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ON SOME FOSSIL CRUSTACEA FROM JAPAN

By

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With 1 Plate

(Contribution from the Department of Geology and Mineralogy,
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The species of fossil Crustacea described in this note are,

Callianassa sp.

C. elongatodigitata nov.

C. kusiroensis nov.

C. titaensis nov.

and

Plagiolophus ezoensis nov.

Callianassa sp. indet.

Pl. XXVI, Figs. 8-11.

Five manus and two carpi were obtained by the present writer some fifteen years ago from the Palaeogene deposits of Northern Kyûsyû, of which two came from the Tikuhô (Chikuhô) coal-field and the others from the Asakura coal-field to the south. All the specimens at hand are imperfect, being more or less weathered on surface and mostly lacking one or both fingers except in one specimen. The specific description is compiled from all these specimens.

In the Asakura coal-field⁽¹⁾ the Palaeogene rocks are divided into the following four beds in descending order:

Dosi bed
Kawamagari bed
Hôsyuyama bed
Yamanokami bed

(1) T. NAGAO: The Palaeogene Stratigraphy of Kyûsyû. Jour. Geogr., vol. XL, 1928, p. 7. T. NAGAO: A Summary of the Palaeogene Stratigraphy of Kyûshû, Japan, with Some Accounts on the Fossiliferous Zones. Sci. Rep. Tôhoku Imp. Univ., Ser. II, vol. XII, 1928, p. 6.

The Hôsyuyama bed is coal-bearing gradually passing into the overlying Kawamagari bed which is marine in origin. The uppermost complex, the Dosi bed, is also coal-bearing but marine in its upper part and considered as Upper Eocene in age. The specimens here treated have been derived from the Kawamagai and Dosi beds.

The specimens from the Tikuhô coal-field⁽¹⁾ came from the Ideyama Sandstone, the lowest member of the Otuzi (Otsuji) group, which is thought to be nearly contemporaneous with the Dosi of the Asakura coal-field, and underlain by the coal-bearing Nôgata group and overlaid by the coal-bearing Onga beds.

Manus. Palm: longer than high, thick especially superiorly, a little attenuated in front and abruptly compressed behind near the manus-carpus articulation, margins convergent a trifle toward the distal end; superior border more blunt than the inferior, straight and horizontal, the inferior border acute, slightly raised distally, faintly excavated below the origin of the finger, and finely crenulated, the crenulations directed forward.

Outer surface moderately convex from above to below, weakly so in a longitudinal direction, flattened in the antero-ventral portion; distal extremity somewhat inflated along the articulation with the dactylus and separated from the flank by a shallow furrow parallel with the articulation; distal margin somewhat sinuous, the upper two-thirds nearly straight and vertical with a very narrow excavation below, the latter being provided with a small process above the origin of the propodal finger; proximal margin rimmed, sinuous, passing gradually into both upper and lower margins over a rounded angle; the articulation with the carpus rather small in height.

Inner surface fairly convex vertically and almost flat longitudinally, compressed in the distal part especially ventrally; distal margin sinuous, the dorsal half slightly concave, a small low process present between it and the origin of the propodal finger; proximal margin faintly excated.

Ornamentation; the surfaces being more or less weathered, the ornamentation is obscure, but on the outer surface about ten irregularly distributed tubercles present in the antero-ventral part

(1) T. NAGAO: The Palaeogene Stratigraphy of Kyûshû. Op. cit., vol. XXXIX, 1927, p. 655. T. NAGAO: A Summary of the Palaeogene Stratigraphy of Kyûshû. Op. cit., p. 6.

including the proximal portion of the propodal finger. Numerous irregularly polygonal pavements apparently belonging to the lower layer cover the whole surface except the distal portion. Inner surface almost smooth, a series of small distant granules present along the upper margin, also decorated with numerous polygonal pavements.

Propodal finger rather short, small and subtriangular in cross-section at its origin; outer surface strongly ridged above, weakly convex dorso-ventrally; lower border acute, faintly excavated in the proximal portion; upper surface horizontal, apparently smooth; inner surface slightly excavated with a ridged upper margin.

