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A communication was read from Mr. L. W. Wiglesworth, entitled "Theories of the Origin of Secondary Sexual Characters," which contained arguments in favour of the theory of the stimulation of parts to higher development through use or external violence or irritation, as observed in birds.

The following papers were read :—

1. On some Crustaceans from the South Pacific.—Part II. *Macrura anomala*[1].

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[Received April 28, 1898.]

(Plate XXXVI.)

The collections with which the present paper deals were made in the islands of Funafuti (Ellice group) and Rotuma by Mr. J. Stanley Gardiner, to whom I am much indebted for information respecting the habits &c. of several of the species. The facts with which Mr. Gardiner has furnished me will be given, in his own words, under the species they refer to.

The Funafuti collection comprised examples of the following species :—

1. *Birgus latro* (Linn.). 2♂, 5♀.
2. *Cœnobita perlatus* H. M.-Edw. 2♂.
3. *Cœnobita rugosus* H. M.-Edw. 4♂.
   Var. *pulcher* Dana. 4♂, 4♀.
4. *Pagurus setifer* H. M.-Edw. 1♀.
5. *Pagurus euopsis* Dana. 1♀.
6. *Aniculus typicus* Dana. 1♂, 1♀.
7. *Calcinus elegans* (H. M.-Edw.). 1♂, 4♀.
8. *Calcinus herbsti* de Man. 11♂, 13♀.
   Var. *lividus* (H. M.-Edw.). 2♂.
9. *Calcinus latens* (Randall). 6♂, 5♀.
10. *Clibanarius corallinus* (H. M.-Edw.). 7♂, 6♀.
11. *Clibanarius æquabilis* Dana. 3♂.
12. *Clibanarius zebra* Dana. 2♂.
13. *Diogenes pallescens* Whitelegge. 2♂.
14. *Galathea affinis* Ortmann. 2♂.
15. *Petrolisthes lamarcki* (Leach). 2♂, 5♀.
    Var. *asiaticus* (Leach). 2♀.
    Var. *rufescens* (Heller). 4♂, 3♀.
    Var. *fimbriatus*, nov. 1♂, 1♀.
16. *Remipes pacificus* Dana. 30♂, 12♀.

[1] For Part I., see P. Z. S. 1898, p. 32.

The collection from Rotuma contained examples of:—

1. *Cœnobita spinosus* H. M.-Edw. 1♂, 2♀.
2. *Cœnobita perlatus* H. M.-Edw. 2♂.
3. *Cœnobita rugosus* H. M.-Edw. 22♂, 17♀.
   Var. *pulcher* Dana. 1♂, 5♀.
4. *Pagurus deformis* H. M.-Edw. 2♂.
5. *Pagurus punctulatus* Olivier. 1♂, 3♀.
6. *Aniculus typicus* Dana. 1♂.
7. *Calcinus elegans* (H. M.-Edw.). 2♂, 2♀.
8. *Calcinus herbsti* de Man. 1♂, 3♀.
   Var. *lividus* (H. M.-Edw.). 1♂, 3♀.
9. *Calcinus gaimardi* (H. M.-Edw.). 2♂.
10. *Calcinus latens* (Randall). 4♂, 1♀.
11. *Galathea affinis* Ortmann. 3♂.
12. *Petrolisthes lamarcki* (Leach). 5♂, 2♀.
    Var. *rufescens* (Heller). 5♂, 7♀.
    Var. *asiaticus* (Leach). 8♂, 4♀.
    Var. *fimbriatus*, nov. 1♂, 2♀.
13. *Remipes pacificus* Dana. 18♂, 58♀.

I proceed to remarks on the several species.

Subtribe PAGURINEA.

Family Cœnobitidæ.

Genus Birgus Leach, 1815.

1. Birgus latro (Linn.), 1766.

Cancer latro, Linnæus, Syst. Nat. ed. 12, ii. p. 1049 (1766).
Pagurus latro, Fabricius, Ent. Syst., Supp. p. 411 (1798).
Birgus latro, Leach, Tr. Linn. Soc. Lond. xi. p. 337 (1815); H. Milne-Edwards, H. N. Crust. ii. p. 246 (1837); Atlas to Cuvier's R. An. 3rd ed. pl. xiii. fig. 1 (no date); Dana, U.S. Expl. Exped., Crust. i. p. 474, pl. xxx. fig. 2 (1852).
(Juv.). *Birgus laticauda*, Latreille, R. An. 2nd ed. iv. pl. xii. fig. 2 (1829).

The tree-climbing habits of this species have been a subject of so much discussion that I have asked Mr. Gardiner for a special note on the point. He says:—"The robber crab is very commonly found in the tops both of Pandanus and of coconut-trees, from which latter I have had it thrown down to me by the natives. It is stated by them to break off the nuts and often to fall with them, never killing itself, as the coconut is underneath. I have seen them constantly clinging to the fruit of the Pandanus, the fallen segments of which, after they have been chewed by the crab, cover the ground. Although all the specimens are from Funafuti, the crab is also very common at Rotuma."

Two males and five females from Funafuti.

Genus Cœnobita Latreille, 1826.

2. Cœnobita spinosus H. M.-Edw., 1837.

Cœnobita spinosa, H. Milne-Edwards, H. N. Crust. ii. p. 242 (1837).

Cœnobita brunnea, Dana, U.S. Expl. Exped., Crust. i. p. 470, pl. xxix. fig. 10 (1852).

