Memoirs of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE.

VOL. XXXV. No. 2.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM AUGUST, 1899, TO MARCH, 1900, COMMANDER JEFFERSON F. MOSER, U. S. N., COMMANDING.

IX.

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X.

THE BRACHYURA.

BY MARY J. RATHBUN.

WITH NINE PLATES.

[Published by permission of GEORGE M. BOWERS, U. S. Commissioner of Fish and Fisheries.]

CAMBRIDGE, U. S. A.:

Printed for the Museum.

AUGUST, 1907.

EASTERN TROPICAL PACIFIC.

The following Publications of the Museum contain Reports on the Dredging Operations in charge of Alexander Agassiz, by the U. S. Fish Commission Steamer "Albatross," during 1904 and 1905, Lieut.-Commander L. M. Garrett, U. S. N., Commanding.

I. Alexander Agassiz. Three Letters to the Hon. George M. Bowers on the Cruise in the Eastern Pacific, of the U. S. Fish Commission Steamer "Albatross." Bull. M. C. Z., XLVI. No. 4. April, 1905. 22 pp.

II. Harriet Richardson. Description of a new genus of Isopods, typical of a peculiar family. Bull. M. C. Z., XLVI. No. 6. July, 1905. 4 pp. 1 Plate.

III. C. A. Kofoid. Craspedotella, a new genus of the Cystoflagellata, an example of convergence. Bull. M. C. Z., Vol. XLVI. No. 9. September, 1905. 5 pp. 1 Plate.

IV. W. E. Ritter. Octacnemus. Bull. M. C. Z., Vol. XLVI. No. 13. January, 1906. 22 pp. 3 Plates.

V. Alexander Agassiz. General Report of the Expedition. Mem. M. C. Z., Vol. XXXIII. January, 1906. 90 pp. 96 Plates.

VI. T. W. Vaughan. Madreporaria. Bull. M. C. Z., Vol. L. No. 3. August, 1906. 14 pp. 10 Plates.

VII. C. R. Eastman. Sharks' Teeth and Cetacean Bones. Bull. M. C. Z., Vol. L. No. 4. November, 1906. 26 pp. 4 Plates.

VIII. S. F. Clarke. The Hydroids. Mem. M. C. Z., Vol. XXXV. No. 1. February, 1907. 20 pp. 15 Plates.

IX. C. A. Kofoid. New Species of Dinoflagellates. Bull. M. C. Z., Vol. L. No. 6. February, 1907. 48 pp. 18 Plates.

X. Mary J. Rathbun. The Brachyura. Mem. M. C. Z., Vol. XXXV. No. 2. August, 1907. 54 pp. 9 Plates.

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THE BRACHYURA

As dredging and shore collecting were of secondary importance during the two cruises of the "Albatross" in the tropical Pacific, the adult Decapods obtained by no means represent the complete fauna of the area visited. Nevertheless, 136 species of Brachyura were obtained, and among them 18 species and one genus new to science.

The majority of the new forms are from the Caroline Islands and the Paumotu Archipelago, while two come from Easter Island. A remarkable discovery is that of a Callinectes inhabiting Tahiti and the Fijis. The genus is one heretofore restricted to middle America and the west coast of Africa. The insular species, even as observed in the young, is a strongly marked one. An addition to the deep-water fauna is a Scyramathia, dredged in 300 fathoms off the Galapagos.

A young specimen of the shore crab, *Grapsus longitarsis*, only 6.5 mm. wide, but having the form of the adult, was taken in the intermediate tow-net, between 300 fathoms and the surface, at station 4717, about 600 miles southwest of the Galapagos Islands, where the depth of the ocean is 2153 fathoms, and where the South Equatorial Current sweeps in a northwesterly direction past the Galapagos towards the Mid-Pacific. It is not surprising, then, that this species when full grown does not inhabit the Galapagos, but is known to occur at the Paumotus, the Ellice, and the Hawaiian Islands. If this single example is representative, the species is fully equipped for its littoral life long before it reaches its final habitation.

