

8. Larger; hind margins of abdominal segments not reddish *spatulatus*, Ckll.
 Smaller; hind margins of abdominal segments reddish *providellus*, Ckll.
9. Antennæ hooked at end; scape red; abdomen with golden pile *moretonianus*, Ckll.
 Antennæ normal at end; scape not red.. 10.
10. Flagellum bright ferruginous beneath; face covered with yellow hair; first recurrent nervure joining second submarginal cell near its beginning *colletellus*, Ckll.
 Flagellum not so 11.
11. Stigma and nervures amber-colour; sides of face with black hair; legs dull reddish *semilautus*, Ckll.
 Stigma and nervures darker 12.
12. Sides of face with black hair 13.
 Sides of face without black hair..... 15.
13. Face densely covered with light yellow hair, except at sides above..... *obscuripennis*, Ckll.
 Face without such yellow hair 14.
14. Larger, about 12½ mm. long; tegulæ black..... *hobartensis*, Ckll.
 Smaller; tegulæ dark brown (Greymouth, New Zealand, *Koebele*; ♂ ♀ in U.S. National Museum) *vestitus* (Smith).
15. First r. n. joining second s.m. near its beginning; abdomen with hair-bands. *perfasciatus*, Ckll., ♀.
 First r. n. joining second s.m. near its middle or before middle, but not very near beginning..... 16.
16. Area of metathorax dull 17.
 Area of metathorax shining 18.
17. Scutellum shining *Worsfoldi*, Ckll.
 Scutellum dull and roughened *rudis*, Ckll.
18. Large, about 13 mm. long; *Colletes*-like; abdomen hairy..... *subfuscus*, Ckll.
 Small; stigma sepia-colour; abdomen strongly punctate..... *thornleighensis*, Ckll.

IV.—Notes on some Genera of the Crustacean Family Hippolytidae. By W. T. CALMAN, D.Sc., British Museum (Natural History).

IN attempting recently to refer to its appropriate genus a species of Hippolytidae obtained by the 'Discovery,' I found it necessary to re-examine the characters of the existing genera of the family so far as these are represented in the Museum collections. Some of the results seem to be of sufficient importance to warrant the publication of the

following notes. A proper revision of the genera would demand the study of much more material than is at my disposal, and for this reason I have confined my examination to characters which have already been employed for systematic purposes by previous authors.

The limits of the family cannot be said to be satisfactorily defined at present. On the one hand, the recognition of the fact that the legs of the first pair in many Pandalidæ are not "simple," but microscopically chelate, renders it hard to define that family so as to exclude the Hippolytid genus *Cryptocheles*, in which the chelæ of these limbs are stated to be "minute." On the other hand, the boundary between the Hippolytidæ and Alpheidæ is so vaguely marked that even Coutière, in his elaborate monograph of the latter family, is unable to decide as to the proper position of certain genera, such as *Ogyris*. Ortmann (Bronn's Thier-Reich, Crust. ii. p. 1130) has separated a group of genera to form the family Latreutidæ, characterized by the absence of the incisor-process* of the mandible. It is impossible, however, to retain this arrangement, since the genus *Nauticaris*, which Ortmann refers to the Latreutidæ, is certainly closely allied to *Saron*, as, indeed, Thallwitz pointed out in establishing the latter genus. The genus *Lysmata* is referred by several recent writers to the Processidæ (Nikidæ), but it seems to be undoubtedly connected with the Latreutid group through Stimpson's *Hippolysmata*. The settlement of such questions, however, must wait for a future reconsideration of the whole classification of the Caridea.

The following is a partial and provisional synopsis of the genera usually referred to the family. The names of those genera of which I have seen no specimens are enclosed within square brackets :—

- A. Arthrobranchiæ are present at the bases of the first four pairs of peræopods. Mandible with palp. More than seven segments in carpus of second peræopods.
 - a. Movable spine at base of uropods.
 - a. Mandible with incisor-process *Saron*, Thallwitz.
 - β. Mandible without incisor-process .. *Nauticaris*, Spence Bate.
 - b. No movable spine at base of uropods.
 - a. Mandible with incisor-process *Merhippolyte*, Sp. Bate.
 - β. Mandible without incisor-process .. *Parhippolyte*, Borradaile.

* I have employed the term "incisor-process" for the distal division of the mandible. It is naturally suggested by "molar-process" and is a little more definite than "cutting-edge," while requiring less explanation than "psalidoma."