Birgus hirsutus, Hess, Decap. Kreb. O.-Austral. p. 36, pl. vii. fig. 16 (1865).

Cœnobita spinosus, Ortmann, Zool. Jahrb. vi. Syst. p. 318, pl. xii. fig. 24 (1892).

? *Cœnobita olivieri*, Owen, Voy. 'Blossom,' p. 84; Dana, U.S. Expl. Exped., Crust. i. p. 470 (1852).

One male and two female specimens from Rotuma, in nutshells of *Calophyllium inophyllum* Linn. Mr. Gardiner says: "All three specimens were obtained between the stones of a built-up grave-yard on the top of Sol-Hoi, Rotuma (about 600 feet above the sea-level)."

3. Cœnobita perlatus H. M.-Edw., 1837.

Cœnobita perlata, H. Milne-Edwards, H. N. Crust. ii. p. 242 (1837); Atlas to Cuvier's R. An. pl. xliv. fig. 1 (no date).

Cœnobita purpurea, Stimpson, Proc. Ac. N. Sci. Philad. 1858, p. 245.

Cœnobita perlatus, Ortmann, Zool. Jahrb. vi. Syst. p. 319 (1892).

Two males from Rotuma. Two males from Funafuti, in shells of *Turbo* and *Ranella*.

With reference to this and the succeeding species, Mr. Gardiner says:—"*Cœnobita perlatus* and *C. clypeatus* are found in all the islands of Funafuti, often on the Pandanus-trees. During the daytime they hide under the heaps of coconut-shells and in holes, but at night they swarm in every direction. They are used by the natives as bait for fishing. *C. perlatus* occurs also in Rotuma, where it is found on the beach sand-flats, but is not very numerous."

4. Cœnobita clypeatus (Herbst), 1796.

Cancer clypeatus, Herbst, Naturg. Krabb. u. Krebse, ii. p. 22, pl. xxiii. fig. 2 (1796).

Pagurus clypeatus, Fabricius, Ent. Syst., Supp. p. 413 (1798).

Cœnobita clypeata, Latreille, Fam. Nat. R. An. p. 277 (1826); H. Milne-Edwards, H. N. Cr. ii. p. 239 (1837); Dana, U.S. Expl. Exped., Crust. i. p. 473, pl. xxx. fig. 4 (1852).

Cœnobita clypeatus, Ortmann, Zool. Jahrb. vi. Syst. pp. 315, 316, pl. xii. fig. 20 (1892).

Three males and one female from Funafuti, one in a *Turbo* shell.

5. Cœnobita rugosus H. M.-Edw., 1837.

Cœnobita rugosa, H. Milne-Edwards, H. N. Cr. ii. p. 241 (1837); Dana, U.S. Expl. Exped., Crust. i. p. 471, pl. xxx. figs. 1, 2 (1852).

Cœnobita cavipes, Stimpson, Proc. Ac. N. Sci. Philad. 1858, p. 245.

Cœnobita rugosus, Ortmann, Zool. Jahrb. vi. Syst. p. 317, pl. xii. fig. 22 (1892).

This species is "very common along the lagoon shores of Funafuti, and along the shore between tide-marks at Rotuma."

Four males from Funafuti, in shells of a *Turbo* and of two species of *Nerita*. Twenty-two males and seventeen females from Rotuma, one in a *Turbo* shell.

Var. pulcher Dana, 1852 (*loc. cit.*).

Four male specimens and four females from Funafuti, in *Nerita* shells. One male and five females from Rotuma.

Family Paguridæ.

Subfamily Paguriné.

Genus Pagurus Fabr., 1798, *restrictum*.

6. Pagurus deformis H. M.-Edw., 1836.

Pagurus deformis, H. Milne-Edwards, Ann. Sci. Nat. 2, ii. p. 272, pl. xiii. fig. 4 (1836); id. H. N. Cr. ii. p. 222 (1837); Hilgendorf, Mon.-Ber. Ak. Wiss. Berlin, 1878, p. 818, pl. iii. figs. 6, 7; Ortmann, Zool. Jahrb. vi. Syst. p. 288; Semon's 'Forschungsreisen in Austral.' v. 1, p. 31 (1894).

Hilgendorf (*loc. cit.*) and Ortmann (Zool. Jahrb. *loc. cit.*) have both remarked that the males of this species show the female openings on the second pair of walking-legs. I have attempted to dissect a spirit-specimen in order to discover the condition of the internal generative organs, but the preservation was so bad as to render this useless. Another point of interest to determine would be whether *P. pedunculatus* and *P. asper*, species closely allied to the present, do or do not share this peculiarity with it. *P. gemmatus* does not, to judge from a male specimen in Dr. Willey's collection.

Of the two specimens of *P. deformis* in Mr. Gardiner's collection, both are males from Rotuma, and one is of interest in that it has the female opening of the left side only, that of the right side being completely absent.

7. Pagurus setifer H. M.-Edw. 1836.

Pagurus setifer, H. Milne-Edwards, Ann. Sci. Nat. 2, vi. p. 274 (1836); id. H. N. Cr. ii. p. 225 (1837); Hilgendorf, Mon.-Ber. Ak. Wiss. Berlin, 1878, p. 815, pl. iii. fig. 8; de Man, Arch. f.

Naturg. 53, i. p. 433 (1887); Ortmann, Zool. Jahrb. vi. Syst. p. 287, x. Syst. p. 275. *Non* de Haan, Faun. Japon. p. 209 (1850); Henderson, Tr. Linn. Soc. Lond. 2, v. pt. 10, p. 420 (1893).

