be distinguished as follows:—

SUBFAM. 1. VIBILINÆ. — Corpus formâ paulo Gammaroideum. Caput oculique mediocres. Maxillipedes palpo parvulo instructi. Palpus mandibularis tenuis.

G. 1. VIBILIA, *Edw.*—Antennæ quatuor breves, 1mæ obtusæ. Pedes 1mi 2dique subprehensiles.

SUBFAM. 2. HYPERINÆ. — Caput tumidum. Oculi pergrandes. Palpus mandibularis tenuis.

1. *Antennæ sive 1mæ sive 2dæ flagello longo confectæ.*

G. 1. LESTRIGONUS, *Edw.*—Antennæ 1mæ 2dæque flagello longo confectæ. Pedes 1mi 2dique paulo prehensiles.

G. 2. TYRO, *Edw.*—Antennæ 1mæ flagello longo confectæ; 2dæ perbreves, flagello nullo.

2. *Antennæ totæ breves. Caput oculique pergrandes.*

G. 3. HYPERIA, *Latr.* — Antennæ 1mæ 2dæque conspicuæ, 2dis gracilioribus.

Pedes 2di sæpiusque 1mi subprehensiles, manibus multum imperfectis, articulo 4to ad apicem inferiorem paulo producto tantum.

G. 4. METÆCUS, *Kröyer*.—*Hypericæ* affinis. Pedes 1mi 2dique perbreves, manibus melioribus didactylis bene confecti.

G. 5. TAURIA, *Dana*.—Antennæ ac in *Hypericâ*. Pedes 2di non prehensiles, articulo 4to apice inferiore non expanso nec producto; 7mi vix abbreviati.

G. 6. CYLLOPUS, *Dana*. *Tauriæ* affinis. Pedes 7mi valde abbreviati vel rudimentarii. Antennæ 1mæ et 2dæ ad basin inter se remotæ.

G. 7. DAIRA, *Edw*.—Antennæ 1mæ non conspicuæ, 2dæ exsertæ. Pedes 1mi 2dique plus minusve prehensiles: tarsi pedum reliquorum breves. Rami styliorum caudalium longi.

G. 8. CYSTISOMA, *Guérin*.*—Antennis pedibusque 1mis *Dairæ* affine. Tarsi prælongi. Styli caudales longi, ramis brevibus.

SUBFAM. 3. SYNOPINÆ. — Corpus gracilius. Palpus mandibularis sat brevis, latissimus. Oculi grandes.

G. 1. SYNOPIA, *Dana*.—Caput subtriangulatum, non oblongum. Pigmentum oculorum unicum. Pedes 1mi parvuli, prehensiles, 2di setis longiusculis confecti; 4ti subprehensiles; 5ti 6ti 7mique subæqui.

SUBFAMILY HYPERINÆ.

The large head, in this group, covered with facets and often nearly filled with the pigments of the eyes, give a wild aspect to the species, which is further enhanced by their ordinary attitude and motions—the head inclining downward upon the anterior legs, and the animal swimming with a diving motion and with great rapidity.

GENUS LESTRIGONUS, *Edwards*.

The thorax in this genus is short and tumid; often the first segment is more or less concealed, and the following two or three are quite short. The head is large and rounded, but usually obliquely truncated in front, about the base of the antennæ. Nearly the whole is covered with hexagonal facets, and the pigment constitutes a large

* *Guérin*, *Rev. Zool.*, i. 1842, p. 214. The species *C. neptunus* is three and half inches long.

dark-coloured mass, about half as long as the height of the head. The upper antennæ have the base rather stout and geniculated at the second articulation; the part of the base beyond is ciliate on the lower side. The flagella of both pairs of antennæ are long and very slender. The abdomen consists of seven segments; but the last three are more or less soldered together, being marked in outline by sutures. Of the three pairs of stylets, the first and third extend about equally far backward, while the second pair falls short of this distance. The six posterior legs are slender and subequal, and end in a slender claw; the third and fourth pairs are equally slender and subequal; the first and second are much the smallest.

These animals move with very quick motion, with head down, turning over and over.

LESTRIGONUS FERUS.

Thorax tumidus, segmentis anticis paulo indistinctis. Caput fronte rotundatum. Antennæ fermè corporis longitudine, 1mæ paulo breviores. Pedes 6 postici subæqui, coxâ ad apicem rotundatâ, ungue dimidii tarsi longitudine.

Thorax tumid, anterior segments indistinct. Head rounded in front and hardly flattened. Antennæ about as long as body, upper a little the shorter. Six posterior feet subequal, coxa rounded at apex, claw half as long as tarsus.

Plate 67, fig. 6 *a*, animal, enlarged; *b*, abdomen, side view; *c*, base of superior antennæ; *d*, exterior maxillipeds.

Atlantic; latitude 2° north to 1° south, longitude 18° to 17° west. Collected, 5 A. M., October 30, 1838; and also, November 3d and 5th.

Length, one-eighth inch. Colour, brownish, or brownish red in irregular spots, partly colourless; basal joints of six posterior legs, brownish red. Head about one-third of whole cephalothorax. Pigment of eye, deep brownish red, nearly black. Third joint of base of inferior antennæ oblong, two preceding short. First pair of legs smaller than second pair. Ciliæ of natatory legs as long as the lamellæ to which they are attached.

Figure 7, Plate 67, represents a young individual probably of the preceding species. The head is larger in proportion, and but one pair of antennæ could be distinguished; these were short, and had a styliform termination, which was shorter than cephalothorax, straight and acute. Length, one-eighth of an inch. Colours, as in the preceding. Taken the following day, October 31, 1838.

LESTRIGONUS FUSCUS.

Thorax 7-articulatus, segmento primo fere celato. Abdominis segmentum ultimum suturâ discretum, penultimo dimidio angustius. Antennæ Imæ corporis longitudine, 2dæ valde longiores; basi ad apicem inferiorem acuto. Coxa pedum 6 posteriorum apice obtusa et unguis dimidio tarsi brevior. Pedes 5ti 6tis 7misve paulo longiores.

Thorax seven-jointed, first segment nearly concealed. Seventh segment of abdomen separated by a suture from preceding, half narrower than the sixth. Superior antennæ as long as the body, inferior one-fourth longer, inferior apex of basal portion acute. Coxa of six posterior feet obtuse at apex, and claw less than half the tarsus in length. Feet of fifth pair longer than sixth or seventh.

Plate 67, fig. 8 *a*, animal, enlarged; *b*, base of superior antennæ; *c*, extremity of abdomen, excepting first pair of stylets.

Atlantic; latitude 1° south, longitude 17° to 18° west. Collected at 4 A. M., November 3d and 5th, 1838.

Length, two lines. Colour, dark reddish brown, pervading whole animal, verging in some parts towards pale reddish; but colour probably not constant. Greatest height of head about twice its length, rounded in front, but profile slightly flattened about the antennary area. Segments of thorax all very narrow, first hardly apparent. Base of inferior antennæ having the last joint longest. Claw of six posterior legs *not* half as long as preceding joint; coxa about as long as width of thorax; fifth joint rather longer than either of the preceding. Ciliæ of natatories about twice as long as the lamellæ. Lamellæ of stylets about one-third their whole length, subcultriform,

acute. Second pair of stylets extend about as far backward as middle of lamellæ of last pair.

LESTRIGONUS RUBESCENS.

Thorax paulo longior, segmento primo fere celato. Caput anticè truncatum. Abdominis segmentum ultimum suturâ discretum, penultimo parce angustius. Antennæ quatuor fere æquæ, corpore paulo longiores; basis antennarum 1marum ad apicem inferiorem non acutus; flagellum fermè 14-articulatum, articulo flagelli primo brevi, sequentibus oblongis. Coxa pedum sex posteriorum ad apicem posticum fere rectangularata et subacuta, et articulus quartus setam antice gerens (pedibus alioque nudis); unguis dimidii tarsi longitudine.

Thorax a little longer than in the preceding, first segment nearly concealed. Head flattened in front. Seventh abdominal segment separated by a suture from the sixth, sparingly narrower. Antennæ four, very nearly equal, a little longer than the body, base of the superior antennæ not acute at lower apex, flagellum about 14-jointed, first joint short, the others oblong. Coxa of six posterior feet nearly rectangular and acute at posterior apex, and fourth joint bearing a seta (these feet elsewhere naked); claw half as long as tarsus.

Plate 67, fig. 9 *a*, animal, enlarged; *b*, extremity of abdomen.

Pacific, lat. 18° south, long. 124° west. Collected several individuals, August 7, 1839.

Length, one-eighth of an inch. Colour, a little reddish in some parts. Coxæ of six posterior legs reddish. First joint of flagellum of superior antennæ not longer than last of base, other joints of flagellum slender, cylindrical. Last (seventh) abdominal segment triangular, obtuse. Two setæ on inferior side of fourth joint of fourth pair of legs. Fifth, sixth, and seventh pairs of legs very nearly equal.

LESTRIGONUS FABREII? *Edwards.*

Plate 67, fig. 10 *a*, animal, much enlarged; *b*, extremity of second pair of legs; *c*, extremity of abdomen, upper view showing stylets; *d*, profile of head, showing mouth organs in lateral view.

Sooloo Sea.

Length, one and a half lines. The specimen here described has many of the characters of the *L. Fabreii*; yet for want of a full description of that species, we cannot pronounce on an identity. The facets cover a very large part of either side of the head. The front of the head in profile is somewhat concave near or below the base of the superior antennæ, but much less so than in Edwards's figure. The four posterior segments of the thorax are distinct, and the first three are coalesced along the back. Antennæ longer than the body; two fringes of hairs on under side of third basal joint of the superior antennæ, very delicate and close; apex of next joint not acute; flagella very slender, consisting of very long joints, excepting part of flagellum of superior pair, near the basal portion of the antennæ; twenty joints or more to the flagellum of this pair. First and second pairs of legs nearly equal, terminating in an imperfect hand, the lower apex of the antepenult joint being prolonged to about half the length of the next joint, which is subcylindrical. Third and fourth pairs equal; seventh pair longer than either of the preceding; these legs naked, and without a longish seta on fourth joint, as in the *rubescens*; tarsus about one-third the length of the preceding joint. Basal joint in fifth, sixth, and seventh pairs narrow, rounded or obtuse at apex. Caudal segment of abdomen about half as wide as preceding, and nearly half as long as posterior caudal stylets, exclusive of the two terminal lamellæ. Posterior caudal stylets rather broad, the lamellæ equal, broad oval-lanceolate, about one-third as long as basal portion.

According to Milne Edwards, the legs of the first pair in the *Fabreii* are cylindrical, and differ from those of the second pair; but we suspect that this form was observed in consequence of the leg being turned with the upper margin to the eye. This is the natural position both of the first and second pairs, in a side view of the animal,

and when so situated, the projecting process (thumb-like) of the antepenultimate joint is not seen.

GENUS HYPERIA, *Latreille*.

The Hyperiæ occur principally in the colder temperate and frigid zones. The species have usually a tumid cephalothorax, rounded above; but, in one species, it is much compressed, and rises above to an edge. The four anterior thoracic legs are much shorter than in the others, and the second pair with usually the first, is subprehensile. This prehensile character is produced by a prolongation of the lower apex of the fourth joint, the fifth and sixth constituting the moveable finger. This finger, exclusive of the claw, or sixth joint, is commonly much longer than the process against which it plays; yet the transition appears to be so gradual to species in which the finger is short, and the hand well formed, that we have doubted the propriety of sustaining the genus *Metæcus*, of Kröyer, based on this distinction,—that is, on having well-formed hands terminating the second pair of feet. In our *Hyperia trigona*, the legs of the first pair are not at all prehensile, the lower apex of the fourth joint not projecting.

HYPERIA AGILIS.

Caput mediocre, pigmentis oculorum angustis. Thorax longus, epimeris totis brevibus, truncatis. Antennæ longiusculæ, dimidii thoracis longitudine, subæquæ; 2dæ parce longiores, 3-articulatæ, non teretes, articulo ultimo longo et remotè pubescente, interdum obsolete articulatæ; 1mæ 5-articulatæ, articulo 4to crasso longoque et infra ciliato, ultimo minuto. Pedes 4 antici subæqui, coxis angustis; 6 postici mediocres, setis brevibus et paucis.

Head of moderate size, pigment of eyes much smaller than usual. Thorax long, all the epimerals short, truncate. Antennæ rather long (half as long as thorax), subequal; inferior slightly the longest, three-jointed, not terete, last joint long, and remotely hairy; superior five-jointed, fourth joint stout, long, ciliate below, the last minute. Four anterior feet subequal, coxæ narrow; six posterior of moderate length, setæ short and few.

Plate 67, fig. 11 *a*, animal, enlarged; *b*, front view of head; *c*, inferior antennæ; *d*, extremity of leg of seventh pair, from New Zealand specimen.

In the Pacific, latitude 41° south, longitude 76° 25' west. Collected several specimens, April 5, 1839, some of which were in the water-cavity of Salpas; also between New Zealand and New Holland.

Length, three to four lines. Colour, mostly dirty purple, with purplish red in basal joints of legs.

The seven thoracic segments about equal. First three abdominal segments with the posterior angle on either side of each, prominent and acute. In front view of the head, the antennary area is large, nearly square, and the pigment occupies nearly all the space on the side of it. This pigment was black.

The inferior antennæ have two short basal joints, and then a long, compressed, subulate joint, which is a little hairy.

The four anterior legs have the last three joints, or the terminal portion straight, and apparently admitting of upward flexion alone; they terminate in a nearly straight spine.

While swimming, the legs are generally folded up across the venter; it swims by means of the abdominal legs, and the extremity of the abdomen.

HYPERIA TRIGONA.

Corpus valde compressum, dorso acie instructo. Antennæ capite longiores, 1mæ subulatæ, 2dæ longæ (segmentum thoracis 4tum fere attingentes), gracillimæ, flagello inconspicuè articulado. Pedes brevissime setulosi, 6 posticis longis, subæquis, 7mis parce brevioribus, articulo 4to 3tiorum 4torumve lato.

Body very much compressed, the back rising to an edge. Antennæ longer than the head; superior pair subulate, inferior long (reaching nearly to fourth thoracic segment), very slender, flagellum indistinctly jointed. Feet very short setulose; six posterior pairs long and subequal, the seventh pair a little the shortest; fourth joint of third or fourth pair rather broad.

Plate 67, fig. 12 *a*, animal, enlarged; *b*, outline section of thorax; *c*, outer maxillipeds; *d*, leg of first pair; *e*, leg of second pair; *f*, same, in oblique under view; *g*, part of leg of fourth pair; *h*, *ibid.* of fifth pair; *i*, extremity of abdomen, upper view; *k*, last pair of stylets.

Probably from the Lagulhas Bank, near Cape Horn.

Length, six to eight lines. The thin body, narrow triangular in its section, and sharp-backed, is unlike that of any *Hyperia* described. About fourteen indistinct joints may be counted in the flagellum of the inferior antennæ. The first pair of legs terminates in a small claw, and is not at all prehensile; the third joint is rectangular at lower apex. The second pair has a process to lower apex of fourth joint, nearly three-fourths as long as the finger (or fifth joint); along the back of the fifth joint, there are four or five short hairs, or pairs of hairs. The fourth joint of the fourth pair is more than twice the width of the fifth joint; and both joints, besides four to seven short hairs (not longer than diameter of fifth joint), have on the lower side exceedingly minute spinules, closely set, seen only with a high magnifier. The fifth joint of the legs of the fifth pair, has six or seven pairs of short hairs on lower margin, not longer than diameter of joint. The caudal stylets have the lamellæ of each unequal, the shorter nearly two-thirds as long as the longer, and both pointed.

GENUS TAURIA, Dana.

Antennæ quatuor breves, basi approximatae, 1mæ crassiusculæ. Pedes nulli subcheliformes nec subprehensiles, 7mi vix abbreviati.

Antennæ four, short, approximate at base, superior rather stout. Feet not subcheliform nor subprehensile, seventh pair hardly abbreviated.

TAURIA MACROCEPHALA.

Caput permagnum, oculorum pigmentis fere repletum. Thorax brevis et crassus, epimerâ quartâ margine productâ et acutâ, 3tiâ 2dâ 1mâ truncatis. Antennæ breves, altitudine capitis duplo breviores, subæquæ,

extremitate multiarticulatæ, subulatæ. Pedes antici bene pubescentes, breviores, articulo quarto lato, plus duplo longiore quam tertius et quintum longitudine valde superante, ungue minuto; decem postici subæqui, nudi. Styli caudales longi, 1mi apicem ultimorum fere attingentes, secundi breviores, apicem basis ultimorum attingentes.

Head very large and nearly filled with the pigment of the eyes. Thorax short and stout, the fourth epimerals produced below and acute, first, second, and third truncate. Antennæ short (hardly as long as half the height of head), subequal, subulate, extremity multiarticulate. Anterior feet shortest, quite pubescent, fourth joint broad, more than twice as long as the third, and much longer than fifth, the claw minute; ten posterior legs subequal and naked. Caudal stylets long, the first pair reaching very nearly to apex of last, the second pair only to apex of base of last.

Plate 68, fig. 2 *a*, animal, enlarged; *b*, same, natural size; *c*, antennæ, as they project from the head; *d*, extremity of leg of first pair, much enlarged; *e*, *ibid.* of second pair.

Antarctic Seas; taken from the cavity of a Medusa, near longitude 157° east, and latitude 66° south.

Length, nine lines. The height of the head is greater than half the length of the thorax. The antennary area on the front of the head is small, not half the height of the front. The epimerals are small, and excepting the fourth are truncate. The antennæ are short, and the subulate extremity is very closely multiarticulate. The four anterior feet have broad lamellar coxæ; the next two joints are small, and have not a projecting lower apex; the last joint and claw together are hardly as long as the fourth joint. The six posterior legs are nearly naked and rather short.

GENUS CYLLOPUS, *Dana*.

Tauriæ affinis. Pedes 7mi valde abbreviati. Antennæ 1mæ et 2dæ ad basin inter se remotæ.

Near *Tauria*. Feet of seventh pair nearly rudimentary. Antennæ of first and second pairs remote at base.

CYLOPUS MAGELLANICUS.

Caput subrotundatum, pigmentis fere repletum. Thorax elongatus, epimeris quartis grandioribus. Antennæ 1mæ summo fronte capitis insitæ, crassiusculæ, acuminatæ, infra ciliatæ, duobus articulis apicalibus minutis; 2dæ imâ parte capitis insitæ, tenues, 7-articulatæ. Pedes quatuor antici, teretes (coxa exceptâ); pedes 3tii 4tique paulo crassiores, 5ti 6tique longi, tenues, nudi, articulis quarto quintoque infra subtilissimè serrulatis; 7mi rudimentarii.

Head nearly round, and almost filled with the pigment. Thorax elongate, epimerals of fourth pair largest. Superior antennæ proceeding from upper part of head, and inferior from the lowest part; the former having the fourth joint long acuminate and ciliate below, and following this, two minute joints; the latter slender, seven-jointed. Two anterior feet terete (coxa excepted); third and fourth pairs a little stouter than four following; fifth and sixth long and slender, and having the fourth and fifth joints very delicately serrulate within; seventh pair rudimentary.

Plate 68, fig. 1 *a*, animal, enlarged; *b*, superior antenna; *c*, inferior antenna; *d*, mandible; *e*, maxilliped; *f*, leg of sixth pair, with branchia; *g*, extremity of abdomen, with stylets.

Orange Bay, Tierra del Fuego, on the *Fucus*. Collected, February 18, 1839.

Length, four lines. Nearly colourless; a little red in the abdominal joints and abdominal legs; pigment of eyes, black in the mass, but when pressed out, a deep reddish purple. The thorax has the fourth and fifth segments longest. The lateral margins of the three anterior abdominal segments serrulate, rounded; of fourth abdominal segment pointed. The superior antennæ are acuminate, and a little shorter than the inferior. The inferior has the articulation between

the third and fourth joints oblique, the fourth joint longer than third, fifth the longest joint, sixth and seventh short and equal. The mandible has a lateral process for manducation, which has a spinose surface, and the palpus is slender, three-jointed, the second joint longest, the third a little shorter, the first quite short. Four anterior feet have a short, nearly straight claw, the two joints preceding the claw subequal in first pair, but in second pair the first of the two much the longest. The third and fourth pairs of legs are much longer than the preceding and nearly equal. The tarsus of fifth and sixth pairs is nearly twice as long as preceding joint. Basal joint of fifth and sixth pairs oblong, finely serrulate on anterior margin. The branches of the caudal stylets are lanceolate; in the first pair they are rather longer than basal portion, and in the third shorter.

The great distance between the two pairs of antennæ at base is a very striking peculiarity.

GENUS DAIRA, *Edwards.*

DAIRA? DEBILIS.

Caput latere visum paululo oblongum et subtriangulatum, anticè obtusum, pigmento fere repletum. Thorax medio altior. Antennæ infra insertæ, breves, 5-7-articulatæ, articulis totis brevibus. Pedes 4 antici parvuli; manu paris secundi non oblongâ, infra subtiliter serrulatâ, apice inferiore producto, triangulato, acuto, carpo parce minore, non transverso, digito infra subtiliter setuloso. Pedes tertii quartique longi, subæqui, sequentibus vix breviores; quinti sextique subæqui; septimi abbreviati, coxâ mediocri, parte reliquâ vix longiore; unguibus brevissimi.

Head in profile a little oblong and subtriangular, obtuse in front, nearly filled with the pigment of the eyes. Thorax highest at middle. Antennæ inserted in lower side of head, short, five to seven-jointed, joints all short. Four anterior feet quite small; hand of second pair not oblong, finely serrulate below, lower apex produced and triangular, acute, carpus hardly smaller and not transverse, finger on inner side minutely setulose; third and fourth pairs of feet subequal, scarcely shorter than following pairs; fifth and

sixth pairs subequal; seventh very short, the coxa of moderate size, the following part but slightly longer.

Plate 68, fig. 3 *a*, animal, enlarged; *b*, under view of head; *c*, antenna; *d*, second pair of feet; *e*, termination of fourth pair; *f*, fourth pair; *g*, extremity of abdomen.

In the Pacific, latitude 2° south, longitude 175° west. Collected, March 30th, 1841, attached to Medusæ.

Length, three lines. The shape of the head is peculiar; it narrows forward to a rounded-obtuse front, as seen in profile. The antennæ are much shorter than the head, and project from its under surface; there are a few short setæ on outer side near middle. The setæ of the legs are all short, much less than the diameter of the joints, and the claws also are very short. The four anterior legs are but little more than half the length of the third and fourth pairs. The last abdominal segment is very small, short ovate, and the preceding is subquadrate, with the sides excavate. The stylets have lanceolate extremities, and the second pair extend hardly as far back as the extremity of the abdomen. The last pair has the branches much unequal, the inner nearly half the longer.

DAIRA? DEPRESSA.

Corpus depressum, latum. Caput lateraliter supernèque visum transversum, hemisphericum. Thoracis segmenta subæqua. Antennæ duæ parvulæ, 4-articulatæ, articulo tertio longiore quam secundus. Pedes toti fere nudi; 4 antici parvi; secundi paris manus paulo transversa, infra serrulata, apice inferiore non prominente; paris manus primi subquadrata, infra serrulata, apice inferiore triangulatè producta, margine palmæ integro. Pedes secundi tertiique longiores subæqui; quinti sextique subæqui, coxis latis; septimi parvuli, coxâ multo brevior, valde angustâ, parte reliquâ minutâ (dimidio brevior quam coxa).

Body depressed, broad. Head seen in profile or from above, transverse, hemispherical. Segments of thorax subequal. Antennæ

two, very small, four-jointed, third joint longer than second. Feet all nearly naked, four anterior small; hand of second pair transverse, serrulate below, lower angle not prominent; hand of first pair serrulate below, nearly square, with the lower angle triangularly prolonged, palm entire. Second and third pairs longer, subequal; fifth and sixth subequal, coxæ broad; seventh small, coxa much shorter and very narrow, the following part minute (half shorter than coxa).

Plate 68, fig. 4 *a*, animal, enlarged; *b*, dorsal view; *c*, antenna; *d*, first pair of feet; *e*, second pair; *f*, termination of sixth pair; *g*, termination of abdomen; *h*, liver glands.

Fifteen miles west of Savaii, one of the Samoan Group, March 5th, 1841.

Length, three lines. Colour, yellowish. Posterior angles of abdominal segments obtuse. Sixth segment abruptly smaller near apex, and terminating in a small obtuse extremity corresponding to the seventh segment. All the stylets extend beyond the apex of the abdomen; the second pair very little the shortest. Antennæ very small, hardly one-fourth as long as the height of the head. Apical joint minute and terminating in a very short seta.

The hands of the four anterior feet have a few serrulations on the lower margin of the hand, but none on the palm, and are without setæ. The next four legs are nearly twice longer; the next four longer than the preceding. Seventh pair with the coxa about half as long as coxa of sixth pair, and hardly half as wide. The fifth joint of sixth pair is minutely serrulate along inner margin.

The liver glands (*h*) are oblong, and are attached to each side of the intestine, below the stomach.

DAIRA INÆQUIPES.

Caput subrotundatum. Thorax 7-articulatus, segmento primo brevior.
Antennæ parvæ, 5-articulatæ, supra parce brevissimeque setulosæ.
Pedes 4 antici parvuli; manus paris secundi subtriangulata, digito immobili late triangulato, intus et extus acutè serrato. Pedes tertii

quartique paulo majores, tenues. Pedes quinti longiusculi; sexti multo breviores, coxá latá, ellipticá, parte reliquá parce longiore; septimi parvi, coxá paulo minore, parte reliquá breviorē quam coxa.

Head subrotund. Thorax seven-jointed, first segment shortest. Antennæ small, five-jointed, upper side sparingly and very short setulose. Four anterior feet quite small; hand of second pair subtriangular, immoveable finger triangular, acutely serrate within and without. Third and fourth pairs a little larger, slender; fifth pair rather long; sixth much shorter, coxa broad, elliptical, the remaining part but little longer than coxa; seventh pair small, the coxa much smaller than coxa of preceding pair, and the following part shorter than coxa.

Plate 68, fig. 5 *a*, animal, enlarged; *b*, antenna; *c*, hand of second pair.

Off south end of Mindoro, January 24, 1842.

Length, two lines. The third joint of the antenna is longer than second or fourth; the terminal is short spiniform.

SUBFAMILY SYNOPINÆ.

GENUS SYNOPIA.

Frons subacutus. Antennæ 4 longæ, apertæ, 1mæ appendiculatæ. Pedes 2 antici subcheliformes; proximi duo vergiformes, quatuor sequentes subprehensiles, digito 2-articulato; reliqui mediocres, unguiculati.

Front subacute. The four antennæ long, and not concealed. Two anterior feet subcheliform; next two vergiform; next four subprehensile, finger two-jointed; remaining of moderate size, unguiculate.

These animals have compressed bodies like the Gammaridea, and a narrow head, a large part of which is covered with facets pertaining to a single large compound eye, almost or quite as broad as the head.

The head is narrow triangular and subacute in front. The thorax has the seven segments distinct and nearly equal. The three ante-

rior abdominal segments are quite large, and are much prolonged on either side, and the following are successively and rapidly smaller. There is a small seventh segment at the extremity. The six caudal stylets are very slender, more as in the Gammaridæ than in most Hyperidæ.

The inferior antennæ are the longest in the species examined. The superior have a short appendage to base. The bases in each pair are rather slender, and the flagellum terete and multiarticulate.

The legs from the second pair to the seventh inclusive have a branchial sac and a fouette. The first pair terminates in an imperfect hand of small size. The second pair is vergiform, and has a few longish setæ at apex; the fourth joint is furnished on the under side with rather long bent setæ, and appear as if they served for prehension in some way, in connexion with the terminal part of the leg. The third pair is smaller than the fourth, and is hardly prehensile. The fourth has the third and fourth joints broad, and the fourth seems to act as a hand, the fifth and a minute claw constituting a finger. The six posterior legs are vergiform and have broad coxæ.

The species are of a bright purplish blue colour, or nearly colourless. They occur sparingly in the tropical part of both the Pacific and Atlantic Oceans.

SYNOPIA ULTRAMARINA.

Caput compressum, anticè triangulatum, lateribus capitis ad frontem inter sese divaricatis 50°–60°. Antennæ 1mæ dimidio breviores, flagello ad basin setoso; 2dæ fere corporis longitudine. Pedes 8 antici infra ciliati; primi minores, articulo tertio parvulo, 4to lato et oblongo, manu breviter obovatâ; secundi tenues, setis duabus longiusculis confecti; quarti crassiusculi et tertiis crassiores, articulo quarto lato, paulo oblongo, ad apicem obliquo, digito brevi; 6 postici subæqui, remotè breviter setigeri, coxis paris quinti sextive latis, subrotundatis, paris septimi angustioribus et posticè ad apicem triangulatè productis et subacutis. Styli caudales tenues, 2di breviores.

Body compressed, triangulate in front, sides of the head diverging at an angle of 50° or 60°. Superior antennæ half the shorter, flagel-

lum setose at base; the inferior nearly as long as the body and very slender. Anterior eight feet ciliate below; the first pair smallest, third joint hardly longer than second, fourth broad and oblong, hand small and nearly obovate, finger minute; second pair slender, ending in two rather long setæ; fourth rather stout, stouter than third, fourth joint broad and a little oblong, oblique at apex, finger short; six posterior pairs nearly equal, setæ few and short, coxæ of fifth and sixth pairs broad, roundish, of seventh pair narrower, and apex behind triangulately prolonged, subacute. Caudal stylets slender, the intermediate pair shortest.

Plate 68, fig. 6 *a*, animal, enlarged; *b*, *b'*, different views of mandible; *c*, first pair of legs; *d*, second pair, with branchia and fouette; *e*, third pair, with the same, and also the epimeral; *f*, fourth pair, with same and epimeral; *g*, fifth pair, with same and epimeral; *h*, seventh pair, with branchia alone.

Atlantic, latitude 8°–12° south, longitude 11°–14½° west; collected, May 5th to 9th, 1842; also, latitude 4°–7° south, longitude 21°–25° west; November 7th and 8th, 1838, 4 A.M.

Length, one-sixth to one-twelfth of an inch. Colour, rich blue, to nearly colourless with a tinge of rich blue along the venter or about the articulations. The specimen here described has the back of the thorax very slightly convex in a profile view. The head in the same position is very obliquely truncate, and the antennæ proceed from a small excavation at its lower angle. The eye occupies the whole breadth of the triangular head (as seen from above), and the facets are in a continuous surface; the pigment is round-elliptical in form.