Dactylus finger large, thick and deep, a little bent downward, probably shorter than the palm, outer surface convex vertically, with an arched upper border.

Carpus. Thick, longer than high, much inferior in height to the palm; outer surface convex vertically and the inner one flattened longitudinally; upper border rather blunt, the lower more acute.

Localities and horizons: Kawamagari and Dosi (Doshi) beds of the Asakura coal-field; Hôsyuyama, Asakura-gun, Hukuoka Prefecture.⁽¹⁾ Iwasaki fossil bed of the Ideyama Sandstone in the Tikuhô (Chikuhô) coal-field; Iwasaki, Inatuki-mura, Kaho-gun, Hukuoka Prefecture.⁽²⁾

Syntypes. The specimens are stored in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, and were kindly lent to the writer through the courtesy of Prof. H. YABE of that Institute.

- no. 36077. An imperfect left manus lacking the propodal finger but with the dactylus preserved, firmly attached to the matrix. (Kawamagari bed of the Asakura coal-field).
- no. 36058. A left propodus with the finger, showing the inner surface, the proximal portion being broken off. Another left propodus with the finger, the dactylus also preserved, firmly attached to the matrix, showing the outer aspect. (Kawamagari bed of the Asakura coal-field).
- no. 36075. A left manus without the finger, the postero-ventral portion incomplete. A carpus probably belonging to

(1) 福岡縣朝倉郡寶珠山村

(2) 福岡縣嘉穂郡稻築村岩崎

another individual. (Dosi bed of the Asakura coal-field).
no. 36071. A left manus without the finger and a carpus.
(Iwasaki fossil bed of the Tikuhô coal-field).

Measurements

	36058a	36058b	36077	36071	36075
Palm, length	15 mm.+	17+mm.	15 mm.	23 mm.	35+mm.
height (maximum)	18 mm.	20 mm.	12+mm.	16.5 mm.	18 mm.
thickness				7.5 mm.	8 mm.
Dactylus finger, length of	12 mm.		12 mm.		
Propodal finger, length of		10+mm.			
Carpus, length				16+mm.	15+mm.
height				13 mm.	11 mm.
thickness				7 mm.	5 mm.

This form is characterised by its long and thick palm, with the distally convergent upper and lower margins, and its thick and deep dactylus finger. As far as the specimens are concerned, there is no trace of a tooth in the fingers. The excavated portion between the origin of the propodal finger and the articulation with the dactylus is very narrow.

The present form is easily distinguished from *C. isikariensis* NAGAO and OTATUME⁽¹⁾ from the Palaeogene Isikari series of Hokkaidô in having the manus much larger, higher and smoother, with the distally convergent margins. The fingers seem to be shorter than in the Hokkaidô species. *C. stimpsoni* GABB⁽²⁾ from the Eocene of California seems to be distinct from the Japanese form in having the palm equally convex on both sides and covered with numerous granules.

This form is provided with a longer palm than *C. twinensis* RATHBUN⁽³⁾ from the Oligocene of Washington to which it is some-

(1) T. NAGAO and K. OTATUME: A New Callianassa from the Palaeogene Isikari Series of Hokkaidô. Transactions Palaeont. Soc. Japan, 1938, p. 101, text-figs. 1-3.

(2) W. M. GABB: Palaeontology of California vol. I, 1864, p. 57, pl. IX, fig. 1; Vol. II, 1969, p. 127, pl. XIX, fig. 3.

(3) M. J. RATHBUN: The Fossil Stalk-eyed Crustacea of the Pacific Slope of North America. Smiths. Inst. U. S. Nat. Mus., Bull. 138, 1926, p. 115, pl. XXVII, figs. 1-4.

what similar in the features of the fingers. The same remark applies to *C. lacunosa* RATHBUN⁽¹⁾ of the Oligocene of the Panama region which is akin to the form under consideration in the lateral aspect of the palm.