Eupagurus setifer, Haswell, Cat. Austral. Crust. p. 154 (1882).

This species is closely allied to *P. guttatus* Olivier, so that it is just possible that the record of the latter species from Funafuti by Whitelegge (Funafuti Atoll, Crustacea, p. 143) may be a mistake.

Mr. Gardiner says that *P. setifer* is "stated by the natives to be very rare, and found only on the southern islands of the atoll. It is caught on land at night."

One male specimen from Funafuti.

8. Pagurus euopsis Dana, 1852.

Pagurus euopsis, Dana, U.S. Expl. Exped., Crust. i. p. 452, pl. xxviii. fig. 6 (1852).

I am informed by Mr. Gardiner that this species is caught on land at night.

One female from Funafuti, two males from Rotuma.

9. Pagurus punctulatus Olivier.

Pagurus punctulatus, Olivier, Encycl. Méth. viii. p. 641; H. Milne-Edwards, Ann. Sci. Nat. 2, vi. p. 273 (1836); id. H. N. Cr. ii. p. 222 (1837); Dana, U.S. Expl. Exped., Crust. i. p. 451, pl. xxviii. fig. 4 (1852).

One male and three females from Rotuma; the male in the shell of a *Malea ringens*.

Genus Aniculus Dana, 1852.

10. Aniculus typicus Dana, 1852.

Pagurus aniculus, Fabricius, H. Milne-Edwards, Ann. Sci. Nat. 2, vi. p. 279 (1836); id. H. N. Cr. ii. p. 230 (1837).

Aniculus typicus, Dana, U.S. Expl. Exped., Crust. i. p. 461, pl. xxix. fig. 1 (1852).

Pagurus (*Aniculus*) *aniculus*, Hilgendorf, Mon.-Ber. Ak. Wiss. Berlin, 1878, p. 824.

One male from Rotuma. One male and one female from Funafuti, in *Turbo* shells.

Genus Calcinus Dana, 1852.

11. Calcinus elegans (H. M.-Edw.), 1836.

Pagurus elegans, H. Milne-Edwards, Ann. Sci. Nat. 2, vi. p. 278, pl. xiii. fig. 2 (1836); H. N. Cr. ii. p. 229 (1837).

Pagurus decorus, Randall, Journ. Ac. Nat. Sci. Philad. viii. p. 135 (1839).

Calcinus elegans, Dana, U.S. Expl. Exped., Crust. i. p. 458, pl. xxviii. fig. 10 (1852).

One male and four females from Funafuti. Two males and two females from Rotuma.

12. Calcinus herbsti de Man, 1887.

Pagurus tibicen, H. Milne-Edwards, Ann. Sci. Nat. 2, vi. p. 278 (1836); H. N. Cr. ii. p. 229 (1837); Atl. Cuv. R. An. pl. xliv. fig. 3.

Pagurus lividus, H. Milne-Edwards, Ann. Sci. Nat. 3, x. p. 63 (1848).

Calcinus tibicen, Dana, U.S. Expl. Exped., Crust. i. p. 457 (1852); Heller, 'Novara' Crust. p. 87 (1865); Henderson, 'Challenger' Anom. p. 61 (1888); Whitelegge, Funafuti Atoll, Crust. p. 144 (1897).

Pagurus (*Calcinus*) *tibicen*, Hilgendorf, Mon.-Ber. Ak. Wiss. Berlin, 1878, p. 823.

Calcinus herbstii, de Man, Arch. f. Naturg. 53, i. p. 437 (1887).

Calcinus herbsti, Ortmann, Zool. Jahrb. iv. Syst. p. 292 (1892).

Non *Cancer tibicen*, Herbst, Krabb. u. Krebse, ii. pl. xxiii. fig. 7 (1796).

? *Pagurus lævimanus*, Randall, Journ. Ac. Nat. Sci. Philad. viii. p. 135 (1839).

There can, I think, be no doubt that the *Pagurus lividus* of Milne-Edwards is a mere colour-variety of this species. Beyond the absence of colour, the only difference given in the definition is that the legs are "finement pointillées," and this statement, as a matter of fact, applies equally well to the most brilliantly coloured specimens. On the other hand, I have Mr. Gardiner's authority for stating that the specimens which I have considered to belong to the var. *lividus* were really colourless when alive, and have not been merely bleached by the alcohol. One of them shows faint traces of the characteristic brown patch on the left "hand."

One male and three females from Rotuma; eleven males and thirteen females from Funafati. The Funafuti specimens are in shells of the following genera of Gastropoda:—*Ricinula*, *Angina*, *Strigatella*, *Nerita*, *Purpura*, *Peristernia*.

Var. *lividus* (H. M.-Edw.), 1848. One male specimen and one female from Rotuma. Two females from Funafuti in shells of *Nerita*.

13. Calcinus gaimardi (H. M.-Edw.), 1848.

Pagurus gaimardii, H. Milne-Edwards, Ann. Sci. Nat. 3, x. p. 63 (1848).

Calcinus gaimardii, Dana, U.S. Expl. Exped., Crust. i. p. 457, pl. xxviii. fig. 9 (1852).

Calcinus gaimardi, Ortmann, Zool. Jahrb. vi. Syst. p. 294 (1882).

Two males from Rotuma.

14. Calcinus latens (Randall), 1839.

Pagurus latens, Randall, Journ. Ac. Nat. Sci. Phil. viii. p. 135 (1839).