The type specimens described below are in the United States National Museum.

The drawings were made by Miss E. G. Mitchell, the photographs by Mr. Clarence Dodge.

INDO-PACIFIC REGION.

OCYPODIDAE.

Ocypode ceratophthalma (Pallas).

Ocypoda ceratophthalma Alcock,[1] 1900, **69**, 345.

Rangiroa Id., Paumotus; shore; Sept 23, 1899; 1 ♂.
Fakarava Id., Paumotus; outer reef; Oct. 12, 1899; 1 juv.
Makemo Id., Paumotus; Oct 21, 1899; 1 ♂.
Nomuka Iki, Tonga Group; shore; Dec. 2, 1899; 2 ♂.
Guam Id., Ladrone Ids.; Feb. 22, 1900; 1 ♀.

Ocypode cordimana Desmarest.

Ocypoda cordimana Alcock, 1900, **69**, 349.

Nomuka Iki, Tonga Group; shore; Dec. 2, 1899; 1 ♂, 1 ♀.

Uca tetragonon (Herbst).

Gelasimus tetragonum Alcock, 1900, **69**, 357.

Borabora Is., Society Group; shore; Nov. 17, 1899; 9♂, 2♀.
Tongatabu, Friendly Islands; reef and shore; Nov. 30, 1899; 5♂, 1♀.
Tarawa Is., Gilbert Group; shore; Jan. 3, 1900; 1♂.

Uca gaimardi (Milne Edwards).

Gelasimus gaimardi Milne Edwards, Ann. Sci. Nat., 1852 (3), **18**, 150, pl. 4, fig. 17.

Near Papeete, Tahiti; Sept. 29, 1899; 3 ♂, 2 ♀.
Borabora Is., Society Group; shore; Nov. 17, 1899; 22 ♂, 10 ♀.
Kusaie, Carolines; Feb. 9, 1900; 1 ♂.

GECARCINIDAE.

Cardisoma carnifex (Herbst).

Cardiosoma carnifex Alcock, 1900, **69**, 445.

Rangiroa Island, Paumotus; beach; Sept. 21, 1899; 1 ♂.
Rangiroa Island on Mohegan Beach; Sept. 21, 1899; 1 ♂.
Near Papeete, Tahiti; Sept. 29, 1899; 1 ♂ juv., 1 ♀ juv.

[1] As the greater part of the species enumerated are described by Alcock in his "Materials for a Carcinological Fauna of India," published in the Journal of the Asiatic Society of Bengal, 1895–1900, **64-69**, references to that work are abbreviated to year, number of volume, etc.

Cardisoma rotundum (Quoy and Gaimard).

Thelphusa rotunda Quoy and Gaimard, in Freycinet's Voyage autour du monde, 1825, Zool., **3**, 527, pl. 77, fig. 1 (*Thelphuse chaperon arrondi*).
Cardisoma hirtipes Dana, Proc. Acad. Nat. Sci. Phil., 1851, **5**, 253; Crust. U. S. Expl. Exped., 1852, **1**, 378; atlas, 1855, pl. 24, fig. 2.
Cardiosoma hirtipes, Alcock, 1900, **69**, 447.
Cardisoma rotundum Safford, Contr. U. S. Nat. Herbarium, 1905, **9**, 90. Rathbun, Bull. U. S. Fish. Comm. for 1903 (1906) part 3, 838.

Niue; Sept. 25, 1899; 1 ♀, juv.

Besides the characters given by Alcock (*loc. cit.*) for distinguishing this species from the preceding, the following are very striking: — The width (transverse dimension) of the orbit is about $\frac{3}{4}$ of the anterior width of the front, in *C. rotundum;* the width of the orbit is greater than the anterior width of the front, in *C. carnifex*. The granulated line which marks the antero-lateral border of the carapace is not prolonged behind the level of the gastro-cardiac suture, in *C. rotundum;* while the same line is prolonged far behind the suture, in *C. carnifex*.

