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TWO TERTIARY AND ONE CRETACEOUS  
CRUSTACEA FROM HOKKAIDÔ,  
JAPAN

By

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*With 1 Plate.*

Three species of Crustacea treated in the present note were obtained in Hokkaidô; they are

1. *Portunites hexagonalis* nov., the Poronai Series<sup>(1)</sup> (Lower Neogene),
2. *Callianassa muratai* nov., *ibid.*, and
3. *C. ezoensis* nov., the Hakobuchi Sandstone<sup>(2)</sup> (Upper Senonian).

*Portunites* BELL, 1857.

1857. *Portunites* BELL: A Monograph of the Fossil Malacostracous Crustacea of Great Britain, I. Crustacea of the London Clay. Palaeontogr. Soc., London, p. 20.
1926. *Portunites* RATHBUN: The Fossil Stalk-Eyed Crustacea of the Pacific Slope of North America. Smith. Inst., U. S. Nat. Mus., Bull. 138, p. 68.
1930. *Portunites* BEURLÉN: Vergleichende Stammesgeschichte, Grundlagen, Methoden, Probleme unter besonderer Berücksichtigung der höheren Krebse. Fortschr. d. Geol. u. Palaeont., Bd. VIII, Heft 26, p. 365.

The genus *Portunites* was founded by T. BELL on *Portunites incerta* BELL<sup>(3)</sup> of the London Clay. M. J. RATHBUN described three species of this genus from the Oligocene of the West Coast of North America, of which *P. alaskensis* RATHBUN<sup>(4)</sup> is similar to the Japanese form described below.

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(1) H. YABE: Recent Stratigraphical and Palaeontological Studies of the Japanese Tertiary. Special Publication of Bernice P. Bishop Museum, no. 7, 1921, p. 7791.

(2) H. YABE: Cretaceous Stratigraphy of the Japanese Islands. Sci. Rep. Tôhoku Imp. Univ., Second Ser., Vol. XI, 1927, p. 40.

(3) T. BELL: *Op. cit.*, p. 21, Pl. III, figs. 1-5.

(4) M. J. RATHBUN: *Op. cit.*, p. 72, Pl. XVIII, figs. 3, 4; Pl. XXII, fig. 3.

*Portunites hexagonalis* nov. sp.

Pl. IV, Figs. 3, 14.

Carapace broader than long, subhexagonal in outline, very minutely and densely granulated. Antero-lateral borders shorter than the postero-lateral. Five broad and prominent teeth including the orbital tooth and the lateral spine present on each of the antero-lateral borders. Lateral spine subtriangular in outline, pointing outward and apparently very prominent. Orbital tooth directed forward and the narrowest of all. The remaining three teeth rather broad, acutely pointed with more or less concave sides. Orbital margin very incomplete, but seemingly deeply excavated; orbital cavities relatively large and far apart from each other. Front moderate in breadth, occupying about one-fifth the greatest length of the carapace, and provided with four forward pointed spines. Postero-lateral borders nearly straight and the posterior rather short.

Regions of the carapace relatively indistinct, the separating furrows being broad and shallow; gastric region indistinctly defined, mesogastric lobe small, very narrow anteriorly, terminating in a pointed furrow which is continuous with a sulcus; sulcus narrow and shallow, running to the anterior margin; mesogastric lobe and the metagastric continuous with each other, forming together an elongate pentagon; hepatic region broad with a slightly raised transverse ridge. A few more ridges exist on the surface, viz., a blunt transverse arched one running from in front of the inner angle of the branchial region to the lateral spine, a broad and round-topped longitudinal one extending from near the inner angle of the last one backward toward the posterior margin, and a transverse one across the protogastric lobes. A crescentic elevation running backward and concave outward observable on either side of the cardiac region. A row of about seven, very irregular tubercles situated in front of and parallel to the transverse branchial ridge.

This species is represented by two imperfect specimens from the Poronai Series (Lower Neogene) of the Ishikari coal-field. They are preserved in marly nodules and are firmly attached to the matrix so as to prevent the observation of the under surface. In one of the specimens there exist two fragments of the appendages, a manus and a carpus, apparently belonging to the same individual as the carapace with which they are in association.

In the specimens the legs, chelipeds, abdomen, and epistome are not preserved, but as the carapace is concerned, this species is closely similar to *P. alakensis* RATHBUN<sup>(1)</sup> from the Oligocene of Alaska, Washington and Oregon. In the former, however, the orbital margin is less excavated, the anterior part of the mesogastric lobe less pronouncedly separated from the other regions, and the front between the orbits shorter. Moreover, the longitudinal ridges on the branchial region, which extend from the posterior margin, seem to be relatively broader and less prominent than in the American form.