Calcinus latens, Dana, U.S. Expl. Exped., Crust. i. p. 459, pl. xxviii. fig. 11 (1852).

Six males and five females from Funafuti; one in a *Cerithium* shell. Four males and one female from Rotuma.

Genus Clibanarius Dana, 1852.

15. Clibanarius corallinus (H. M.-Edw.), 1848.

Pagurus corallinus, H. Milne-Edwards, Ann. Sci. Nat. 3, x. p. 63 (1848).

Clibanarius corallinus, Dana, U.S. Expl. Exped., Crust. i. p. 468, pl. xxix. fig. 8 (1852); de Man, Arch. f. Naturg. 53, i. p. 447 (1887); Ortmann, Zool. Jahrb. vi. Syst. p. 292 (1892).

Clibanarius obesomanus, Dana, Proc. Ac. Nat. Sci. Philad. 1851.

Clibanarius globosimanus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 247.

Seven males and six females from Funafuti. In shells of *Purpurea*, *Peristernia*, *Cerithium*, *Nerita*, *Ricinula*, *Angina*.

16. Clibanarius æquabilis Dana, 1852.

Clibanarius æquabilis, Dana, U.S. Expl. Exped., Crust. i. p. 464, pl. xxix. figs. 4 *a–f* (1852).

Three males from Funafuti.

17. Clibanarius zebra Dana, 1852.

Clibinarius zebra, Dana, U.S. Expl. Exped., Crust. i. p. 465, pl. xxix. figs. 5 *a–d* (1852).

Two males from Funafuti.

Genus Diogenes Dana, 1852.

18. Diogenes pallescens Whitelegge, 1897.

Diogenes pallescens, Whitelegge, Funafuti Atoll, Crust. p. 141, pl. vi. figs. 2 *a*, *b*, *c* (1897).

Two males from Funafuti.

Subtribe GALATHEINEA.

Family Galatheidæ.

Genus Galathea Fabricius, 1798.

19. Galathea affinis Ortmann, 1892.

Galathea affinis, Ortmann, Zool. Jahrb. vi. Syst. p. 252, pl. xi. fig. 9 (1892).

Three males from Rotuma. Two males from Funafuti.

Subtribe PORCELLANINEA.

Family PORCELLANIDÆ.

Genus PETROLISTHES Stimpson, 1858.

20. PETROLISTHES LAMARCKI (Leach), 1820. (Plate XXXVI. figs. 1, 1*a*, 1*b*, 2.)

(1) Type.

Pisidia lamarckii, Leach, Dict. Sci. Nat. xviii. p. 54 (1820).

Porcellana speciosa, Dana, U.S. Expl. Exped., Crust. i. p. 417, pl. xxvi. fig. 8 (1852) [in part].

Porcellana bellis, Heller, 'Novara' Crust. p. 76, pl. vi. fig. 4 (1865).

Porcellana dentata, de Man, Journ. Linn. Soc. Lond. xxii. p. 216 (1888).

Petrolisthes speciosus, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, pp. 227 & 241; Ortmann, Zool. Jahrb. vi. Syst. p. 262 (1892); ?Whitelegge, Funafuti Atoll, Crust. p. 144 (1897).

Petrolisthes haswelli, Miers, Rep. Zool. Coll. 'Alert,' p. 269, pl. xxix. fig. A (1884); Whitelegge, Funafuti Atoll, Crust. p. 144 (1897).

Porcellana (*Petrolisthes*) *dentata*, de Man, Arch. f. Naturg. 53, i. p. 409, pl. xviii. fig. 7 (1887).

Petrolisthes lamarcki, Stimpson, Proc. Ac. Nat. Sci. Phil. 1858, p. 227; Miers, Rep. Zool. 'Alert,' pp. 268 & 557 (1884); Ortmann, Semon's 'Forschungsreisen in Austral.' v. 1, p. 26 (1894).

(2) Var. ASIATICUS (Leach), 1820.

Pisidia asiatica, Leach, Dict. Sci. Nat. xviii. p. 54 (1820); Desmarest, Consid. sur les Crust. p. 198.

Porcellana asiatica, Gray, Zool. Misc. p. 15 (1831); H. Milne-Edwards, H. N. Cr. ii. p. 252 (1837); Richter's Decap. Ins. Mauritius, p. 159, pl. xvii. fig. 13 (1880).

Porcellana armata, Gibbes, Proc. Am. Assoc. iii. p. 190 (1850); id. Proc. Elliot Soc. i. p. 11, pl. i. fig. 4 (1854); v. Martens, Arch. f. Naturg. 38, i. p. 121, pl. v. fig. 11 (1872).

Porcellana speciosa, Dana, U.S. Expl. Exped., Crust. i. p. 417 (1852), in part.

Porcellana gundlachii, Guérin, de la Sagra's Hist. Cuba, Anim. Artic. p. 39, pl. ii. fig. 6 (1857); v. Martens, Arch. Naturg. 38, i. p. 122, pl. v. fig. 12 (1872), *juv.*

Porcellana leporina, Heller, Verh. zool.-bot. Ges. Wien, p. 523 (1862); 'Novara' Crust. p. 78, pl. vi. fig. 7 (1865).