In the 3 females of *C. rotundum* which I have examined, the antero-lateral region of the carapace and also the chelipeds are much more roughly granulated than in the males.

GRAPSIDAE.

Grapsus grapsus tenuicrustatus (Herbst).

Grapsus grapsus tenuicrustatus Rathbun, Bull. U. S. Fish Comm. for 1903 (1906), part 3, 838, and synonymy.

Mohegan Reef, Rangiroa Id., Paumotus; Sept. 21, 1879; 1 ♂, 3 ♀
Rangiroa Id.; beach; Sept. 21, 1899; 1 ♀.
Fakarava, Paumotus; reef, sea beach; Oct. 13, 1899; 1 ♂.
Makemo, Paumotus; Oct. 29, 1899; 1 ♂, 1 ♀.

Grapsus strigosus (Herbst).

Grapsus strigosus Alcock, 1900, **69**, 393.

Tongatabu, Friendly Islands; shore; Nov. 29, 1899; 2, ♂ and ♀ of small size.

Grapsus longitarsis Dana.

Grapsus strigosus longitarsis Rathbun, Bull. U. S. Fish Comm. for 1903 (1906), part 3, 838, text fig. 4, pl. 8, fig. 1.

Rangiroa Island, Paumotus; beach; Sept. 21, 1899; 1 ♂, 1 ♀.

Mohegan Reef, Rangiroa; Sept. 21, 1899; 1 ♂.

Tikei, Paumotus; shore; Oct. 9, 1899; 1 ♀ with eggs.

Fakarava Island, Paumotus; outer reef; Oct. 12, 1899; 1 ♂.

Funafuti, Ellice Islands; shore; Dec. 25, 1899; 1 ♀.

Between Galapagos and Manga Reva; 300 fath. to surface; station 4717; Jan. 13, 1905; 1 juv.

I now believe the *longitarsis* form to be an independent species. Besides the characters given in the work above cited, *G. longitarsis* has the anterior half of the carapace more tuberculous, front wider, and the ridge running lengthwise across the middle of the palm less distinct than in *G. strigosus*. Although the fingers are narrower at the tip than in typical Grapsus, they are much more hollowed underneath than in Geograpsus.

Geograpsus grayi (Milne Edwards).

Geograpsus grayi Alcock, 1900, **69**, 395.

Niue; Nov. 25, 1899; 1 ♂, 1 ♀.

The width of the meropodites of the ambulatories in this and the following species is not a dependable character. In the U. S. National Museum there are specimens of *G. grayi* from Glorioso Id. in which the meropodites are less than half as wide as long, and a series from Japan in which they are more than half as wide as long.

In *G. crinipes*, which have been handled (from 7 localities), the meropodites are commonly less than half as wide as long, sometimes just half as wide as long.

Geograpsus crinipes Dana.

Geograpsus crinipes Alcock, 1900, **69**, 396.

Makemo Id., Paumotus; Oct. 29, 1899; 1 ♂.

Aruo Atoll, Marshall Ids.; Jan. 27, 1900; 1 ♀.

Ponape, Caroline Ids.; Feb., 1900; 1 ♂, 1 ♀.

Kusaie, Caroline Ids.; Feb. 9, 1900; 1 ♀.

Geograpsus lividus stormi de Man.

Geograpsus lividus var. **stormi** de Man, Zool. Jahrb., Syst., 1895, **9**, p. 88; 1898, **10**, pl. 28, fig. 18 *a* and *c*.

Nukuhiva, Marquesas Ids.; shore, seine; Sept. 15-17, 1899; 1 ♀ with eggs.

Tarawa Id., Gilbert Group; shore; Jan. 3, 1900; 1 ♂.

Tari-Tari Id.; shore; Jan. 6, 1900; 1 ♀.