Localities and geological horizon: Poronai Series (Lower Neogene); Kumanosawa Colliery of the Kaede Coal-mines, Yûbarigun (M. KANDORI coll.) and a cliff of the Ikushumbets west of the Yayoi Colliery, at its junction with the Bannosawa, Sorachi-gun (R. SAITO coll.), both in the province of Ishikari.

*Callianassa* LEACH, 1814

*Callianassa muratai* nov. sp.

Pl. IV, Figs. 1, 2, 4-8, 15.

Manus: Palm quadrate, a little longer than high; proximal margin undulating with the lower proximal corner forming a rounded lobe which projects backwards a little beyond the line of the manus-carpus articulation; upper margin nearly straight and horizontal, lower margin subparallel to the upper but somewhat convex in its proximal portion and slightly concave in its distal half; upper, proximal, and lower margins with a thin and narrow rim; distal margin between the propodal finger and the articulation with the dactylus, provided with a low process and a rather well developed sinus below. Outer surface convex in a vertical direction especially in the upper third, but almost flat in a longitudinal direction; inner surface slightly convex in a vertical direction and almost flat in its distal portion.

Ornamentation: Outer surface; ornamented with about nine granules in its lower half, all but one being situated in distal quarter, of which, four elongated and somewhat larger than the others; near the lower margin occurring a longitudinal row of about six widely separated punctae; distal margin above the articulation

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(1) M. T. RATHBUN: Op. cit., p. 72, Pl. XVIII, figs. 3, 4; Pl. XXII, fig. 3.

with the dactylus finger swollen and apparently provided with a few irregular granules. Whole surface except near the distal margin, showing evidence of a pavement of oblong yellowish markings belonging to a lower layer.

Inner surface; a row of small, crowded granules present on the lower margin, a longitudinal row of more than six granules near the upper margin, a series of four granules near the upper distal corner, and a few granules below the base of the dactylus finger. In the lower distal corner occurring a large tubercle at the base of the propodal finger and another smaller one further back above the margin. Inner surface with a similar pavement as the outer.

Propodal finger slightly shorter than the palm, a little curved upward and pointed at the distal end. Outer surface divided lengthwise by a strong ridge which has a row of four sockets; upper oblique surface concave, the lower convex and provided with three or four sockets near the lower margin; another socket occurring at the median longitudinal line. Lower margin smooth, rimmed in its basal half length. Prehensile edge with two large teeth and a smooth and very concave interspace between; of the teeth the posterior one placed near the base, bearing two granular crenulations, and the anterior one prominent, stout and rounded; margin in front of the latter with a row of low granular crenulations. Inner surface with an acute longitudinal ridge; upper horizontal surface concave and the lower vertical one almost flat or slightly concave, with a row of four or five sockets placed in the median longitudinal; above the lower margin there is a longitudinal row of pustules.

Dactylus finger triangular in cross-section, very thick, being broader, more curved and slightly longer than the propodus; outer surface with a distinct, narrow and curved longitudinal ridge, which is smooth in its distal half length and provided with a row of crowded, small and round granules in its basal half; lower surface slightly oblique with three large, distant and vertically elongated sockets at some distance from the ridge, and the upper surface nearly horizontal with four sockets. Inner surface with a strong and blunt rim separating its two surfaces; upper surface curved over to the ridge, on which are four large tubercles placed at nearly equidistant intervals. Lower surface in its turn marked except distally by a blunt longitudinal ridge which bears at its posterior portion two large granules and a series of six smaller granules in front of the latter; vertical surface above the ridge almost flat or slightly

concave, with a longitudinal row of two sockets in its proximal half; lower horizontal surface below the ridge nearly perpendicular to the vertical one and moderately concave, with a row of three smaller sockets stretching along the middle portion; vertical surface above described also with a curved row of five rounded and low granules on the basal portion of the dactylus finger. Prehensile margin sinuous, the median portion being concave and smooth, and its basal portion convex with a row of five round and large crenules; distal portion provided with a large tooth, the margins anterior and posterior to this having a row of small, low and round crenules.

Carpus very short, not exceeding one half the length of the manus; upper margin almost straight and the lower convex near the proximal end; proximal margin slightly arched. Merus a little longer than the carpus, very narrow especially at the distal end; lower margin moderately convex in its proximal half; outer surface divided into two flat upper and lower halves by a blunt longitudinal ridge. Ischium slender, nearly as long as the merus with its upper and lower margins subparallel to each other. Merus and ischium ornamented with a pavement of numerous oblong markings.