Petrolisthes asiaticus, Stimpson, Proc. Acad. Nat. Sci. Phil. 1858, p. 227; de Man, Zool. Jahrb. ix. Syst. p. 376 (1896), *juv.*

Petrolisthes armatus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 227; Ann. Lyc. N.Y. vii. p. 73 (1862); Streets, Proc. Ac. Nat. Sci. Philad. 1871, p. 204; Lockington, Ann. Mag. Nat. Hist. 5, ii. p. 339 (1878); Kingsley, Proc. Acad. Nat. Sci. Phil. 1879,

p. 406; Henderson, 'Challenger' Anom. p. 105 (1888); Heilprin, Proc. Ac. Nat. Sci. Phil. 1888, p. 320; Ortmann, Dec. Schiz. Plankton Exped. p. 51 (1893); Zool. Jahrb. x. Syst. p. 280 (1897).

Petrolisthes marginatus, Stimpson, Ann. Lyc. Nat. Hist. vii. p. 74 (1862).

Petrolisthes leporinoides, Ortmann, Zool. Jahrb. vi. Syst. p. 263 (1892); Semon's 'Forschungsreisen in Austral.' v. 1, p. 26 (1894).

Petrolisthes dentatus, Henderson, Tr. Linn. Soc. Lond. 2, v. p. 426 (1893).

Petrolisthes dentatus var., de Man, Zool. Jahrb. ix. Syst. p. 374 (1896), in part.

Petrolisthes lamarckii var. *asiaticus*, Miers, Zool. 'Alert,' pp. 269 & 557 (1884).

(3) Var. RUFESCENS (Heller), 1861.

? *Porcellana dentata*, H. Milne-Edwards, H. N. Crust. ii. p. 251 (1837); Dana, U.S. Expl. Exped., Crust. i. p. 419 (1852).

Porcellana rufescens, Heller, Sitz.-Ber. Ak. Wiss. Wien, xliv. p. 255, pl. ii. fig. 4 (1861); 'Novara' Crust. p. 76 (1865); ? Kossmann, Ergebn. Zool. Reise, ii. 1, pp. 75–78 (1880).

Petrolisthes dentatus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 227; Haswell, Cat. Austr. Crust. p. 146 (1882); Ortmann, Zool. Jahrb. vi. Syst. p. 262 (1892).

Porcellana (*Petrolisthes*) *rufescens*, Hilgendorf, Mon.-Ber. Ak. Wiss. Berlin, p. 825, pl. ii. fig. 7 (1878).

Petrolisthes lamarcki, Ortmann, Semon's 'Forschungsreisen in Austral.' v. 1, p. 26 (1894), in part.

The full synonymy which I have felt obliged to give for this very variable species reveals the remarkable fact that it has been described under no fewer than twelve names. In default, however, of any reliable separating character of specific value, I am compelled to include all its various forms under one head.

Colour is of course useless to us as a specific character. It is here very variable, and its variations run counter to those of other characteristics. The extreme forms are on the one hand almost white, and on the other dark red blotched with dark purple. The *P. speciosus* of Dana comprised light-coloured forms with red or purple spots. Some of these varieties are extremely beautiful. Again the number, size, and arrangement of the teeth on the inner side of the wrist of the chelæ show great variations. But the number increases with age, and the limbs of the two sides are often different, so that any distinctions founded on these must be abandoned. Extreme forms are:—(1) a wavy edge with a large hump at the near end, and (2) the same edge bearing a row of five well-defined teeth, with hints of a sixth. The teeth may be sharp or blunt in otherwise similar forms, or may become bicuspid, seemingly by two running together. Leach's orignal *P. lamarckii* had three teeth; *P. asiaticus* Leach, *P. leporina* Heller, *P. leporinoides* Ortmann, *P. armatus* Gibbes, and *P. gundlachii* Guérin,

resemble it in this respect. In *P. marginatus* Stimpson the number tends to increase. *P. bellis* Heller, *P. speciosus* Dana, *P. haswelli* Miers, *P. dentata* H. M.-Edw., and *P. rufescens* Heller, have at least four.

The spines on the upper edge of the merus of the walking-legs are another character which it has been attempted to use as specific. They are, however, so inconstant, and form such a complete series, from specimens with an almost straight edge (Plate XXXVI. fig. 1 *a*), through those with imbricating scales, to those with well-marked spines, that it seems impossible to make use of them. The best-marked of these spines is about a third of the length from the far end of the joint (fig. 1 *b*). Often this spine appears on one or a few legs only, and as often as not the legs of the two sides do not agree. In Leach's original specimen of *P. asiaticus* in the British Museum, the first two walking-legs on the left side alone show spines. The type specimen of *P. lamarckii* is without them.

Then there is the epibranchial spine, whose presence or absence would seem to afford an excellent criterion for our purposes. According to Ortmann, however (Semon's 'Forschungsreisen in Austral.' *loc. cit.*), this is not of specific value, since it occurs in specimens from the same locality as, and in other respects exactly resembling, forms without such spines.

The breadth of various joints of the limbs varies, but is not to be relied upon, since it appears to alter with age.

Lastly, I have ventured to name a new variety, *fimbriatus*, from the fact of its possessing a more or less plentiful fringe of hairs to the outer margin of the "hand" (Plate XXXVI. fig. 2).

The following key indicates the characters attaching to those varietal names which it appears advisable to retain:—

A. With an epibranchial spine. Colour tends to sprinkling of red spots on lighter ground.

i. Without a fringe to the outer side of the chelæ.

1. Without spines on the anterior margin of the merus of any walking-leg ..... *Type* (Leach), 1820.

2. With at least one spine on the anterior margin of the merus of at least one of the walking-legs. Usually with spines on several legs. Var. *asiaticus* (Leach), 1820.

ii. With a scanty or plentiful fringe to the outer side of the chelæ. With or without spines on the anterior margins of the walking-legs. Var. *fimbriatus*, nov.