Callianassa elongatodigitata nov.

Pl. XXVI, Figs. 12-20.

1931. *Callianassa muratai* NAGAO (in part): Two Tertiary and One Cretaceous Crustacea from Hokkaidô, Japan. Jour. Fac. Sci., Hokkaidô Imp. Univ., Ser. IV, vol. II, p. 17, pl. VI, fig. 10.

Numerous specimens of *Callianassa* are met with in calcareous nodules contained in the Takinoue bed and the underlying Poronai series in the Isikari coal-field and the contemporaneous rocks of various places in Hokkaidô. Among these specimens, many belong to *C. muratai* NAGAO,⁽²⁾ but others are distinct from it.⁽³⁾ The specimens of the latter are found together, but in different nodules, with those of the former and they are so similar that they might be taken as conspecific with *C. muratai* at a cursory examination.⁽⁴⁾ However, since the differences especially observable in the fingers are not small, the writer feels warranted to create a new species and separate it from the species above cited.

The new species is almost identical with *C. muratai* in the form, size and thickness of the chelipes and also in the ornamentation. The most remarkable differences between these two forms are in the characters of the fingers, as described in the following:

(1) M. J. RATHBUN: Decapod Crustaceans from the Panama Region. Ibid., Bull. 193, 1919, p. 138, pl. LIX, figs. 6-11.

(2) T. NAGAO: Two Tertiary and One Cretaceous Crustacea from Hokkaidô, Japan. Jour. Fac. Sci., Hokkaidô Imp. Univ., Ser. IV, vol. II, 1932, p. 17, pl. IV, figs. 9, 11, 12, 13 (non 10).

(3) In the Takinoue bed another but very different species, *C. inornata* NAGAO and HUZIOKA is found. See: T. NAGAO and K. HUZIOKA, A New Species of *Callianassa* from the Neogene Tertiary of Hokkaidô. Ibid., vol. IV, 1938, p. 63, pl. IV (I), figs. 1-5.

(4) In former occasions specimens of this form were mixed with *C. muratai*. For example, T. NAGAO, 1932, pl. IV, fig. 10 and T. NAGAO and K. HUZIOKA, 1938, pl. IV (I), figs. 7, 8; these specimens belong to the present species and not to *muratai*.

C. muratai

1. Manus..... Usually longer than high, inner surface with a vertical series of small granules near the margin of the articulation with dactylus.
2. Propodal finger..... Thick, triangular in cross-section at a short distance from the origin, the outer upper surface steeply sloped outward and downward.
 Prehensile edge..... Smooth except the anterior portion, that is in front and behind the anterior tooth. Besides the posterior triangular tooth on its basal portion, a prominent and longitudinally elongated tooth in the median length. Interspace between these two teeth very broadly and deeply excavated and smooth.
3. Dactylus finger..... Strong, rather short, shorter than palm, thick especially in the basal part, strongly bent downward, with subquadrate cross-section near the middle length and arched upper surface.
 Outer surface..... Narrow, vertical; lower margin concave, broadly excavated in the middle length and strongly convex posteriorly.
 Inner surface..... Rather broad, nearly vertical, slightly excavated, with the granules arranged in the longitudinal direction small; lower edge strong, crenulated in the posterior half length.
 Lower surface..... Relatively narrow, nearly horizontal forming a prehensile edge, median portion smoothly excavated, posterior portion convex, ornamented with a number of rather large and prominent granules together with the posterior portion of the inner surface; lower margin finely crenulated in the anterior length and coarsely granulated in the posterior; granules in the median line rather small.

C. elongatodigitata

1. Manus..... Frequently nearly as high as long, inner surface without a vertical series of granules near the margin of the articulation with dactylus.
2. Propodal finger..... Thin, trapezoidal in cross-section at a short distance from the origin, the upper outer surface broad and steeply sloped downward.
 Prehensile edge..... Finely crenulated in the whole length except the anterior extremity. A prominent triangular and finely crenulated tooth in the basal part, no anterior tooth. No excavation in front of the tooth.