Numerous specimens of *Callianassa-chelae* are met with in the Poronai Series (Lower Neogene) of Hokkaidô, especially abundant in the Ishikari coal-field. They are almost always found in marly nodules and usually represented by manus, very often isolated but rarely in association with carpi and other joints. Cephalothoraces and abdomens which are sometimes found are nearly always crushed.

The manus of the present species has many points in common with that of *C. allamensis* WHITERS<sup>(1)</sup> from the Upper Oligocene of Washington, but it has a thinner and differently ornamented palm. Our species is similar in various features of the fingers to *C. twinensis* RATHBUN,<sup>(2)</sup> but it is distinguished from the latter by its relatively broader carpus. The form of the manus is quite different between the American species and the Japanese.

*C. dijki* MARTIN<sup>(3)</sup> from the Miocene of Java and *C. birmanica* NOETLING<sup>(4)</sup> from the Miocene of Burma are easily distinguished

(1) WHITERS: Ann. Mag. Nat. Hist., ser., 9, Vol. XIV, 1924, Pl. IV, figs. 4-7 (cited from RATHBUN's paper). M. J. RATHBUN: Op. cit., p. 114, Pl. XXVI, figs. 6-12.

(2) M. J. RATHBUN: Op. cit., p. 11, Pl. XXVII, figs. 1-4.

(3) K. MARTIN: Palaeontologische Ergebniss von Tiefbohrungen auf Java. Samml. geol. Reichsmus., Leiden, ser. I, Bd. 3, 1833-1887, p. 36, Pl. III, figs. 31, 32 and 33 (?).

(4) F. NOETLING: The Fauna of the Miocene Beds of Burma. Pal. Indica, N. S., Vol. I, 1901, p. 368, Pl. XXIV, figs. 3-5.

from ours in having a much larger manus with its surface ornamented by numerous granules disposed almost all over.

Geological horizon: Poronai Series (Lower Neogene).

Localities:

A point between Momijiyama and Numanosawa along the Yûbari-gawa, Yûbari-gun, province of Ishikari (four specimens, S. MURATA coll. and eleven specimens, K. ÔTATSUME coll.).

Momijiyama, Yûbari-gun, province of Ishikari (three specimens, K. UWATOKO coll.).

A cliff of the Ikushumbets, near the Yayoi Colliery, Sorachi-gun, province of Ishikari (one specimen, Y. SASA coll. and five specimens, R. SAITO coll.).

A cliff of the Mukawa, south of the Hobetsu Station, Yûfutsu-gun, province of Iburi (one specimen, K. ÔTATSUME and T. NAGAO coll.).

The Panke-opiraruka north of the preceding locality (one specimen, ÔTATSUME coll.).

Furenai, Hiratori-mura, Saru-gun, province of Hidaka (one specimen, H. TAKEDA coll.).

Okumuri, Ombets-mura, province of Kushiro (one specimen, S. WATASE coll.).

The specific name is dedicated to Mr. S. MURATA, engineer of the Tanko-kisen Co., who is now studying the stratigraphy of the Poronai Series.

*Callianassa exoensis* nov. sp.

Pl. IV, Figs. 9-13.

Manus: Right and left manus almost equal in form and ornamentation. Palm subquaderate in outline, nearly as long as high; distal portion swollen into a low, relatively broad and smooth vertical ridge with a shallow and narrow depression behind. Outer surface moderately convex, the inner evenly and slightly convex in a vertical direction and almost flat or a little concave at the base of the propodal finger. Proximal margin faintly sinuous; upper and lower margins straight, acute, subparallel to each other and somewhat convex at the proximal ends; lower margin serrated; the upper and the proximal with a thin rim. Distal margin between the propodal finger and the articulation with the dactylus not much produced, the sinus below being broadly concave.

Ornamentation: Inner surface with numerous granules and pustules which, excepting about ten irregularly distributed on the lower distal quarter, are arranged in a few variously directed rows; a vertical row of about seven large and longitudinally elongate granules along the proximal margin of the distal depression; two longitudinal ones of smaller granules, of which one near the dorsal margin and little lowered distally and the other at one third distance from the lower margin; a row of about fourteen small and crowded pustules on the lower margin, also a submarginal row of distant granules. Outer surface ornamented almost equally with the inner, except that the longitudinal row of granules near the upper margin is not observable owing most probably to imperfect preservation. Whole surface, except near the margins, with numerous oblong, usually polygonal pavements which are more prominent at the dorsal portion of the outer surface.

Propodal finger slightly shorter than the palm and moderately curved inward and outward, with a large tooth on the prehensile margin; two longitudinal rows of sockets, one on the outer ridge and the other a little above the lower margin. Dactylus finger not preserved.