B. Without an epibranchial spine. Colour tends to red or white with large blotches of purple or blue. Attains a larger size than (A), has a greater average of teeth on the inner margin of the wrist, but none on the merus of any walking-leg. Exhibits its peculiarities in small specimens, and is therefore not merely a collection of older individuals. Possibly a distinct species ..... Var. *rufescens* (Heller), 1861.

I should have used Milne-Edwards's name of *dentatus* for this latter form, since his definition would agree very well with the specimens, but de Man states very positively (Zool. Jahrb. ix. p. 374) that he has had the original specimens sent him from Paris and that they possess an epibranchial spine. Should there not be, as

Ortmann suspects (Semon's 'Forschungsreisen in Austral.' *loc. cit.*), a mistake about these specimens, *dentatus* thus becomes a synonym for *lamarckii* Leach, and *rufescens* Heller is next in order of priority among the names for forms without an epibranchial spine. The specimens of var. *fimbriatus* nov. are all small (carapace 4–5 mm. long) and are of a white or yellow colour with red spots.

There is a very distinct difference in coloration between the Rotuma and Funafuti specimens of this species, the latter being much lighter in colour than the former. This difference runs through all the varieties, and I am informed by Mr. Gardiner that the specimens have not undergone much change of colour since they were collected.

Five males and two females from Rotuma; two males and five females from Funafuti.

Var. *asiaticus* (Leach), 1820. (Plate XXXVI. fig. 1 *b*.)

Eight males and four females from Rotuma; two females from Funafuti.

Var. *fimbriatus*, nov. (Plate XXXVI. fig. 2.)

One male and two females from Rotuma; one male and one female from Funafuti.

Var. *rufescens* (Heller), 1861.

Five males and seven females from Rotuma; four males and three females from Funafuti.

Subtribe HIPPINEA.

Family Hippidæ.

Genus Remipes Latr., 1806.

21. Remipes pacificus Dana, 1852. (Plate XXXVI. figs. 3 *a–i*.)

Remipes pacificus, Dana, U.S. Expl. Exped., Crust. i. p. 407, pl. xxv. fig. 7 (1852); de Man, Zool. Jahrb. ix. Syst. p. 476 (1897), x. Syst. pl. xxxiii. fig. 53 (1898).

Remipes testudinarius, Miers, J. Linn. Soc. Lond., Zool. xiv. p. 318, pl. v. fig. 2 (1879).

Remipes adactylus, Ortmann, Zool. Jahrb. ix. Syst. p. 228 (1897).

Of forty-one specimens of this species from Funafuti all had the normal number of joints to the second antennæ. Of seventy-six specimens from Rotuma no fewer than eight, or more than ten per cent., showed abnormalities. In one of this eight the two sides varied alike, both having a 3-jointed flagellum, as opposed to the two-jointed normal form. Five of the remaining seven had the flagellum of the left antenna normal, while, in the right, one specimen had the penultimate joint partially divided into two; two specimens had three joints, one had four joints, and one had five joints. The remaining two abnormal specimens had the right antenna normal, while in the left the flagellum was three-jointed. One of these latter was the only abnormal male, all the rest being

females, some bearing eggs. The length of the carapace varied from 12 to 20 mm., and there was no correspondence between the size of the individuals and the number of joints in their antennæ.

No two of the abnormal antennæ were exactly alike. Thanks to the excellent diagnoses given by de Man (*loc. cit.*) for the *testudinarius*-group of *Remipes*, I have been able to satisfy myself that all the above specimens, including the first-mentioned with three-jointed flagella on both the second antennæ, were true *R. pacificus*.

On Plate XXXVI. fig. 3 *a* represents a normal second antenna in this species; figs. 3 *b–i* show the abnormal specimens in the order in which I have alluded to them.

Twenty-nine males and eleven females from Funafuti; eighteen males and fifty-eight females from Rotuma.

EXPLANATION OF PLATE XXXVI.

Fig. 1. *Petrolisthes lamarcki* (Leach), ×1½, p. 464.
1 *a*. ,, ,, ,, right third leg.
1 *b*. ,, ,, var. *asiaticus* (Leach), right third leg, p. 467.
2. ,, ,, var. *fimbriatus*, nov., ×3, p. 467.
3 *a–i*. *Remipes pacificus*, Dana, second antennæ, ×7, p. 467.

a, normal form; *b–i*, abnormal.
b–g, right antennæ; *h* & *i*, left antennæ.
a–h, ♀; *i*, ♂.

Note.—Errata in Part I. of this paper:—On pp. 33, l. 30, and 37, l. 4, *for* "Blanche Bay, Loyalty Islands," *read* "Blanche Bay, New Britain." On p. 34, l. 25, *omit* "smooth."

2. Report on the Gephyrean Worms collected by Mr. J. Stanley Gardiner at Rotuma and Funafuti.

By Arthur E. Shipley, F.Z.S., Fellow and Tutor of Christ's College, Cambridge, and University Lecturer in the Advanced Morphology of the Invertebrata.