3. *Dactylus* finger..... Long, longer than palm, thin, nearly straight, subtrapezoid in cross-section in the middle length, sublancoolate in lateral view; upper surface not much arched.
- Outer surface..... Broad, slightly sloped inward and downward; lower margin nearly straight in its greater length, without any marked excavation, finely crenulated.
- Inner surface..... Rather narrow, a little sloped outward and downward, much excavated, the longitudinal granules small; lower edge blunt, smooth except for a few granules in its basal length.
- Lower surface..... Broad, slightly concave dorso-ventrally and longitudinally, without any median excavation, granulation in the posterior portion rather weak and granules few in number; lower margin not excavated, finely crenulated; longitudinal granules large.

Almost all features are identical in both right and left chelipeds in this form.

Localities and horizons.

Poronai Series and the contemporaneous rocks.

Ikusyunbetu, Sorati-gun, province of Isikari;⁽¹⁾

Ponkuruki, Yûbari-mati, Yûbari-gun⁽²⁾, do.;

Momiziyama, Yûbari-gun,⁽³⁾ do.;

Takutakubeobetu and Koikata-horokatyako, tributaries of the Tyaro-gawa,⁽⁴⁾ and Okumuri, Onbetu-mura, Siranuka-gun, province of Kusiro.⁽⁵⁾

Takinoue bed.

Takinoue, Yûbari-mati, Yûbari-gun;⁽⁶⁾

Hobetu, Hobetu-mura, Yûhutu-gun, province of Iburi.⁽⁷⁾

(1) 石狩國空知郡幾春別

(2) 夕張郡夕張町ポンクルキ

(3) 夕張郡紅葉山

(4) 釧路國茶路川タリタリベオベツ及コイカタホロカチヤロ

(5) 白糠郡音別村奥霧里

(6) 夕張郡夕張町瀧ノ上

(7) 膽振國勇拂郡穂別村穂別

Callianassa kusiroensis nov.

Pl. XXVI, Fig. 21.

A single left manus showing its inner side is at hand, which is closely similar to the preceding one and also to *C. muratai* NAGAO. The latter two are very common in the Sitakara beds from which the present specimen has been derived and also in the younger Tyaro beds, in the Kusiro coal-field. The form under consideration is quite akin to *C. muratai* in the features of the dactylus finger, while it is almost identical to *C. elongatodigitata* in the fixed finger, as stated below.

Manus very short and nearly rectangular in outline, approaching to that of *C. elongatodigitata*, but even shorter. Inner surface of the manus only slightly convex downward from above. Fingers rather long.

Fixed finger almost straight, the prehensile border evenly excavated and acute with a prominent tooth proximally, the margin in front of the tooth being rather coarsely serrated for a short distance and very finely serrated distally.

Dactylus finger also straight, very coarsely granulated on the border between the inner surface and the lower one, being similar to that of *C. muratai* and more coarsely than in *C. elongatodigitata*. Lower border convex proximally, slightly excavated in the midlength and also coarsely serrated in the proximal portion behind the excavation and rather smooth in front. Lower surface subhorizontal and distinctly excavated.

Mesurements: Manus 8 mm. long and 10 mm. high.

As stated above, the present form is intermediate in various features between *C. muratai* and *C. elongatodigitata*. It is especially similar to the last one and the differences are not improbably sexual ones. It is remarkable that these three forms are met with in the same complex and apparently very closely related, if not conspecific.

Locality and geological horizon: Koikata-horokatyaro,⁽¹⁾ a small tributary of the Tyaro-gawa, Siranuka-gun, province of Kusiro. Sitakara beds (Poronai Series).

(1) 釧路國臼糠郡茶路川支流コイカタホロカチヤロ川 (舌辛層)

***Callianassa titaensis* nov.**

Pl. XXVI, Figs. 3-7.