Carpus slightly longer than one half the palm. Merus slender, nearly as long as the manus and much narrower distally; upper margin almost straight and the lower convex especially near the proximal end.

This species is represented by more than ten detached manus and one more or less perfect cheliped. It is closely similar to the preceding form but distinguishable in several points.

In the former, the manus is shorter, the outer surface less convex especially at the upper third and ornamented with numerous granules on the lower distal quarter which is almost smooth in *C. muratai*. The margin of the articulation with the dactylus finger is less distinctly swollen and smoother, and the propodal finger apparently more curved inward in the Cretaceous species in question than in the Tertiary one.

The present form is also akin to *C. whiteavesi* WOODWARD<sup>(1)</sup> from the Upper Cretaceous of Vancouver Islands but its palm is more

(1) H. WOODWARD: On some Podophthalmatous Crustacea from the Cretaceous Formation of Vancouver and Queen Charlotte Islands. Quart. Jour. Geol. Soc. London, Vol. LII, 1896, p. 223, text-figs. 1 and 2; Further Notes on Podophthalmatous Crustaceans from the Upper Cretaceous Formation of British Columbia, etc. Geol. Mag., Dec. IV, Vol. VII, 1900, p. 435, Pl. XVII, fig. 2 a, b. J. F. WHITEAVES: Mesozoic Fossils, Vol. I, pt. 5, 1903, p. 319, text-figs. 18 and 19. M. J. RATHBUN: The Fossil Stalk-Eyed Crustacea of the Pacific Slope of North America. Smithsonian Inst., U. S. Nat. Mus., Bull. 138, 1926, p. 107, Pl. XX, figs. 6-8.

quadrate and its merus relatively shorter. *C. burckhardti* J. BOEHM<sup>(1)</sup> from the Upper Cretaceous of Argentina is another species allied to ours. The palm of the former, however, has more numerous granules on the basal portion of the outer surface of the propodal finger than the latter. In the South American form, moreover, the distal margin of the palm is provided with a deep triangular sinus below, and the upper and lower margins are slightly concave in the middle and pronouncedly convex at the proximal end. *C. americana* WOODS<sup>(2)</sup> from the Eocene of Peru has the palm apparently more flat on the inner surface and is ornamented with more numerous granules.

The author does not know much about *C. stimpsoni* GABB<sup>(3)</sup> from California, but this species seems to have a longer proposal finger and more numerous granules on the surface than the Japanese one under consideration.

Geological horizon and localities: Hakobuchi Sandstone (Upper Senonian); Nakahobets along the Hobets-gawa and two places near the gorge of the Mukawa west of Hetonai, both in Yûfutsu-gun, province of Iburi, Hokkaidô,

At the end, the author wishes to express his thanks to Prof. H. YABE of the Institute of Geology and Palaeontology in Sendai for the free use of his private library.

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(1) J. BOEHM: *Callianassa burckhardti* n. sp., etc. Zeitschr. deutschen geol. Gesell., Bd. LXIII, 1911, p. 37, text-fig.

(2) H. WOODS in T. O. BOSWORTH: Geology and Palaeontology of North-west Peru, 1922, p. 115, Pl. XVII, figs. 5 and 6.