Leptograpsus variegatus (Fabricius).

Leptograpsus variegatus Kingsley, Proc. Acad. Nat. Sci. Phil., 1880, 196.

Easter Id.; shore; Dec. 21, 1899, Dec. 16, 20, 1904; 4 ♂ 5 ♀; also in La Perouse Bay; Dec. 17, 1904; 7 ♂, 5♀.

Metopograpsus messor (Forskål).

Metopograpsus messor Rathbun, Bull. U. S. Fish Comm. for 1903 (1906), part 3, 839.

Borabora, Society Ids.; shore and fringing reef; Nov. 17, 1899; 2♂.

Tongatabu; shore and reef; Nov. 29, 30, 1899; 11 ♂, 8♀.

Tari-Tari Id.; shore; Jan. 19, 1900; 1 ♂.

Kusaie, Caroline Ids.; reef; Feb. 8, 1900; 2♀.

Pachygrapsus transversus (Gibbes).

Pachygrapsus transversus Rathbun, Bull. U. S. Fish Comm. for 1900 (1901), **2**, 17.

Easter Id.; shore; Dec. 16, 1904; 1 ♀.

Pachygrapsus plicatus (Milne Edwards).

Pachygrapsus plicatus Kingsley, Proc. Acad. Nat. Sci. Phil., 1880, 200, and synonymy.

Fakarava Id.; Paumotus; outer reef; Oct. 12, 1899; 1 ♂, 1 juv.

Makemo, Paumotus; reef; Oct. 21, 1899; 1 ♂.

Funafuti, Ellice Ids.; reef; Dec. 24, 1899; 1 (broken).

Kusaie, Caroline Ids.; reef; Feb. 8, 1900; 2 ♀.

Pachygrapsus fakaravensis, sp. nov.

Pl. 5, Fig. *1;* Pl. 9, Figs. *6, 6a.*

Carapace $\frac{9}{10}$ as long as wide, its whole surface crossed by prominent, granulated lines, the granules diminishing in size from front to back, the

lines fringed anteriorly by hairs lying flat on the carapace, and averaging half the width of the space between ridges. Lateral borders parallel and entire.

Front a little over half width of carapace, steeply inclined, its free edge slightly sinuous and as a whole convex. Middle pair of suprafrontal lobes very prominent and elongate, separated from each other and from the lateral lobes by broad, deep, hairy furrows.

Chelipeds of ♂ unequal, much stouter than legs, $1\frac{1}{2}\times$ as long as carapace, and roughened by striae fringed with hair, those on the arm smooth, those on the wrist granulated, short and curved; those on the outer face of the palm coarsely granulate and longitudinal, except near the top, where they are broken into short lines or tubercles. Inner border of ischium and merus denticulate; inner tooth of wrist stout, sharp-pointed. Fingers narrowly gaping, each with a tooth on the basal half much larger than the other teeth; that on the dactylus is proximal to that on the pollex.

Legs smoothly striated, the striae fringed; those on the merus joints transverse, those on the carpal and propodal joints longitudinal. Last three joints bristly and sparsely long-hairy. Merus with a subterminal spine on the anterior margin, and 3 or 4 spines at the distal end of the posterior margin. Second leg longest, twice as long as carapace.

Dimensions: — ♂, length 18 mm., width 19.5 mm.

Type locality: —Fakarava Id., Paumotus; outer reef; Oct. 12, 1899; 1 ♂ (Cat. No. 32,844, U. S. N. M.).

This species is near *P. plicatus* (Milne Edwards),[1] but is distinguished at once by its parallel sides, coarse striation, and great hairiness.

Pachygrapsus minutus A. Milne Edwards.

Pachygrapsus minutus Rathbun, Bull. U. S. Fish Comm. for 1903 (1906) part 3, 840.

Ponape, Caroline Ids.; reef; Feb. 11, 12, 1900; 6 ♂, 1 ♀.