In the Institute of Geology and Palaeontology, Tôhoku Imperial University in Sendai, are stored four specimens of *Callianassa* collected from the Tita Peninsula, Aiti Prefecture, and another conspecific cheliped obtained from Ena-gun, Gihu Prefecture, which are closely similar to *C. muratai* NAGAO⁽¹⁾, a very common species in the Poronai and the overlying Takinoue bed of Hokkaidô. These specimens were kindly lent to the writer for study.

According to Mr. T. OSE, the Tertiary of Tita Peninsula overlies the Palaeozoic basement rocks and is unconformably covered by Quarternary sediments, being divided into two parts. The lower part, the Morosaki Group, comprises the following two subdivisions, viz.,

1. Himaga bed (15 m. thick) is the basal bed composed of sandstone and shale in alternation, with layers of conglomerate in the lower part and intercalated with a thin coal seam or seams. Fragments of molluscs are met with.

2. Morosaki bed (ca. 100 m. + thick), consisting of light yellowish sandstone and dark gray shale, containing abundant remains of molluscs in various horizons. *Yoldia tokunagai* YOK., *Venericardia ferruginea* var. *orbicularis* YOK., *Pecten clancularis* YOK. and *Natica janthostoma* DESH. are among them. OSE⁽²⁾ reported the occurrences of crustacean chelipeds and star fishes.

The upper part, Hazikami bed (ca. 60 m. thick), is an alternation of sandstone and shale, the former predominating, also with remains of foraminifera and molluscs, besides star-fishes. *Natica janthostoma* and *Pecten clancularis* are listed by OSE among the molluscan fossils.

The chelipeds under consideration have without doubt been derived from the Morosaki bed, three being contained in nodules of dark coloured calcareous shale and the remaining one in dark coloured hard shale.

(1) T. NAGAO: Two Tertiary and One Cretaceous Crustacea from Hokkaidô, Japan. This Journal, Vol. II, 1932, p. 17, pl. VI, figs. 9, 11-13.

(2) T. OSE: Topography and Geology of Tita Peninsula. Jour. Geogr., Vol. XLI, 1929, p. 338.

Another mould from Gihu Prefecture is contained in yellowish white tuffaceous rock of the Iwamura Group of Mr. I. SAGA.⁽¹⁾ The writer is not acquainted much with the geological age of the Morosaki bed but it no doubt occupies some horizon of the middle or upper part of Miocene.

Syntypes:

no. 47299. Three specimens; chelipeds of three individuals had been included, all segments but the palm crushed. The fingers broken in some specimens.

Locality, Kosa, Toyohama-mura, Tita-gun, Aiti Prefecture⁽²⁾ (Morosaki bed, IWAMOTO coll.).

no. 37086. An imperfect external mould of a right cheliped, with the dactylus, propodus, carpus and a small part of the ischium preserved.

Locality not exactly informed, the southern part of Tita Peninsula (Morosaki bed, OSE coll.).

no. 22194. An external mould of a left cheliped, crushed but retaining the details of some features.

Locality, Tomita, Hongô-mura, Ena-gun, Gihu Prefecture⁽³⁾ (Iwamura Group of SAGA, SAGA coll.).

Horizon: Miocene.

Manus. Palm nearly quadrate, usually very slightly higher than long, sometimes as long as high; both upper and lower margins subparallel, straight, but the latter somewhat raised proximally, being convex along the proximal corner of the palm; upper border rather blunt, lower one acute; proximal margin somewhat sinuous with a round and low lobe below, projecting beyond the manus-carpus articulation, above this lobe the margin a little concave.

Outer surface especially in the upper third very convex from above to below, flattened near the lower margin, almost flat longitudinally and compressed in the antero-ventral portion; proximal extremity separated from the flank by a shallow vertical depression, and the distal one swollen. Upper and lower margins distinctly rimmed; distal margin sinuous, the upper half length slightly convex,

(1) I. SAGA: Tertiary Geology of Eastern Mino, 1918 (MS.).