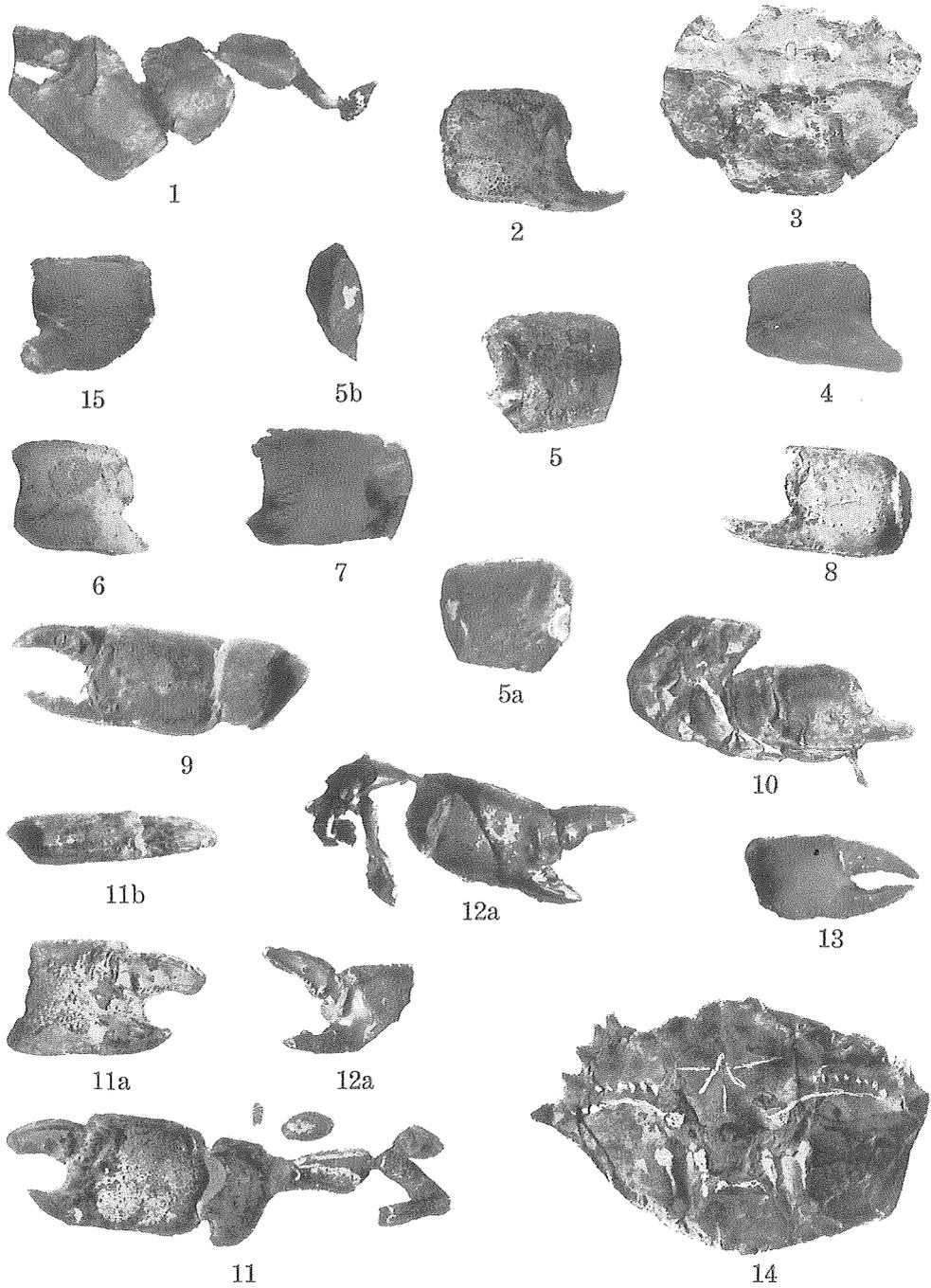
(3) W. M. GABB: Paleontology of California I, 1864, p. 57, Pl. IX, fig. 1; II, 1869, p. 127, Pl. XIX, fig. 3. M. T. RATHBUN: Op. cit., p. 107.

Plate IV

## PLATE IV

(All figures are of natural size).

- Fig. 1. *Callianassa ezoensis* NAGAO. Hakobuchi Sandstone; Panketosano-sawa west of Hetonai, Yûfutsun-gun, province of Iburî. A left cheliped.
- Figs. 2, 4, 5, 7, 8, 15. *Callianassa ezoensis* NAGAO. Hakobuchi Sandstone; Nakhobetsu, Hobetsumursa, Yûfutsu-gun, province of Iburî.  
2 (the type), a right manus; 4, an artificial mould of a right manus; 5, a left manus; 7, an artificial manus of a right manus; 8, a right manus.
- Fig. 3. *Portunites hexagonalis* NAGAO. Poronai Series; a cliff of the Ikushumbets, near the Yayoi Colliery, Sorachi-gun, province of Ishikari.
- Fig. 6. *Callianassa ezoensis* NAGAO. Hakobuchi Sandstone; Gorge of the Mukawa west of Hetonai, Yûfutsu-gun, province of Iburî. A right manus.
- Figs. 9, 11, 13. *Callianassa muratai* NAGAO. Poronai Series; Momijiyama, Yûbari-gun, province of Ishikari.  
9, a left manus; 11 (the type), a left cheliped (11 b, upper view); 13, an artificial mould of a left manus.
- Figs. 10, 12. *Callianassa muratai* NAGAO. Poronai Series; a cliff of the Ikushumbets, near the Yayoi Colliery, Sorachi-gun, province of Ishikari.  
10, a right cheliped; 12, a right manus.
- Fig. 14. *Portunites hexagonalis* NAGAO. Poronai Series; a cliff of the Ikushumbets, near the Yayoi Colliery, Sorachi-gun, province of Ishikari. The type.



Mashiko and Takeda photo.

*T. Nagao: Three Fossil Decapoda.*