The antennæ are very unequal in length. The superior are about half the shorter, and are much less than half the length of the body. They have a five-jointed flagellum, which is more than twice as long as the base; the first joint of this flagellum is much the longest and is hairy above. The appendage to this pair is about as long as this joint and is faintly three-jointed. The inferior pair has the base much longer than the base of the superior, and about half as long as the flagellum. The penult basal joint is much the longest, and the preceding one is as long as the last. The flagellum is very slender terete, and consists of about fourteen oblong joints.

In the first pair of feet, the short spatulate or obovate hand is about half the length of the preceding joint. The finger is a small claw, and applies against the rounded terminal margin. The ciliæ of the fourth joint are curved at apex.

The second pair has attached at base a branchia and a fouette, and these parts pertain also to all the following pairs, excepting the last, which wants the fouette, though having the branchia. The fifth joint of the second pair is shorter than the fourth and rather slender. The setæ of the fourth have a curved form, and appear as if they might be used, in connexion with the following part of the leg, for prehension.

The third pair has the third and fourth joints subequal, the former a little the larger, and the finger is slender, with a short claw, the whole about as long as the hand.

In the fourth pair the third joint is broad triangular and shorter than the fourth; the fourth is truncate at apex a little obliquely, and is rounded at the lower angle. The finger is sparingly longer than the oblique terminal margin; the claw is very short.

The fifth pair has a rotund coxa, and the third, fourth, and fifth joints are subequal. The claw is nearly half the length of the preceding joint.

In the seventh pair the coxa is straight along the anterior side and prolonged at apex behind.

The branchiæ are oblong sublinear, except for the last legs, which are obovate. The mandibles are like those of the Gammaridæ. The apex is denticulate, and there is a large molar prominence, with a tuft of short setæ above. The palpus is three-jointed; the first and third joints are quite small and subequal, the second is very large and broad, nearly circular. There are two setæ at apex, and two on the inner margin of second joint towards apex.

The abdominal natatories have the basal portion very large and truncate at apex. The stylets are long and slender. The first and third pairs are longer than the second, and the first extends nearly as far back as the last. They consist of a basal portion, and two terminal styliform branches, each acute at apex. The basal part of the first pair is as long as the terminal; but in the last pair it is about half as long as the terminal.

Figure 7, Plate 68, probably represents the male of the preceding,

with which it was found; *a*, the animal, enlarged; *b*, upper view of head and eye; *c*, basal portions of antennæ; *d*, terminal stylets; *e*, one of the first pair of stylets.

Length, one-sixth of an inch. Colour, more or less entirely ultramarine. The body is more slender than in the *ultramarina* above described, and has no convexity along the back, the dorsal line of thorax, as seen in profile, being straight, or even concave. The excavation in the lower part of the head, from which the antennæ proceed, is very large, being as broad as the part of the head immediately above. The thorax consists of seven segments, of which the first is shortest. The epimerals were not distinguished. The superior antennæ are sparingly shorter than the inferior; the inferior but little shorter than the body; flagellum of the inferior pair scabrous. The blue colour was deepest along the venter. The four anterior legs, and the base of the superior antennæ, had the same rich blue colour.

Under the idea that this was a distinct species (which it may still be), I had named it *Synopia gracilis* in my original manuscript.

SYNOPIA ANGUSTIFRONS.

S. ultramarinae similis. Caput angustius, ejus lateribus inter sese 40°-45° divaricatis. Antennæ 2dæ corpore breviores, flagello 10-articulato, articulis tenuibus, cylindricis; 1mæ basi inferiorum paululo longiores, flagello 5-articulato. Pars quarti manus ad dorsum recta, infra arcuata; digito tenui, articulis duobus subæquis.

Similar to the *S. ultramarina*. Head much narrower, the sides of the same converging forward at an angle of 40° to 45°. Inferior antennæ considerably shorter than the body, flagellum 10-jointed, joints slender, cylindrical; superior pair but a little longer than base of inferior, flagellum five-jointed. Hand of fourth pair straight along the back, and arcuate on the opposite margin, finger slender, consisting of two nearly equal joints.

Plate 68, fig. 8 *a*, animal, enlarged; *b*, upper view of head; *c*, superior antennæ; *d*, second pair of legs.

Pacific, latitude 18° south, longitude 122° west. Collected, August 6, 1839, at 5 A.M.

Length, one-eighth of an inch. Colour, intense blue, with a barely perceptible tinge of red.

The rows of facets of the eyes cross at right angles, and, therefore, are not hexagonal; they are round, however, instead of square, the interstitial spaces being occupied by a grayish cellular substance. The whole number of facets between forty and fifty.

The inferior antennæ about three-fourths as long as the body. The last two joints of base of superior are equal. Appendage to superior pair short and three-jointed, as in preceding species. The second pair of legs is slender, the joints cylindrical; the third and fourth pairs terminate in a moveable finger formed of the last two joints. Last three pairs very nearly equal, the sixth a little the longest, claw nearly straight.

A longitudinal vessel was observed in the thorax, along the back, which from its pulsations was evidently the heart.

The general form of this species is like that of the *S. ultramarina*, but the head is sharp and narrower, and the second pair of legs differs in its articulations, as well as the antennæ. The drawing represents the coxa of fifth pair of legs about half as broad as the same in sixth pair. The coxa of the seventh pair is similar to that of the *ultramarina*.

FAMILY II. PHRONIMIDÆ.

THERE is a wide diversity among the legs of the last three pairs in the Phronimidæ. The fifth may have a stout, well-formed hand, while the two following pairs have the usual unguiculate character;—or the hand may consist of a long, slender style, which has the power of folding against the two preceding joints, one or both of which is also elongated;—or the fifth pair may be very long and slender, without the power of prehension, while the sixth pair is unusually large

and stout, and although not properly prehensile, for it has no proper hand, its size fits it for prehension (or clasping in coition), and it is, probably, so used,—whence the propriety of placing the species with the Phronimidæ. The legs of the third and fourth pairs are usually prehensile.

The included genera and subfamilies are as follows:—

SUBFAM. 1. PHRONIMINÆ.—Abdomen versus basin sat gracile. Pedes 5ti magnâ manu didactylâ vel monodactylâ confecti, 3tii 4ti extremitate graciles, non prehensiles. [Antennæ breves.]

G. 1. PHRONIMA, *Latr.*—Manus pedis 5ti didactylæ. Segmentum thoracis 1mum oblongum.

G. 2. PRIMNO, *Guérin.*—Manus pedis 5ti monodactylæ. Segmentum thoracis 1mum non oblongum.

SUBFAM. 2. PHROSININÆ.—Abdomen versus basin sat crassum. Pedes 5ti prehensiles, monodactyli; quoque 3tii 4tique prehensiles. [Antennæ sat breves.]

1. *Manus pedis 5ti latæ, digito arcuato.*

G. 1. ANCHYLOMERA, *Edw.**—Manus pedis 5ti latè et crassè subtriangulatæ. Pedes 6ti non prehensiles.

G. 2. PHROSINA, *Risso.†*—Manus pedis 5ti latæ, oblongæ. Pedes 6ti prehensiles, 5tis fere similes, minores. Mandibulæ non palpigeræ.

2. *Manus pedis 5ti elongatè lineares, digito recto, longissimo, tenui.*

G. 3. THEMISTO, *Guérin.*—Pedes 3tii 4tique prehensiles, manibus latis.

SUBFAM. 3. PHORCINÆ.—Pedes 5ti 6tive valde elongati et crassi, sed manu non confecti. [Antennæ breves.]

G. 1. PHORCUS, *Edw.*—Pedes 1mi 2di 3tii 4tique graciles, unguiculati, 5ti 6tique prælongi, 5ti aciculares, 6ti crassissimi.

* *Hieraconyx*, *Guérin.*

† *Dactylocera*, *Latreille.*

SUBFAMILY PHRONIMINÆ.

GENUS PHRONIMA.

PHRONIMA ATLANTICA, *Guérin*.

Atlantic, latitude 7° or 8° north, and longitude about 24° west.

The figure of Guérin represents our specimens correctly in most respects. The moveable finger of the large hand has a low tooth on its inner side, one-third of the distance from its base to its apex; and the immoveable finger is longer, with a prominent angle near the articulation with the moveable finger.

GUÉRIN, *Iconogr. Crust.*, pl. 25, f. 41, and *Magasin Zool.*, 1836, pl. 8, f. 1.

SUBFAMILY PHROSININÆ.

GENUS ANCHYLOMERA, *Edw.*

ANCHYLOMERA PURPUREA.

Antennæ 4 corpore longiores. Manus tertia quartaque subtriangulatæ, digito immobili tertice brevissimo, acuto, quartæ elongato et tenui, digitis mobilibus (ungue excluso) palmâ paulo longioribus, ungue longiusculo. Pedes quinti maximi; coxâ oblongâ pentagonâ, versus extremitatem angustiore (articulum sequentem parce superante), integrâ, marginibus paulo excavatâ; manu oblongâ triangulatâ, intus dentatâ, digito (ungue excluso) manu parce longiore, ungue longo. Pedes 6ti longi, articulo 4to elongatè subcylindrico; coxâ apice acutâ et angulo basali postico rotundatâ. Pedes septimi debiles, coxâ parce longiore quam pars reliqua. Lamellæ caudales latè ellipticæ, nudæ.

Four antennæ about as long as body. Hands of third and fourth pairs subtriangular, third with an acute point as an immoveable

finger, fourth with this finger elongate and slender, moveable finger (without the claw) a little longer than the surface on which it closes, claw rather long. Feet of fifth pair very large, coxa oblong, pentagonal, with sides a little concave, narrowed towards apex, where it is but little wider than next joint, hand oblong, triangular, straight and dentate within, finger (claw excluded) longer than the hand, claw rather long. Sixth pair of feet long, fourth joint rather long subcylindrical, coxa acute at apex and posterior basal angle rounded. Seventh pair weak, coxa a little longer than the following part.

Plate 68, fig. 9 *a*, animal, enlarged; *b*, front view of head; *c*, inner maxillæ; *d*, second maxillæ; *e*, base of superior antennæ; *f*, base of inferior antennæ; *g*, first pair of feet; *h*, second pair of feet; *i*, third pair of feet; *k*, fourth pair; *l*, abdominal leg; *m*, extremity of abdomen.

Atlantic, latitude 27° south, longitude 45° 10' west, off the Brazilian coast. Collected, January 11, 1839, at 4 A. M.

Length, two lines. Colour, mostly purple, with some brown. Head subtruncate in front. Antennary area quadrate, height half the height of head; rest of the head covered with facets. There are four masses of pigment. In a front view, two of a crimson colour have a narrow lanceolate form, being rounded above and coming to an acute point below, each side of the antennary area. Just exterior to this pair, there is a second, of a green colour and subtriangular form, presenting bright metallic reflections in certain lights. In a lateral view the green area is in part projected upon the red one. I did not ascertain beyond doubt that both pairs were spots of pigment.

The thoracic segments are seven in number; but the first is nearly concealed under the second. The whole length of the thorax is less than that of the abdomen. Last segment of thorax a little longer than the preceding. Last abdominal segment broad triangular, obtuse. Preceding segment very short.

Mouth organs constitute a large triangular prominence below the head, a front view of which is seen in figure 9 *b*. The maxillæ are represented in figures 9 *c*, *d*. The outer terminates in two narrow imperfectly ciliated ensiform laminæ, and within, there is an oblong

process, stout and subcorneous, forming an elongate apex to the basal portion. The inner pair have a two-jointed base, bearing an inner oblong lamella sharply dentated along an oblique summit, and also a two-jointed branch, the second joint of which is the longer, and has a few slender short spines at apex.

The antennæ are very long, the superior rather longer than the body, and the inferior somewhat longer than the superior. The superior have a three-jointed base, with a flagellum which is very long and slender. The base is geniculate at the first articulation. The third joint is longest, and has a prominent ridge below, which is densely hairy. The first joints of the flagellum are very short.

The two anterior pairs of legs are similar. Both terminate in an oblong extremity, with a subulate apex, which is most slender and longest in the second pair. Only four joints were distinguished besides the straight claw which forms the apex.

In the third and fourth pairs the claw is more than half the length of the preceding joint, and is but little curved. The fifth and sixth pairs have the second and third joints very short. In the fifth pair, the third is slender and acute behind; the teeth of the hand are six in number and rounded; the claw is about half the preceding joint in length. In the sixth pair, the claw is two-thirds the length of the fifth joint or tarsus, and the fifth joint is shorter than the fourth. In the seventh pair, the coxa is nearly as large as in the sixth pair. The rest of the leg is often concealed by being thrown up against the surface of the coxa. The second joint is short; the third long and slender; fourth short; fifth still shorter and rounded. The abdominal legs consist of a broad nearly quadrate base, and two lanceolate terminations. The latter are finely lined transversely, and are thus divided into ten parts; they are furnished with long ciliæ. The fourth abdominal segment bears a pair of appendages each composed of two oval plates, the inner quite broad; they extend backward beyond the extremity of the abdomen. The appendages to the fifth segment consist each of a single large oval plate, which extends farther than the preceding. None of these plates are ciliated.

This animal darts through the water with extreme rapidity. When at rest, it lies with the six posterior coxæ folded across the venter.

Several individuals were obtained, and one of them, cut open between the third and fourth segments of the thorax, was found to

contain numerous eggs. The eggs were spherical, or nearly so, and within were subdivided into four equal parts.

The spots of red pigment in the head became a dull yellow soon after the death of the animal.

ANCHYLOMERA THYROPODA.

Caput transversum. Antennæ (an adultæ?) brevissimæ flagello carentes. Pedes secundi primis longiores, subulati. Manus tertia quartaque triangulatæ, margine inferiore palmâque subtiliter serrulatis aut spinulosis, digito (ungue excluso) palmâ non longiore. Pedes quinti maximi, coxâ oblongâ, pentagonâ, ad apicem quam articulus sequens parce latiore et integrâ, latere paulo excavatâ; manu oblongâ, triangulatâ, palmâ dentatâ, dente externo parce majore, digito (ungue excluso) multo brevior quam palma. Pedes sexti mediocres, articulis secundo tertio quartoque brevibus, subæquis; septimi obsoleti coxâ laminatâ exceptâ. Lamellæ caudales late ellipticæ, partim ciliatæ.

Head transverse. Antennæ (probably not adult) very short, without a flagellum. Second pair of feet longer than first, subulate. Hand of third and fourth pairs triangulate, inner margin and palm very finely serrulate or spinulous, finger (claw excluded) not longer than palm. Fifth pair of feet very large, coxæ oblong pentagonal, at apex but little wider than preceding joint and entire, sides a little excavate; hand oblong triangular, palm dentate, external tooth little the largest; finger, excluding claw, much shorter than palm. Sixth feet of moderate size, second, third, and fourth joints short, subequal; seventh pair obsolete, excepting coxa. Caudal lamellæ broad elliptical, some of them ciliate, entire.

Plate 68, fig. 10 *a*, animal, enlarged; *b*, front view of head; *c*, antenna; *d*, maxilla; *e*, sixth pair of legs; *f*, seventh pair; *g*, extremity of abdomen.

Atlantic, latitude 39° south, longitude 54° west; January 18, 1839.

Length, one line. Specimen probably not mature, judging from the antennæ, which were without flagella and very short; they were

closely applied to the surface of the head, and curved downward and outward. The first segment of thorax mostly concealed by second; the second segment longer than seventh. The antennary area narrow below and widening a little above. Abdomen terminates in a small triangular obtuse segment. Coxæ of three posterior pairs broad lamellar and often folded over the venter when the animal is at rest. No pediform termination to seventh pair of legs was observed. The proportional length of the joints of the sixth pair of legs is very different from the same in the preceding species.

Eyes, sepia brown. The two masses of pigment, of an oblong subulate form, had a reddish-brown colour, and became ochre-yellow after death. Ciliations of caudal lamellæ plumose; the largest of these lamellæ are not ciliated.

GENUS THEMISTO, Guérin.

THEMISTO ANTARCTICA.

Antennæ 1mæ capite longiores, fere nudæ, 3-articulatæ, articulis duobus basalibus parvulis, tertio longo, acuminato; 2dæ longiores et tenuissimæ, basi 4-articulato, articulis tertio quartoque tenuibus, quarto longiore, flagello articulum quartum paululo superante. Pedes 3ti 4tique prehensiles, manu latâ, triangulato-subovatâ, digito tenui, longiore quam manus, ungue fere recto. Pedes quinti crassiusculi, coxâ longâ, articulis 2 sequentibus brevibus, quarto longo, crasso, quinto longiore quam tres precedentes simul sumti. Pedes sexti septimique subœqui, tenues. Styli caudales longissimi.

Superior antennæ longer than the head, nearly naked, three-jointed, two basal joints small, the third long and acuminate; inferior pair longer and very slender, base four-jointed, third and fourth joints slender, fourth longer, flagellum a little longer than fourth joint. Third and fourth pairs of feet prehensile, hand broad, triangulato-subovate, finger slender, longer than hand, claw nearly straight. Fifth pair rather stout, coxa large, next two joints short, fourth long, stout, fifth longer than three preceding together. Sixth and seventh subequal and slender. Caudal stylets very long.

Plate 69, fig. 1 *a*, animal, enlarged; *b*, front view of head; *c*, superior antennæ; *d*, inferior antennæ; *e*, extremity of abdomen.

Antarctic Seas, latitude 68° south, longitude 94° west.

Length, eight lines. Thoracic segments seven, subequal. Fifth abdominal segment very short. Last segment quite small, triangular. Terminal caudal stylets longest, nearly as long as abdomen, first pair longer than second, but not extending as far back as third pair.

Antennary area rather small, broader above, occupies more than half the height of the head, and less than half its width.

Two anterior pairs of legs are cylindrical towards apex and pointed, fifth joint longer than fourth, and fourth longer than third; at apex a few short setæ. The hand in third and fourth pairs has a few very short setæ on the palm, and the finger one or two minute setæ on the inner side. The long tarsus or finger of fifth pair appeared to have a minute claw at apex. The sixth and seventh pairs are rather long and nearly equal; there are several short spines on inner margin of fourth joint, besides a few on the other joints. The third pair of abdominal legs is smaller than the preceding.

SUBFAMILY PHORCINÆ.

GENUS PHORCUS, *Edwards*.

PHORCUS HYALOCEPHALUS.

Caput fronte rotundatum et proclivum. Segmenta thoracis primum secundumque partim celata. Pedes 3ti 4tique tenues, æqui. Pedes 5ti fere corporis longitudine, articulo ultimo longiore, acuto, quarto brevior quam 3tius. Pedes 6ti elongati, 5tis breviores, articulo 1mo grandi, fere elliptico, 2do parvulo, 3tio subelliptico, ad extremitatem profundè excavato, apice postico acuto anticeque obtuso, 5to parce longiore quam 4tus, intus subtiliter serrulato; ungue brevi. Pedes 7mi tenues, coxâ valde brevior quam pars reliqua.

Head with the front rounded, and front surface oblique downward and outward. First and second segments of thorax nearly concealed. Feet of third and fourth pairs equal, slender. Fifth pair

nearly as long as body, last joint longest, acute, fourth shorter than third. Sixth pair long, but shorter than fifth, first joint large and nearly elliptical, second small, third large subelliptical, with the outer extremity deeply excavate (for articulation with next joint), posterior apex acute, anterior obtuse, fifth joint a little longer than fourth, and inner margin minutely serrulate, claw short. Seventh pair slender, the coxa much shorter than the following part.

Plate 69, fig. 2 *a*, animal, enlarged; *b*, anterior antenna; *c*, extremity of abdomen.

Atlantic, latitude 1° south, longitude 18° 20' west. Collected, November 5, 1838, at 4 A. M.

Length, two lines. Mostly colourless, excepting a few brownish spots, and a black spot at base of each of the ten posterior thoracic legs. Head placed obliquely, so that the buccal extremity is thrown somewhat forward; the whole covered with facets. Pigment of eyes angular in form, upper line straight and nearly horizontal, the whole situated low in the head, appearing just above the mouth. Anterior antennæ with a stout oval base, which is three-jointed, the last joint having five transverse lines or articulations, hirsute about apex, and a lateral appendage, which is quite small and three-jointed. Only five joints of the thorax are distinct, and these are nearly of equal length (the posterior slightly longest); only one was observed anterior to these, and this was partly concealed at its upper part, beneath the third segment; it appeared to correspond to first and second segments.

The anterior feet are a little shorter than second pair, and the claws turn downward, and the third and fourth pairs are much longer than second. The fifth is very slender and has an acicular extremity. The fourth and fifth joints of sixth pair are subcylindrical, and the claw is hardly a fourth as long as preceding joint. Seventh pair has the fourth joint longest. Abdomen five-jointed, the last oblong, broad, compressed, truncated at apex, and having an indistinct suture near base; bears second and third pairs of stylets. Stylets extend about equally far backward, last pair attached to apex of last abdominal segment, and having basal portion very short, not oblong; branches of stylets finely serrulated at one or both margins. In second pair of stylets the branches are a little shorter than basal portion.

This species has most of the characters mentioned for *M. Edwards's Phorcus Raynaudii*: but, he observes, that the antennæ are "un peu renflées vers le milieu;" while, in this species, the basal portion is stout ellipsoidal. Moreover, he states, that the second thoracic ring is very much developed, and the fifth pair of legs is shorter than the sixth.

FAMILY TYPHIDÆ.

THE peculiar character of the outer antennæ of the Typhidæ—their being folded up and concealed beneath the head or thorax—is considered a character of higher value than the flexing of the abdomen against the venter, which is observed in some of the species, although the latter produces striking peculiarities in the form and habits of the species. The antennæ are organs high in rank, from their connexion with the senses; and hence, a peculiarity of structure in them, prevailing through a group of species, is entitled to prominent consideration. On the contrary, this power of flexing the abdomen to the venter is deemed of small importance among the Oniscidæ and Spheromidæ, and does not even authorize in the latter case a subfamily division. The transitions, moreover, among the species which have the peculiarity alluded to and those without it, are very gradual. The species are, therefore, here retained in a single family, although the extreme forms are very diverse.

The subfamilies and genera of Typhidæ, are as follows:

SUBFAM. 1. TYPHINÆ.—Abdomen in ventrem se flectens.

- G. 1. *DITHYRUS*, *Dana*.—Pedes 5ti 6tique articulo 1mo latè lamellati, articulis reliquis omnino obsoletis. Antennæ 2dæ breves, sub capite celatæ, non replicatæ, articulo 1mo longiore quam 2dus.
- G. 2. *TYPHIS*, *Risso*.—Pedes 5ti 6tique articulo 1mo late lamellati, articulis reliquis paulo abbreviatis. Antennæ 2dæ biplicatæ, articulo 1mo longiore quam 2dus.
- G. 3. *THYROPUS*, *Dana*.—Pedes 5ti 6tique articulo 1mo late lamellati, articulis reliquis paulo abbreviatis. Antennæ 2dæ 4-5-plicatæ, sub thoracis latere celatæ, articulo 1mo multo brevior quam 2dus.

SUBFAM. 2. PRONONINÆ. — Abdomen in ventrem se non flectens. Caput non oblongum, antennis in capitis frontem insitis.

- G. 1. PRONOE, *Guérin*.—Pedes 2di non prehensiles. Pedum 6 posticorum articuli 1mi lati, reliquâ parte paris 7mi fere obsoletâ.
 G. 2. LYCÆA, *Dana*.—Pedes 1mi 2dique subchelati. Articuli pedum 6 posticorum 1mi angusti, subæqui, reliquâ parte paris 7mi paulo abbreviatâ.

SUBFAM. 3. OXYCEPHALINÆ.—Abdomen in ventrem se non flectens. Caput oblongum, antennis 1mis superficiem capitis inferiorem insitis.

- G. 1. OXYCEPHALUS, *Edw.*—Caput breviter acuminatum. Styli caudales longitudine mediocres.
 G. 2. RHABDOSOMA, *White*.—Caput rostro longo styliformi armatum. Styli caudales valde elongati.

SUBFAMILY TYPHINÆ.

GENUS DITHYRUS, *Dana*.

Abdomen ad ventrem optimè claudens. Caput transversum, pigmentis non grandibus. Antennæ 2dæ sub capite celatæ, breves, non replicatæ. Pedes 6 postici coxis latissimè clypeati, parte pedum reliquâ obsoletâ. Pedes 4 antici subcheliformes. Abdomen 5-articulatum, segmento ultimo triangulato.

Abdomen shutting well upon the venter. Head transverse, pigments not large. Posterior antennæ concealed beneath the sides of the head, not folded. Six posterior feet reduced to mere coxæ, which are very broad clypeate. Four anterior feet subcheliform. Abdomen five-jointed, last segment triangular.

This genus is peculiar in having the six posterior legs reduced to mere coxæ, which are broad plates adapted to close over the whole venter from the head some distance backward, and fitting well together. This leaves a triangular opening behind, which is filled by the abdomen, making as tight and neat a box as any work of art. The abdomen, unlike that of *Thyropus*, is shorter than the thorax, it

being fitted to fill (on closing up) only the space behind left by the clypeate coxæ.

There are two masses of pigment, which are of moderate size. The thorax is distinctly seven-jointed. The last abdominal segment carries the posterior stylets upon its under surface, as in the preceding genus, and they are short. The other abdominal legs are very broad, and the two branches are broad ovate.

When the animal is closed up, it has the appearance of a short bean. A large cavity is contained over the venter, which is filled with water, and serves to sustain the animal a long time when out of its element.

DITHYRUS FABA.

Caput transversum, tumidum, fronte rotundatum, pigmentis duobus, non grandibus. Antennæ 2dæ tenues, rectæ, 4-articulatæ, articulo 1mo longiore, articulis 2do 3tioque subæquis, quarto brevioribus. Coxa quinta apice valde obliquè truncata, acuta, margine postico arcuato; sexta duplo majore, lunato-ovata, apice obtusa, margine postico omnino arcuato, et antico æque excavato; septima parvula, tenuis, subensiformis. Segmentum abdominis ultimum triangulatum, lateribus prope apicem obsolete excavatum, apice subacuto. Styli postici inferiores, ramis valde inæquis, basi non longioribus.


Head transverse, tumid, rounded in front, pigments two, not large.

Posterior antennæ slender, straight, four-jointed, first joint longest, second and third about equal, fourth shortest. Coxa of fifth pair with a very oblique truncation of extremity, and apex acute, posterior margin arcuate; of sixth pair twice larger, obtuse at apex, ovato-lunate, posterior margin arcuate throughout, and anterior equally excavate; of seventh pair small and slender, subensiform. Last segment of abdomen triangular, sides towards apex obsolete excavate, apex subacute. Posterior stylets articulated with under surface of segment, branches very unequal, not longer than base.

Plate 69, fig. 3 *a*, oblique dorsal view of animal, closed up; *b*, ventral view, abdomen thrown back; *c*, ventral view of thorax (part of organs omitted), and showing three posterior coxæ of one side thrown

open; *d*, front view of head; *e*, antennæ; *f*, maxillipeds; *g*, first pair of feet; *h*, second pair of feet; *i*, one of third or fourth pairs; *k*, pair of natatory abdominal appendages; *l*, last abdominal segment, with second and third pairs of stylets; *m*, first pair of stylets.

Taken from the stomach of a Bonito, caught off the Canaries, September 27, 1838.

Length, when closed up, four lines; when extended, about six lines. All the organs of motion and manducation are concealed when the animal is not in motion. The coxal plates have motion back and forth, as well as laterally; and by retracting them a little, the animal exposes its mouth, and is also enabled to thrust out its legs to secure its prey. The head, in a front view, has a semicircular outline, with the lower side -shape. The thorax is broad and convex; the first two segments are each nearly half shorter than the following. The epimerals are narrow and distinct.

The exterior antennæ are inserted just below the eye, and lie along a narrow channel directed towards the beak.

The mouth is closed by small lamellar maxillipeds (fig. 3*f*).

The four anterior legs have a small hand, with the inner angle (corresponding to an immoveable finger) elongate and acute. The moveable finger is oblong, but, excluding the claw, does not exceed the other in length; the claw is quite short, and the fingers are very finely serrulate. The third joint is as broad as the hand, but not oblong; the preceding is half smaller; the first is oblong, nearly equaling the rest of the leg in length.

The legs of the third and fourth pairs are longer and more slender, and vergiform. The second joint is small and short (hardly oblong); the following three are each between two and three times the length of the second; the last terminates in a short, straight claw. The third pair is a little longer than the fourth.

The six anterior abdominal legs have the lamellæ ovate in form and ciliate (fig. 3*k*); these lamellæ are transversely marked by about twelve transparent lines. The setæ are plumose.

The fourth segment of the abdomen is much shorter than the preceding. It is provided with a pair of stylets, having each two narrow, elliptical plates, quite unequal, naked, on an elongate pedicel. The second pair of stylets has the lamellæ nearly equal; and, in the

third pair, one (the inner) is more than twice the length of the other; the larger is somewhat ensiform, and is minutely serrated on the margin.

The terminal abdominal segment evidently corresponds to the fifth, sixth, and seventh normal segments. The suture between the fifth and sixth is distinct; but none is perceived between the seventh and sixth.

The specimens procured from the Bonito were twenty to thirty in number. They were in a fine state of preservation, though dead. Excepting two or three which were dirt-brown, they were nearly colourless; the original colour could not safely be inferred.

GENUS THYROPIUS, Dana.

Abdomen ad ventrem claudens. Caput transversum. Pigmenta oculorum non grandia, quatuor. Antennæ 2dæ longæ, sub thoracis latere celatæ, 4-5-plicatæ, articulo 1mo multo brevioribus quam 2dus. Pedes 6 postici coxis late clypeati, articulis reliquis paulo abbreviati.

Abdomen closing upon the venter. Head transverse; pigments of eyes not large, often four in number. Antennæ of second pair long, and four to five-plicate, concealed under the sides of the thorax; first joint much shorter than second. Six posterior feet having the coxæ broad clypeate, the remaining part of the legs a little abbreviated.

The antennæ of the second pair in Thyropus, are much longer than in Typhis. They are folded at each articulation, excepting the last, and, may be, also at that; moreover, the first joint is much shorter than the second, a fact which (as we judge from comparing them with Dithyrus and Pronoe) appears to be connected with the position of the antennæ beneath the thorax, when retracted, instead of beneath the head. In Typhis, on the contrary, these antennæ are not folded between the first and second joints, and the first joint is much longer than the second. The general structure of the thoracic legs is as in Typhis. The coxa of the fifth pair bears the following joints at or near its extremity; that of the sixth, from the under surface remote

from the extremity; that of the seventh is narrow, and bears but one or two small joints near its apex. In *Typhis*, the coxa of the fifth pair bears the following joints upon its under surface a little distance from the extremity. In our species, there are *four* masses of pigment.

This genus includes the *Typhis ferox* of Edwards, Crust., iii. 96. The name is from *θυρα*, door, and *πους*, foot.

THYROPUS DIAPHANUS.