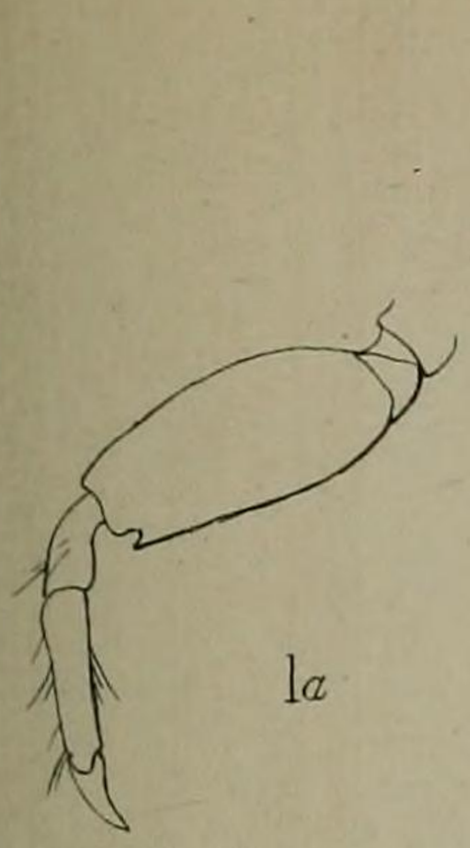
[Received May 13, 1898.]

(Plate XXXVII.)

The Gephyrea collected by Mr. J. Stanley Gardiner during his visits to Rotuma and Funafuti in the years 1896–97 comprise specimens of two species of the Echiuroidea and twelve of the Sipunculoidea. Of the latter, two species of *Sipunculus* are in my opinion new, whilst a third, *Physcosoma*[1] *varians* Kef., is, so far as I know, recorded for the first time from the Pacific.

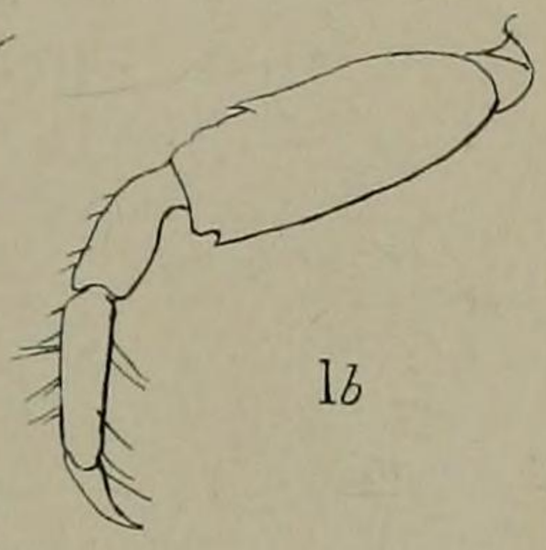
In nearly all the cases where species are common to the two localities, the specimens from Funafuti were considerably smaller than those from Rotuma.

[1] The reason for adopting the generic name *Physcosoma* in place of *Phymosoma* (*Phymosomum* Quatrefages) is given by Selenka in the Zool. Anz. Band xx. No. 546, 1897, p. 460.

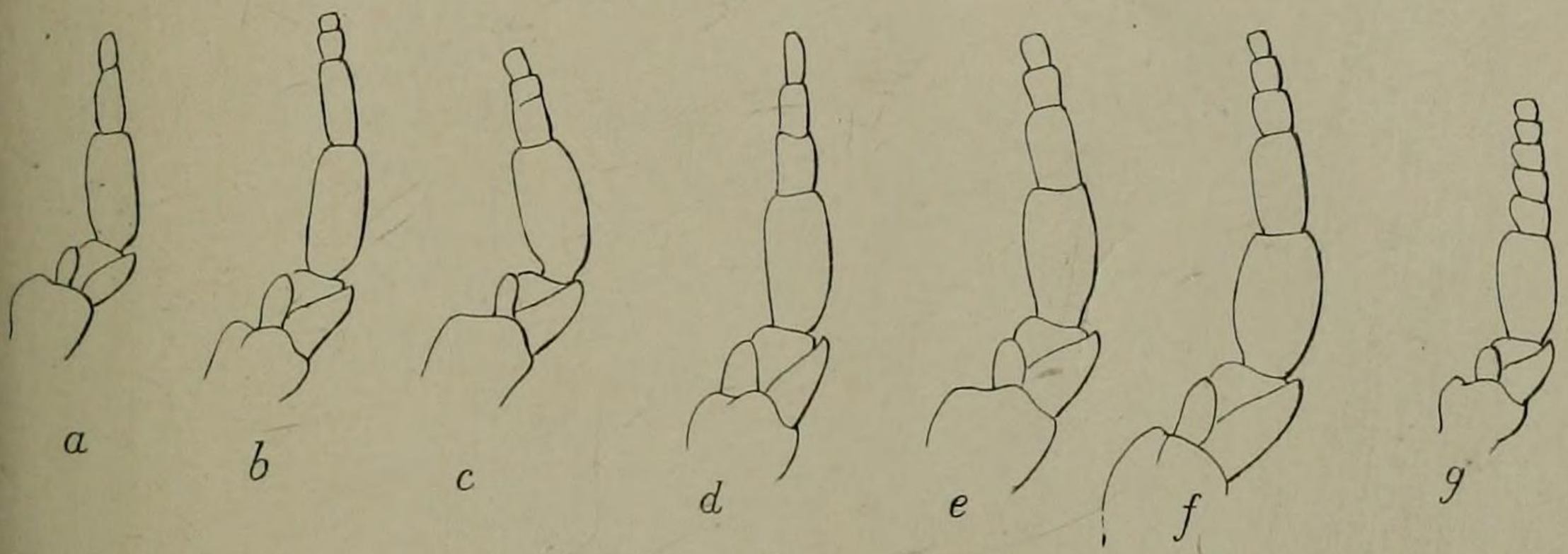


1a

1.