- B. No arthrobranchiæ on peræopods.
- a. Mandible with incisor-process.
- a. Mandible with palp.
- a. Two segments in carpus of second peræopods *Caridion*, Goës.
- b. Four segments in carpus [*Pterocaris*, Heller.]
Leontocaris, Stebbing.
- c. Seven segments in carpus.
- a. Mandibular palp of two segments. *Spirontocaris*, Spence Bate
(including *Hetairus*, Spence Bate, *Euales*, Thallwitz, *Helia*, Thallwitz, *Hetairocaris*, de Man, *Heptacarpus*, Holmes, *Birulia*, Braźnikov.)
- b. Mandibular palp of three segments *Alope*, White.
- d. More than seven segments in carpus. *Chorismus*, Spence Bate.
- β. Mandible without palp *Hippolyte*, Leach.
[*Thor*, Kingsley.]
[*Cryptocheles*, Sars.]
- b. Mandible without incisor-process or palp.
(= *Latreutidæ*, *Ortm.*, *pro parte*.)
- a. Two segments in carpus *Trachycaris*, g. n.
[*Concordia*, Kingsley.]
- β. Three segments in carpus *Latreutes*, Stimpson
(= *Platybema*, Sp. Bate).
Angasia, Sp. Bate (= *Tozeuma*, Stimpson).
- γ. More than three segments in carpus. *Bythocaris*, Sars.
Hippolysmata, Stimpson.
[*Mimocaris*, Nobili.]
Lysmata, Risso.

Genus NAUTICARIS.

Nauticaris, Spence Bate, Chall. Rep., Macrura, p. 602.

No type is specified, but *N. marionis*, which stands first among the species described, may be taken as the type. In Spence Bate's summary of the generic characters on p. 577 of the 'Challenger' Report the carpus of the second legs is said to be 7-articulate, whereas in the definition of the genus on p. 603 it is stated to be "multiarticulate"; as a matter of fact, I find 15-16 segments in the carpus of co-typical specimens. This inaccuracy appears to have misled Mr. Stebbing in his summary of Spence Bate's classification (Hist. Crustacea, p. 234), and, through him, Mr. Hodgson, who has described, under the name *Merhippolyte australis* (Rep. 'Southern Cross,' p. 233), a form which I find on comparison of the type specimens to be identical with *Nauticaris marionis* of the 'Challenger' Report. Mr. Hodgson was mistaken in supposing that the mandible of his specimens possessed an incisor-process.

Hippolyte magellanicus of A. Milne-Edwards (Miss. Cap

Horn, Crust. p. F 46) belongs to the same genus. I have examined two of the type specimens kindly sent me by Prof. E. L. Bouvier. It differs from the other species of the genus in possessing exopods on the third maxillipeds.

Genus MERHIPPOLYTE.

Merhippolyte, Spence Bate, Chall. Rep., Macrura, p. 618. (Type, *M. agulhasensis*, Sp. Bate.)

The carpus of the second peræopod in the type species has 14 or 15 segments and the merus is also more or less distinctly annulated. Of the three segments of the mandibular palp the first is subequal to the second. The other characters are as given by Spence Bate. On *Merhippolyte australis*, Hodgson, see under *Nauticaris* above. Spence Bate suggested that *Hippolyte spinifrons*, Milne-Edwards, might belong to this genus, and Mr. G. M. Thomson has accepted the suggestion (Trans. Linn. Soc. (2) Zool. viii. p. 444, 1903). The species, however, appears to me to be much more closely allied to the genus *Alope*, and, indeed, a specimen in the Museum collection labelled *Hippolyte spinifrons* is specifically identical with *Alope palpalis*, White.

Genus SPIRINTOCARIS, Spence Bate.

Spirintocaris, Spence Bate, Chall. Rep., Macrura, p. 595. (Type, *S. spinus*, Sowerby.)

Hetairus, Spence Bate, *t. c.* p. 610. (Type, *H. polaris*, Sabine.)

Euales (or *Eualus*), Thallwitz, Abh. Mus. Dresden, 1890-91, no. 3, p. 23. (Type, *E. obesus*, Thallw.)

Helia, Thallwitz, *t. c.* p. 24. (Type, *H. Fabricii*, Kröyer.)

Hetairocaris, de Man, Notes Leyden Mus. xii. p. 120 (1890). (Type, *H. orientalis*, de Man.)

Heptacarpus, Holmes, Occas. Pap. Calif. Acad. Sci. vii. p. 195 (1900). (Type, *H. palpator*, Owen.)

Birulia, Bražnikov, Annuaire Mus. St. Pétersb. viii. Nouvelles, p. xlv (1903). (Type, *B. sachalinensis*, Bražnikov.)

All the above genera agree in possessing a mandible with a reduced incisor-process and a palp of two segments, seven segments in the carpus of the second peræopods, and no arthrobranchiæ on the peræopods. They have been separated mainly on the ground of differences in the armature of the carapace and in the number of epipods. It is possible that some of them may deserve to be kept distinct, but the material at my disposal is not sufficient to enable me to estimate the value of the characters upon which they have been based.

I have assumed that Thallwitz is in error in stating that the mandible is without an incisor-process in his genus *Helia*.