Caput transversum, fronte rotundatum. Abdomen thorace paulo longius, 5-articulatum, segmento postico triangulato, non oblongo, subacuto, stylis inferioribus. Pigmenta oculorum quatuor, parva. Antennæ 1mæ breves, basi crassæ, articulo basis ultimo ellipsoideo, subacuto, multi-articulato, appendice laterali parvulâ, 3-articulatâ. Antennæ 2dæ longissimæ, 5-articulatæ, ad articulationes quatuor flexæ, articulis secundo tertioque valde elongatis, æquis, primo plus triplo brevior, quarto fere triplo longiore quam primus, quinto primum fere æquante. Coxa quinta subelliptica, parte pedis reliquâ parce longior, apice vix prominente. Coxa sexta obliquè ovata, apice truncata, parte pedis reliquâ plus triplo brevior. Coxa septima angustissima.

Head transverse, rounded in front. Abdomen a little longer than thorax, five-jointed, last segment triangular, not oblong, subacute, stylets attached to under surface. Pigments of eyes four in number, small. Anterior antennæ short, at base stout, last joint of base oval, subacute, multiarticulate, lateral appendage small, three-jointed. Posterior antennæ very long, five-jointed, flexed at four articulations, second and third joints quite long, equal, first less than one-third the second, fourth three-fourths the second, fifth about equal to first. Coxa of fifth pair subelliptical, about as long as rest of leg, apex hardly prominent. Coxa of sixth pair obliquely ovate, truncate at apex, rest of foot not one-third as long as coxa. Coxa of seventh pair a slender lamina, a little curved.

Plate 69, fig. 4 *a*, animal, enlarged, ventral view; *b*, same, oblique dorsal view; *c*, inner antenna; *d*, outer antenna; *e*, one of third or

fourth pairs of feet; *f*, last segment of abdomen, under view; *g*, one of first pair of stylets.

Atlantic, latitude $4^{\circ} 25'$ south, longitude $21^{\circ} 30'$ west. Collected, November 7, 1838, 4 A. M.

Length, when extended, one-fourth of an inch; when folded up, one-eighth of an inch. Nearly colourless; diaphanous. Head large and broad, the whole covered with facets, excepting a small space in front. Within, four small black spots of pigment, the two outer of which are transversely oblong, and the two inner (between the outer) are acute-triangular, and longitudinal in position. Lower surface of head nearly all open, the antennary area being much broader than long; at the centre of its anterior margin, there is a slight triangular projection. Thorax broad, broadest posteriorly, seven-jointed; epimerals distinct. Abdomen about as long as head and thorax together. The last segment has no suture separating a seventh normal segment from sixth; but a faint one is observed separating the fifth and sixth. The last pair of stylets is articulated with the under surface, and extends backward as far as extremity of abdomen. The second pair reaches to base of third pair. The inner antennæ have the last joint of base crossed by fine lines (10?) indicating articulations, and the surface is short hairy; the preceding joint is equally stout, of nearly the same length, but is at right angles with the last. The first joint of the appendage is the largest of the three. Coxa of sixth pair with the outline sparingly undulate, being concave for the most part on the anterior side; rest of leg slender and short, and articulated on medial line of coxa farther than its length from the apex. The posterior stylets have a very short base, and subequal lanceolate branches.

Observed a palpitating longitudinal vessel (shown in fig. 4 *b*), situated in the third, fourth, fifth, and sixth thoracic segments.

Abdomen is generally applied to the venter, and, in connexion with the clypeate coxæ, it covers the whole of the ventral surface, including the antennary cavity.

[The first pair of legs was not made out.]

SUBFAMILY PRONAINÆ.

GENUS PRONOE, *Guérin*.

Anterior antennæ stout at base, the last basal joint oval, with a very small lateral appendage. Posterior antennæ folded up and concealed under the head, being 3-4-plicate. Pigments of the eyes two in number and very large, nearly filling the head, in our species. Coxæ of the fifth and sixth pairs of legs broad (sixth broadest) and bearing following joints by the margin and not by the under surface; posterior pair having but one or two rudimentary joints besides the coxa, which is quite narrow. Abdomen not closing against the venter; the last segment small triangular, and the posterior caudal stylets projecting in our species much beyond its extremity.

PRONOE BRUNNEA.

Caput subtriangulatum, non oblongum, fronte obtusum, pigmentis duobus fere repletum. Thorax apertè 5-articulatus. Abdomen 6-articulatum, segmento ultimo parce discreto, triangulato, subacuto. Antennæ 2dæ longæ, 5-articulatæ, articulis primo secundo tertioque longis, æquis, quarto fermè dimidio brevior, quinto parvulo. Coxa sexta latissima, obliquè subovata, apice prominulo, rotundato, parte, pedis reliquâ paulo brevior; coxa quinta dimidio angustior, fere elliptica, margine antico serrato; coxa septima obliquè sublanceolata, apice truncata, articulo sequente parvulo, subrotundato.

Head subtriangular, not oblong, obtuse in front, pigments of eyes nearly filling it. Thorax appearing in a dorsal view but five-jointed. Abdomen six-jointed, last segment small triangular, subacute at apex. Second antennæ long, five-jointed, first, second, and third joints long and equal, fourth about half shorter, fifth quite small. Coxa of sixth pair much the broadest, obliquely subovate, apex prominent, obtuse, remaining part of leg shorter than coxa; of fifth pair half narrower, subelliptical, anterior margin about apex serrate, remaining part of leg a little longer than coxa; of seventh

pair obliquely sublanceolate, apex truncate, next joint small and nearly round.

Plate 69, fig. 5 *a*, animal, enlarged, ventral view; *b*, same, dorsal view; *c*, inner (or anterior) antennæ; *d*, outer antennæ; *e*, leg of third or fourth pairs; *f*, fifth pair of legs; *g*, sixth pair; *h*, seventh pair; *i*, extremity of abdomen; *l*, *l'*, branches of first pair of stylets.

Atlantic, latitude 4° 25' south, longitude 21° 30' west. Collected, November 7, 1838, at 4 A. M.

Length, four lines. Colour, dark brown, with some brilliant green reflections or a kind of iridescence. Head covered with hexagonal facets; two oblong masses of pigments separated by a narrow line, and visible both in an upper and under view. Antennary area, seen in under view, small and narrow (not over one-third the width of head), anteriorly quadrate; pigment seen either side of the area. Thorax has seven joints, but first two very short and partly concealed; whole thorax but little longer than head. Abdomen not abruptly narrower than thorax. Last abdominal segment consists of an anterior part subquadrate, and a smaller posterior, which is triangular, and not longer than broad; this part is separated by a suture, and corresponds to normal seventh segment; there is also a suture near anterior margin of this last abdominal segment, separating fifth and sixth normal segments. The posterior stylets are attached to the margin of the last abdominal segment, either side of the triangular termination. They have a very short base, and extend more than half their length beyond the extremity of the abdomen, the branches are truncate at apex and equal in length. The other stylets about reach to extremity of abdomen, and have lanceolate branches. The branches of first pair of stylets are serrulate on the margins, excepting outer margin of outer branch. The apex of coxa of fifth pair is prominent, and the serratures of the margin extend from this apex around half way to base.

This animal swims rapidly. It remained swimming on the surface of the water while confined in a jar. On dying it became colourless.

GENUS LYCÆA (*Dana*).

Pigmenta oculorum grandia. Antennæ 2dæ sub capite celatæ et replicatæ et flagello longiusculo confectæ. Pedes 4 antici subcheliformes, reliqui mediocres; 2 ultimi breviores; coxæ sex posticæ angustæ. Abdomen in ventrem se non flectens.

Pigments of the eyes large. Posterior antennæ folded up beneath the head either side, and having the flagellum long. Four anterior feet subcheliform, the rest of moderate length; two last abbreviated; coxæ of six posterior legs rather narrow. Abdomen not folding against the venter.

This genus is near *Pronoe*, but has the four anterior legs alike subcheliform. In the only species seen, the antennæ are bent back and forth at three articulations, and the last portion is slender setaceous, and multiarticulate. The coxæ of the three posterior pairs of legs are not much flattened. The abdomen has but five distinct segments. The fifth consists of the fifth, sixth, and seventh normal segments, the first of these being indicated in its limits by a faint suture, and the last forming a triangular projection to the extremity. The head is rounded and is covered with facets, excepting a narrow medial line. The pigment is large and central, as seen in a lateral view. The thorax has the seven segments all distinct. The mandible has a dentate apex, and a three-jointed rather slender palpus.

The superior antennæ consist of a stout base, with the apex truncate, except the upper part, which is slightly prominent, and bears one or two minute joints in the same line with the upper margin of the basal joint.

LYCÆA OCHRACEA.

Caput subrotundatum. Thorax apertè 7-articulatus. Antennæ 2dæ nudæ, articulo primo brevi, secundo tertioque longis, æquis, quarto parvulo, non oblongo, parte reliquâ tenui, vix breviora quam articulus tertius, flexili. Abdomen extremitate triangulatum, obtusum. Pedes toti nudi, manu primâ vix oblongâ, apice inferiore triangulato, manu

secundâ paulo oblongâ, angustiore, subrectangulatâ. Pedes tertii quartique tenues. Pedes 5ti 6tis parce longiores, 7mi debiles, coxâ plus duplo longiore quam pars reliqua. Coxæ 6 posticæ subæquæ.

Head nearly round. Thorax distinctly seven-jointed. Posterior or second pair of antennæ naked, first joint short, second and third long and equal, fourth very small, not oblong, the following part slender and flexible, about as long as third joint. Abdomen with a triangular and obtuse extremity. Feet all naked. Hands of first pair broad, hardly oblong, inferior apex triangular; hands of second pair a little oblong, narrower, subrectangular. Feet of third and fourth pairs slender. Fifth pair longer than sixth. Seventh weak, coxa more than twice as long as following part. Six posterior coxæ subequal.

Plate 69, fig. 6 *a*, animal, enlarged; *b*, head, in upper view; *c*, inner antennæ; *d*, outer antennæ; *e*, mandible; *f*, first pair of legs; *g*, second pair; *h*, extremity of abdomen.

Pacific, near Sunday Island, north of New Zealand. Collected, April, 1840, from the cavities of Salpas.

Length, four lines. Colour, ochreous to brownish yellow. Body depressed. Head rounded, and in vertical view the front forms a very obtuse angle, and a narrow line is seen separating the facets of the two sides. Pigment black or brownish black, occupying about half the width of the head in a lateral view. First two thoracic segments much shorter than following. Last abdominal segment oblong, and its triangular apex longer than broad. The stylets hardly extend farther backward than extremity of abdomen, and the second pair falls short of it. The claws of the feet are very short. The hands of the four anterior feet are made of the fourth joint, and the finger of the fifth with a very minute claw (the sixth) at apex. The fifth, sixth, and seventh pairs decrease in length in order. The antennæ are seldom seen exerted. Coxæ of seventh pair of legs not smaller than of sixth; both are compressed but not very broad.

ORDER ENTOMOSTRACA.

THE grand subdivisions of the Entomostraca here adopted, are based on the character of the mouth, and are distinguished as follows:—

- I. GNATHOSTOMATA.—Os mandibulis maxillisque regularibus armatum, sessile et non rostriforme nec mobile.
- II. CORMOSTOMATA.—Os mandibulis tenuibus et sæpe spiculiformibus armatum, rostriforme sæpeque basi mobile; raro videtur inerme.
- III. MEROSTOMATA.—Os basibus pedum plurium in locis mandibularum et maxillarum instructum.

The propriety of this arrangement has been discussed on pages 12 and 13. The Limuli constitute the last section, being closely related to other Entomostraca. It may even be doubted whether this third subdivision should not be merged in the first, as the transition in the structure of the mouth from the first to the third, is very gradual, as will be shown beyond. We would here refer to a concluding chapter in this volume for some additional observations on the relations of the Entomostraca to the higher Crustacea.

SUBORDER I.

GNATHOSTOMATA.

THE Entomostraca with a mouth of the normal form belong to two series, and each includes three tribes, as presented in the earlier part of this volume. The following are these subdivisions, with their characteristics:—

LEGIO I. LOPHYROPODA.*

Pedes numero normales et non multiplicati.

Tribus I. CYCLOPOIDEA.†—Corpus elongatum, rectum, abdomine non inflexo. Cephalothorax et abdomen pauci-annulati. Membra buccalia pedesque thoracis numero 16–18. Pedes thoracis 6–10 postici biremes, foliacei, ultimis interdum prehensilibus.

Tribus II. DAPHNIOIDEA.‡ — Corpus breve, postice inflexum, testâ

* *Lophyroga*, Latreille, Cuv. Règne An., 1817; *Lophyropoda* (in part), Leach, Dict. Sci. Nat., xiv. 524; *ibid.*, Gray, Cat. Brit. Crust. Brit. Mus., 1850, 100; *ibid.*, Baird, Brit. Entomost., 138.

† *Carcinoida* (in part), Latreille; *Copépodes*, Edwards, Crust., iii. 411; *Copepoda*, Baird, Brit. Entomost., 182; *Crophyropoda*, Burmeister, Organiz. of Trilobites; *Copepodita*, Gray, Cat. Brit. Crust. Brit. Mus., 1850, 110.

‡ *Daphnides*, Strauss; *Cladocera*, Latreille, Cuv. Règne An.; *Daphnoïdes*, or *Cladocères*, Edwards, iii. 372; *Cladocera*, Baird, Brit. Entomost., 62.

grandi tectum, capite excluso suturâque discreto. Membra buccalia pedesque thoracis numero 12-16. Pedes thoracis 6-8 postici foliacei.

Tribus III. CYPROIDEA.* — Corpus breve, postice inflexum, testâ bivalvi omnino tectum capite incluso. Membra buccalia pedesque thoracis numero 10. Pedes thoracis postici in *Cyclopoideis* et *Daphnioideis* foliacei in *Cyproideis* obsoleti sunt.

LEGIO II. PHYLLOPODA.†

Pedes numero abnormales multum multiplicati.

Tribus I. ARTEMIOIDEA.‡ — Corpus fere rectum. Cephalothorax multiannulatus, testâ sive tectus sive non tectus. Appendices cephalothoracis plerumque foliacei. Oculi pedunculati.

Tribus II. APODOIDEA.§ — Corpus fere rectum. Cephalothorax testâ scutiformi tectus. Appendices cephalothoracis posteriores lamellatæ. Abdomen multiannulatum. Oculi sessiles.

Tribus III. LIMNADIOIDEA.|| — Corpus testâ omnino tectum capite abdomineque inclusis. Oculi sessiles. Habitu *Cyproideis* similis.

The first of these tribes, *Artemioidea*, includes *Chirocephalus* (or *Branchipus*), *Artemia*, *Eulimene*, and *Nebalia*, which agree in their pedunculate eyes, the divided posterior thoracic legs, and the straight abdomen with terminal stylets or plates. In the character of the abdomen they are related to *Cyclops* and the *Mysidæ*; the multiplied annulations in *Chirocephalus* constitute the main point of divergence.

* *Ostracoda*, Latreille, Hist. Nat. des Crust. et des Insectes, 1802; *Ostrapoda*, Strauss; *Cyproïdes* or *Ostracodes*, Edwards, Crust., iii. 393.

† Latreille, Hist. Nat. des Crust. et des Insectes, 1802, iv. 130; also, most subsequent authors.

‡ *Branchipiens*, Edwards, Crust., iii. 364; *Branchiopoda*, Leach; *Branchipodidæ*, Baird, Brit. Entom., 38.

§ *Apusiens* (in part), Edwards, iii. 353; *Apodidæ*, Burmeister; Baird., loc. cit. 18.

|| *Apusiens* (in part), Edwards, iii. 353.

Milne Edwards refers the four posterior pairs of natatory legs in *Nebalia* to the abdomen; but their close similarity to the thoracic natatories in *Cyclops*, and also the resemblance between the following part of the body in the two groups, satisfies us that these natatories in *Nebalia* are properly thoracic, and that consequently the abdomen of *Nebalia* is not abnormal in the number of its segments.* The structure in certain *Mysidæ* is strongly brought to mind.

Chirocephalus and *Artemia* constitute one family, the ARTEMIADÆ, among the Artemioidea, and the *Nebalia* another, the NEBALIDÆ.

The *Apodoidea* have sessile eyes, and although having a little of the *Nebalia* and *Cyclops* habit, yet they are quite remote in their characters, and more resemble the *Limuli* in structure, especially in the foliaceous appendages below, the appearance of the shell, and the position of the eyes, though not like them in the mouth. The abdomen is straight, as in *Cyclops*, but its extremity is unlike any species of that group.

The *Limnadioidea* have a close resemblance in form to *Cypris*, and the extremity of the abdomen is like that in *Daphnia*.

The *Phyllopoda* should properly be arranged after the *Lophyropoda*. The great number of joints and appendages, as shown by Agassiz, is a mark of inferior grade. It is a characteristic of larval forms among insects, as distinguished from the perfect animal. It is a peculiarity of the earlier Crustacean forms of the globe, when vegetative growth in animals often predominated over concentration.

The three tribes of *Lophyropoda* appear to rank in the order above given. The *Cyclopoidea* approach the nearest in general form and structure to the *Mysidæ*, and they may be considered their representatives among the Entomostraca. The *Cyproidea* are quite remote in structure from any of the higher Crustacea. Moreover, they resemble closely the immature forms of the *Anatifidæ*, also a low grade of Crustacea, a relation which indicates their own inferiority. The *Daphnioidea* are evidently intermediate between the *Cyclopoidea* and *Cyproidea*; for they have the large shell and habit of the latter, with the natatory legs and exsert head of the former.

* See our remarks on the homologies of *Nebalia*, page 41.

LEGION I. LOPHYROPODA.

TRIBE I. CYCLOPOIDEA.

THE Cyclopoidea have in general more the aspect of a Macroural Crustacean, than any others of the Entomostraca. A few depressed species look a little like Isopods, though without any other point of special resemblance to that group. They are all minute, the largest not exceeding one-third of an inch in length, and the size usually varying between a twelfth and a twentieth of an inch. Figure 7, Plate 70, represents one of the flattened species, a Sapphirina, and figure 8, one that is slender and compressed, the two extremes, into which the common type graduates.

The cephalothorax is transversely articulated, and the shell of the anterior segment never extends like a carapax over the following part of the animal.

The abdomen is extended in the same line with the thorax instead of being inflexed, and bears at its extremity two lamellar or styliform appendages. It is usually abruptly smaller than the thorax, as in figure 5, but in some species, as in figures 7, 8, the two are regularly continuous.

Cephalothorax.—The cephalothorax consists ordinarily of but *four* segments, *one* large *anterior*, and *three* short *posterior* (Plate 70, figs. 1 B, *Cyclops*; 1 A, *Calanus*; 6, *Corycæus*; 7, *Sapphirina*). But the number is often larger, being at times increased to *seven*. This increase takes place in four ways:—

1. By the addition of a fourth posterior segment to the extremity of the thorax (Fig. 3, *Calanus*; 4, *Euchæta*; 5, *Pontella*, Plate 70).

2. By an articulation crossing the anterior segment, just anterior to the mouth, separating a cephalic segment from the rest of the cephalothorax, as in many *Pontellæ*.

3. By another articulation across the anterior segment posterior to the mouth (*b*, fig. 5, *Pontella*), this articulation passing anterior to the first pair of legs.

4. By an articulation like the last-mentioned, but passing just anterior to the second pair of legs, that is, the first pair of natatories (*b*, fig. 2, *Laophon*).

The following table exhibits the relations of the segments to the normal annuli, showing those that are coalesced in the different varieties of cephalothorax. The normal annuli are each named by the pair of organs it bears, and we add also the normal number of the annulus, the first antennæ pertaining to the second normal annulus.

	Cephalo- thorax 7-jointed.	Cephalothorax 6-jointed.		Cephalothorax 5-jointed.			Cephalothorax 4-jointed.
		A.	B.	A.	B.	C.	
II. 1st Antennæ,	} I.	} I.	} I.	} I.	}	}	}
III. 2d Antennæ,							
IV. Mandibles,	} II.	} II.	} II.	} II.	} I.	} I.	} I.
V. Maxillæ,							
VI. Maxillipeds,	} III.	} III.	}	}	}	} II.	}
VII. 1st Feet,							
VIII. 2d Feet (1st Nat.),	} IV.	} IV.	} III.	} III.	} II.	} III.	} II.
IX. 3d Feet (2d Nat.),							
X. 4th Feet (3d Nat.),	} V.	} V.	} IV.	} IV.	} III.	} IV.	} III.
XI. 5th Feet (4th Nat.),							
XII. 6th Feet (5th Nat.*)	} VII.	} 0.	} VI.	} 0.	} V.	} 0.	}

The last column represents the most common form, numbering but four segments, and the first the seven-jointed cephalothorax. The number *seven*, it is seen, is reduced to *six* in two ways:—

1. By the last segment becoming obsolete.
2. By the obsolescence of the articulation *b* (fig. 4).

There is a farther reduction to five segments in three ways:—

1. By the obsolescence of the articulation *b* and the last segment becoming obsolete.
2. By the obsolescence of the articulations *a*, *b* (fig. 3).

* Usually either obsolete or adapted for prehension.

3. By the obsolescence (fig. 2) of the articulation *a*, and the last segment becoming obsolete.

There is a reduction to four segments :—

By the obsolescence of *a* and *b*, and also, the last segment becoming obsolete (figs. 1 A, 1 B, 1 C, 6, 7, 8, Plate 70).

The *front* is often truncated or rounded without appendages below. In other species it has a short beak, which is either obtuse, or acute and simple, or furcate (figs. 9 *a* and 14 *a*, *Pontellæ*; 10, *Catopia*; 11, *Euchæta*). In others still, as the *Setellæ*, there is a pair of small moveable unjointed appendages (fig. 12) attached below to the front.

Eyes.—The *eyes* are of three kinds :—

1. A pair of simple internal eyes with spherical lenses. These are the common kind in this group. They are either united on a single spot of pigment, which appears like a mere point unless highly magnified (figures 1, 3, 8, and 13), or are more or less remotely separated (fig. 4, *Euchæta*, and 5 and 9 *b*, *Pontellæ*). They are usually situated close to the cephalic ganglion, and look upward or partly forward.

2. A pair constituting a prominence on the under side of the head between the antennæ.* They have a single mass of pigment. The prominence has a rounded or reniform contour in a vertical view, the latter shape indicating the existence of two (or more) lenses, in many, if not all cases,—a fact not distinctly made out by dissection. Figures 9 *a* and 14 *a*, Plate 70 (*Pontellæ*), represent this prominence in a lateral view, of different sizes. Figures 9 *b*, 14 *b*, represent the same, as appearing in a vertical view, visible through the head just behind, or directly beneath the other eyes. In 9 *b* the reniform shape is distinct. Figures 4 and 5, are other examples. Figure 10 (*Catopia*) represents a species, in which a spherical lens was very distinct, and only *one* could be made out. Figure 2 is an upper view of the same, in which view also only a single lens was distinguished.

The pigment is either blue-black (like a piece of solid indigo), or carmine.

These eyes may be designated, for distinction, the latter, the *inferior* eyes, and the former, the *superior*.

* The author follows Edwards in considering these organs eyes, who states that he dissected out the lenses and found that the eyes were compound.

3. A pair of simple eyes consisting of an internal prolate lens situated at the extremity of a vermiform mass of pigment, and of a large oblate lens-shaped cornea. The cornea is connected intimately with the exterior shell of the front or under side of the head (figures 6 and 15, *Corycæus*; 7, *Sapphirina*), and the two corneæ are like spectacles adapted to the near-sighted lenses within; their size is extraordinary, being often one-third the greatest breadth of the body in *Corycæus*. The lens (*l*, fig. 15) and the cornea (*c*) are often very distant from one another, being separated by a long clear space. The exterior surface of the cornea is spherical; but the inner is conoideo-spherical or parabolic. The texture is *firm*, and when dissected it breaks or cuts like a crystalline lens. The true lens is always prolate, with a regular contour, excepting behind, where it is partly penetrated by the pigment. The pigment is slender vermiform, of a deep colour, either red or blue, but at its anterior extremity usually lighter, and often orange or yellow. Other figures and illustrations are given among those of the *Corycæidæ*.

Antennæ.—There are two pairs of antennæ in all the Cyclopoidea.

a. First pair of antennæ.—The first pair of antennæ is always antenna-like in form and function in females; in males one or both are sometimes prehensile, for clasping the female in coition. The organs are either simple (figs. 16 to 41, Plate 70), or appendiculate (figs. 42, 43*). The number of joints varies from three to twenty-four, and perhaps, twenty-eight.

When appendiculate, there is a basal portion, consisting of two to five [rarely] joints; and this base bears at apex a slender flagellum, three- to seven-jointed, besides a small one- or two-jointed appendage or branch, which usually terminates in two setæ.

The figures 16 to 43, illustrate the principal varieties of these organs. They show that the few-jointed antennæ are sometimes short (figs. 16–18), and sometimes long; and farther, that in the same genus, antennæ of equal length, may consist of seven or twenty joints: also, in the same species, a male antenna may have but half the number of joints in the female, although scarcely different in

* Figs. 16, 17, from *Sapphirina* and *Corycæus*; 18 *a*, *b*, 19, 20, *Cyclops*; 21, *Calanus*; 22 ♀, 23 ♂, 24, *Euchaeta*; 25, *Undina*; 26, 27, 28, 29, *Pontella*; 30 to 36, *Pontella*; 37, 38, *Candace*; 39, 40, *Oithona*; 41, *Acartia*; 42 *a*♀, *b*♂, *Clytemnestra*; 43, *Setella*.

length; and in some males a like difference exists between the left and right antennæ. Among the genera with long antennæ, therefore, where the number of joints is few, it is so from a union of several joints that are in other cases separate. Figures 37, 38 belong to the same species; in the former several joints correspond to each of the longer ones in the latter. So in figures 18 *a* and *b*, 19 and 20, 26 and 27, 28 and 29, 30 and 31, 32 and 33, each of the longer joints of one antenna, in each species, corresponds to several joints in the other.

This is very evident from the occasional existence of the articulations, either complete or in faint traces, intersecting the longer joints. In figures 30, 31, the last three joints of 31 correspond to the last three of 30; the next of 31, to the next two of 30; the next (or fifth from apex) of 31, to the next two (sixth and seventh from apex) of 30; the next (or sixth from apex) of 31, to at least four, probably five, (eighth, ninth, tenth, eleventh, and twelfth) of 30. In figure 29, these joints are actually separate, as in 28, excepting the fourth and fifth from apex of 28, which are coalesced in 29; but the joint formed has one or two setæ at middle to indicate its compound character. In 26 and 27, the same principle is illustrated.

This is also obvious, from the relative positions of the setæ in the different antennæ. For example, in figure 37, the longer setæ have about the same distances apart as in 38, and there is a general correspondence in other respects, as is seen by making the comparison. It is plain, therefore, that the last four joints of 38, correspond to the last four of 37; the next of 38 to the next three of 37; the next of 38 to the next two of 37. Again, the longish seta on the broad joint of figure 31, obviously corresponds to a similar one at the apex of the *ninth* joint (from apex) of 30. Very often, too, the second joint at base is much longer in the male than in the female (as in 26 and 27), and faint lines are at times distinguished that show that this length arises from the non-separation of short joints from the apex of this second joint. This is the case in figure 33.

We therefore arrive at the general conclusion, that *the multiplication of joints takes place by the subdivision of pre-existing joints*. This appears to be a general law, not confined to Crustacea. The increase does not take place by the addition of joints at the base of the organ, or their seriate development at its apex. From the first stages of the

animal, the existing joints (of which there are but two or three in the earliest state of the young) gradually lengthen and undergo subdivision, and by this process the multiarticulate character is produced. These changes probably take place mainly in the process of moulting.

Towards the base of the simple antenna, the subdivisions are near the apex of the joints, and commonly from the *apical half* of the second joint. But about the medial portions the subdivision often *bisects* the joint. In the many-jointed antennæ these medial joints when much oblong have one or two setæ at middle, as in figures 28 and 36, which setæ indicate this tendency to central subdivision, although the bisection does not actually take place. Upon the second basal joint the setæ are usually clustered towards apex, this part being the portion that tends to become subdivided. Thus while development takes place symmetrically about the middle and outer portions of these organs, it is most active towards the outer extremity of the second basal joint, instead of its middle or basal portions.

These principles account for the fact that the first joint of the antenna is nearly alike in the different species of a genus, however different the length of the organs; this would not be the case if the multiplication of joints took place at the base. This first joint is, however, sometimes obsolete, a fact which should be noted, since ignorance of it might lead to incorrect inferences regarding homologous parts.

It would seem also to be true, that in the multiarticulate antennæ (species of Calanidæ), the last three joints do not change by subdivision; for these joints are furnished with *posterior* as well as *anterior* setæ (in which fact, with sometimes the next preceding joint, they are peculiar), and this is the case whatever may be the number of joints, which in some Calanidæ is but *nine*. If the apical or penult joint subdivided, this would increase the number of joints bearing posterior setæ; and the number actually found could be retained in such a case only by removal of one or more pre-existing setæ. This removal might take place, but we have no evidence of it. It is, therefore, probable, that after the organs are so far advanced as to have posterior setæ to the three or four terminal joints, these joints do not undergo subdivision. These setæ in fact appear often to precede the existence of separate joints for them, the separation (or development of an articulation) afterwards taking place. Thus in figure 40, the second joint from apex corresponds evidently to the

second and third in figure 39 and others. In some male antennæ, like figure 33, the articulations separating the last three joints are obsolete, and are only indicated as regards position by the setæ.

In the course of the preceding remarks it has been shown, that the right antenna, represented in 33, has the following relations in its articulations to 32, the left antenna of the same male individual. The joints are numbered from the apex.

Joints 1, 2, 3,	.	.	in 32, correspond to joints 1, 2, 3, in 33.
" 4, 5,	.	.	" " 4, "
" 6, 7,	.	.	" " 5, "
" 8, 9, 10, 11, and probably 12,	.	.	" " 6, "

In 33, the geniculating articulation is between joints 4 and 5 (joints five and six of 32); joints 5 and 6 of 33, constitute a kind of hand, against which, joints 1 to 4, finger-like, may be flexed for grasping.

Again: the following are the relations of figures 37 and 38:—

Joints 1, 2, 3, 4,	.	.	in 37, correspond to joints 1, 2, 3, 4, in 38.
" 5, 6,	.	.	" " 5, "
" 7, 8,	.	.	" " 6, "

The geniculating articulation is here between the joints five and 6 of 38, or 6 and 7 of 37. The joints preceding the eighth in 37, are somewhat enlarged, but are not coalescent.