Pachygrapsus longipes Rathbun.

Pachygrapsus longipes Rathbun, Bull. U. S. Fish Comm. for 1903 (1906) part 3, 840, pl. 8, fig. 7.

Fakarava Id., Paumotus; outer reef; Oct. 12, 1899; 1 ♀

Kusaie, Caroline Ids.; reef; Feb. 8, 1900; 3 ♂ 1 ♀.

Ponane Caroline Ids.; reef; Feb. 11, 12, 1900; 2 ♀

[1] Hist. Nat. Crust., 1837, **2**, 89.

Ptychognathus easterana, sp. nov.

Pl. 2, Fig. *4;* Pl. 7, Figs. *4*, *4 a*.

Male. — Carapace distinctly broader than long, broadest at the posterior of the lateral teeth, slightly convex in an antero-posterior as well as a transverse direction. Surface with a deep median H-form depression, and numerous irregular pits, some of which define the hepatic region. Anterior and lateral portions very finely granulate. Entire upper surface punctate and finely veined.

Fronto-orbital width about $\frac{7}{8}$, and front about $\frac{2}{5}$, the greatest width of the carapace; edge of front sinuous; orbital margin sinuous and directed distinctly backward toward the outer angle.

Two lateral teeth, marked by triangular notches, the posterior the smaller; distance between tips of teeth $\frac{5}{8}$ the distance between the first tooth and the orbital tooth. The branchial ridge arises as far behind the second of the lateral teeth as those teeth are distant from each other; the ridge or granulated line is bent at first strongly inward, then turns strongly backward.

The edge of the front, viewed from before, is curved upward.

The outer maxilliped is much like that of *P. polleni* de Man,[1] but the merus of the endognath has a greater outer extension. The abdomen of the ♂ resembles also that species (*op. cit.*, fig. *20 b*), but the sides of the terminal segment are more divergent at the base.

Chelipeds finely granulate. Wrist with blunt inner angle. Chelae without the patch of hair so conspicuous in some species. Immovable finger with a deep longitudinal groove, which at the base of the finger turns upward on the palm. Fingers with a moderate gape; dactyl with many teeth, the basal one a little larger. Teeth of pollex, 3 large, and 1 or 2 small at basal end. Horny, spoon-shaped extremities of fingers, bordered proximally with a row of short hairs.

Last 3 joints of feet with short setae on the edges; meral joints setose at the extremity, with transverse bands of color.

Dimensions: — ♂, length 10.6 mm., width 12.7 mm.; fronto-orbital width 11 mm., width of front 4.7 mm.

Type locality: — Easter Island; shore; Dec. 20, 1904; 1 ♂ (Cat. No. 32,845, U. S. Nat. Mus.).

[1] Zool. Jahrb., Syst., 1898, **10**, pl. 28, fig. 20 *a*.

The genus Ptychognathus already comprises 12 species and 1 subspecies, all Indo-Pacific. Our species is most closely related to *P. polleni* de Man,[1] from Madagascar, in which the carapace is narrower and front wider, and the branchial ridge arises near the last lateral tooth.

Pseudograpsus albus Stimpson.

Pseudograpsus albus Kingsley, Proc. Acad. Nat. Sci. Phil., 1880, 205.

Fakarava Island, Paumotus; outer reef; Oct. 12, 1899; 1 ♀ juv.

Hemigrapsus elongatus (A. Milne Edwards).

Pl. 2, Fig. *2;* Pl. 7, Figs. *2, 2 a.*

Heterograpsus elongatus A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, 1873, **9**, 317, pl. 17, fig. 5.

Tongabatu, shore; Nov. 22, 1899; 1 ♂.