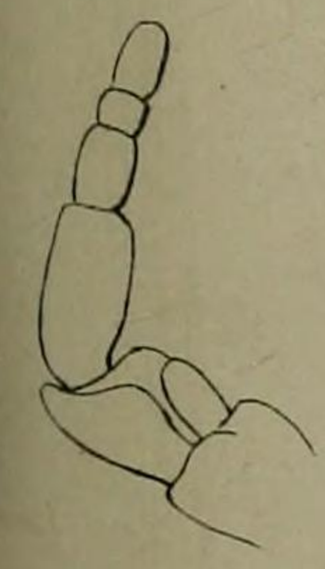


1b

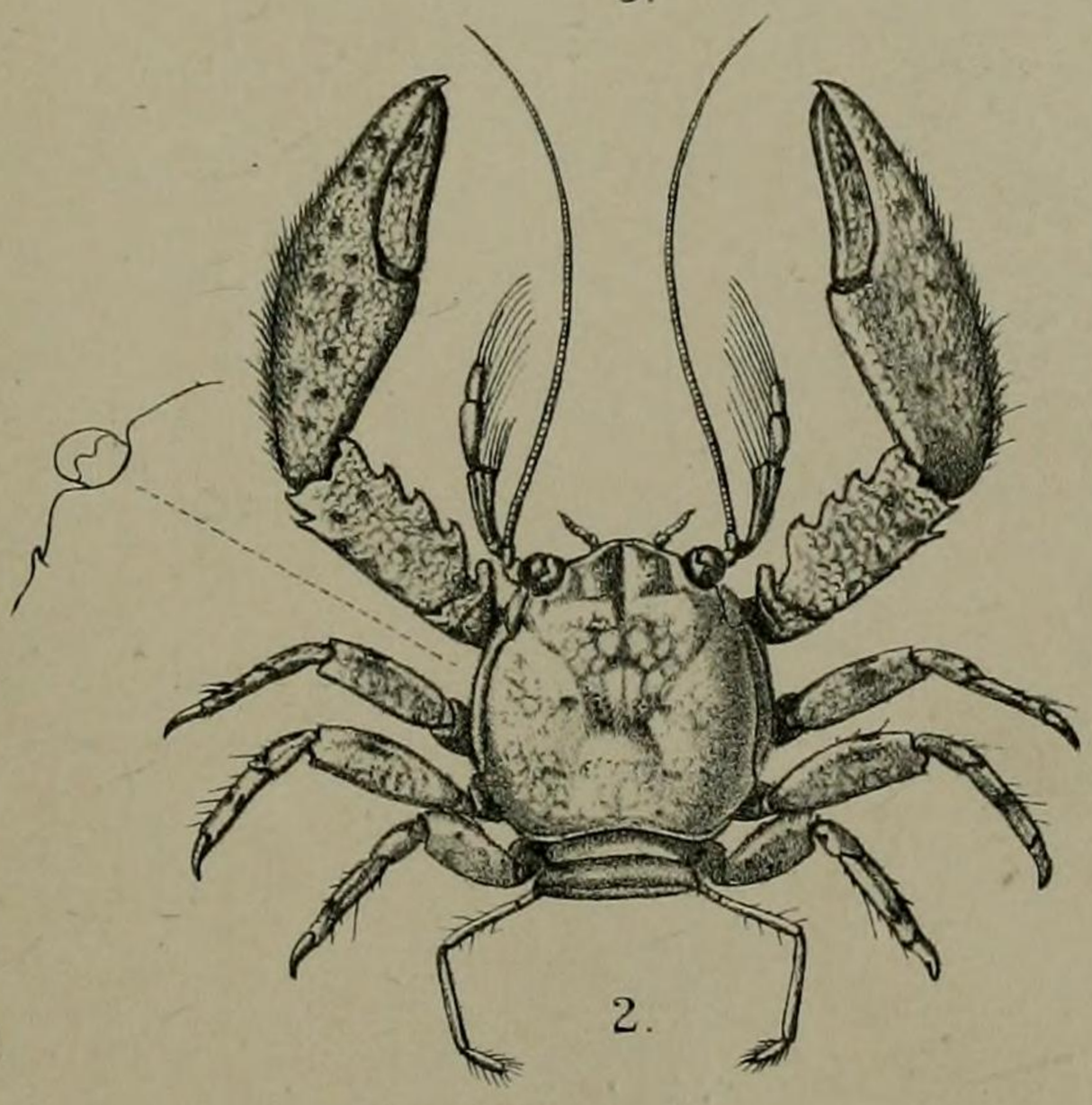


a b c d e f g

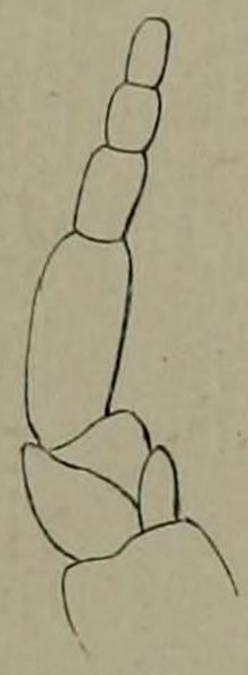
3.



3h



2.



3i

Edwin Wilson, Cambridge.

MACRURA ANOMALA FROM THE SOUTH PACIFIC.