Seven is the smallest number of joints to which the right antenna of a male is ever reduced. In that case,

Joints 1, 2, 3,	.	.	of the female correspond to joint 1 of male.
" 4, 5,	.	.	" " 2 "
" 6, 7,	.	.	" " 3 "
" 8, 9, 10, 11, 12,	.	.	" " 4 "
" 13 to penult inclusive,	.	.	" " 5, 6, "
" Last or basal,	.	.	" " 7 "

From a glance at figures 21, 22, 23, 24, 37, 38, it is seen that the antenna is marked off into parts by the positions of several long setæ. In figure 21, there are five of these long setæ besides those about the apex, and they thus divide the organ into six parts. In figure 23 (female), there are also *five*; and 22 corresponds, except that there

are two bent setæ in place of the second from the base. In figures 37 and 38, the longer setæ of the outer half of the organ correspond to those in figure 22, 23. The joints (counting from the apex) from which these setæ proceed, are in—

Fig. 21,	joints	5	8	12	17	22
" 22,	"	4	7	11	16-18	21
" 24,	"	4	7	11	17-18	21

or, counting from the base,

Fig. 21,	joints	20	17	13	8	3
" 22,	"	20	17	13	6, 7	3
" 24,	"	19	16	12	5, 6	2

Figure 21 has twenty-four joints, and figure 22, but twenty-three: the two organs, as seen by comparing, differ in the former having *four* terminal joints, corresponding to *three* in the latter. Again, figures 22, 24 (the former with twenty-three and the latter twenty-two joints), differ in the second joint from base, being divided in one species and not in the other.

If, then, twenty-four be the normal number of joints, the variations from perfect correspondence in the above arise from the obsolescence (or rather, non-development) of one or more articulations.

It does not follow necessarily, that whatever the number of joints, the longer setæ will correspond severally in position to the same normal joints of the organ. On the contrary, the facts as far as observed are otherwise, and tend to prove that the positions have rather a relation to the length or organogenic nature of the organ. Thus, in figures 32 to 36, the longer seta near the middle of the antenna is situated on the eighth, ninth, tenth, or eleventh joint (from apex), according to the species. The organ, in an important sense, has the character of a unit in its development, and the position of the seta has a relation to its unit character, rather than to particular joints in a normal antenna.

It seemed natural, at first thought, that the position of the longer setæ, in figures 21, 22, 37, 38, &c., should indicate the limits of the joints in the few-jointed antennæ. Yet this is by no means the case. Compare 37 and 38, left and right antennæ of the same individual:

the non-correspondence is obvious. Other examples proving the same are numerous.

The position of the anterior antennæ, or their angle with the medial line of the body, is sometimes (as in the Calanidæ) fixed and characteristic of species. In this case they have a power of rotation at the articulation with the head, by which the organ may be brought to the side of the body, but no free motion back and forward.

The setæ are either naked or plumose; and some when long are edged with short distant setules. They occasionally have free motion at base. The setules alluded to often move freely upon the seta to which they are attached.

b. Second pair of antennæ.—The antennæ of the second pair are very various in forms and functions. They are either simple (figs. 44–48), or have a lateral appendage, which though sometimes obsolescent, may be as long as the main portion (figs. 49–55).^{*} They often terminate in a few setæ (fig. 44), and in some genera by a long finger-like claw (figs. 46, 47). They have, therefore, at times a prehensile character; and even when furnished only with terminal setæ, the terminal setæ are generally (always?) moveable, so as to admit of being spread open or closed, in which case they act like fingers in enabling the animal to adhere to surfaces. It is not unusual to see a Cyclops thus resting with its posterior antennæ fastened to an object.

Comparing these two-branched organs with others of the Cyclopoidea, but more particularly here with the natatory legs, in which this structure is well exhibited,—we ascertain that the basal part of these organs consists normally of two joints, the second bearing the following main part of the organ, and the branch or lateral appendage. In figure 51, this constitution is apparent, and we have numbered the joints correspondingly, the joints of the branch being distinguished in the numbering by the addition of a dash ('). There are in the figure referred to, joints 1 and 2 as a base, then 3 and 4, for the main stem, and 3' and 4' for the branch. A small joint may sometimes be distinguished on the side of joint 4, as seen in figure 54, which makes the whole number of joints in the series, *five*. In this last-mentioned figure, however, the joints 1 and 2 were not observed to be distinct.

^{*} Fig. 44, from a Cyclops; 45, *Setella*; 46, *Sapphirina*; 47, *Corycæus*; 48, *Oithona*; 49, *Harpacticus*; 50, *Euchæta*; 51, 52, 53, *Calanus*; 54, *Pontella*; 55, *Candace*.

In figure 52, joints 1, 2, and 3, were united in one, or the first is obsolete. This is a common case. Figure 49 is another example.

When the branch is wanting, the whole five joints of the main stem are sometimes present, as in figures 44 and 46. But often one or more are not apparent. In figure 48, 1 and 2 are not disjoined. In figure 47, either the 5th, or apical, is wanting, or the joints 3 and 4 are united; the latter, we think the fact, since in some species an articulation crossing this joint is distinctly seen. In figure 45, there are but three joints in all. The numbers on the figures will aid in comprehending these normal relations.

Buccal area.—The buccal area is a low convex prominence, with the opening of the mouth on the posterior side (see figures on plate 75, which will be particularly described on a following page).

Mandibles or mandibular feet.—The mandibular feet vary in number of joints from one to five. When *more than one*, the basal is usually called the mandible, and the others a palpus,—a distinction which is without good foundation. The whole is properly a mandibular foot, of which the first joint is laterally prolonged, and constitutes the mandible.

This mandible has either a simple corneous extremity, Plate 71, fig. 56, more or less pointed; or it terminates in a dentate edge, and is furnished often with a seta on one side near apex (figs. 57–62).* The teeth are in general nearly equal, excepting one or two at one side, which are larger and longer (figs. 60, 61, 61 *a*), though not projecting beyond the line of the others. The mandible enters the buccal area from one side, and has some lateral play, through the action of powerful muscles.

The rest of the organ, when other joints exist, is either simple or two-branched. Figure 57 represents an example with a simple extremity, consisting of four joints, or *five*, including the basal or mandibular joint. In figures 58 to 61, there are two branches, the branches proceeding from the second normal joint, as numbered on the plate. In figures 58 and 60, the branches are one-jointed; in figures 59 and

* On Plate 71, fig. 56, from a Sapphirina; 57 *a, b*, Calanus, different views; 58, Calanus; 59, Euchæta; 60, 61, 61 *a*, Pontella; 62, Harpacticus; 63, Oithona.

61, each are two-jointed; in 62, one is one-jointed, and the other two-jointed.

By comparing the figures with those of the second pair of antennæ, and observing the numbers affixed to the joints (e. g. figs. 50 or 51 and 59), it will be seen that there are the same elements in both: viz., a two-jointed base (the first joint mandibular), and two branches of corresponding character. The difference consists mainly in the basal joint.

The mandibular feet when multiarticulate, are sometimes furnished with many long setæ at the extremity, and in other cases with only one or two setæ (fig. 63). There are many species in which only the mandibular (basal) joint exists.

First pair of maxillary feet or maxillæ.—These maxillary feet are one- to four-jointed, and as in the preceding there is sometimes a lateral branch.

When of the most simple form, there is a single lamellar joint with a lateral lobe, the whole edged about the apex and inner side with minute hairs, as in fig. 64; or, there is a one- or two-jointed organ, with a few short spines at apex (figure 65).

Other forms, more complex in general appearance, are represented in figures 66 to 73.* Figure 66 has three lamellar joints, of which the apex of the first and one margin of the second joint are furnished with spinulous setæ for maxillary purposes. There are also on the opposite apex of the first joint a cluster of long setæ, and another forms the apex of the third (or last) joint. In figure 67, the spinulous maxillary setæ belong all to the first joint; and from both apices of the same, there are several long setæ. The second joint is large and simply lobed, and bears a number of setæ in three clusters. Figure 68 in the main resembles 67. The second joint bears two others at apex, and on one side a single joint of another branch. Figure 69 is essentially like 68. Figures 70, 71, and 72, have the same parts as the preceding.

Thus among the above, two kinds may be made out; one in which the spinulous maxillary setæ are confined to the first joint, and the other in which they belong mostly to the second. The position of these setæ may be seen on Plate 75.

* Figure 64, Plate 71, from a *Corycæus*; 65, *Sapphirina*; 66, *Euchæta*; 67, 68, 69, *Calanus*; 70, 71, 72, *Pontella*; 73, *Oithona*; 73 bis, *Candace*.

Figure 73 represents another kind, in which the setæ belong to the basal joint and are very stout, instead of being capillary. There are two branches, one terminating in two rather short setæ, and the other in one very long naked seta.

The parallelism between the parts of these organs and the mandibles or posterior antennæ is apparent from the figures (which have the joints numbered to correspond) without farther explanation.

Second pair of maxillary feet or maxillipeds.—The maxillipeds are always simple, or have only a rudimentary second branch. They vary in number of joints from one to five. One of the simple uni-articulate forms is seen represented in figure 74 *a*.* It has an uncinatè apex; which in a lateral view, is seen to be furcate; and, besides, there are two obtuse setiform processes, which are short setulose.

In figure 75 (*Corycæus*), another variety, there are two joints, and the termination has much similarity to the preceding. Of the two setiform processes, one is closely ciliate, and the other has a short scopiform extremity.

In figure 76, there are the same elements, but with three joints, the uncinatè termination constituting a separate joint. There are three setiform processes on the inner side, which are furcate and short setulose.

In figures 77, 78, there are three stout joints in the same line, the last not uncinately prolonged, and all furnished on the same side with long, setulose, simple setæ; the setæ are acute, and those of the first of the three joints are the shortest.

In figure 79, the organ has four joints and is geniculate between the first and second. It resembles both figures 76 and 77, but it has not the uncinatè extremity of the former, and is not straight like the latter. The joints are furnished with long setulose setæ.

In figures 80 and 81, there is much resemblance to 79, but the long setæ are naked instead of being setulose.

It is plain here that there is but one type for the whole, and a comparison of figures 76 or 77 with figures 66 or 69, will exhibit a general correspondence with the maxillæ; and by a glance at figures

* From a *Sapphirina*; figure 74 *b* is the same, in a different position; 75, *a, b*, *Corycæus*; 76, *Harpacticus*; 77, *Pontella*; 78, *Euchaeta*; 79, *Oithona*; 80, 81, *Candace*.

47, 48 (inverting the latter), evident relations to the forms among the second antennæ will be observed. The joints are numbered so as to exhibit their normal relations.

Anterior pair of legs.—This pair is one of the most various in form, in the Cyclopoidea. In some species it is rudimentary, the preceding being in this case unusually enlarged. In others it is long and seven- or eight-jointed, with slender setæ to the joints (fig. 82). Still others, in which there are as many joints as in the last, have the last five short, so that the setæ form together a long thick pencil (f. 83.) In others, again, the organ is subcheliform (figures 84, 85, 86, Plate 71), or it terminates in a claw (figure 87), or in a few short setæ (figures 88, 89), or in one or two oval plates. The relations of figures 82 and 83 are obvious from the figures; and the passage into the cheliform variety takes place, in the same manner as in the posterior antennæ. In figures 84 and 85 there is a setose prominence on the large joint corresponding to the hand, to which the claw is opposed in grasping.

In figure 89, there is the same general structure; and if the last joint and the prolonged apex of the penult joint were both lamellar, the organ has a bilamellar termination, as above alluded to.

In figure 90, the organ is nearly rudimentary. Moreover, it is two-branched. And if we compare it with figure 77 or 78, which represents a maxilliped, we may infer that the maxilliped corresponds to one branch (3' 4'), and these feet we are describing, to the other branch. This appears from the setulose setæ of the branch, 3' 4', which are identical with those of the maxilliped referred to. Figure 91, is another rudimentary form (three or four times more magnified than figure 90), and the whole probably corresponds to the shorter branch of figure 90. Figure 92 is another example of the same. It is closely related to figure 79, and is actually from the same species; the organ is quite small, while the maxilliped, as is seen in figure 79, is comparatively large.

These organs sometimes differ in the sexes. Figures 84 and 85 are male forms, and figure 87 a female form of this organ, in one of the genera. The enlargement in the male takes place to enable it to use them for grasping in coition.

This pair of legs is often called a pair of *maxilla-feet*, *jaw-feet*, or *masticatory feet*. It is more correct and better sustained by analogies

to call it a pair of true legs. Its form is generally that of a pair of legs, being either elongate, pediform, or furnished with a monodactyle hand, and it differs as widely from proper maxillipeds as the anterior legs in *Astacus*, or the prehensile legs in *Tanais*. They are situated in some genera very close to the mouth, but not so in others; and in none nearer than the anterior pair in *Tanais*. This pair is normally the seventh in the body, while the first pair in *Tanais* and all Choristopods is the eighth; but this is no good objection, certainly no better than could be urged against calling the two anterior pairs in Isopods feet, these pair corresponding to pairs of mouth organs in the Decapods. The typical form in the Decapods is based on the existence of but five pairs of legs, the nine more anterior pairs of organs being devoted to the senses and mouth; in the Choristopods the senses and mouth have but *seven* of these pairs of organs; and in the highest Entomostracan type, the senses and mouth have but *six*.

The legs referred to, that is, the first pair of organs preceding the natatories, are a large stout pair in *Caligus* and *Argulus*, in which genera they are called legs.

Natatory legs.—The natatory legs do not differ essentially from these organs in most other Entomostraca. They are furnished with setæ for natation, excepting sometimes the first pair, which, in one or two genera has lateral play, and is imperfectly prehensile. They are always two-branched, and have a two-jointed base, excepting when one of the joints is obsolete. These branches are two- or three-jointed; rarely one of the branches consists only of a single joint.

There are four pairs of natatory legs of the kind here described, and sometimes also, posterior to these, a fifth pair. But this fifth pair when not rudimentary, has usually a prehensile or subcheliform character, fitting it for use in coition. Figures 93, 94, and 95 are examples of the rudimentary fifth pair. In figure 94, the leg is reduced to a single joint. In figures 96 to 100, several cheliferous forms are exhibited. Figures 96 and 97 represent each a pair, having the left leg rudimentary, and the right cheliform. Figures 98 and 99 are the right leg alone of other species. Figure 100 is the pair of still another genus; the left is much elongated and subulate, while the right is also long, and besides is subcheliform. Figure 95 is female to 96, and 93 is female in the same genus with 100.

The anterior pair of natatories is sometimes destitute nearly of

setæ, and takes a subprehensile character. In *Harpacticus* and the allied genera it varies much in the articulations, the highest number being three joints in both branches, and varying as regards one branch (the inner) from three to one; and this branch may even become obsolete or rudimentary, as in *Laophon* of Philippi. In the genus *Setella* this pair spreads laterally, and may serve for grasping the body of the female.

Abdomen.—The abdomen varies in number of segments from one to six, and is generally not half as long as the cephalothorax, though sometimes exceeding it in length. Figures 101 to 111, Plate 71, represent various forms; 101 has *four* joints, which is a common number; 102 and 104, have *three*; 103, *two*; 111, but *one*; 105, 106, 107, and 109, *six*; 108 has the joints very much elongated. The variations in number of joints is large in the same genus; and even may differ in a given species.

The first segment is often obsolete, and, as in the *Sapphirinæ*, fails in some males, when present in the females. Very often too it is united with the second, and distinguishable only by a faint suture. Frequently, also, the sixth is obsolete or is concealed beneath the fifth, as in many *Sapphirinæ*.

The first segment often bears a pair of appendages which are sometimes nearly as long as the abdomen, though in general, when present, quite short, or only represented by one or two setæ. These appendages are seen in figures 107 and 110, and the setæ corresponding to them, in figures 106 and 108. When of large size they lie over the bag of eggs in the female, serving to retain it in place; the male of such species usually have the same organs much shorter than the females. The bags of eggs are always connected with the second (normal) segment, which is the first apparent one, when the normal first is not distinct. This second segment, as in *Setella*, may also have a pair of appendages.

The *caudal stylets* are either lamellar or styliform, according to the form of the species. In many species they are furnished with six setæ; but in the different genera, the number varies through the obsolescence of some of the six. The six may be seen in figure 101; the inner of the six is always short, as in the species here represented, and it is often bent. In figures 102, 104, 105, 106, there are but *five*, the inner being wanting. In 107, both the inner and outer of the six

are absent, and there are only *four*. In 108 and 111, a second inner is wanting, and consequently there are but three setæ. In 109, one seta is very much elongated, so as to be much longer than the animal, and the others are very short.

The same variations take place with the setæ of the lamellar stylets, except that the number never exceeds *five*. This number is seen in 112. In 113, the inner of the five is wanting, and there are but *four*; and in 114, the outer as well as inner is wanting, leaving but *three*.

Circulatory system.—We have ascertained little regarding the circulating system, except recognising in most species the existence of a heart in the posterior half of the thorax. What we have on this subject will be presented in connexion with the descriptions of the genera and species.

Genital system.—The seminal duct of the male extends from the abdomen forward in the cephalothorax as far as the mouth, where there is a pair of ovoid or pyriform glands which are united together at the smaller apex. The ovarian ducts are much convoluted on either side of the cephalothorax, and often extend quite to the front of the animal. Figures will be referred to, and farther descriptions beyond.

Nervous system.—A large ganglion exists over the mouth and surrounds the œsophagus, the latter passing upward from below through it. In the species where it was studied, there was no other ganglion. The nerves of the eyes, anterior antennæ, and front portions of the animal, were distinct; and the cords passing to the posterior members start from this ganglion, and give off branches, without an enlargement in any part (see figures 2 *a, g*, Plate 88). In such species, therefore, the nervous system fails of presenting the important characteristic distinguishing the Articulata from the Mollusca,—that is, a succession of ganglia for the separate segments, although in its position and in the external structure of the animal, the articulate character is very distinct.

Further details will be given on these points in connexion with the description of particular species on the following pages.

Classification.—Among the Cyclopoidea, we distinguish *three* families. There are species in which the mandibles and maxillæ have a jointed,

palpiform appendage, of considerable size, which is furnished with setæ; the mandibular palpi (or, more properly, the pediform termination of the mandibular organ) extend laterally in such species like a pair of short legs. Moreover, the feet of the first pair never take the form of a monodactyle hand. These are the CALANIDÆ.

The remainder have the mandibular palpi small with few setæ, or obsolete, and the feet of the first pair often terminate in a monodactyle hand, or are in some way prehensile at the extremity. These species, may, as in the ordinary Cyclops, have only a single minute eye of two lenses, or there may be also a second pair consisting of a large prolate lens with a very broad oblate cornea in the shell, as in Sapphirina. Those of the former kind are the CYCLOPIDÆ, and those of the latter kind, the CORYCÆIDÆ. The flat or depressed, sub-cylindrical, and compressed forms of body may all occur in the same family, as such variations are of small importance; and the transitions are sometimes so gradual that it is difficult to divide off the depressed species from the others in a group.

The three families mentioned may be characterized as follows:—

Fam. I. CALANIDÆ.—Oculi duo simplices minutissimi, pigmentis sive coalitis sive discretis; interdum oculi quoque alii duo coaliti infra caput deorsum spectantes. Mandibulæ maxillæque elongatè palpi-geræ vel instar pedum productæ, palpibus bene setigeris. Sacculus ovigerus unicus. Antennæ 1mæ elongatæ, non appendiculatæ; antenna *maris* sive dextra sive nulla geniculans. Pedes 1mi extremitate nunquam subprehensiles.

Fam. II. CYCLOPIDÆ.—Oculi duo simplices minutissimi, pigmentis coalitis. Mandibulæ palpo parvulo vel obsolete et parce setigero. Sacculi ovigeri sive unicus sive duo. Antennæ 1mæ sæpe appendiculatæ, *maris* sive ambæ sive nullæ geniculantes. Pedes 1mi extremitate plus minusve subprehensiles.

Fam. III. CORYCÆIDÆ.—Oculi duo simplices minutissimi, pigmentis coalitis; alii quoque duo portentosæ magnitudinis, lenticulo prolato interno, corneâque magnâ oblatâ in testam insitâ instructi. Sacculi ovigeri sive duo sive unicus. Antennæ 1mæ nunquam geniculantes. Pedes 1mi extremitate sæpius subprehensiles.

We doubt somewhat as to which of these families takes precedence

in rank. The largely developed mandibular palpus is not proof of superiority; neither, as among the Macroura, can it be considered a mark necessarily of inferiority. The species of Cyclopoidea attain their largest size among the Calanidæ, some in this group being a fourth of an inch in length. There is also a strength and agility which may perhaps be additional evidence of their superiority. We commence, therefore, in our further consideration of the species of Cyclopoidea, with the family Calanidæ. They are pre-eminently oceanic species, while the Cyclopidæ are found mainly in fresh waters and along sea-shores. The Corycæidæ are also oceanic species, and among the Sapphirinæ there are species of comparatively large size.

The distinctive characters of many genera in these families depend largely on different modes of adapting the sexes to cling together in coition. These modes are as follows:—

1. Both male antennæ of the first pair with a geniculating joint, as in *Cyclops*, *Harpacticus*, &c.

2. The right male antenna alone of the first pair with a geniculating joint, and at the same time the right leg of the last thoracic pair being large prehensile for the same purpose, as in *Pontella*, *Candace*, &c.

3. Neither male antenna of the first pair with a geniculating joint, but both having a peculiar flexibility, which may fit them for the same end, as in *Setella*, *Clytemnestra*.

4. The male antennæ of the first pair unmodified and rigid; but the second pair of antennæ very large and stout prehensile, as in *Corycæus*, *Sapphirina*, &c.

5. Neither pair of antennæ adapted for the purpose, but the first pair of feet (sometimes called outer maxillipeds), much elongated, and having lateral play, as in *Calanus*. *Calanus* and *Pontella* pass into one another by very gradual transitions. As the geniculating joint of the right antenna in the *Pontellæ* becomes weak, and the size of the posterior thoracic legs small, this anterior pair of legs, which is rudimentary in the more characteristic *Pontellæ*, as gradually enlarges and takes on the *Calanus* form.

6. Neither pair of antennæ fitted for prehension; but both of the posterior thoracic legs (a pair posterior to the four pairs of natatories, and the same which on the right side is prehensile in *Pontia*) very much elongated, nearly to the length of the body, as in *Euchaeta*.

These forms are illustrated in the figures already referred to, Plates 70 and 71, and by others on the following plates.

FAMILY I. CALANIDÆ.*

THE relations of the Calanidæ to the other Cyclopoidea it is unnecessary to dwell upon at much length, after the remarks already made, and the illustrations given on Plates 70, 71. To this family belong figures 21 to 41, Plate 70, of the anterior antennæ; 50 to 55, Plate 70, with 48, of the posterior antennæ; 57 to 61 and 63, of Plate 71, the mandibles or mandibular feet; 66 to 73, of the maxillæ; 77 to 81, of the maxillipeds; 82, 83, and 90 to 92, of the anterior feet; and the various figures on the following Plates 72 to 82 illustrate farther their general characters and structure.

The cephalothorax varies in its segments, as explained on page 1024, and the number of joints is not a generic distinction; an attempt to use it as such would prove a vexation to science, besides dissevering natural associations of species. In nearly all the genera, the number of joints varies; and in some cases it does not appear to be altogether constant in a species.

The front is rostrate and either acute or furcate, as in figures 9, 10, 11, Plate 70. Only a few species (*Euchætæ*) have the emargination shown in the profile view in figure 11, Plate 70. The extremity is usually furcate and the divisions are sometimes slender setiform, and quite long.

The *eyes* are of two kinds, the *superior* and *inferior* (page 1025); the superior eyes are either united on a single point of pigment, as in the Cyclops, or they are distant, with separate spots of pigment. Both varieties are found among the Pontellæ.

The anterior *antennæ* vary in number of joints from seven to twenty-four (and perhaps twenty-eight), as explained on pages 1026-9. They are alike in both sexes in some genera, and in others the right has a geniculating joint and an enlargement, as in the figures referred to on Plate 70, and also Plate 82, fig. 6 *c*. These organs are long, and have no perfect flexion at any of the articulations excepting the basal, and the geniculating joint in certain males.

* The new species of Calanidæ beyond, are briefly described by the author in the Proceedings of the American Academy of Arts and Sciences, for 1849, vol. ii. pp. 10 to 34.

The posterior antennæ have usually two branches, and they terminate in setæ.

The mandibular feet have a dentate mandible for the basal joint, and a stout second joint, bearing commonly two short branches one- or two-jointed, each ending in a tuft of setæ.

The first pair of maxillary feet are irregularly lobed, as shown in the figures already referred to. The setulose setæ, especially used for maxillary purposes, proceed from one side of one or both of the first two joints. The other setæ are longer and generally plumose.

The *maxillipeds* are not branched. They are stout organs, either straight or flexed, furnished on one side and at apex, with long setæ either naked or setulose. They are sometimes obsolescent, when the following pair is much enlarged.

The first pair of feet are either obsolescent; or long and slender legs. When the former, they are sometimes two-branched, as in figure 90, Plate 71, but when the latter, one branch is wanting and the other is much enlarged, as seen in figures 82, 83. The last five joints are shorter, and the setæ, therefore, more crowded together in 83 than in 82.

The posterior pair of cephalothoracic legs when developed are either true natatory or subprehensile, as in figures 96 to 100, Plate 71. This prehensile character belongs only to the right leg of the pair in males. Figures 94 and 96 belong to the same species, female and male; 93 is female, and 100 male; 99 is another form of the prehensile leg.

The abdomen is always without appendages to the basal joint; the number of joints is rarely over *five* and oftener it is *four*. It varies somewhat even in the same species in its different states, and often differs in the sexes; and it is unsafe, therefore, to use it as a distinctive character of species.

Figures 101 to 104, and 108 to 110, Plate 71, are from different Calanidæ. The caudal stylets and setæ are specifically constant, and are an important means of distinction; their varieties of form will be observed in the figures alluded to, and in the various plates of species of this family.

The more prominent points of difference among the Calanidæ, suggesting a subdivision into subfamilies, are to be found in the first pair of antennæ and the eyes. The existence of an inferior eye, situated

on the under side of the head, distinguishes *Pontella*, *Acartia*, and *Catopia* from the other genera; and a geniculation in the right male antenna of the first pair, characterizes *Pontella*, *Catopia*, *Candace*, *Diaptomus*, *Hemicalanus*. The presence of the inferior eye, with commonly the geniculating right antenna, may, therefore, distinguish one subfamily, *Pontellinæ*, from the other related, *Calaninæ*, in which the inferior eye does not exist. The transitions among the genera of the two groups thus instituted, are, however, very gradual. An enlargement of the posterior thoracic legs in the males, and the existence of a prehensile form in the right leg of the pair is found in all the species that have the geniculating joint in the right male antenna. But there are two genera in which this enlarged posterior pair of legs exists, without the geniculating joint. One of them, *Undina*, closely resembles *Calanus* in most characters, but has a slight angle in the antennæ, not far from its middle, and probably this organ has the power of flexion, in the same manner as when a geniculating joint exists; the genus, therefore, is intermediate between the *Calaninæ* and *Pontellinæ*. The other, *Euchæta*, also, has nearly the habit of *Calanus*; although, differing from all the other *Calanidæ* in its beak, the long setæ of the female antennæ, and the anterior feet. *Calanus* and *Euchæta* are the only genera in which the feet of the first pair are stouter than the maxillipeds, the maxillipeds being generally the larger pair, and the first pair of legs in *Pontella* being sometimes even rudimentary.

A single genus, *Oithona*, differs widely from the others in having the abdomen very long linear, not shorter than the cephalo-thorax, and the maxillæ and mandibles of peculiar form, and it may be the type of a third subfamily, *Oithoninæ*.

Besides these, there is another subfamily quite distinct from the above, in having the antennæ of the second pair prehensile or monodactyle. It includes the genus *Notodelphys* of G. J. Allman.* The probable relation of the *Notodelphys* to the *Calanidæ* in the maxillipeds, maxillæ, and mandibles, will be seen on comparing these organs with those of the other *Calanidæ*; and to aid the comparison we have copied on Plate 71 the figures of these parts by Allman. Fig. 117 is the mandibular palpus; 118, maxillary palpus; 119, maxilliped; 120, first pair of legs. Figure 116 of the same Plate, represents the

* Ann. and Mag. Nat. Hist., xx. 1, Pl. 1 and 2; and Baird's Brit. Entomost., 1850, 237, Pl. 30.

antenna of the second pair; the form is nearly like that of Corycæus, although the species is very unlike those of that genus and family in the mouth organs, and in the absence of the spectacle-eyes. It appears, therefore, to be a connecting link between the other Calanidæ and the Corycæidæ.

The subfamilies indicated, and the genera they contain are characterized as follows:—

1. ANTENNÆ 2DÆ NON PREHENSILES.

SUBFAM. 1. CALANINÆ.—Abdomen longitudine mediocri. Oculi inferiores nulli. Antennæ 1mæ longæ, fere transversim porrectæ; dextra *maris* articulatione non geniculans. Antennæ 2dæ apice setigeræ. Maxillæ latere interiore setigeræ.

- G. 1. CALANUS, *Leach*,* *D.*—Cephalothorax 4–5-articulatus, capite non discreto. Frons sæpius rotundatus raro triangulatus, rostro infra tenuiter furcato. Oculi superiores minuti, conjuncti. Pedes antici maxillipedibus longiores, lateraliter porrecti; postici *maris* et *feminæ* sive regulariter biremes sive obsolescentes. Antennæ 1mæ fere transversim porrectæ, setis regularibus antice ornatae. Antennæ posticæ biramæ, ramo anteriore setis tribus confecto.
- G. 2. RHINOCALANUS, *Dana*.—*Calano* affinis. Frons elongatè productus, rostro breviter et crasse furcato.
- G. 3. CETOCHILUS, *Goodsir*, haud R. de Vauzème.†—*Calano* affinis. Oculi superiores remoti. Cephalothorax 5–7-articulatus, capite plus minusve discreto. Antennæ 1mæ et 2dæ et pedes 1mi ac in *Calano*. Pedes postici biremes precedentibus similes.
- G. 4. EUCHLÆTA, *Philippi*.‡—Frons triangulatus, acutus, rostro brevi transversim emarginato et non furcato. Oculi superiores minuti, conjuncti. Antennæ 1mæ *maris* non geniculantes sed angulo leviter flexæ, *feminæ* setis paucis longis et aliis brevibus antice ornatae. Pedes antici elongati, maxillipedibus longiores, duplo geniculati et sub corpore projecti, penicillum setarum nudarum reflexum ferentes. Pedes postici *maris* ambo valde elongati, subulati.
- G. 5. UNDINA, *Dana*.§ — *Calano* affinis. Pedes antici fere ac in *Calano*;

* Dict. Sci. Nat., Art. Entomostraca; Dana, Am. J. Sci. [2], i. 1846, p. 228; *Cetochilus*, Roussel de Vauzème, Ann. Sci. Nat. [2], i. 333; Edwards, Crust., iii. 421; *Temora*, Baird, Brit. Entomostraca, 1850, 227.