The fronto-orbital width is a little less than the length, while the greatest width of the carapace exceeds the length. Carapace almost smooth and punctate, the punctae unequal in size and distribution. Posterior angles of mesogastric region deeply marked. The postero-external surface of the branchial region is very steep, and its upper margin is stronger than the lower, and continued nearly to the posterior margin of the carapace. Front very nearly half as wide as the carapace; the lobes of margin are separated by a broader sinus than shown in Milne Edwards's figure. Upper margin of orbit sinuous, a notch at the inner end. Lateral teeth blunt, formed by small triangular notches, the distance between them less than the distance from the first to the orbital angle.

The left cheliped only is present. Merus and carpus unarmed, the inner angle of the latter bluntly rounded. Palm nearly as high as long, and longer than the fingers, measured horizontally. The longitudinal ridge on the lower half of the palm occupies only the proximal half. Fingers strongly gaping. The large patch of thick hair on the inner side of the chela extends half way on the palm and half way along the pollex, and partly along the occludent edges of the fingers, even to the outer side of the articulation of the dactylus.

The ambulatory legs are chiefly light colored, with a few narrow bands of the dark color of carapace and cheliped. They are sparsely furnished with fine hairs.

[1] *Op. cit.*, 1895, **9**, 94; 1898, **10**, pl. 28, fig. 20.

Abdomen of ♂ rather narrow; terminal segment much longer than wide.

Dimensions: — Length of carapace 8.3 mm.; width 9.1 mm.; fronto-orbital width 7.5 mm.; front 4.4 mm.

Sesarma (Sesarma) rotundatum Hess.

Sesarma rotundata Hess, Arch. f. Naturg., 1865, **31**, 1, 149, pl. 6, fig. 9. Miers, Proc. Zool. Soc. London, 1877, 133, 136. De Man, Zool. Jahrb., Syst., 1887, **2**, 654, 682.
Sesarma dentifrons A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, 1869, **5**, 31. De Man, Zool. Jahrb., Syst., 1887, **2**, 651; Jahrb. Hamburg. Wiss. Anst., 1896, **13**, 110, pl. 3, figs. 6 and 7.
Sesarma gardineri Borradaile, Proc. Zool. Soc. London, 1900, 593, pl. 42, fig. 8.
Sesarma (Sesarma) gardineri Nobili, Ann. Mus. Nat. Hungarici, 1905, **3**, 497.
Sarmatium faxoni Rathbun, Bull. U. S. Fish Comm. for 1903 (1906), part 3, 841, pl. **7**, fig. 1.

Aruo Atoll, Marshall Group; Jan. 27, 1900; 1 ♂.

Distribution: — Oahu and Marshall Islands (Rathbun); Duke of York Island (Miers); Upolu (A. M. Edwards); Funafuti and Rotuma (Borradaile); Nairai, Fijis (Miers); Seleo, Berlinhafen, New Guinea (Nobili); Sydney (Hess).

I think that Nobili is correct in his surmise that *S. gardineri* Borradaile is the same as *S. rotundatum* Hess. This is also the species that I mistakenly placed in Sarmatium, *S. faxoni* (*loc. cit.*). In the two specimens before me, ♂ and ♀, the anterior $\frac{2}{3}$ of the branchial region is inflated. The ♂ (Aruo) has a soft shell, the lower edge of its front is visible in a dorsal view; in the ♀ (Oahu) this edge is invisible in a dorsal view. In the ♂ the posterior margin of the orbit slopes distinctly outward and backward; in the ♀ almost imperceptibly so.

Neither of these specimens agrees in detail with the type of *S. dentifrons* A.M.Edw. or of *S. rotundatum* Hess as figured by de Man (*loc. cit.*), or with the figure of *S. gardineri* Borradaile, but the differences may be attributed to individual variation.

Sesarma (Sesarma) trapezoideum (Milne Edwards).

Sesarma trapezoidea Milne Edwards, Hist. Nat. Crust., 1837, **2**, 74. De Man, Zool. Jahrb., Syst., 1887, **2**, 654; 1889, **4**, 426, pl. 9, fig. 7.

Fatana River, Tahiti; Nov. 7, 1899; 1 ♂.