He gives as the type species *H. Fabricii*, which has a typical *Spirontocaris* mandible.

The type of Spence Bate's *Hetairus* is a species which he describes under the name *H. Gaimardii* (M.-E.), but which Miss Rathbun (Harriman Alaska Exped. x. p. 73, 1904) identifies, no doubt correctly, as *H. polaris* (Sabine).

So far as I can gather from the description of *Birulia*, which Mr. W. F. Kirby has kindly translated from the Russian for me, the genus differs from *Spirontocaris* only in the characters of the carapace and rostrum.

Genus LATREUTES, Stimpson.

Latreutes, Stimpson, Proc. Acad. Philadelphia, 1860, p. 27; Spence Bate, Chall. Rep., Macrura, p. 531. (Type, *L. ensiferus*, M.-Edw.)

Platybema, Spence Bate, Chall. Rep., Macrura, p. 578. (= *Cyclorhynchus*, de Haan, *Rhynchocyclus*, Stimpson. Type, *P. planirostris*, de Haan.)

As Ortmann has pointed out (Zool. Jahrb., Abth. f. Syst. v. p. 505, 1891), there seems to be no valid reason for regarding the two species mentioned above as belonging to distinct genera. They agree in having the carpus of the second legs composed of three segments and in such details as the rounded lobe of the first segment of the antennules, the acute antennal scale, and the serrated antero-lateral margin of the carapace. Stebbing (Hist. Crust. p. 235) relies for their separation on the statements of Spence Bate that the second maxillipeds of *Platybema* are six-jointed and those of *Latreutes* seven-jointed. This, however, is certainly not the case in the two type species, both of which have the second maxillipeds identical in structure and composed of six segments. Apart from the difference in general form, which seems to have been Stimpson's chief reason for separating the genera, the only distinction which I can find is that, while in *Platybema* the series of epipods extends to the penultimate pair of legs, in *Latreutes* (contrary to Stimpson's statement) it ceases at the third pair. Since Spence Bate names *Cyclorhynchus planirostris* as the type of *Platybema*, it is not legitimate to use that generic name, as Ortmann has done, after transferring its type species to *Latreutes*.

Genus TRACHYCARIS, gen. nov.

Type, *Platybema rugosus*, Spence Bate, Chall. Rep., Macrura, p. 579.

There can be no doubt that Spence Bate's *P. rugosus* is generically distinct from de Haan's *Cyclorhynchus planirostris*, the type of the genus *Platybema*. The following

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may serve as a definition for the new genus in which I propose to place it:—

“Carapace with a supraorbital, an antennal, and a single antero-lateral (pterygostomial) spine. External process on first segment of antennules spiniform. Antennal scale broad, rounded at the tip. Mandibles (according to Spence Bate) without incisor-process or palp. Third maxilliped with exopod. Carpus of second peræopods composed of two segments. Neither arthrobranchiæ nor epipods on the peræopods. Endopods of the second to the fifth pairs of pleopods very broad.”

The genus *Concordia* (Kingsley, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 413), of which I have seen no specimens, is stated to have the rostrum very short, the antennal scale very small, and the telson acute, and it appears to have no supraorbital spines.

Genus ANGASIA, Spence Bate.

Toxeuma, Stimpson, Proc. Acad. Philadelphia, 1860, p. 26 (preoccupied as *Toxeuma*, Walker). (Type, *T. lanceolatum*, Stimps.)

Angasia, Spence Bate, Proc. Zool. Soc. London, 1863, p. 498. (Type, *A. pavonina*, Sp. Bate.)

This genus is very closely allied to *Latreutes*, with which it might, perhaps, be united. It differs, however, in having the process on the first segment of the antennules long and spiniform, a single antero-lateral (pterygostomial) tooth on the carapace, and no epipods on the legs.

Genus AMPHIPLECTUS.

Amphiplectus, Spence Bate, Chall. Rep., Macrura, p. 622.

The genus *Amphiplectus* of Spence Bate must, I think, be excluded from the Hippolytidæ altogether. In examining the unique specimen of the only species of the genus—*A. depressus*—I fail to see the slightest trace of segmentation in the carpus of the second peræopods. Spence Bate's reference to this is not very intelligible, but he seems to have had difficulty in perceiving the segmentation. The shape of the mandible, which has the incisor-process not separated from the molar, is very unlike that found in any of the other genera of the family. It is possible that Spence Bate's remark on the resemblance of the legs to those of *Nematocarcinus* may point the way to the true position of the genus; but the consideration of this question may be postponed till we are in possession of more satisfactory material than is afforded by the unique and now much mutilated type specimen.



Calman, W. T. 1906. "Notes on some genera of the Crustacean family Hippolytidae." *The Annals and magazine of natural history; zoology, botany, and geology* 17, 29–34.

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