† *Cetochilus australis* of Roussel de Vauzème (Ann. Sci. Nat. [2], i. 333), does not differ essentially from *Calanus*. The *C. septentrionalis* of Goodsir (Jameson's Edinb. New Phil. J., xxxv. 339, pl. 6) has the two superior eyes remote; and unless a *female* of a *Pontia*, is a good genus, as all the true Calani have their eyes united on a single minute spot of pigment.

‡ Archiv für Naturg., ix. 55; *Euchirus*, Dana, Amer. J. Sci. [2], i. 228.

§ Proc. Amer. Acad. Sci., 1849, ii. 22.

postici *maris* crassi dextro prehensili ac in *Pontiâ*. Antennæ angulo leviter versus medium flexæ, *maris* articulatione non geniculantes.

SUBFAM. 2. OITHONINÆ.—Abdomen prælongum et lineare, cephalothorace vix brevius. Oculi inferiores nulli. Maxillæ latere interiore subdigitatæ. Antennæ 1mæ longæ, pauci-articulatæ; dextra *maris* non geniculans nec angulo flexa. Antennæ 2dæ apice setigeræ, simplices (?).

G. 1. OITHONA, *Baird*.*—Maxillipedes pedibus anticis majores, 4-articulati, geniculati, et prorsum flexi. Pedes postici parvuli. Seta grandis sæpe plumosa e basi pedum biremium interdum lateraliter porrecti.

SUBFAM. 3. PONTELLINÆ.—Abdomen longitudine mediocri. Oculi superiores sæpeque inferiores. Antennæ 1mæ longæ; dextra *maris* articulatione geniculans (genere *Acartia* forsitan excepto). Antennæ 2dæ apice setigeræ. Pedes postici *maris* crassi, dextro prehensili.

1. *Oculis superioribus instructi tantum.*

G. 1. DIAPTOMUS, *Westwood*.† — *Calano* antennis pedibusque affinis. Ramus antennarum 2darum minor 6–7-articulatus, articulo ultimo oblongo, articulis 4 ante ultimum medianis perbrevibus. Maxillipedes pedibus anticis vix minores interdum majores. Pedes postici *maris* crassi, dextro subprehensili; *feminæ* longi et crassi, precedentibus non similes. Sacculus externus ovigerus unicus.

G. 2. HEMICALANUS, *Dana*.‡ — *Calano* antennis pedibusque affinis. Antennæ 1mæ 2dæque ac in *Calano*. Ramus antennarum 2darum minor sine 4 articulis perbrevibus medianis. Maxillipedes pedibus anticis vix minores vel majores. Pedes postici *maris* crassi, dextro prehensili; *feminæ* sive biremes et precedentibus similes sive parvuli.

G. 3. CANDACE, *Dana*.|| — Frons quadratus. Antennæ 1mæ recte transversæ, antice regulariter et breviter setigeræ. Maxillipedes pedibus anticis majores,

* Baird, Zoologist, 1843; *Scribella*, Dana, Am. J. Sci. [2], i. 227, and Proc. Amer. Acad. Sci., 1849, ii. 19.

† J. O. Westwood, Partington's Cyclop. Nat. Hist., Art. Cyclops, 1836, and Entomologist's Text Book, 1838; W. Baird, Brit. Entomost., p. 219; *Cyclopsina*, Edwards (in part), Crust., iii. 427; Baird, Zoologist, i. 56, and Trans. Berw. Nat. Club, ii. 154; *Omethia*, Templeton, Trans. Ent. Soc., ii. 118, 1838; *Glaucea*, Koch, Deutschl. Crust.; *Broteas*, Loven, Kongl. Vet. Akad. Handl., for 1845, p. 436, pl. 6, and Ofvers. Vet. Acad., Förhandl., 1846, p. 57. Loven's species has the posterior antennæ, abdomen, and absence of inferior eyes of Diaptomus; and the first pair of feet are longer than the maxillipeds. The species *B. falcifer* is from marshes near Port Natal. The female is represented with a large bag of eggs attached.

‡ *Cyclopsina*, Dana, Proc. Amer. Acad. Sci., 1849, ii. 24.

|| Amer. J. Sci. [2], i. 1846, 227; Proc. Amer. Acad. Sci., 1849, ii. 22.

duplo geniculati et inflexi, 4-articulati, setis nudis longis. Styli caudales perbreves, setis strictè appressis.

2. *Oculis superioribus et inferioribus instructi.*

G. 4. ACARTIA, Dana.*—Frons rotundatus. Antennæ 1mæ longæ, rectiusculæ, flexiles, setis quaquaversum insistentibus ornatae, dextrâ maris non geniculante (?). Pedes postici *feminae* et *maris* (?) parvuli, uni-articulati, 2 setas divaricatas gerentes. Maxillipedes et pedes antici fere ac in *Pontellâ*.

G. 5. PONTELLA (*Pontia*, Edwards).—Frons sive rotundatus sive triangulatus, rostro infra rigide furcatum. Oculi superiores sive coaliti sive late disjuncti. Antennæ 1mæ longæ, sæpe oblique prorsus porrectæ, antice regulariter setigeræ. Antennæ posticæ biramæ, ramo anteriore setis quinque apice sæpius confecto. Cephalothorax 4-7-articulatus. Maxillipedes pedibus anticis majores, recti, setis longis setulosis antice instructi.

3. *Oculis superioribus carentes.*

G. 6. CATOPIA, Dana.†—*Calano* paulo affinis. Antennæ 1mæ fere transversim porrectæ, regulariter setigeræ. [In specie scrutatâ cephalothorax 4-articulatus, styli caudales oblongi et divaricati, caputque quadratum.]

The Calanidæ, when not colourless, are usually tinged either with reddish, bluish, or purplish shades. The red colour is often confined to the internal parts near the mouth, and to the sides covering the muscles of the legs. The blue colour is sometimes quite deep, and occasionally it passes into a rich green. In several species, the back has a silvery or pearly appearance. A few have the body, natatory legs, and the antennæ in part a rich black or brownish black.

The species are widely distributed over all oceans, both in the tropics, and far beyond, north and south. A hand-net of gauze thrown at any time, but especially at night, or before daylight in the morning, will almost invariably bring up some species. Calm weather is the most favourable. At times, they occur in swarms that cover square miles of ocean, giving the waters the bloody tint so often

* *Pontia*, Edwards, Ann. des Sci. Nat., 1828, xiii. 296, and Crust., iii. 417; *Pontella*, Dana, Am. J. Sci. [2], i. 228, and Proc. Amer. Acad. Sci., 1849, ii. 26. The genera *Anomalocera*, Templeton, Trans. Ent. Soc., ii. 35, 1837, and Baird, Brit. Entomost., p. 229; and *Irenæus*, Goodsir, Jameson's Jour., 1843, xxxv. 337, are here included, as they differ in no essential point from *Pontia* of Edwards.

† Proc. Amer. Acad. Sci., 1849, ii. 25.

described. When thus abundant, they are food for the right whale, whose arrangement of whalebone in the roof of the mouth serves to strain these minute animals from the water which it ejects by the spout-holes. The species never exceed a quarter of an inch in length, and rarely an eighth of an inch; as seldom also do they fall short of a twentieth of an inch.

SUBFAMILY CALANINÆ.

The Calaninæ pass into the Pontellinæ through *Undina*, of the former, which has the posterior prehensile leg in males like *Pontella*, but no geniculating joint in the antennæ, and no inferior eyes; and through *Hemicalanus* and *Diaptomus* of the latter, which have the geniculating male antenna of *Pontella*, without the inferior eyes; and through *Acartia*, which has the inferior eyes of *Pontella*, but without probably the geniculating antenna, or prehensile posterior legs.

The genus *Cetochilus* of Roussel de Vauzème,* is essentially identical with *Calanus*, if the right male antenna is not geniculating, and the inferior eyes are wanting, as would appear from the figures and descriptions. The posterior legs, moreover, are not prehensile, according to Milne Edwards, who states that he examined sixty specimens. The species *C. australis* is intermediate between the *Calani* and *Pontellæ*. The *Cetochilus septentrionalis* of Goodsir† may be the type, however, of a good genus, as recognised on page 1044. This species resembles the females of some *Pontellæ*.

GENUS CALANUS, *Leach*.

The species of *Calanus* are distinguished by having only a single pair of eyes united on a minute spot of pigment; the anterior feet prolonged and laterally extended, with long unequal setæ to each joint; the posterior legs obsolescent in both sexes; the antennæ alike in both sexes, and neither prehensile.

* Ann. des Sci. Nat. [2], i. 333, 1834.

† Jameson's Edinb. New. Phil. Jour., xxxv. 339, pl. 6, f. 1-11.

The cephalothorax has never a distinct cephalic segment, like many *Pontellæ*. The number of segments is usually *four*, one long anterior, corresponding to all the anterior members, as far as the second pair of natatories; and then three short posterior, each bearing a pair of natatories (the second, third, and fourth). Another segment posterior to these is sometimes observed.

The front has below a furcate beak, and in some species the furcations are long capillary (Plate 75).

The anterior antennæ project laterally, usually with a double curvature, the two bracket-like (—) in position, with the tips not anterior to the line of the front. A few have the antennæ straight, and these form an approximation to the *Pontellæ*. The number of joints is large, and the setæ are regularly arranged along the anterior margin, excepting two or three upon the terminal joints, which project backward. The relative lengths of the apical and subapical setæ, as well as the position of the antennæ, afford good characters for distinguishing species. The *subapical* setæ are those of the penult and antepenult joints.

The posterior antennæ have each branch terminating in setæ. In the longer branch, the first joint constitutes the greater part of its length; the following part is quite short, and bears its setæ in two clusters. The shorter branch is nearly equal in its two joints; the setæ at apex are three in number and they are bent; and besides these, there are several longish setæ on the side of the first of the two joints. In a few species, the second joint consists of five or seven very short joints.

The organs of the mouth and their position are shown on Plate 75.

The maxillipeds are like those of the *Pontellæ*, but smaller. They are straight, three-jointed, with several long setulose setæ on the anterior side.

The next pair of organs (the anterior legs) are long, and have a lateral play, and the species are thus distinguished from the *Euchætæ*, in which the five terminal joints are short, their setæ collected into a pencil, and the organs act only in the line of the body.

The natatories have the branches either two- or three-jointed, usually both the latter.

The abdomen is without appendages, excepting the stylets at the extremity. These are furnished with six setæ; the inner very short (sometimes obsolete?), the next, which we have called the *first* (being

the *first* of the longer setæ), is shorter than the *second*, which is always the longest seta of the stylets.

The position of the antennæ, mouth, and organs about the mouth, and immediately posterior to it, are shown on Plate 75. The buccal mass (*m*) is quite large, and has behind a ciliated lip. The nerves to the anterior antennæ are also shown.

A young individual, probably of a *Calanus*, is represented in figure 3, Plate 76. Length, one-thirtieth of an inch. There are three pairs of jointed organs; the first simple, and the other two, two-branched, each branch one-jointed. It was collected, in the harbour of Rio Janeiro, January, 1838.

The Calani are among the most common of the oceanic Cyclopoidea. Their colours are either a faint tinge of red, purple, or bluish purple, rarely a pure blue, like many Pontellæ.

The genus *Calanus* was instituted and incorrectly characterized by Leach. As the species here described are evidently congeneric with the *Calanus finmarchianus* (Leach), we adopt the generic name, without his generic description. The genus *Temora* of Baird, was instituted in 1850 (Brit. Entomost., p. 227), for the *Calanus finmarchianus* of Leach, and, therefore, upon the same type as that of Leach's genus.

I. SETÆ ANTENNARUM IMARUM APICALES SUBAPICALIBUS LONGIORES.

a. *Styli caudales vix oblongi.*

CALANUS ROTUNDATUS.

Frons rotundatus. Cephalothorax 4-articulatus, crassus, posticè obtusus. Antennæ anticæ corpore vix breviores, 24-articulatæ, duplo curvatæ, apicibus fronte paulo posterioribus, articulo ultimo elongato; setis apicalibus articulum ultimum longitudine æquantibus, anticis apice remotis, setis sub-apicalibus minutis. Styli caudales brevissimi; setis inæquis, secundis abdomine longioribus et apice divaricatis.

Front rounded. Cephalothorax four-jointed, stout, obtuse behind. Anterior antennæ about as long as body, twenty-four-jointed, doubly curved, apices behind line of beak, apical joint elongate; apical setæ

flexed backward, as long as the last joint, the anterior remote from the apex, subapical setæ minute. Caudal stylets very short, setæ unequal, the second longer than abdomen with the apex curved outward, the others a little shorter than the abdomen.

Plate 72, fig. 1 *a*, animal, enlarged; *a'*, natural size; *b*, extremity of anterior antenna, enlarged; *c*, side view of body, showing alimentary canal (*i*, *i'*) and position of heart (*h*); *d*, a young animal, possibly of this species; caught, April 9, 1840, at the same time with the preceding.

South of Tongatabu, in latitude $32^{\circ} 24'$ south, April 9, 1840, when many specimens were caught; also, near Gilbert's Island, April 19, 1841; also, latitude 28° north, longitude $171^{\circ} 30'$ east, May 17, 1841.

Length, one line. The body is stouter than usual; the beak is short, and in a side view is not incurved. The unequal setæ of the caudal stylets is a prominent characteristic. The setæ of the antennæ are short; those near the base scarcely longer than the diameter. The terminal joint has some appearance of being double, the setæ on the anterior side being at the apex of what might be thought the first of the two joints. The posterior setæ of the two subapical joints are nearly obsolete. The anterior seta of the fourth joint, counting from the apex, is a little elongated, and the same is true of that of the seventh joint, both being a little longer than the joint to which attached; while the setæ of the other joints in the same part of the antennæ are very short.

The posterior antennæ have the anterior branch much the longest. The setæ of the following organs are moderately short. Caudal setæ spread but little. The abdomen has four joints, of which the first is much the longest.

CALANUS COMPTUS.

Frons rotundatus. Cephalothorax 4-articulatus, posticè obtusus. Antennæ anticæ tenuissimæ, cephalothorace paulo longiores, fermè 24-articulatæ, duplo curvatæ, apicibus fronte posterioribus, articulo ultimo

elongato (forsan duplice); setis apicalibus posticis articulum fere æquantibus, anticis apice remotis, posticâ penultimâ articuli longitudine, anticâ penultimâ et antepenultimis minutis. Styli caudales breves; setis strictis, rectis, duobus paulo longioribus.*

Front rounded. Cephalothorax four-jointed, obtuse behind. Anterior antennæ very slender, a little longer than cephalothorax, about twenty-four-jointed, doubly curved and apex behind line of beak, short setigerous, last joint elongate (perhaps double); posterior apical setæ nearly as long as joint, anterior remote from apex, posterior penult as long as penult joint, anterior penult and both antepenult obsolete. Caudal stylets very short; setæ straight, not spreading, two a little longer than the others.

Plate 72, fig. 2 *a*, animal, enlarged; *b*, extremity of anterior antennæ; *c*, abdomen, in profile.

Latitude 40° north, longitude 157° west, July 2, 1841; also, latitude 45° north, longitude 156° west, July 6, 1841; also, in latitude 27½° south, longitude 136° west, August 13, 1839.

Length, one-fifteenth to one-twelfth of an inch. The body has the usual proportions. The caudal setæ are peculiar in not being divergent, and the stylets are scarcely longer than broad, not exceeding, or scarcely so, the last segment of the abdomen. The setæ of the anterior antennæ towards the base are scarcely longer than the diameter of the antenna. The last joint of this organ has the same appearance of an oblique articulation under the apex of the preceding, as in the *C. rotundatus*. The anterior setæ of the apical joint are distinct but very short. Setæ of the following organs rather short.

Colour, a little purplish or reddish. A bag of eggs was attached to one individual, from latitude 45° north. It was a little torn, and contained ten eggs. In the specimens obtained in August of 1839, the abdomen appeared to be five- instead of four-jointed, there being a faint articulation across near its base, subdividing what is properly the first joint in the specimens obtained in latitude 45° north. The second joint in the former was the largest, and a little gibbous below.

* By this expression we mean, in this and other cases, *the particular joint which bears the setæ alluded to.*

CALANUS NUDUS.

Frons rotundatus, prominulus. Cephalothorax 4-articulatus, posticè subacutus. Antennæ anticæ cephalothorace vix longiores, fermè 18-articulatæ, articulo ultimo non longiore, apicibus fronte paulo anterioribus; setis totis brevissimis, apicalibus articulo non longioribus, et anticis ab apice vix remotis, subapicalibus minutis. Styli caudales paulum oblongi, setis rectis, strictis, abdomine non longioribus.

Front rounded, little prominent. Cephalothorax long elliptical, four-jointed, a little prominent in front and obtuse, subacute behind. Anterior antennæ shorter than the body, doubly curved, apices in advance of the line of beak, appearing naked, setæ all very short (shorter than breadth of joints), apical not longer than last joint, subapical minute. Caudal stylets somewhat oblong; setæ straight, parallel, not longer than abdomen.

Plate 72, fig. 3 *a*, animal, enlarged; *b*, second pair of antennæ.

Taken in great numbers, October 20, 22, 25, November 1, 3, 5, 8, 12, 1838, in the Atlantic, latitude 8° north to equator, longitude 21° to 18° west, and from the equator to 6° south, longitude 18° to 25° west.

Length, one-twentieth of an inch. Colourless, or a little red about the articulations. On account of the very short setæ of the antennæ, its even outline without very prominent articulations, the slender abdomen, and straight, not spreading caudal setæ, the individuals have a naked look. The last three joints of the cephalothorax are about one-third its whole length. The beak is short. In a vertical view the front margin between the antennæ is prominent, but obtuse. The abdomen is apparently three-jointed, yet the first articulation is somewhat uncertain. The antennæ when in position, have the apices a little in advance of the line of the beak, and in this respect, as well as others, the species differs from the preceding.

Other specimens were obtained in the Atlantic on October 13 and 15, in latitude 8°–9° 20' north, longitude 23° 40'–24° 15' west, which are believed to be identical with the *C. nudus*. Length, one-twenty-fourth of an inch. Colour, rose-red, a little purplish and deepest

along the venter. The setæ of the antennæ very short, not longer than diameter of joints, except at apex, where are two directed forward and two backward, which are as long as the last joint.

CALANUS MAGELLANICUS.

Frons rotundatus. Cephalothorax 4-articulatus, posticè obtusus. Antennæ anticæ corpore breviores, duplo curvatæ, apicibus fronte valde posterioribus, articulis quatuor ultimis brevibus, subæquis; setis totis per brevibus, apicalibus articulo brevioribus, anticis apice remotis, subapicalibus posticis minutis, anticis obsolete. Styli caudales perbreves, setis abdomen longitudine fere æquantibus.

Front rounded. Cephalothorax four-jointed, obtuse before and behind. Anterior antennæ shorter than the body, having a double curvature, apices behind line of beak; four terminal joints subequal, setæ all very short, those of last joint not longer than joint, two apical reflexed, the anterior near middle of front margin; the posterior of the subapical joints very short, the anterior obsolete. Caudal stylets very short, setæ about as long as abdomen.

Plate 72, fig. 4 *a*, side view, enlarged; *b*, position of antennæ; *c*, extremity of antenna.

Collected, March 27, 1839, in latitude 52° south, near Patagonia.

Length, one-twenty-fourth of an inch. Colourless, except sometimes a little orange about the centre of the cephalothorax. This species differs from the last in the position of the antennæ and their apical and subapical setæ. There is a longer set at intervals of three or four joints on the antennæ, but none are longer than the joint to which they are attached. The last seven articulations are about equal, and each is shorter than either of the six or seven preceding. The last joint has the anterior setæ situated some distance from the apex, and, although no subdividing articulation was distinguished, there is evidently an analogy between this joint, and the terminal in *C. comptus* and *C. rotundatus*. In these two species the terminal is as

long as the two preceding, while in the *C. magellanicus*, it is scarcely longer than the next one preceding.

The three posterior joints of the cephalothorax are nearly half the whole length. Beak directed a little inward. Abdomen four-jointed. There are four pairs of natatories with the fifth rudimentary. Setæ of the mouth organs of moderate length.

CALANUS CRASSUS.

Frons rotundatus. Cephalothorax crassus, 4-articulatus, posticè vix subacutus. Antennæ anticæ corpore breviores, apicibus fronte valde posterioribus, setis brevibus, apicalibus paulo longioribus, subapicalibus minutis, aut obsoletis. Styli caudales perbreves, setis subæquis, abdomine paulo brevioribus.

Front rounded. Cephalothorax stout, four-jointed, hardly subacute behind. Anterior antennæ shorter than the body, much reflexed, the apices therefore much behind the line of beak, last joint nearly half shorter than penult; setæ short, some near base a little longer, and curving, the posterior of apical joint as long as two terminal joints, the anterior half shorter, those of the subapical joints very short or obsolete. Caudal stylets very short; setæ subequal, not as long as abdomen, slightly spreading.

Plate 72, fig. 5, animal, enlarged.

Collected in the Atlantic, May 9, 1842, latitude 9° south, longitude 17° 30' west.

Length, one-sixteenth of an inch. Slightly reddish, with deeper red about the mouth and stomach. The antennæ have an oblong basal joint, and some of the setæ on the second or third joints are about as long as this joint. These organs curve near base and then extend obliquely backward, hardly curving again. The penult joint has a seta at anterior apex shorter than that on anterior apex of last joint, but none was observed at posterior apex; and the antepenult joint has neither anterior nor posterior setæ, or they are very short.

CALANUS FURCICAUDUS.

Frons triangulatus. Cephalothorax 4-articulatus, capite subito angustatus, posticè obtusus. Antennæ anticæ corpore paulo breviores, duplo curvatæ, apicibus fronte posterioribus, fermè 24 (26 ?)-articulatæ; articulo ultimo paulo longiore; setis brevibus, prope basin numerosis, apicalibus articulo paulo longioribus et anticis apice parçè remotis, subapicalibus minutis. Styli caudales setæque latè divaricati, setis inæquis, secundis abdomine longioribus.

Front triangular. Cephalothorax rather stout, four-jointed, head abruptly narrower, obtuse behind. Anterior antennæ a little shorter than the body, doubly curved, apex behind line of beak, twenty-four (twenty-six ?)-jointed; last joint (perhaps a double one) somewhat longer than either of the three preceding; setæ near base numerous and short (twice longer than diameter of joints), the anterior and posterior apical elongate (nearly as long as last two joints), the anterior remote from apex, subapical setæ minute. Caudal stylets and setæ widely divergent, setæ unequal, the second longer than the abdomen.

Plate 72, fig. 6 *a*, animal, enlarged; *b*, extremity of anterior antennæ; *c*, profile of abdomen.

Collected in the Pacific, a few miles southeast of Pitt's Island, the northern of the Kingsmills, latitude 3° north, longitude 173° east, April 28, 1841.

Length, one-twelfth of an inch. Nearly colourless. The subacute triangular front of this species and furcate caudal extremity, the setæ and stylets diverging with a curve, are striking characters of this species. In addition, at the apex of the anterior antennæ the posterior and anterior setæ are somewhat long and nearly in the same line, while the setæ of the preceding joints are quite short. At the apex, in addition to the longer anterior setæ a short distance back from the apex, there are two quite short anterior just at the apex. The anterior seta of penult joint is about as long as diameter of joint; the

posterior much shorter; anterior of antepenult, about as long as two diameters, and posterior equalling one diameter. The second pair of antennæ is rather short, with short setæ. The abdomen has three segments, of which the first is largest, and is gibbous below (fig. 6 c); this gibbosity is probably not a permanent character.

CALANUS ARCUICORNIS.

Frons obtusus. Cephalothorax 4-articulatus, capite angustatus, posticè subacutus. Antennæ anticæ cephalothorace vix longiores, leviter arcuatæ, apicibus fronte vix posterioribus, articulis 4 ultimis subæquis, setis perbrevis, apicalibus articulo valde brevioribus, duabus uncinatis, subapicalibus obsolete, prope basin paucis brevibus uncinatis. Abdomen angustum, lineare. Styli caudales perbreves, setis strictis, rectis, abdominis longitudine.

Front obtuse. Cephalothorax four-jointed, nearly obtuse behind, head narrower. Anterior antennæ hardly longer than cephalothorax, slightly arcuate towards base, and then straight and inclined a little back, tips nearly in line of beak; first and second joints a little oblong and nearly equal, the last four subequal; setæ very short, a few uncinata near base, the apical quite short, much shorter than apical joint, two uncinata, the subapical extremely short. Abdomen slender, four-jointed, second joint longest. Caudal stylets very short, setæ not spreading, straight, about as long as abdomen.

Plate 72, fig. 7 a, animal, enlarged; b, extremity of antenna.

Collected, April 9, 1840, in the Pacific, latitude 32° 24' south, longitude 178° 15' east.

Length, one-sixteenth of an inch. The antennæ bend outward, with a single curve, and incline a little backward. The abdomen is slender and rather long, being half the length of the cephalothorax; this, in connexion with the non-spreading setæ, makes the species resemble a Candace. The subapical setæ are nearly obsolete.

b. *Styli caudales valde elongati.*

CALANUS TURBINATUS.

Frons obtusus. Cephalothorax anticè crassus, posticè attenuatus (idcirco, segmentum posticum abdomine parèè latius) obtusiusculus. Antennæ anticæ duplo leviter curvatæ, corpore breviores, tenuissimæ, articulis 5 ultimis subæquis; setis totis perbrevibus, apicalibus (?) subapicalibusque articulo non longioribus. Styli caudales tennes, paralleli, setis dimidio brevioribus.

Front obtuse. Cephalothorax broadest anteriorly, obtuse in front, gradually diminishing posteriorly to breadth of abdomen, subobtuse behind. Antennæ slightly doubly curved, but tips not behind line of beak, shorter than body, very slender, last five joints subequal; setæ all short, subapical setæ not longer than either of the joints; apical of the same length, one perhaps longer (broken in specimen?) Abdomen three-jointed. Caudal stylets styliform, parallel, as long as abdomen, setæ half shorter.

Plate 72, fig. 8, animal, enlarged.

Collected in the Sooloo Sea, southwest of Panay, January 29, 1842.

Length, one-twelfth to one-fifteenth of an inch. Colour, red about mouth and in posterior part of thorax; alimentary canal, in part light green; a broad brown line either side of stomach and meeting nearly over the mouth, which is the ovary; other parts nearly colourless. The tapering body, the thorax diminishing to the abdomen, and without acute posterior angles, in addition to the long slender stylets, parallel in position, and bearing very short setæ, are striking characters. It is probable that the longest of the apical setæ of the anterior antennæ was broken off in the specimen examined; it may have been somewhat longer than the joint: those that remain entire on the joint, are about as long as the joint, and the anterior and posterior are nearly equal. The penult has the anterior and posterior about equal and as long as the joint; the same is true of the antepenult.

The antennæ of the second pair are short, and so also their setæ, and the setæ of the following organs.

CALANUS STYLIFER.

Frons truncatus. Cephalothorax curtus, posticè abdomine valde latior et elongatè acutus, 5-articulatus, segmento ultimo brevissimo. Antennæ anticæ duplo paululum curvatæ, apicibus fronte non posterioribus; setis perbrevibus, apicalibus et penultimâ posticâ fere articuli longitudine, penultimâ anticâ et antepenultimis brevissimis. Styli caudales tenues, fere abdominis longitudine, recti, paralleli, setis non longioribus, unâ valde externâ.

Front truncate. Cephalothorax short, behind much broader than abdomen, posterior angles acutely prolonged, five-jointed, the last segment very short. Anterior antennæ slightly doubly curved, apices a little in advance of line of beak; setæ very short, the apical and posterior penult nearly as long as joint, the anterior penult and antepenult very short. Abdomen three-jointed. Caudal stylets slender, not as long as abdomen, straight, parallel, setæ hardly longer than stylets, four apical, and one which is somewhat shorter, proceeding from the middle of the exterior side.

Plate 72, fig. 9, view, enlarged.

Obtained in the Atlantic, off the harbour of Rio Janeiro, in latitude 23°–24° south, longitude 41°–43° west, November 19, 1838, and January 9, 1839.

Length, one-twelfth of an inch. Colour, a little yellowish in front, with dirty brown along the centre, arising from the alimentary material within. The cephalothorax is not longer than two and a half times its breadth, and the prolonged posterior angles are wide apart and distant from the sides of the abdomen. There is a short prominence near the centre of the back, seen in a lateral view. The first joint of the abdomen is much longer than either of the others. The fifth or rudimentary pair of natatories is not half the length of the preceding; it is without setæ, and very slender. The last three or four

joints of the antennæ are rather longer; the basal joint is short, with the following oblong.

CALANUS CURTUS.

C. stylifero similis, sed curtior. Cephalothorax 5-articulatus, segmentis 4 posticis subæquis. Antennæ anticæ corpore paululo longiores, tenuissimæ, duplo paulum curvatæ, apicibus fronte vix anterioribus; setis perbrevibus, apicali anticâ longiore, articulum non superante. Abdomen 3-articulatum. Styli caudales tenues, fere abdominis longitudine, vix recti, setis non longioribus, flexuosis, unâ valde externâ.

Near *stylifer*. Cephalothorax shorter, five-jointed, the four posterior segments subequal. Anterior antennæ a little longer than the body (stylets being excluded, as usual), slightly doubly curved, tips in line of beak; setæ very short, anterior apical seta longest, but not exceeding length of joint. Abdomen three-jointed. Caudal stylets slender, nearly as long as abdomen, hardly parallel, setæ of same length nearly, spreading and crooked, one on outer side near middle remote from apex, which is a little shorter than the others.

Plate 72, fig. 10, animal, enlarged.

Collected in the Sooloo Sea, fifteen miles west of Panay, January 27, 1842; also, in Straits of Banca, east of Sumatra, March 2, 1842.

Length, one-twentieth of an inch. Nearly colourless; red about mouth and in thorax. This species differs from the preceding in its shorter body, its posterior thoracic segment as long as the preceding, its caudal stylets a little divergent, and the setæ crooked. The antennæ are more slender and the terminal joints are much shorter; the basal and following joints are as in the *stylifer*; the setæ of the following joints are short, hardly exceeding the diameter of the joints, excepting one on the eleventh (?) joint, which is more than twice longer; the four joints following are quite short, and the next are longer. The anterior apical and posterior penult setæ are about as long as the apical joint. The setæ of the second pair of antennæ

and following organs are short. The animals move through the water with a very rapid darting motion.

CALANUS SCUTELLATUS.

Latè depressus. Cephalothorax 4-articulatus, segmento antico anticè fortè arcuato, posticè latè producto et acuto, segmento postico utrinque elongatè acuto, et divaricato. Antennæ anticæ corpore paululo longiores, duplo curvatæ, apicibus fronte vix anterioribus, articulo apicali longiore; setis brevibus, apicali anticâ penultimâque posticâ articuli longitudine, aliis subapicalibus perbrevibus. Abdomen 3-articulatum. Styli caudales tenues, fere abdominis longitudine, parè divaricati.

Body much depressed and broad. Cephalothorax four-jointed, rounded in front; anterior segment scutellate, with the sides broadly produced posteriorly, and acute behind, last segment acutely and divaricately prolonged behind. Anterior antennæ a little longer than the body, doubly curved, tips about in line of beak; apical joint longer than preceding; setæ rather short, anterior apical and posterior penult as long as the joint to which attached, the other subapical very short. Abdomen three-jointed. Caudal stylets slender, nearly as long as abdomen, somewhat divaricate.

Plate 72, fig. 11 *a*, animal, enlarged; *b*, extremity of antenna.

Collected in the Sooloo Sea, east of Panay, January 27, 1842.

Length, one-sixteenth of an inch. Colourless, except a faint yellowish tint, and red about the mouth and in part of thorax. The legs scarcely project beyond the shield-like anterior segment. The form of this segment is nearly that of a half ellipse, with the angles lamellarly prolonged behind and acute; the length and breadth are about equal. The posterior angles of the cephalothorax are prolonged into long slender points, which are distant and divaricate. The caudal setæ were mutilated in the specimen examined, except the inner one of the four apical, which was about as long as the stylets.

The antennæ have the basal joint slightly oblong, but shorter than the following. At intervals (? on second, sixth, and eleventh joints) the

setæ are a little longer than on the intermediate joints. The posterior setæ of the penult joint are as long as joint, the anterior quite short; on the antepenult joint, the anterior is very short, the posterior less so; the præantepenult has the anterior seta as long as the joint.

II. SETÆ ANTENNARUM ANTICARUM APICALES SUBAPICALIBUS NON LONGIORES.

A. *Setæ caudales totæ mediocres. Frons obtusus, non elongatus.*

a. CEPHALOTHORAX 4-ARTICULATUS.

CALANUS PAVO.

Frons subtriangulatus, obtusus. Cephalothorax posticè obtusus. Antennæ anticæ corpore dimidio longiores, duplo curvatæ, articulo ultimo longiore, setis longiusculis. Abdomen brevissimum. Styli caudales breves, divaricati, setis fere corporis longitudine, latis, eleganter plumiformibus, flabellatim divaricatis.

Front subtriangular, obtuse. Cephalothorax rather stout, obtuse behind. Anterior antennæ one-half longer than the body, doubly curved, last joint as long as three preceding; setæ rather long. Abdomen very short, two-jointed; caudal stylets a little oblong, divaricate, furnished with elegant spreading plumes, the plumes broad and subequal, and nearly as long as body.

Plate 72, fig. 12 *a*, view, enlarged; *b*, second pair of antennæ.

Obtained in the Atlantic, latitude 12° north, longitude 24° west, October 9, 1838, at 9 A. M.

Length, one-twenty-fourth of an inch. Colourless, excepting a large reddish spot near the centre of the body, and a similar spot in each of the inner caudal plumes. Anterior segment of cephalothorax two-thirds whole length. Caudal plumes seen only spreading, as in the figure. The antennæ have the anterior margin towards the base uneven, and the clavate setæ alluded to, extend forward from several of the joints in the first quarter of the antenna; they have a

reddish-yellow colour, and one is full half as long as the body of the animal. The animal swims by saltations, with great agility. The position of the antennæ in the figure may not be exactly correct, as the drawing was made before the importance of this character was appreciated.

CALANUS LEVIS.

Frons obtusus. Cephalothorax mediocris, posticè subacutus. Antennæ anticæ corpore vix longiores, duplo leviter curvatæ, apicibus fronte non anterioribus; setis brevibus, 4-5 remotis longioribus, apicalibus et anticâ penultimâ fere articuli longitudine, posticis penultimâ antepenultimâ-que paulo longioribus, subæquis, anticâ antepenultimâ obsoletâ. Styli caudales parce oblongi, setis rectis, appressis, abdominis longitudine.

Front obtuse. Cephalothorax moderately stout, obtuse or subacute behind. Anterior antennæ fully as long as body, slightly doubly curved, tips not in front of line of beak; setæ short, four or five at intervals somewhat longer, apical and anterior penult nearly as long as respective joints, posterior penult and antepenult a little longer, subequal, anterior antepenult obsolete. Abdomen three-jointed. Caudal stylets sparingly oblong. Setæ parallel, about as long as abdomen.

Plate 73, fig. 1 *a*, animal, enlarged; *b*, extremity of anterior antenna.

Obtained off Rio Janeiro, January 7, 1839.

Length, one-twentieth of an inch. The cephalothorax is rather broader posteriorly. The three posterior segments are about one-third whole length; and the articulations between them are without a sulcus, so that the body in an upper view has apparently an uninterrupted surface. The last three joints of the anterior antennæ are longer than the preceding. The longer setæ of the anterior margin proceed from the second, sixth, eleventh, and fifteenth joints; of the apical setæ two are directed backward a little obliquely, and two forward, more obliquely.

Fig. 2 *a*, Plate 73, represents another individual, obtained a few

days afterwards in the harbour of Rio. It appears to be the same species; but it differs in having but two joints to the abdomen, the first quite short, the second oblong; and in having the subapical posterior setæ more nearly equal than in the preceding. Whether these differences are owing to a difference of sex, age, or species, I am unable to decide. 2 *b*, represents the extremity of the superior antenna; 2 *c*, the posterior antenna; 2 *d*, leg of first pair.

CALANUS MEDIUS.

Frons rotundatus. Cephalothorax posticè obtusus. Antennæ anticæ cephalothorace paulo longiores, duplo curvatæ, apicibus fronte posterioribus; setis perbrevibus, 4-5 remotis longioribus, posticâ apicali et anticâ penultimâ largè articuli longitudine, posticâ penultimâ paulo brevior, posticâ antepenultimâ duplo longiore. Styli caudales breves, setis appressis, abdomine brevioribus.

Front rounded. Cephalothorax obtuse behind. Anterior antennæ a little longer than cephalothorax, doubly curved, tips behind line of beak, setæ very short, four or five at intervals longer, posterior apical and anterior penult fully as long as joint to which attached, posterior penult a little shorter, posterior antepenult twice longer than the apical. Caudal stylets short, setæ shorter than abdomen, straight and not spreading.

Plate 73, fig. 3 *a*, animal, enlarged; *b*, extremity of antenna.

Collected in the Pacific, latitude 44° north, longitude 153° west, July 6, 1841.

Length, one-sixteenth of an inch.

This species is near the preceding. From the third joint of the antennæ there is a seta extending forward, which is as long as three diameters of the joint. The antepenult joint has no distinct anterior seta, or only a very short one; the præantepenult has a very short posterior seta. At the apex, there are, besides the posterior apical, one directed outward and two obliquely forward. Abdomen in specimen 4-jointed; first abdominal segment the longest. The caudal stylets

scarcely longer than broad. The animal carried, below, a bag containing six eggs.

CALANUS PLACIDUS.

Frons rotundatus. Cephalothorax posticè obtusus. Antennæ anticæ corporis longitudine, duplo leviter curvatae, apicibus fronte paulo posterioribus; setis apicalibus brevibus, posticis penultimâ antepenultimâque valde elongatis, anticâ penultimâ dimidio brevior. Styli caudales breves.

Front rounded. Cephalothorax obtuse behind. Anterior antennæ as long as body, slightly doubly curved, tips a little behind line of beak, apical setæ short, posterior penult and antepenult long, equaling last five or six joints of antenna, anterior penult half as long, apical and anterior antepenult short. Caudal stylets short, sparingly longer than broad.

Plate 73, fig. 4, animal, enlarged.

Collected abundantly near the Kingsmill Group, April 30, 1841; also, again in latitude 40° north, longitude 157° west, July 2, 1841.

Length, one-twelfth of an inch. Colourless, or a little purplish. Body moderately stout. Length of stylets not exceeding twice the breadth. Setæ of anterior antennæ mostly about twice as long as diameter of joints, much crowded towards base. First joint of the anterior antenna short; second oblong; last three nearly equal. Length of anterior seta of antepenult joint about equal to two diameters of joint. Second pair of antennæ rather short, with short setæ. Abdomen in specimen three-jointed.

CALANUS RECTICORNIS.

Frons obtusus. Cephalothorax posticè rotundatus. Antennæ anticæ corpore longiores, rectissimæ, apicibus fronte non anteriores, articulo primo (2do?) crassè oblongo, ultimo paulum demisso; setis brevibus, setâ

articuli secundi subelongatâ, articuli antepenultimi posticâ longiore (= 4 artic.), penultimis posticâ et anticâ paulo brevioribus, apicali posticâ minore, articulo longiore, duabus aliis apicalibus brevibus et subuncinatis. Styli caudales breves; setis mediocribus, parçè diffusis.

Front obtuse. Cephalothorax rounded behind. Anterior antennæ straight from the base, and the two lying in the same line, longer than the body, first joint stout and oblong, apical a little bent back, setæ short, on basal joint very short, on second joint, a long seta, as long as four diameters of joint; posterior seta of antepenult joint longest, as long as last four joints, posterior and anterior of penult a little shorter, posterior apical still shorter, longer than joint, two other apical very short and subuncinate or curved. Caudal stylets short, setæ little spreading, hardly as long as abdomen.

Plate 73, fig. 5 *a*, view, enlarged; *b*, extremity of antenna.

Collected in the Sooloo Sea, southwest of Mindanao, February 1, 1842.

Length, one-twelfth of an inch. Colour, orange, with some red blotches about the mouth and in the thorax. The body is rather slender, and is broadest posteriorly near the first articulation. The inner three caudal setæ of each stylet are nearly equal. The antennæ have a stout basal joint, which is placed a little oblique to the body; but beyond this the organ extends straight out, with scarcely any curve, so that both are in the same straight line. Last three joints of antennæ subequal, the apical a little the longest. The longish seta from the second joint of these antennæ, and the two setæ on either side of the cephalothorax posteriorly, are striking characters. The abdomen in the specimens was four-jointed.

δ. CEPHALOTHORAX 5-6-ARTICULATUS.

1. Cephalothorax posticè obtusus aut breviter subacutus.

CALANUS SETULIGERUS.

Frons rotundatus. Cephalothorax 5 (6?)-articulatus, posticè obtusus, segmentis 4 posticis subæquis. Antennæ anticæ corpore paulo longiores,

duplo curvatæ, setis prope basin plerumque duplo longioribus quam articuli et numerosis, setâ articuli sexti (forsan quinti) longiore, setis duabus posticis subapicalibus longis, subæquis, apicalibus brevibus, anticâ penultimâ longiore quam articulus. Styli caudales perbreves; setis mediocribus, parcè diffusis, secundis fere duplo longioribus.

Front rounded. Cephalothorax obtuse behind, four posterior segments subequal. Anterior antennæ a little longer than the body, doubly curved, setæ short, towards base mostly twice as long as the joints and numerous, a longer one from fifth or sixth joint, two posterior subapical quite long, apical short, anterior penult longer than the joint. Caudal stylets very short, setæ of moderate length, sparingly spreading, the second nearly twice as long as the others.

Plate 73, fig. 6 *a*, animal, enlarged; *a'*, profile of body, showing alimentary canal (*i*), and heart (*h*); *b*, second pair of antennæ; *c*, first pair of legs; *d*, second or third pair of natatory legs.

Taken in the Atlantic, October 13 to 16, 1838, latitude 6°–9° north, longitude 21°–24° west.

Length, one-sixteenth of an inch. Colour, faint purplish blue. The first two segments of the cephalothorax correspond to the first in many other Calani. The last four occupy about two-fifths the whole length of cephalothorax, and are about equal in length. Joints of abdomen short, and stylets not longer than last joint. The longer seta is about as long as the abdomen, and is a little curved. Of the posterior subapical setæ of the anterior antennæ, the inner one is the longest, and the outer margin of each is pectinate setulose. The second pair of antennæ have the branches unequal (the shorter two-thirds the longer); the last joint of longer branch more than one-third preceding; the two joints of other branch subequal. Natatories four pairs; the posterior shortest; the anterior next shortest. A fifth pair rudimentary. Abdomen in specimen four-jointed.

The heart is situated in the posterior half of the thorax, mostly within the fourth segment from the last, extending a little into the preceding.

CALANUS PELLUCIDUS.

Frons rotundatus. Cephalothorax 5-articulatus, posticè obtusus, articulo ultimo brevi. Antennæ anticæ corporis longitudine, setis subapicalibus posticis longiusculis. Styli caudales oblongi.

Front rounded. Cephalothorax five-jointed, behind obtuse, last segment short. Anterior antennæ about as long as the body, posterior subapical setæ rather long. Caudal stylets somewhat oblong.

Plate 73, fig. 7, animal, enlarged, the antennæ not quite accurate in the articulations or setæ.

Taken in the Atlantic, October 5, 1838, latitude $14\frac{1}{2}^{\circ}$ north, longitude 21° west.

Length, one twenty-fourth of an inch. Colourless. Length of cephalothorax about four times its greatest breadth, some appearance of an articulation is distinguished within, near middle of cephalothorax. Beak bears below two spines, extending downward, which are rather long. The eyes small; pigment deep reddish black, and nearly quadrilateral in form, rather larger than usual. Abdomen three-jointed; setæ of moderate length.

The stomach is a long oval sac; and the intestine beyond, which commences at the first articulation, is half its diameter. The heart gave two hundred and fifteen palpitations in a minute.

CALANUS AFFINIS.

Frons rotundatus. Cephalothorax 5-articulatus, posticè obtusus, articulis 4 posticis subæquis. Antennæ anticæ corporis longitudine, apicibus fronte posterioribus; setis brevibus, duabus posticis subapicalibus prælongis, anticâ penultimâ dimidio brevior, apicalibus brevibus. Styli caudales perbreves, setis diffusis, secundis fere duplo longioribus quam primæ.

Front rounded. Cephalothorax five-jointed, obtuse behind, four posterior segments about equal in length. Anterior antennæ as long

as the body, tips a little behind line of beak, setæ very short, two posterior subapical quite long and nearly equal, anterior penult nearly half as long, apical very short. Caudal stylets very small, not oblong; setæ of moderate length, the second about twice the first in length.

Plate 73, fig. 8 *a*, animal, enlarged; *b*, abdomen of another individual; *c*, extremity of antennæ of another individual.

Taken March 3, 1842, southeast of Sumatra.

Length one-twelfth of an inch. Nearly colourless. The setæ of the antennæ are all short except the subapical. The inner setæ of the caudal stylets are a little curved at the tips; the second seta is somewhat arcuated. Abdomen four-jointed, first joint longest, last very short.

CALANUS FLAVIPES.

Frons triangulatus, vix prominulus. Cephalothorax 5-articulatus, posticè attenuatus, obtusus aut subacutus. Antennæ anticæ corpore paulo longiores, duplo leviter curvatae, apicibus fronte vix posterioribus; setas vis affinis similes. Styli caudales oblongi, setis mediocribus, non diffusis. Abdomen 2-articulatum;—an adultum?

Front triangular, slightly prominent. Cephalothorax five-jointed, broadest anteriorly, narrowing much behind, and obtuse or subacute. Anterior antennæ a little longer than the body, very slightly doubly curved, tips hardly posterior to line of beak; setæ like those of the *affinis*. Caudal stylets somewhat oblong, setæ of medium length, not spreading. Abdomen two-jointed, the second oblong (possibly not adult).

Plate 73, fig. 9 *a*, animal, enlarged; *b*, extremity of antenna.

Taken, off the harbour of Rio Janeiro, January 7, 1838.

Length, one-tenth of an inch. Colourless, except the lateral organs and antennæ, which were part orange.

The front forms a low obtuse angle between the antennæ. The cephalothorax narrows posteriorly, and the last segment is about twice the breadth of the first abdominal. The last joint of the antennæ is longer than the preceding. The posterior subapical setæ are about twice as long as the last two joints; the anterior and posterior præantepenult are very short; the apical are short, two extending backward, and one or two obliquely outward and forward.

CALANUS TENUICORNIS.

Frons rotundatus. Cephalothorax 5-articulatus, posticè obtusus, segmentis 4 posticis subæquis. Antennæ anticæ sesqui corporis longitudine, tenuissimæ, duplo levissimè curvatæ, apicibus fronte vix posterioribus, articulis tribus ultimis subæquis; setis brevibus, articuli tertii setâ longiore, setis duabus posticis subapicalibus prælongis, anticâ penultimâ fere dimidio breviorè, apicalibus brevibus. Styli caudales oblongi (latitudine duplo longiores).

Front rounded. Cephalothorax five-jointed, posterior angles a little elongate, but obtuse, the last four segments nearly equal. Anterior antennæ nearly one and a half times as long as body, very slender, slightly doubly curved, tips nearly in line of front, last three joints subequal, setæ short, one a little longish on the third joint, two subapical, posterior quite long, anterior penult more than half shorter, apical short. Caudal stylets twice as long as broad.

Plate 73, fig. 10 *a*, animal, enlarged; *b*, extremity of antenna.

Taken, July 2, 1841, in the Pacific, latitude 40° north, longitude 157° west.

Length, one-twelfth of an inch. Nearly colourless. The posterior antepenult seta of the anterior antennæ is as long as last six or seven joints of the antennæ; the penult is a fourth shorter; the apical are shorter than the joint. At apex of seventh joint from the extremity there is a prominent seta, nearly as long as two joints of the antenna, and equalling the seta from the third joint. The caudal setæ were broken off in the specimen examined. The posterior antennæ have

the outer joint of one branch five- or six-articulate. Abdomen four-jointed, first segment oblong.

CALANUS SANGUINEUS.

Frons rotundatus. Cephalothorax 5-articulatus, posticè obtusus aut subacutus, articulis 4 posticis subæquis. Antennæ anticæ corporis longitudine, fere rectæ, apicibus fronte vix posterioribus; setis brevibus, unâ articuli tertii longiore, subapicalibus iis tenuicornis fere similibus. Styli caudales paulum oblongi, setis mediocribus, diffusis, secundis longioribus.

Front rounded. Cephalothorax five-jointed, last four segments subequal, posterior angles a little prolonged, obtuse or subacute. Anterior antennæ as long as body, nearly straight, the tips scarcely posterior to line of front, setæ short, one longer from third joint, subapical as in the *tenuicornis*. Caudal stylets a little oblong, setæ spreading, of medium length, the second a little elongate.

Plate 73, fig. 11 *a*, animal, enlarged; *b*, extremity of antenna.

Collected abundantly, May 28, 1841, in the Pacific, latitude 32° north, longitude 173° west; also, July 6, 1841, latitude 44° north, longitude 153° west; also, the same species, apparently, January 28, 1842, in the Sooloo Sea, east of Panay.

Length, one-tenth of an inch. Often deep red; also, colourless. On May 28, 1841, the sea was coloured red by this species over large areas. The blood-coloured areas mostly formed bands, two to four feet wide, extending as far as the eye could reach, at right angles with our track, the vessel heading east-northeast, with the wind at southeast by east. Anatifas were abundant at the same time.

The antennæ have, at intervals of a few joints, a seta two or three times as long as the others. The posterior subapical setæ are as long as the last five or six joints; the posterior apical about as long as apical joint; anterior apical much shorter; anterior penult as long as last two joints. Abdomen four-jointed, segments subequal.

Fig. 12 *a*, Plate 73, represents a specimen which may belong to the above species. I suspect that the setæ of the antennæ as well as caudal stylets were mutilated. The front (12 *b*) is a little flattened (instead of rounded); the posterior angles of the cephalothorax are subacute; antennæ longer than the body by two or three joints, and tips a little behind line of beak; four segments of abdomen subequal; posterior penult seta of antennæ (12 *c*) equals last six joints, and is two-thirds of antepenult in length. Collected, March 22, 1841, north of Depeyster's Island, Kingsmill Group, Pacific.

Var. *perspicax*.—Plate 74, figs. 1 *a, b, c*, illustrate another specimen, possibly a variety of the *sanguineus*. The following are its characters:

Cephalothorax rounded in front, obtuse behind, five-jointed, four posterior segments subequal. Abdomen about half as long as cephalothorax. Pigment of eyes transversely oblong, somewhat bilobate. Anterior antennæ a little longer than body, curved at base, but thence straight and both in same line, tips not behind line of beak; first joint short, second oblong, last three subequal, last acuminate; setæ short, a longer one from fifth joint, two posterior subapical very long (as long as last five or six joints), subequal, anterior penult a fourth shorter, apical short. Abdomen consisting of four subequal joints, none oblong. Caudal stylets short, slightly longer than broad, setæ much spreading, inner nearly half shorter than second.

Collected among the Feejee Islands, July, 1840.

Length, one-twelfth of an inch.

In habit, this species resembles some *Pontellæ*, and it may belong to that group.

CALANUS MUNDUS.

Frons rotundatus. Cephalothorax posticè obtusus, 5-articulatus, articulis 4 posticis subæquis. Antennæ anticæ corpore parè longiores, bene rectæ, apicibus fronte non posterioribus, articulo primò (2do?) crassè oblongo et setis inflexis instructo; setis perbrevisibus, articuli secundi longiore, apicalibus brevibus, posticâ antepenultimâ longâ, posticâ penultimâ dimidio breviorè, anticâ penultimâ paulo minore (articulum æquante),

anticâ antepenultimâ minutâ. Abdomen 4-5-articulatum. Styli caudales breves, setis appressis, secundis longioribus.

Front rounded. Cephalothorax five-jointed, four posterior joints subequal, obtuse behind. Anterior antennæ slightly longer than body, straight even from the basal joint, which is stout and oblong, tips in line of beak, first (or second) joint stout and oblong, and furnished with inflexed setæ, setæ very short, on second joint a seta three or four times as long as diameter of joint, apical setæ short, posterior antepenult seta nearly as long as last four joints, posterior penult half shorter, anterior penult still shorter (about as long as penult joint), anterior antepenult minute, apical shorter than apical joint. Abdomen four to five-jointed. Caudal stylets very short, setæ but slightly divergent, the second a little elongate (one-fourth longer than third).

Plate 74, fig. 2 *a*, animal, enlarged; *b*, extremity of antenna.

Collected, July 6, 1841, in the Pacific, latitude 44° north, longitude 153° west.

Length, one-tenth of an inch. Colour, slightly yellowish. The two anterior antennæ lie in the same transverse line. The basal joint is long and stout, with a few short uncinæ setæ; and on the following joints several of the setæ are curved or hooked. The antepenult joint is longer than either of the following, and the last is somewhat longer than the penult. At apex, one or two of the anterior setæ extend outward, and are uncinæ. The setæ of the posterior antennæ and following organs are rather short. The specimens were taken at the same time with the *C. sanguineus*, and they somewhat resemble that species, though different in the base and terminal setæ of the antennæ, and the abdomen and caudal setæ.

CALANUS INAURITUS.

Frons rotundatus. Cephalothorax posticè obtusus, 5-articulatus, articulo ultimo brevissimo. Antennæ anticæ fere rectæ, corpore paulo breviores, articulo primo valde elongato (an duplice?) tribus setis pendulis sub-

clavatis et aliis setis brevibus uncinatis instructo, setis apicalibus et anticis subapicalibus perbrevibus, subapicalibus posticis articulo viâ longioribus, inæquis. Styli caudales breves, setis parçè diffusis aut appressis.

Front rounded. Cephalothorax obtuse behind, five-jointed, last segment very short. Anterior antennæ nearly straight, a little shorter than the body, the first or basal joint elongate (probably double), furnished with three pendulous subclavate setæ, and others quite short, apical and anterior subapical setæ very short, posterior subapical setæ slightly longer than joint. Caudal stylets short, setæ not spreading.

Plate 74, fig. 3 *a*, animal, enlarged; *b*, bases of the same, more enlarged; *c*, extremity of antenna.

Collected, October 22, 1838, in the Atlantic, latitude 6° north, longitude 21° west.

This specimen had three or four setæ pendant from the anterior margin of the basal joint of the antennæ (fig. 3 *b*), which were coloured reddish orange, like the central portions of the cephalothorax. They were nearly as long as whole base. Besides these, there were on the base a few uncinatæ setæ. Cephalothorax a little broader posteriorly, and somewhat truncate behind. The abdomen linear; the stylets about as long as last joint of abdomen. The caudal setæ were mostly broken off. Apical joint of longer branch of posterior antennæ, about one-third the length of the branch; the other branch much the shortest. Four pairs of natatories. Abdomen five-jointed.

2. Cephalothorax posticè acutus, angulis posticis abdomen appressis.

CALANUS SIMPLICICAUDUS.

Frons obtusus. Cephalothorax 5-articulatus, segmento postico angusto et posticè brevissimè acuto. Antennæ anticæ corpore paulo longiores, basi arcuatae, alioque fere rectæ, apicibus fronte parçè posterioribus; setis brevibus, duabus subapicalibus posticis longis, inæquis, anticâ penul-

timâ dimidio brevior, apicalibus brevibus. Abdomen 2-articulatum (an adultum?). Styli caudales paulum oblongi.

Front obtuse. Cephalothorax five-jointed, the last segment of the thorax but little broader at extremity than the abdomen, and behind very short acute. Anterior antennæ a little longer than the body, arcuate at base, and then straight and slightly inclined backward, the tips a little behind line of beak; setæ mostly short, the two posterior subapical long, the longer equalling last four joints, anterior penult half shorter, the apical short, spreading, one anterior subremote from apex. Abdomen two-jointed (possibly not adult), second segment oblong. Caudal stylets twice their breadth in length.

Plate 74, fig. 4 *a*, animal, enlarged; 4 *b*, extremity of antenna.

Collected in the Pacific, July 7, 1841, latitude 45° north, longitude 153° west.

This species resembles the *flavipes* in the abdomen, and in the last thoracic joint being but little broader than the abdomen; also, in the stylets and antennæ. But the form of the cephalothorax is elliptical, the posterior angles are minute points, the front is rounded instead of triangulate. On these grounds the species are considered distinct. The anterior antennæ have the setæ of the fourth joint of the anterior from the extremity very short before and behind; on the next preceding, there is an anterior seta nearly as long as the joint. The basal joint is oblong, and a shorter anterior to the oblong joint was not observed.

CALANUS APPRESSUS.

Frons obtusus. Cephalothorax posticè angustior, angulis posticis elongatè acutis abdomen appressis, 5-articulatus, articulis posticis longitudine subæquis. Antennæ anticæ corpore paulo longiores, duplo leviter curvatæ, articulo ultimo valde graciliore quam penultimus; setis brevibus, duabus posticis subapicalibus prælongis, subæquis, strenuis, anticâ penultimâ dimidio brevior, apicalibus articulo non longioribus. Styli caudales breves, setis diffusis, mediocribus, secundis longioribus.

Front obtuse. Cephalothorax posteriorly narrowed, behind long-acute, the points appressed to abdomen, five-jointed, four posterior segments of nearly equal length. Anterior antennæ a little longer than the body, with a slight double curvature, tips behind line of beak, last joint much more slender than penult, setæ short, two posterior subapical very long and rather stout, subequal, the anterior penult half shorter, apical short, not longer than apical joint, spreading. Caudal stylets short, setæ spreading, of moderate length, second nearly half longer than the others.

Plate 74, fig. 5 *a*, animal, enlarged; *b*, extremity of antenna; *c*, caudal stylets and setæ of another individual.

Collected in the Pacific, latitude 25° north, longitude 167° east, May 14, 1841; also latitude 30° south, longitude 13° east, April 21, 1842; also March 4, 1842, east of Sumatra.

Length, one-twelfth of an inch. Colour, red in blotches, or about the articulations and mouth, and also in the palpi and posterior antennæ. The long posterior points of the cephalothorax close appressed to the abdomen give a peculiar appearance to the species. The caudal stylets are a little longer than broad. The antennæ are longer than the body by the apical joint. The setæ towards base of anterior antennæ are all very short, with an occasional one but little longer; the posterior subapical are as long as last five or six joints, and the penult articulates with the penult joint near the middle of its posterior margin. The longest of the apical setæ is about equal to the joint in length. Of the fourth joint from the extremity, the posterior seta is as long as breadth of joint, and the anterior is twice longer. The last joint of the antennæ is very much more slender than the preceding.

Plate 74, fig. 6, represents the antenna of an individual apparently of the above species; and if so, the organ is a monstrosity. The setæ are all short, and there is a tuft at apex, which looks quite abnormal, especially as there are no posterior subapical setæ to the organ, as in all other known species. It consists of twenty-one joints, instead of twenty-four, the entire number, evincing that probably the last three joints were abortive; its length was about equal to the cephalothorax and half the abdomen. It was taken southeast of Sumatra, March 3, 1842.

3. Cephalothorax posticè elongatè acutus, angulis posticis remotis.

CALANUS COMMUNIS.

Frons rotundatus. Cephalothorax posticè elongatè acutus, 5-articulatus, articulis 4 posticis subæquis. Antennæ anticæ corpore paulo longiores, duplo leviter curvatæ, apicibus fronte non anterioribus, setis apicalibus brevibus, duabus posticis subapicalibus longis, subæquis, anticâ penultimâ quadruplo brevior, setis totis aliis brevibus. Styli caudales breves, setis diffusis, secundis duplo longioribus.

Front obtuse. Cephalothorax posteriorly long acute and points distant, five-jointed, four posterior segments subequal. Anterior antennæ a little longer than the body, very slightly doubly curved, tips not anterior to line of front; apical setæ short, two posterior subapical long, nearly equal, anterior penult one-fourth as long, all the other setæ short, apical minute. Caudal stylets very short, setæ spreading, the second twice longer than the first.

Plate 74, fig. 7, view, enlarged.

Collected in the Atlantic, October 18, 20, 27, 31, and November 2, 3, 8, and 12, 1838, latitude 8° north to 5° south, longitude 23° to 15° west; also May 13 and 16, 1842, latitude 4° 30' to 1° south, and longitude 25° to 30° 30' west.

Length, one-tenth of an inch. Colour, purplish or reddish, faint.

The four posterior joints of the cephalothorax constitute more than two-fifths of its whole length. Among the caudal setæ the second is about half longer than the others. There are five pairs of natatories, of which the first pair is the shortest, and the fifth the next shortest. Eyes minute. Last joint of antennæ a little longer than the preceding. Abdomen four-jointed, first segment a little the longest.

CALANUS AMENUS.

C. communi quoad antennas anticæ setasque caudales affinis. Cephalo-

thorax 5-articulatus, articulo ultimo brevissimo, angulis posticis elongatè acutis.

Near the *C. communis* in the anterior antennæ and caudal setæ. Cephalothorax five-jointed, last segment very short, posterior angles long acute.

Plate 74, fig. 8 *a*, animal, enlarged; *b*, extremity of antenna.

Collected in the Pacific, near the island of Upolu, Samoan Group, February 26, 1841, at 9 P. M; also off southeast end of Mindoro, East Indies, February 1, 1842.

Length, one-tenth of an inch. Colour, a faint tinge of bluish purple, with some red blotches in posterior segments of cephalothorax.

The caudal setæ are much less spreading than in *C. communis*, and the second seta is longer in proportion to the others.

CALANUS BELLUS.

Frons rotundatus. Cephalothorax posticè elongatè acutus, 5-articulatus, articulis 4 posticis subæquis. Antennæ anticæ corpore paululo longiores, vix duplo curvatæ, apicibus fronte non anterioribus; setis brevibus, unâ tertii articuli longâ, duabus posticis subapicalibus longis, subæquis, apicalibus brevibus, anticâ penultimâ paulo longiore. Styli caudales breves, setis diffusis, secundis fere duplo longioribus.

Front rounded. Cephalothorax behind long acute, and points remote; five-jointed, four posterior segments subequal. Anterior antennæ very little longer than the body, scarcely doubly curved, nearly straight, tips nearly in line of beak; setæ short, one from third joint long, two posterior subapical quite long, subequal, apical short, with one seta remote from apex, anterior penult about as long as joint. Caudal stylets very short, setæ much and neatly spread, the second nearly twice as long as first.

Plate 74, fig. 9 *a*, animal, enlarged, lateral appendages omitted; 9 *b*, extremity of antenna.

Collected in the Sooloo Archipelago, February 2, 1842; also in Straits of Banca, March 2, 1842.

Length, one-eighth of an inch. Colour, a shade of rose, with red blotches; another specimen with a tinge of greenish yellow.

Resembles the two preceding, but differs from both in the long seta to third joint of antenna, directed straight forward, and the more widely spread caudal setæ. The abdomen is four-jointed, the first segment oblong. In some young individuals, the prominent posterior angles of thorax were much shorter than in the figure, and only subacute. The penult is the shortest of the five terminal joints of the antennæ; the long posterior subapical setæ about equal the last five joints, the anterior antepenult is about half as long as joint, apical less than length of joint. Caudal stylets not longer than broad.

From the *setuligerus* it differs in having the cephalothorax behind acute.

B. Setæ caudales 2dæ longissimæ. Frons sive obtusus sive triangulato-acutus; rostro elongatè furcato, brachiis setiformibus.

CALANUS GRACILIS.

Gracilis. Frons rotundatus. Cephalothorax elongatus, 5-articulatus, posticè obtusus, segmentis 4 posticis subæquis, ultimo parce brevior. Antennæ anticæ sesqui corpore longiores, rectæ, 160° inter sese divaricatæ; setis brevibus, duabus posticis subapicalibus longis, apicalibus et anticis subapicalibus brevibus. Abdomen curtum, 4-articulatum. Styli caudales breves, setis secundis dimidio corporis longioribus.

Slender. Front rounded. Cephalothorax elongate, obtuse behind, five-jointed, four posterior segments subequal, the last somewhat shorter than the others. Anterior antennæ more than one and a half times the length of the body, straight, slightly curved at base, the two diverging at an angle of 160°; first joint short, second a little oblong, penult abbreviate; setæ short, two posterior subapical long, apical and anterior subapical short. Abdomen short, four-jointed. Caudal stylets short, second seta much longer than half the body, the others of moderate length.

Plate 74, fig. 10, animal, enlarged.

Collected in the Atlantic, latitude 4° 30' south, longitude 25° west, May 13, 1842.

Length, one-eighth of an inch. Colourless, except some red about the mouth, the articulations of the thorax, and in the posterior antennæ and first pair of legs.

In the specimen, the setæ of the antennæ and caudal stylets were partly mutilated. The species is near the *C. elongatus* and *attenuatus* in habit, but the front is not at all triangulate. The body is slightly and gradually narrower anteriorly, it being broadest posterior to middle; there is no abrupt narrowing posterior to the first pair of antennæ, as in the species just alluded to. The antennæ are about one and two-thirds times as long as the body. The apical setæ are much shorter than the apical joint, and one quite short seta, directed forward, is situated some distance from the apex.

CALANUS ELONGATUS.

Elongatus. *Frons breviter triangulatus, subacutus, rostro elongatè et tenuiter furcato. Cephalothorax 4-articulatus, anticè angustatus, posticè obtusus. Antennæ anticæ sesqui corporis longitudine, rectæ, et latissimè divaricatæ, apicibus fronte vix anterioribus, articulo penultimo abbreviato; setis plerumque brevibus, paucis remotis longiusculis, apicalibus diffusis articulo longioribus, subapicalibus posticis longis, inæquis, anticâ penultimâ minus dimidio breviorè, anticâ antepenultimâ obsoletâ. Antennæ posticæ ramo minore 2-articulato. Abdomen curtissimum. Styli caudales brevissimi.*

Elongate. Front short triangular, subacute, rostrum long and slenderly furcate. Cephalothorax four-jointed, narrowed anteriorly, obtuse behind. Anterior antennæ one and a half times as long as body, very nearly straight quite to base, and very broadly divaricate, tips hardly anterior to line of beak; penult joint very short, setæ mostly short, those of the joints 3, 8, 9, 17, rather long, apical diffuse, longer than apical joint, posterior subapical long, unequal,

anterior penult less than half shorter, anterior antepenult obsolete. Shorter branch of second antennæ two-jointed. Abdomen very short. Caudal stylets extremely short.

Plate 75, fig. 1 *a*, animal, enlarged; *b*, under view of anterior part, more enlarged (*a*, base of anterior antennæ; *b*, posterior antennæ; *c*, mandible; *c'*, mandibular palpus; *d*, maxilla and palpus; *e*, maxilliped; *f*, first pair of legs, in part; *m*, buccal mass; *n*, furcate appendage to beak).

Collected in the Sooloo Sea, southwest of Mindanao, February 1, 1842.

Length, one-fifth of an inch. This species is much narrower for some distance posterior to the first pair of antennæ than across the middle, and the second pair of antennæ is remote from the first pair. The beak is very long and slender furcate. The abdomen is singularly short and but two-jointed; the last joint very short also, and bears the stylets at its truncate posterior angles, these stylets hardly projecting beyond the posterior margin of the joint.

The anterior antennæ have a barely perceptible curve towards base. The apical setæ are spreading and a little bent, and all are longer than apical joint; the penult anterior is half the posterior, and about as long as apical joint; the anterior antepenult appears to be obsolete; the anterior of next joint preceding is as long as the longest apical seta. The third joint of the antenna is in fact a part of the second; its seta is as long as first three joints, and it is directed straight forward. The setæ of the second pair of antennæ and following organs are rather short, the length scarcely equalling the greatest breadth of the cephalothorax. The branches of the second pair of antennæ are unequal; the shorter consists of two subequal joints, and the other of two quite unequal joints, the second being about half as long as the first.

CALANUS ATTENUATUS.

Elongatus. Frons triangulatus, acutus, rostro elongatè et tenuiter furcato. Cephalothorax anticè valde angustatus, posticè obtusus, 5-articulatus

articulo ultimo brevi. Antennæ anticæ corpore valde longiores, prope basin arcuatæ, alioque rectæ et latissimè divaricatæ, apicibus fronte paulo anterioribus, articulo penultimo abbreviato; setis vix brevibus, plerumque fractis, fere æquis, apicalibus et subapicalibus inæquis, longiusculis, anticâ antepenultimâ obsoletâ. Antennæ posticæ ramo minore multiarticulato. Abdomen curtissimum. Styli caudales perbreves, setis secundis dimidio corporis longioribus.

Much elongate. Front triangular, acute, rostrum long and slenderly furcate. Cephalothorax anteriorly narrow, obtuse behind, five-jointed, last joint very short. Anterior antennæ much longer than the body, arcuate towards base, then straight, the tips a little anterior to line of beak, the penult joint very short; setæ moderately short, mostly bent, subequal, apical and subapical spreading, unequal, rather long, anterior antepenult obsolete. Shorter branch of second pair of antennæ multiarticulate. Abdomen extremely short. Caudal stylets very short; second seta longer than half the length of the body, the others of moderate length.

Plate 75, fig. 2 *a*, view, enlarged; *a'*, extremity of antenna; *b*, mandible; *b'*, body of mandible in another position; *c*, maxilla; *d*, under view, more enlarged (*a*, first antenna; *b*, second antenna; *c*, mandible; *d*, maxilla); *e*, back view (showing the nerves to the antennæ (*a*), that to the eyes (*e*), and the glands over the stomach, which are ovarian or spermatoc; *m*, a muscle moving the abdomen).

Collected two individuals just south of the Kingsmill Islands, in the Pacific, April 1, 1841, 4 A. M.; also, April 13, 1841, in the Kingsmill Group; also in the China Sea, February 15, 1842.

Length, one-eighth of an inch. The anterior part of the body is proportionally much narrower than in the preceding species and more elongate; the breadth posterior to the first antennæ is hardly half that across the middle. The setæ of the first antennæ and caudal setæ are unlike those of that species; and the setæ of the second antennæ and following organs are much longer than in the *C. elongatus*. The first antennæ are one-fourth longer than the body; the last joint is longer than the two preceding. There is a seta a little longer than the others near, about one-third the length of the antenna from its base.

Abdomen three-jointed, first joint oblong. The long seta of the caudal stylets is two-thirds as long as the body, and is naked or not plumose. The furcate process of the beak is long and slender.

The multiarticulate character of the smaller branch of the posterior antennæ may authorize the institution of a new genus, or subgenus, for this and allied species, for which we propose the name *Eucalanus*. The above species will be *E. attenuatus*.

GENUS RHINCALANUS, Dana.

Calano fermè affinis. Frons valde angustèque productus, rostro breviter crassèque infra furcato.

Near *Calanus*. Front long produced and narrow, beak below short and stout furcate.

The species of this genus have the legs and antennæ of *Calanus*, with a narrow elongate, rostriform head, as in the preceding species, but with a stout furcate beak, directed downward from its extremity. The beak approaches that of some *Pontellæ*. The body is unusually long and slender. Among the caudal setæ, the second is probably very long: our specimens were mutilated in this part. The species below are referred to the genus *Calanus* in the *Proceedings of the Amer. Acad. Sci.*, ii. 19, as *C. rostrifrons* and *C. cornutus*.

RHINCALANUS ROSTRIFRONS.

Gracillimus. Frons valde elongatus, subacutus. Cephalothorax anticè paulo angustior, posticè rotundatus, 5-articulatus, articulo postico brevi, articulis penultimo antepenultimoque posticè acutis. Antennæ anticæ corpore valde longiores, leviter arcuatæ, latè divaricatæ, apicibus fronte anterioribus, setâ articuli secundi longiusculâ, setis apicalibus articulo vix longioribus, duabus subapicalibus posticis longis. Abdomen curtum. Styli caudales fere duplo longiores quam lati, setis latissimè diffusis.

Very slender. Front much elongate, subacute. Cephalothorax five jointed, penult and antepenult segments acute either side, the last

very short, obtuse behind. Anterior antennæ considerably longer than the body, gently arcuate, tips anterior to line of beak, first joint much oblong, four apical short; seta of second joint rather long, of sixth a little shorter, of sixteenth a little longer; apical setæ scarcely longer than joint, two posterior subapical long (others mutilated). Abdomen short. Caudal stylets oblong, about twice as long as broad, setæ widely spreading.

Plate 76, fig. 1 *a*, animal, enlarged; *b*, another individual.

Collected in the Sooloo Archipelago, February 2, 1842.

Length, one-eighth of an inch. The furcate processes of the front below are stout and rather short, and quite unlike the long slender processes of some Calani, and in one specimen, they were seen either side in an upper view. The abdomen is three-jointed. The caudal stylets are articulated obliquely to the abdomen, and the projecting part is but slightly oblong. The outer setæ are nearly at right angles with the side of the stylet; the second were broken off and are probably quite long; the third and fourth are about as long as the abdomen. The setæ of the second pair of antennæ and the following organs are rather short. The posterior subapical setæ of the anterior antennæ are as long as the last five or six joints of the antenna; the anterior antepenult is as long as the joint (other apical or subapical mutilated). These antennæ diverge at base at an angle of about 120°, but gradually curve more and more outward.

The animal often flexed its antennæ against its sides, quite unlike in this respect the ordinary Calani.

RHINCALANUS CORNUTUS.

Gracillimus. Frons valde elongatus, subacutus. Cephalothorax posticè rotundatus, 5-articulatus, articulo postico fere obsoleto, articulis tribus precedentibus posticè acutis. Antennæ anticæ sesqui corporis longitudine, fere rectæ, vix arcuatæ, apicibus fronte paululo anterioribus; setâ articuli tertii longiusculâ, setis apicalibus et penultimis brevibus, posticâ antepenultimâ longiore. Abdomen curtum. Styli caudales elongati; setis valde diffusis.

Very slender. Front much elongate, subacute. Cephalothorax rounded behind, five-jointed, last segment nearly obsolete, second, third, and fourth acute on either side behind. Anterior antennæ one and a half times as long as body, very nearly straight, hardly arcuate, tips anterior to front, setæ mostly very short, one on third joint rather long, apical and penult setæ short, posterior antepenult somewhat long. Abdomen short. Caudal stylets oblong, setæ much spreading.

Plate 76, fig. 2 *a*, animal, enlarged; *a'*, profile view of front; *b*, maxilla; *c*, a natatory leg; *d*, form of heart.

Collected four or five individuals in the Atlantic, November 3, 1838, latitude 1° north, longitude 18° west.

Length, one-eighth of an inch. Colour, reddish in spots about the articulations of the cephalothorax. This species is very near the preceding, but has the antennæ straight, and the abdomen four-jointed, besides other points of difference. The four posterior segments of the cephalothorax are scarcely one-third the whole length. The forks of the beak are seen in an upper view, as in the figure. The abdomen is four-jointed; first segment about as long as broad, the next two together about the same length. The stylets are much more oblong than in the *rostrifrons*. The caudal setæ were partly mutilated; the exterior one arises, as in the *rostrifrons*, on the outer side of the stylet near its base, the next, near its middle; neither of these two are quite as long as abdomen. There are four pairs of natatories, besides a pair of small feet.

This species approaches the *Pontellæ*, but appears to be nearer *Calanus*. The maxillipeds are large, nearly as in *Pontella*, but the following organs, the first pair of feet, have lateral motion, and are moderately long.

GENUS EUCHÆTA, *Philippi*.

The species of this genus collected by the author have the front in a vertical view pointed, and acute or nearly so; while in a lateral view it is transversely notched, so as to be two-toothed. The cephalic segment, as in the *Calani*, is never distinct from the following part of

the cephalothorax; and the number of posterior cephalothoracic segments is either three or four. The abdomen is linear, rather long, but not exceeding half the length of the cephalothorax; and the caudal stylets are quite short. The caudal setæ are straight; they are moderately short, excepting the second, which is much longer than the others, and in the females observed, not shorter than the body. The eyes are two on a single minute spot of pigment.

The antennæ extend outward either side with a double curvature, and the tips are not in advance of the line of the beak. In the *females*, several joints, including the apical, are furnished with one or more long setæ, and two towards the base are bent; but in the *males* examined, the same joints have setæ only moderately long. The two sexes thus do not agree in the setæ of the antennæ: moreover, they are unlike (if we are right in our reference of male to female in two species) in the basal joints of the antennæ; in the number of cephalothoracic segments, the male having a posterior segment which does not appear in the female of the species alluded to; and in the caudal setæ, the second seta being very much shorter in the male than in the female.

The anterior feet instead of extending laterally, as in the *Calani*, are thrown forward: the basal joint is long; the second is still longer; and the remainder, which is quite short, consists of five to seven minute joints, more or less distinct, each bearing a long naked seta, and the whole forming a pencil. The leg is thrown forward so that the apex of the second joint is under the mouth, and the apical portion with the pencil is directed downward.

The maxillipeds are nearly as in *Pontella*, but rather smaller. The base and other joints form a straight leg, and the rather long spinulous setæ are together directed forward.

The second pair of antennæ are as in *Calanus*. One branch consists of two nearly equal joints; it bears at apex three setæ, and on the under side of the first joint other setæ. The other branch is two-jointed, the second quite short, and bearing a number of long setæ.

The mandible is dentate at apex, and has a short seta on one side. The palpus is two-branched, and the two branches are nearly of equal length; the shorter has two short subequal joints; the longer has a short basal joint. Both are furnished at apex with several subequal setæ.

The posterior feet in the female are short, as in the *Calani*, and with-

out setæ. In the male they are long and straight, and extend forward, reaching as far as the mouth, or even beyond. The right terminates in an imperfect hand, consisting of a small arcuate thumb, or immoveable finger, and a long subulate finger, at least three times as long as the thumb. The left is two-branched; one branch is a single oblong joint; the other consists of two long joints, of which the second is long subulate.

The setæ of the antennæ of the females are quite similar in different species. The apical are four or five in number, there being two long posterior, of which one is one-third to one-half as long as the antenna, one anterior somewhat shorter, and one or two quite short extending outward. The posterior penult is about as long as anterior apical; the anterior penult very short. The posterior antepenult is sometimes as long as the joint, in other cases very short; the anterior antepenult very short. Counting from the apex, the fourth, seventh, eleventh, seventeenth, eighteenth, and twenty-first joints are furnished with very long setæ, and of these, the setæ of the seventeenth and eighteenth joints are bent, and have free motion in different directions; the others are directed straight forward in parallel lines, except the posterior apical, which point straight backward.

The species of this genus, though few in number, are very extensively distributed in the Atlantic, and but little less so in the Pacific Ocean.

Euchæta, PHILIPPI, Archiv für Naturgeschichte, ix. 55. In the figures given by Philippi, the mandibular palpus is separated from the rest of the mandible, and called a "kaufuss," or maxilla-foot. His fig. 5 *d*, is properly the mandibular palpus; 5 *c*, the maxilla; 5 *e*, the maxilliped; 5 *f*, the foot of first pair.

Euchirus, DANA, Amer. J. Sci. [2], i. 228, *Euchæta*; Proc. Amer. Acad. ii., 20, where the following new species are briefly described by the author.

EUCHÆTA COMMUNIS.

Cephalothorax nudus, 4-articulatus, posticè obtusus. Feminae:—*Antennæ anticæ corpore vix breviores, setis paucis remotis prælongis, rectis, et aliis duabus flexis longissimis, apicalibus prælongis, posticâ antepenultimâ fere articuli longitudine. Setæ caudales rectæ, secundâ sæpius corporis longitudine. Ova cærulea. Maris:—Antennæ anticæ corpore paulo breviores, angulo levissimè flexæ, setis brevibus, paucis, articulum apicalem vix superantibus. Setæ caudales abdominis longitudine.*

Cephalothorax naked, three-jointed, rounded behind. *Female*:—Anterior antennæ hardly shorter than the body, the last joint longer than the others; a few remote setæ very long and straight, besides two that are very long and bent. Apical setæ long, posterior antepenult about as long as the antepenult joint. Caudal setæ straight, the second usually as long as the body. Eggs blue. *Male*:—Anterior antennæ a little shorter than the body, slightly bent, setæ short, the longer scarcely exceeding the length of the apical joint. Caudal setæ about as long as the abdomen.

Plate 77, fig. 1'a, lateral view of *female*, enlarged; *b*, mandible, more enlarged; *c*, maxilla; *d*, maxilliped. Fig. 2 *a*, *male*, enlarged; *a'*, upper view of front; *b*, second pair of antennæ; *c*, one of the natatories; *d*, *e*, genital feet, *d* being the left.

The *females* were collected abundantly in the Atlantic, October 15, 18, 20, 24, 26, 27, 29, 30, 31, November 1, 3, 5, 9, 12, 1838, latitude 9° north to 0°, longitude 17°–23° west; and latitude 0°–13° south, longitude 17°–32° west; also, May 11, 1842, latitude 7° south, longitude 20° west. The *males* were collected October 18, and November 1, 1838. The hour of collection was usually at 4 A.M., before daylight.

Length, one-eighth of an inch. Some red about the thorax; eggs bright blue.

The propriety of uniting the two *Euchætæ*, here described as male and female, is still quite uncertain, and rests mainly on the fact that they were found in the same part of the Atlantic, and no other male corresponding to the female, or female corresponding to the male was obtained. Besides this, the anterior legs are similar in the size of the apical multiarticulate part.

In the *female*, the first of the four cephalothoracic segments sometimes appears divided by an imperfect articulation, near the centre of the cephalothorax. The first of the joints of the abdomen is a little the longest. The caudal stylets are shorter than the last joint, and their apices are generally nearer than their bases; the setæ are not as long as the abdomen, except the second; this is curved, and in one specimen was longer than the body, while in another it was a little shorter. The anterior antennæ are in general very even; the long posterior apical seta is nearly half as long as the antenna, and a shorter one

with it is straight and nearly half this length. The posterior antennæ have the branches nearly equal, the apical joint of longer branch about half the first joint of same, and the setæ at apex are not quite as long as branch. The joints of the shorter branch are subequal. The ovarian sac contained ten eggs, and was attached below to the first of the four abdominal joints.

In the male, the front is low triangular, there being a sub-obtuse angle in the margin at the posterior angle of the antennæ, and the centre of the front being prolonged a little and acute. The antennæ differ from those of the above, in being a little bent at the eleventh joint from the apex, but without a geniculating joint, and also slightly bent near base; the setæ at apex are hardly longer than the apical joint, and the posterior penult is very short. The genital feet are very long, extending as far as the beak. One is three-jointed; the first joint very broad and short; the second long, subcylindrical; the third long subulate; there is also articulated with the first, a straight and subcylindrical joint (the other branch), nearly as long as second joint. The other leg is five-jointed; the second joint longer than first or third; the third and fourth nearly equal, the former arcuate; the fifth long subulate.

Figure 3, Plate 77, represents the young of one of the oceanic Calanidæ, and we believe of the above species, as it was found abundantly in the ocean where that was common. The body is subacute at each extremity, with no distinction of abdomen, and the segments are indistinct. There are three pairs of appendages, each three-jointed. The anterior is stout, with the second joint longest; and the last have a few short blunt setæ on the posterior side, which have the appearance of longer hairs broken off. The second pair has a two-jointed base, and two one-jointed branches, with a few setæ at apex. The third pair is simple, and has a few setæ at apex.

Length, one-twenty-fourth to one-thirtieth of an inch. Colourless, or a little red about the joints. Abundant, November 3, 1838. Atlantic, latitude 0° 40' north, longitude 18° west.

EUCHÆTA CONCINNA.

Cephalothorax nudus, ellipticus, capite lateraliter arcuatus, angulis posticis paulum productus et obtusus; feminæ 4-articulatus, maris

5-articulatus segmento postico perbrevis. Antennæ anticæ corpore paulo breviores, feminæ marisque iis E. communis fere similes, setâ antepenultimâ posticâ brevissimâ. Setæ caudales abdomine breviores, secundâ feminæ fere corporis longitudine, maris abdomen paulo superantibus.

Cephalothorax naked, elliptical, sides of head arcuate, the posterior angles of thorax a little elongate, but not acute, in *male* five segments, in *female* four segments. Anterior antennæ a little shorter than the body, nearly similar to those of the *communis*, doubly curved, and tips posterior to beak, posterior antepenult seta minute. Caudal setæ straight, second nearly as long as body, in female slightly longer than abdomen in male.

Plate 77, fig. 4 *a*, *female*, enlarged; 4 *b*, abdomen of another specimen. Fig. 5 *a*, *male*, enlarged; *b*, genital or posterior feet; *c*, one of the same.

Male and female, collected in the Straits of Banca, east of Sumatra, March 1, 1842.

Length, one-tenth of an inch. Colourless, nearly; a little red about the mouth and posteriorly.

We make the same remark with regard to the male and female of this species as of the last. The species is near the *communis*: but the front is laterally arcuate; the setæ of longer branch of posterior antennæ are longer than the branch, the abdomen in the female has a short apical joint, making five in all. The ovarian sac of the female contained twelve eggs. The internal ovaries were distinct, and appeared as a convoluted mass, extending either side of the body as far as the mouth. The genital feet are nearly as in the preceding. The basal joint of the subulate branch is more than twice as long as broad, and the second is but little longer; the third abruptly narrows from one side a short distance from base. The other leg has the fourth joint, or thumb, quite thin in its thumb part, and there is an indentation, or possibly articulation, in the subulate finger, opposite the apex of the thumb or immoveable finger. The anterior antennæ of the male are slightly bent at the eleventh joint from the apex, and also at the second or third joint; the part beyond the eleventh joint is slightly arcuate.

EUCHÆTA PUBESCENS.

Feminæ:—*Cephalothorax pubescens, capite lateraliter angulatus, 5-articulatus, segmento postico perbrevis, subacuto. Antennæ anticæ corpore paulo breviores, quoad setas E. communi fere similes, setis antepenultimis brevissimis. Pedes antici apice 5-articulati et subelongati. Abdomen 4-articulatum, segmento primo secundum longitudine duplo superante. Seta caudalis secunda fermè corporis longitudine, plumosa.*

Female:—Cephalothorax pubescent, the front on either side forming an angle with the sides, and at middle acute, five-jointed, posterior segments four, the last very short, subacute behind. Anterior antennæ a little shorter than the body, setæ nearly as in the *communis*, the antepenult setæ both anterior and posterior, minute; anterior feet having the apical portion somewhat elongated and five-jointed. Abdomen four-jointed, first joint oblong, twice as long as second, last very short; caudal setæ straight, second about as long as body, plumose.

Plate 77, fig. 6 *a*, animal, enlarged; *a*, beak; *b*, posterior antennæ; *c*, mandibles; *d*, lip; *e*, maxilla; *f*, maxilliped; *g*, anterior feet.

Collected in the Paumotu Archipelago, Pacific, August 19, 1839, latitude 15° 45' south, longitude 144° 30' west.

Length, one-twelfth of an inch. Colour, slightly yellowish red in the posterior thoracic segments.

The abdomen was but four-jointed, with some indication of a very short basal segment. The first of the four segments was largest and gibbous below. The long caudal seta is plumose. The anterior feet have the long setæ about ten in number, and very finely pectinate; the five-jointed apical portion is more than a fourth the length of the second joint. The basal joint bears a few spinous setæ; on the second the longer setæ are finely pectinate, like the apical setæ—the pectination is so fine as to require a very high power to detect it; the shorter spines are more slender and numerous than in the *communis*.

EUCHÆTA DIADEMA.

Feminæ:—*Cephalothorax pubescens*, capite lateraliter angulatus, 4-articulatus, posticè obtusus. Antennæ anticæ fere corporis longitudine, quoad setas E. communi fere similes, setâ posticâ penultimâ dimidium posticæ apicalis superante, setis antepenultimis brevissimis. Pedes antici apice 5–7-articulati et perbreves. Abdomen elongatum, segmento primo secundum longitudine paulo superante. Seta caudalis secunda corpore longior, nuda.

Female:—Cephalothorax obtuse behind, pubescent, front on either side and at middle acute, four-jointed, a fifth behind sometimes apparent. Anterior antennæ almost as long as body, the setæ nearly as in the *communis*, posterior penult seta longer than half the posterior apical, antepenult setæ very short. Anterior feet having the apical jointed portion rather short, the long setæ seven in number. Abdomen elongate, four-jointed, the first segment oblong, a little exceeding the second in length. Caudal setæ straight, the second longer than the body, naked.

Plate 77, fig. 7 *a*, animal, enlarged; *b*, maxillipeds; *c*, anterior feet; *d*, posterior thoracic feet of female; *e*, an appendage attached below to abdomen near its base in some individuals.

Collected in the Pacific, March 23, 24, and 25, 1841, south of and near the Kingsmill Islands, latitude 6°–6° 30' south, longitude 175° 30'–177° east.

Length, one-seventh of an inch. Colour, yellowish, or reddish; also, colourless.

This species is near the preceding, but is different in having the long caudal setæ naked instead of plumose, and also in its anterior feet, and in the maxillipeds being much smaller in proportion. In the organs last mentioned, the setæ are not longer than the leg, while in the *pubescens* they are much longer. The abdomen varies somewhat, and although about half the length of the cephalothorax in the

specimen figured, in another it was shorter, and more resembled this part in the *pubescens*. The posterior thoracic legs represented on the Plate, were figured from this specimen.

- GENUS UNDINA, Dana.

Frons infra tenuiter furcatus. Antennæ anticæ longæ, angulo ante medium leviter flexæ sed articulo geniculante non instructæ. Maris pes posticus dexter grandis et prehensilis, ac in Pontellâ. Pedes antici subelongati, fere ac in Calano et non geniculati. Maxillipedes pedibus anticis vix minores. Oculi inferiores nulli, superiores coaliti.

Front below slender furcate. Anterior antennæ long, slightly bent at an angle, but not having a geniculating articulation. Right posterior feet of male large and prehensile, as in *Pontella*. Anterior feet subelongate, of same form as in *Calanus*. Maxillipeds nearly as large as the anterior feet. No inferior eyes, the superior coalesced.

The *Undinæ* have the general habit of the *Calani*. The anterior antennæ in the males have no geniculating joint, but in both males and females they are slightly bent, about one-third of their length from the base. Like the *Pontellæ*, they have the posterior thoracic legs large and prehensile, while unlike them, the anterior feet have lateral motion, and are not smaller than the maxillipeds. The antennæ have the usual position in the *Calani*, the tips not being anterior to the line of beak or but slightly so. They are also near the *Euchætæ*, from which they differ in the maxillipeds not being thrown forward nor geniculate. The cephalothorax consists of four or five segments. The beak is similar to the same in *Calanus*.

Undina, DANA, Proc. Amer. Acad. Sci., ii. 22, where the following new species are briefly described.

UNDINA VULGARIS.

Frons obtusus. Cephalothorax 4-articulatus, posticè rotundatus. Antennæ anticæ corporis longitudine, ad articulum octavum leviter reflexæ; setis brevibus, setâ articuli tertii longâ, flexâ, setis apicalibus

perbrevibus, unâ uncinatâ, posticâ antepenultimâ longiusculâ, penultimis anticâ posticâque paulo brevioribus, hâc ad extremitatem uncinulatâ. Abdomen 5-articulatum. Styli caudales breves, setâ secundâ ceteris duplo longiore.

Front obtuse. Cephalothorax four-jointed, rounded behind. Anterior antennæ as long as the body, at eighth joint slightly flexed, tips much behind line of beak; setæ short, a rather long bent one from the third joint, apical setæ very short, one uncinuate, posterior antepenult as long as last three joints, posterior and anterior penult one-third shorter, nearly equal, the posterior curved at apex, anterior antepenult very short. Abdomen five-jointed. Caudal stylets short, second seta more than twice the length of the first, the others of moderate length.

Plate 77, fig. 8 *a*, animal, enlarged; 8 *b*, extremity of antenna; *c*, right genital foot; *d*, profile of cephalothorax, showing alimentary cavity and spermatic gland, with the appearance of the beak.

Collected in the Straits of Banca, east of Sumatra, March 1, 1842; also, in the Atlantic, May 9, 1842, latitude 9° south, longitude 17° 30' west; also, May 13, latitude 4° 30' south, longitude 25° west.

Length, one-twelfth of an inch. Nearly colourless, a little reddish in some parts.

The body narrows a little anteriorly. The basal joint of the anterior antennæ is about twice as long as broad, and it is followed by seven short joints, after which these organs are flexed slightly backward. The apical joint is articulated with the preceding under its apex, or obliquely, and it is rather shorter than the penult. The posterior seta, directed straight backward, is not longer than the joint; there is a small uncinuate seta directed outward, and quite a short one directed forward, a short distance back from the apex. The longish bent seta proceeding from the third joint is as long as the first six joints of the antenna; this seta has motion in different directions. There is a seta a little longer than the others near by, at the flexion of the antenna. The caudal setæ are all plumose. The right of the genital or posterior thoracic feet, is large and doubly geniculate, consisting of a large oblong basal joint; a second slender, a little curving and rather longer

than the basal; a third and fourth, each half shorter than the second, and stout; the fourth, bearing a stout spine or claw (nearly straight) at apex, nearly or quite as long as itself; and the second giving origin within to a long, naked, and stout seta, which extends beyond the apex of the terminal spine or claw. The whole has nearly the shape of a letter N, the second joint constituting the oblique line in the letter, and the third and fourth joints together one of the legs. The left of this pair of feet is simple and unflexed.

UNDINA SIMPLEX.

Frons obtusus. Cephalothorax posticè rotundatus, 5-articulatus, segmento ultimo brevior. Antennæ anticæ corporis longitudine, articulo primo elongato; setis perbrevis, setâ articuli secundi longiusculâ, flexâ, setis penultimis rectis et articuli longitudine, posticâ antepenultimâ dimidio longiore, apicalibus minutis, unâ uncinatâ. Abdomen 5-articulatum. Styli caudales perbreves; setæ plumosæ, 2dæ duplo longiores.

Front obtuse. Cephalothorax rounded behind, five-jointed, last segment short. Anterior antennæ as long as the body, first joint oblong; setæ very short, on second joint a longish bent seta; the posterior antepenult setæ equalling last two joints of antenna in length, the anterior and posterior penult half shorter, straight; the apical shorter than joint, one uncinat. Abdomen five-jointed. Caudal stylets very short, setæ plumose, second more than twice the first.

Plate 77, fig. 9 *a*, view, enlarged; *b*, extremity of antenna.

Collected, March 25, 1841, in the Pacific, off El Gran Cocal, south of the Kingsmill Islands, latitude 5° 45' south, longitude 175° 30' west; also, May 14, 1841, latitude 25° north, and longitude 167° east.

Length, one-twentieth of an inch. Colourless.

This species is near the preceding, and may be the same. Yet it is retained as distinct, as there are four posterior joints to the cephalothorax and the setæ of the antennæ are different; the basal joint is longer, and the longish bent seta is attached to the second joint.

Plate 77, figs. 10 *a, b, c, d, e, f*, represent organs of a species found abundant in the Atlantic, from October 18 to Nov. 12, 1838, latitude 6° 30' north, to 12° 40' south, longitude 21° 40' to 31° 30' west, and it may be the same with one of the preceding species. The figure of the antenna may not be quite accurate, as it was made before the importance of attending strictly to the exact position of these organs and the comparative lengths of the joints was understood. There are four posterior joints to the cephalothorax.

Figure 10 *a*, represents the anterior antennæ; *b*, the posterior; *c*, the first pair of feet; *d*, the right genital foot; *e*, a lateral view of cephalothorax, showing position of beak and the alimentary cavity; *f*, abdomen.

As the species was figured, the tips of the anterior antennæ are a little anterior to line of beak. A specimen resembling it in this and other respects (or having the tips only a little posterior to line of beak), was obtained off the south end of Mindoro, East Indies, January 22, 1842.

UNDINA INORNATA.

Frons rotundatus. Cephalothorax posticè vix acutus, 5-articulatus, segmento postico brevi. Antennæ anticæ corporis longitudine, setis perbrevis, setâ articuli secundi (tertii?) longiusculâ, rectâ, setâ apicali posticâ articuli longitudine, anticâ penultimâ suboblongâ, posticâ brevi, posticâ antepenultimâ articulum vix superante. Styli caudales parce oblongi.

Front rounded. Cephalothorax subacute behind, five-jointed, last segment quite short. Anterior antennæ as long as body, second joint oblong; setæ very short, one from second or third joint a little long and straight, posterior apical seta as long as joint, anterior penult the longest of the subapical, the posterior antepenult next longest, the other subapical short. Abdomen five-jointed, segments subequal. Caudal stylets sparingly oblong; setæ spreading, not longer than the abdomen, the second twice as long as first.

Plate 77, fig. 11 *a*, animal, enlarged; *b*, extremity of anterior antennæ; *c*, one of the second pair of natatories; *d*, posterior natatories.

Collected several individuals, October 27, 1838, in the Atlantic, latitude 4° north, longitude 19° west.

Length, one-twelfth of an inch. Colour, in part orange or reddish orange.

The antennæ have the usual slight bend after the eighth or ninth joint, and the following part of the antenna consists of fifteen or sixteen joints. The beak is furcate below, and the furcation is directed downward and much inward. The cephalothorax is broadest posterior to centre. The first segment of the abdomen is a little the longest, and the last the shortest. The posterior antennæ have the first joint of the longer branch about twice the remaining portion in length; the setæ at apex are a little longer than the branch.

Posterior pair of thoracic legs nearly like the preceding, dissimilar; the left leg most slender, without hairs, and having very long spines at the apices of the joints, which are much longer than the joint. The spines at the apices of the joints of the right leg are shorter than the joint, and there are a few short hairs from the inner side of longer branch. The specimen described was probably a female, while those of the other species appear to have been males.

SUBFAMILY OITHONINÆ.

The Oithoninæ are related to *Calanus* more nearly than to *Pontella*. As in *Calanus*, the eyes are the superior alone, and these occupy a single minute spot. Moreover, the right antenna is not geniculating in the males, and the legs of the posterior pair are rudimentary. As in *Acartia*, the hairs of the antennæ are rather long and point in various directions, instead of being confined to the anterior side, like *Calanus* and *Pontella*. As in *Pontella*, the maxillipeds are longer than the first pair of legs, being much longer than in that genus, and geniculated and thrown forward, instead of standing at right angles with the body. The very long abdomen, the small mandibular palpus, the digitate inner side of the maxillæ, are characters in which the species are altogether peculiar. Such distinctive characters belong, at least, to the only genus of this family yet discovered. More particular descriptions are given beyond.

GENUS OITHONA, Baird.

Antennæ anticæ elongatæ, articulis paucis, prælongis, setis diffusis, longis.

Antennæ posticæ simplices (?). *Maxillipedes ad articulationem secundum geniculati, prorsus projecti, setis spinulosis validis instructi. Abdomen lineare, corporis longitudine. Styli caudales oblongi, divaricati, setis prælongis. Sæpius e basi pedum biremium seta grandis sæpe plumiformis lateraliter porrecta.*

Anterior antennæ long; joints few but long, setæ pointed different ways and quite long. Posterior antennæ simple (?). Maxillipeds geniculate between the first and second joints, and thrown forward, furnished with long spinulous setæ. Abdomen as long as the body. Caudal stylets oblong, divaricate, setæ very long. Usually a long seta, often plumiform, projecting laterally from the base of the natatory legs.

The Oithonæ have a long slender abdomen, and are not over one-twentieth of an inch in their whole length. They are like a minute hair in the water, scarcely visible to the naked eye, because proportionally so narrow; under a microscope, they are remarkable for their spreading antennæ, with long diffuse setæ, the long divaricate setæ of the caudal stylets, and the plumes or coloured setæ along the sides of the body.

The *anterior antennæ* are about as long as the body, and have not far from seven unequal joints. Many of the setæ are more than half as long as the organ.

The *posterior antennæ* are three-jointed. The third oblong, and bearing at apex two long stout setæ, besides one or two shorter. The second is much shorter than the third, and also bears some setæ.

The *mandible* has a slender denticulate summit. The basal part projects at right angles with the mandible into an oblong process, having at apex two remotely spinulous setæ. The palpus is one-jointed, and has one or two naked setæ at apex.

The *maxilla* consists at its inner extremity of four stout digitiform or spiniform processes, which extend inward, nearly parallel and a little distant from one another. From this part, at right angles with it, there is an oblong process (like that of the mandible), having one

or two setæ at apex; and the palpus articulated with it is a single oblong joint, bearing a very long naked seta, many times longer than the joint.

The *maxillipeds*, which are longer than the anterior feet, have a long basal joint, which stands at right angles to the body; the organ is then flexed forward, and the remaining part is three-jointed, and together about as long as the basal joint. Each of the joints bears a few stout and long setulous setæ, which, in the natural position of the parts, reach forward to the mouth. At the inner apex of the basal joint there are two or three of these setulous setæ on a common base, and above, there are a few other setæ, which are naked.

The *anterior feet* are either straight, or flexed like the maxillipeds. They are three-jointed and bear a few short spinulous setæ (see Plate 76). The first or basal joint is longer than the third, and has in one species a naked spine on the inner margin near the middle, and another on the outer towards the apex.

The *natatories* have the usual form, except that in two species out of the three collected, there is a long seta extending outward from the second of the two basal joints, which is seen in an upper view projecting from the side of the body when the animal is swimming. There are thus four setæ either side (as there are four natatories), and in one species they were delicately coloured plumes. We did not succeed in ascertaining whether these plumes or setæ are peculiar to one sex alone, or belong to both; but are inclined to the former opinion.

The *abdomen* consists of four or five segments in the species observed. The basal bears one or two setæ on either side: it is not always distinct from the following.

The caudal stylets are styliform and divergent. The setæ are very unequal. One is much longer than the others, exceeding the length of the abdomen; the rest are short.

The cephalothorax in the species observed is only four-jointed, and is obtuse in front and behind.

The *Oithonæ* are best distinguished by the antennæ, the abdomen and its basal and caudal setæ, the lateral setæ of the natatory legs. They are very widely distributed in different oceans, yet pertain to few species.

Oithona, BAIRD, Zoologist, 1843.

Scribella, DANA, Amer. Jour. Sci. [2], i. 227, and Proc. Amer. Acad., 1849, ii. 19, where the following new species are briefly described by the author.

OITHONA PLUMIFERA, Baird.

Antennæ anticæ late (130°) divaricatæ, fere corporis longitudine, 7-articulatæ, articulis secundo quarto et duabus ultimis brevioribus, setis longissimis. Seta pedium biremium externa grandis, eleganter plumiformis. Abdomen 5-articulatum, cephalothorace longius, segmento 1mo perbrevis, setas basales duas longiusculas rectas dimidio inæquas gerente. Styli caudales tenues, setâ externâ fere styli longitudine.

Anterior antennæ widely divaricate (130°), nearly as long as the body, seven-jointed, second, fourth, and last two segments shortest; setæ very long, some exceeding half the length of the antenna; external seta of the natatory legs elegantly plumiform. Abdomen five-jointed, longer than cephalothorax, the first segment very short, bearing two unequal straight setæ, one about half the length of the other. Caudal stylets slender, divaricate, the external as long as the stylet.

Plate 76, fig. 4 *a*, animal, enlarged; *a'*, position of the antennæ in a specimen collected, May 16, 1842; *b*, imperfect view of posterior antennæ; *c*, maxillipeds; *d*, anterior feet; *e*, natatory.

Abundant in the Atlantic, October 22, 23, 24, 26, 1838, latitude 4½°–7° north, longitude 20°–22° west; also, taken May 16, 1842, latitude 1° south, longitude 30° 30' west; also, probably the same in the Pacific, among the Kingsmill Islands, April, 1841.

Length, one-twentieth of an inch. Colour, reddish orange, or orange-yellow; the lateral plumes and some of the plumose setæ of the antennæ of the same colour. This is a remarkably elegant species, under the microscope. The four coloured plumes are alluded to in Baird's specific name of this species.

The three posterior segments of the cephalothorax are about one-third the whole length. The second joint of the abdomen is a little longer than the following (which are subequal), and it is a little enlarged at base. The anterior antennæ diverge at an angle of

nearly 130°. The external seta of the stylets proceeds from near the middle of the stylet, rather nearer the base than apex. The other setæ were mutilated, and those of the antennæ also were often so. The plumes either side of the body were as long as the breadth of the body.

The position of the antennæ in figure 4 *a'* may be more correct (or, at least, more common) than that in 4 *a*.

Oithona plumifera, BAIRD, Zoologist, 1843.

Scribella scriba, DANA, Proc. Amer. Acad. Sci., ii. 20.

OITHONA ABBREVIATA.

Antennæ anticæ latè divaricatæ, 7-articulatæ, articulis duobus ultimis brevibus, tertio quarto quintoque subæquis. Setæ externæ pedium biremium obsoletæ (an distinctio sexus?). Abdomen 5-articulatum; setis basalibus dimidio abdominis valde brevioribus, subæquis, curvatis. Styli caudales paulum divaricati; setâ externâ perbrevis.

Anterior antennæ widely divaricate, much shorter than the body, seven-jointed, last two joints very short, second moderately short, third, fourth, and fifth subequal; setæ less than half the length of the antenna. External seta of the natatories wanting. Abdomen five-jointed; first segment usually nearly half the second, and having on either side two curved setæ, subequal, and of moderate length. Caudal stylets sparingly divergent, outer seta very short; second seta slightly longer than abdomen; third more than half same length.

Plate 76, fig. 5 *a*, animal, enlarged; *b*, maxilliped.

Collected abundantly, off Patagonia, in the Pacific, January 21, 1839, latitude 40° south, longitude 55° 30' west; also, April 21, 1840, one hundred miles southeast of Tonga; also, July 7, 1841, latitude 44° 15' north, longitude 153° west.

Length, one-twenty-fourth of an inch. Colourless.

A large number of specimens were taken and examined, but in none were the setæ entire. If the absence of the external setæ of the

natatories is sexual, it may be that the fact of the shorter setæ of the anterior antennæ is also so, as this difference in these antennary setæ occurs in the Euchætæ. On account of our being unacquainted with the sexual characteristics, we cannot lay down satisfactorily the distinctions between this species and the following.

The anterior antennæ are about as long as the cephalothorax and first two abdominal segments. The articulations are rather indistinct, which makes the number of joints somewhat uncertain.

The above may possibly be the female of the *setigera*; but we believe not. It was not ascertained that the specimens were female. Moreover, the localities are rather wide apart.

OITHONA SETIGER.

Antennæ anticæ fere corporis longitudine, latè divaricatæ, 7-articulatæ, articulis 3 ultimis brevissimis, tertio quartoque prælongis, setis longissimis. Seta pedium biremium externa longa, nuda, tenuissimè subclavata. Abdomen 5-articulatum, segmentis subæquis, setis basalibus duabus, unâ prælongâ, alterâ brevi. Styli caudales tenues, setâ externâ valde longiore quam stylus et prope basin styli insitâ.

Anterior antennæ nearly as long as body, widely divaricate, seven-jointed; the three apical joints quite short, third and fourth very long, some of the setæ longer than half the antenna. External seta of natatories long, naked, very slender subclavate. Abdomen five-jointed, segments subequal, setæ of first joint very unequal, one very short, the other longer than half the abdomen. Caudal stylets slender, divaricate, outer seta almost twice the length of stylet, and proceeding from near its base.

Plate 76, fig. 6 *a*, animal, enlarged; *a'*, extremity of anterior antenna, setæ partly cut off; *b*, posterior antennæ; *c*, mandible (not in natural position); *d*, maxilla; *e*, maxilliped; *f*, anterior leg.

Collected in the Pacific, latitude 3° north, longitude 173° east, south of Pitt's Island, Kingsmill Group, 4 A. M., April 28, 1841.

Length, one-twentieth of an inch. Colour, faint ochreous; lateral

thoracic setæ, and also those from base of abdomen, of an orange colour.

The cephalothorax was broadest just anterior to middle. The caudal stylets were nearly as long as last abdominal segment. The caudal setæ were broken off except the outer and two very short at apex, one the inner, the other the outer; there appears to have been only one long seta. The second pair of antennæ were apparently simple; whether the longer setæ were naked (as in the figure) or not, is not quite certain. The outer setæ of the base of the natatories are slender, and have very short hairs near their tips, which are seen only with a very high power; but the setæ are not plumose.

Another specimen was obtained by the author off Pitt's Island, in which the setæ of the base of the natatories were wanting; the cephalothorax was more evenly elliptical, and a little more slender, and the outer setæ of the caudal stylets were shorter than in the figure given.

SUBFAMILY PONTELLINÆ.

Many of the Pontellinæ (the Acartia, Pontellæ, and Catopiæ) are distinguished from all the other Calanidæ by the singular inferior eyes, which form a prominence on the under side of the head; and those not so characterized (the Diaptomi and Candaceæ) have the geniculating joint in the male right antenna, as well as a prehensile right leg at the posterior extremity of the thorax. The geniculating joint is wanting in one genus of the Pontellinæ alone, *Acartia*; but as it is possible that none of the individuals observed were males, this genus may be no exception, though we think it not probable. The antennæ in *Acartia* have an unusual degree of flexibility, and we suspect that they may therefore be used with the same facility as if the geniculating joint were present. Moreover, the legs of the posterior pair (one-jointed rudimentary appendages with two divaricate setæ), even if of females alone (instead of a form common to the sexes), are still unlike anything occurring in other genera; and this divergence is likely to be attended with other peculiarities.

The general form of the body is similar to that of the Calaninæ. The anterior antennæ, although they often project transversely, are very often thrown obliquely forward, a position rarely found among the Calaninæ. The cephalothorax also is more frequently divided into seven segments than in the preceding groups.

GENUS HEMICALANUS, Dana.

Rostrum infra furcatum. Oculi duo simplices tantum, pigmentis scæpissime coalitis, minutis. Antennæ anticæ maris parce impares, dextrâ cum articulatione geniculante, articulis raro coalitis. Antennæ posticæ biremes, ramis subæquis; ramo laterali 2-articulato, articulis duobus subæquis, apice 3 setas gerente et articuli primi dorso setigero. Maxillipedes recti, grandes, elongate setigero. Pedes postici maris impares, dextro crasse prehensili; feminæ sive precedentibus similes sive parvuli.

Beak furcate below. Eyes two, simple, the pigment of the two usually united, minute. Anterior antennæ of *male* sparingly dissimilar, the right having a geniculating joint, the joints in few cases coalescing. Posterior antennæ two-branched, the branches subequal, lateral branch often the longer, two-jointed, joints subequal, at apex of this branch three setæ, and several on the back margin of the first joint. Posterior feet in *males* dissimilar, the right stout prehensile; in *females*, either like the preceding, or obsolescent.

This genus, like *Undina*, is intermediate between *Pontella* and *Calanus*. It has the posterior antennæ of *Calanus* and *Undina*, and the anterior antennæ have a *Calanoid* position, the tips being behind or but little in advance of the beak. Moreover, the inferior eyes of the *Pontellæ* are wanting. But like the genus *Pontella*, the right male antenna has a geniculating joint, yet with but little modification of the organ, and also, the posterior thoracic legs are dissimilar, and one is large prehensile; besides, the maxillipeds are larger if not longer than the anterior feet, and the setæ extend forward beneath the mouth, as particularly described under *Pontella*. The genus *Undina* differs from this in having no geniculating joint in the male antennæ, these organs on both sides having instead a slight bend, one-third of the way from the base. *Diaptomus* of Westwood (including the *C. castor*, a fresh-water species) differs from *Hemicalanus* in having the posterior thoracic legs in the *female* quite large and stout, and the shorter branch of the posterior antennæ with several short joints at middle. As no species of *Hemicalanus* or of *Pontella* has been ob-

served by the author with a bag of eggs attached to the female abdomen, it is quite probable that no such bag exists; and if so, this would make a wider distinction between Hemicalanus and Diaptomus.

The particular character of the organs of the mouth and other parts in the Hemicalani, will be gathered from the figures and the descriptions beyond.

There are some species that have all the Calanoid characteristics of this genus, in which minute inferior eyes are distinguishable, as in Pontella. It may be doubted, whether the existence of these eyes should require us to place them with the Pontella, or whether we should regard as more important the characters of the posterior antennæ, and arrange them with this genus. The former course has been adopted. The character of the posterior antennæ more especially referred to, is their having only *three* setæ at the extremity of the shorter or anterior branch, *five* being the typical number for *Pontella*.

The species of this genus, here described, are all oceanic, occurring in the pure ocean waters, like the Pontellæ and unlike the Diaptomi.

HEMICALANUS LONGICORNIS.

Frons rotundatus. Cephalothorax posticè obtusus, 5-articulatus, articulis posticis æquis. Oculi coaliti, minuti. Antennæ anticæ sesqui corporis longitudine, rectiusculæ, setis brevibus, duabus subapicalibus posticis prælongis, subæquis, apicalibus perbrevibus, anticâ penultimâ articuli longitudine. Styli caudales breves.

Front rounded. Cephalothorax obtuse behind, five-jointed, four posterior segments subequal. Eyes united, minute. Anterior antennæ one and a half times as long as body, nearly straight, the tips nearly in line of beak; setæ short, two posterior subapical quite long, subequal, apical very short, anterior penult as long as penult joint. Caudal stylets very short, the setæ spreading, subequal, not longer than abdomen.

Plate 78, fig. 9, animal, enlarged.

Collected a few individuals, November 7, 1838, at 4 A. M., in the Atlantic, latitude 4° south, longitude 21° west.

Length, one-eighth of an inch. The furcate beak is quite long. The caudal setæ are nearly equal, the first being but little shorter than the second. The setæ of the anterior antennæ are short, the apical quite short; the long posterior subapical are furnished with short distant ciliæ on the outer side, which move on their base when the antenna is agitated in the water. The setæ on the longer branch of the posterior antennæ are longer than the antennæ. Natatories five pair and subequal; the posterior dissimilar. Two rows of large globular masses extend along nearly the whole length of the cephalothorax, which have a greenish colour and bright reflections; the posterior masses oblong, and largest. Abdomen four-jointed, first joint oblong.

This species is in some points near the *Cetochilus septentrionalis* of Goodsir, described in Jameson's Edinb. New. Phil. Jour., 1843, vol. xxxv. pp. 102 and 336.

Cyclopsina longicornis, DANA, Proc. Amer. Acad. Sci., ii. 24.

HEMICALANUS GALANINUS.

Gracilis. Frons triangulatus. Cephalothorax posticè obtusus, 6-articulatus, capite vix discreto, segmentis posticis æquis. Antennæ anticæ corpore longiores, tenuissimæ, rectiusculæ, apicibus fronte non posterioribus; setis brevibus, apicalibus anticis articuli longitudine, subapicalibus totis valde brevioribus; antenna maris dextra medio leviter incrassata. Styli caudales elongati, divaricati, setis subæquis, divaricatis.

Slender. Front triangular. Cephalothorax obtuse behind, six-jointed, the cephalic articulation not distinct, four posterior segments subequal. Anterior antennæ longer than the body, very slender, nearly straight, the tips not behind line of beak; setæ short, the anterior apical as long as the last joint, the subapical all much shorter, right of male nearly terete, the joints not blended, but little enlarged. Caudal stylets half as long as abdomen, slender, divaricate, setæ spreading, subequal.

Plate 78, fig. 10 *a*, animal, enlarged; *b*, extremity of antenna.

Collected in the Pacific, near El Gran Cocal, latitude 5° 30' south, longitude 175° east, March 25, 1841.

Length, one-sixteenth of an inch. Colour, bluish, with a reddish tint in the head and abdomen. The species is near the Calani in habit. The body is slender, narrower anteriorly. The eyes are approximate, but were not quite clearly seen. The male right antenna differs but little from the female, as the joints are all distinct, and a few only are a little enlarged, without affecting much the terete character of the organ. These antennæ are nearly in the same straight line, after the first curving at base; each inclines a little back of an exact line. The second joint is oblong, full twice as long as broad; the apical is a little longer than the penult. After the geniculating articulation there are five joints, the first and second hardly coalescent and very nearly straight, the last three but little longer than the other two. The setæ are all short, those towards the base about twice as long as the diameter of the joints, and much crowded. The second pair of antennæ is rather small; one branch consists of two nearly equal joints, and has three setæ at apex, like the Calani, and several on the back surface of the first joint. The setæ are rather small. The other branch is much the shorter.

Cyclopsina calanina, DANA, Proc. Amer. Acad. Sci., ii. 25.

HEMICALANUS TENUICORNIS.

Maris:—*Frons triangulatus*. *Cephalothorax posticè fere obtusus*, 7-articulatus, capite discreto, segmentis posticis æquis. *Antennæ anticæ corpore vix longiores, apicibus fronte vix anterioribus, tenuissimæ, rectiusculæ, setis brevibus, anticis apicalibus fere articuli longitudine, posticâ penultimâ paulo longiore*. *Antenna maris dextra parce incrassata, articulis nullis coalitis*. *Abdomen 3-articulatum*. *Styli caudales elongati, divaricati*.

Male:—Front triangular. Cephalothorax behind nearly obtuse, seven-jointed, head separate, four posterior segments subequal. Anterior

antennæ as long as the body, very slender, nearly straight, tips very slightly behind the line of beak; setæ short, anterior apical nearly as long as apical joint, the posterior penult quite as long as this joint, the anterior apical but little shorter, the other subapical still shorter. Right antenna of male nearly terete, the joints of the middle portion slightly enlarged, but not coalescent. Abdomen three-jointed, first joint longest and abruptly wider. Caudal stylets nearly as long as abdomen, divaricate, setæ subequal, about as long as abdomen.

Plate 78, fig. 11 *a*, animal, enlarged; *b*, extremity of antenna.

Collected, March 22, 1841, in the Pacific, north of Depeyster's Island, latitude $6^{\circ} 40'$ south, longitude $177^{\circ} 30'$ east; also, in Paumotu Archipelago, latitude $18\frac{1}{2}^{\circ}$ south, longitude 136° west, August 13, 1839.

Length, one-sixteenth of an inch. Colour, burnt sienna, more or less generally diffused. This species is very near the preceding. They differ in the subapical setæ of the anterior antennæ, in the abdominal stylets, and in the cephalic part of the cephalothorax.

The eyes constitute a very minute point or red spot. No inferior eyes were observed. The cephalic articulation is distinct. The beak is much incurved. The anterior antennæ are very slender, and are nearly in the same straight line, each falling but a little back. The setæ are all short; those towards the base are a little longer than the diameter of the joints and crowded; the posterior penult seta is the longest of those at the extremity. The part of the antennæ beyond the geniculating articulation in the right antenna of the male is four-jointed, the first joint being arcuate, and corresponding to two joints in the left antenna; moreover, it is much shorter than the three joints following. The anterior part of the body is not as narrow as in the *calanina*, and the posterior angles of the cephalothorax are more prolonged. The maxillipeds were larger than the anterior legs, and had the scoop-net form characteristic of *Pontella*.

The posterior antennæ are very short, and the branch which is usually the longer is the shorter; the longer has two nearly equal joints, with three bent setæ at apex and others on the back of the first joint. The setæ of the shorter branch and of the following organs are short.

A specimen was collected in the Paumotus, August 13, 1839, which is probably a female of this species. The head is narrow. Eyes on one and the same minute red spot. Cephalothorax obtuse behind. Antennæ distinctly longer than the body, the two nearly in a straight line, very slender, apical joint longer than penult. Abdomen four-jointed, the second large, inflated, gibbous below. Stylets about half the abdomen in length, divergent; setæ about as long as abdomen. Five pairs of natatories, the posterior pair much like the preceding, but a little smaller.

Cyclopsina tenuicornis, DANA, Proc. Amer. Acad. Sci., Boston, ii. 25.

HEMICALANUS GRACILIS.

Maris:—*Antennæ anticæ corpore valde longiores; abdomen 4-articulatum; aliis C. tenuicorni similis.*

Male:—Anterior antennæ much longer than the body. Abdomen four-jointed. In other characters near the *C. tenuicornis*.

Plate 78, fig. 12 *a*, animal, enlarged; *b*, extremity of female antenna, or of left of male.

Collected in the Pacific, May 14, 1841, latitude 25° north, longitude 167° east.

Length, one-sixteenth of an inch. Colour, in part reddish.

This species may possibly be only a variety of the *tenuicornis*. The length of the antennæ is not constant. In one specimen they were one and one-third times as long as the body, extending beyond the stylets as far as the whole length of the abdomen; in another they were one and one-fifth times as long as the body. The cephalothorax narrows anteriorly, as in the two preceding species, and has about the same form. The branches of the posterior antennæ are not as unequal as in the *tenuicornis*, yet the one with two subequal joints is the longer. The setæ of the anterior antennæ towards the base are generally three or four times as long as the diameter of the joints. The part of the right male antenna beyond the geniculating articulation

is four-jointed, the first (a double joint), being nearly as long as the other three, and very slightly arcuate. The apical setæ, both anterior and posterior, are but a little shorter than the joint. The eye-spot is very minute.

GENUS CANDACE, Dana.

Frons quadratus. Oculi inferiores obsoleti. Antennæ anticæ latissimè divaricatæ, regulariter breviterque setigeræ; dextra maris articulatione geniculans. Maxillipedes pedibus proximis majores, sub corpore projecti, geniculati et inflexi, 4-articulati, setis nudis, longis. Pedes postici maris impares, dextro subprehensili. Abdomen mediocre. Styli caudales breves, setis rectis et strictè appressis.

Front quadrate. Inferior eyes wanting. Anterior antennæ very widely divaricate, regular and short in the setæ; the right male antennæ having a geniculating articulation. Maxillipeds larger than the first pair of feet, having motion in the line of the body, geniculate and inflexed, four-jointed, setæ long and naked. Posterior feet of male unequal, the right subprehensile. Abdomen of moderate length. Caudal stylets quite short; setæ straight and close appressed.

The species of Candace are remarkable for their quadrate front, appressed caudal setæ, anterior antennæ, both falling after a basal outward curve, into the same straight transverse line, and in the colour being generally in part black. Often the apical portion of the antennæ, for six to eleven joints, is black, and the body is banded with black at each articulation; sometimes also the natatory feet are partly black. In some specimens of one species there were black lines in the anterior part of the thorax, and four black spots, as shown on Plate 78. One specimen of another species was black throughout, excepting the head, basal half of the anterior antennæ, and the abdomen. The colour is not constant for the species.

The cephalothorax has usually three or four posterior segments. In one species another articulation was observed across the middle; and in one of the following species the head was separated by an imperfect articulation. The posterior angles are either truncate, obtuse, or long