(2) 愛知縣知多郡豐濱村小佐

(3) 岐阜縣惠那郡本郷村富田

excavated between the articulation and the origin of the propodal finger, with a small and round process.

Inner surface less convex vertically as well as longitudinally than the outer, flattened especially in the antero-ventral portion; distal extremity inflated along the articulation and separated from the flank by a shallow depression; distal margin undulating, slightly convex above along the articulation, broadly excavated below between the articulation and the origin of the propodal finger, with a small, low process.

Ornamentation. Outer surface; antero-ventral portion including the origin of the finger ornamented with 6 distant crater-shaped tubercles, of which that situated on the median longitudinal line and behind the articulation is usually the largest and most prominent; another smaller one present far behind and a little below the middle. A longitudinal series of 6 crater-shaped tubercles along the lower margin, the tubercles gradually increasing in size anteriorly and directed forward; a few more, probably 3 belonging to this series present near the lower margin of the propodal finger. Surface all over, except the anterior portion, with numerous oblong, irregularly set pavements belonging to a lower layer. Inner surface, rather smooth; a longitudinal series of about 10 small and distant pustules along the upper margin; a small pustule on the median longitudinal line, another obliquely elongate, large tubercle in the antero-dorsal portion, besides a smaller granule in the corner; a series of a few round granules observable on the lower half of the swollen portion along the distal extremity. The pavement ornamentation similar to that of the outer surface.

Propodal finger; strong, rather long, only slightly shorter than the palm, very little bent upward in the distal extremity, thin, trapexoidal in cross-section, with an acute, rimmed lower margin. Upper outer surface concave transversely and sloped outward, separated by a blunt ridge from the lower outer surface, provided with three or four distant sockets near the lower ridge; lower outer surface slightly excavated in the basal portion and convex anteriorly. Upper inner surface steeply inclined downward, excavated transversely, and separated from the lower inner surface by a prominent ridge; lower inner surface smooth with two pustules in the posterior portion, of which the posterior one is situated above the origin of the propodal finger and the other in the median longitudinal line

and in advance. A prominent, sharp, pointed and smooth tooth present above the origin of the finger; prehensile margin itself shallowly excavated in its posterior portion in front of the tooth, thence slightly and broadly convex in the mid-length, the edge in front finely crenulated.

Dactylus finger; subtrigonal in cross-section, stout, long, longer than the palm, its distal extremity projecting far beyond that of the propodal finger, strongly bent downward especially at the extremity. Upper surface arched longitudinally, convex transversely toward the anterior extremity; posterior portion flattened, with two longitudinal elevations separated by a concave interspace; the longitudinal elevations interrupted, outer one with two distant sockets placed on the outer slope in its posterior half length, besides two closely set pustules near the anterior end; the inner one with four distant, vertically elongate, large sockets on its inner slope.

Outer surface moderately broad, nearly vertical, excavated, bounded above by a prominent ridge, and with a longitudinal series of four or five vertically elongate tubercles near the lower margin; lower margin rimmed, convex and granulated in the basal portion, thence broadly concave and smooth, and again weakly convex and finely crenulated toward the anterior end. Inner surface broad, deeply excavated especially near the upper margin, smooth except for a vertical series of three or four small granules in the basal portion and two small longitudinally arranged crater-shaped tubercles in advance; lower margin ridged, smooth in the greater length but ornamented posteriorly with a few low, round granules; upper margin strongly rimmed, also with a series of crowded granules in the basal length. Lower surface narrower than the inner one, deeply excavated longitudinally, steeply inclined outward, a little convex in the basal portion where occur a few granules arranged in a longitudinal ridge and close to the lower margin which is smooth, concave in the mid-length; two distant pustules present in the anterior half length and near the upper margin.

Carpus smooth, very short, quadrate in lateral view. Merus deeper in the proximal portion, with the lower margin raised distally and the upper one nearly horizontal. Ischium elongate-ovate.

Measurements: (in mm.)

	47299			37086	22194
	a.	b.	c.		
Palm, length of	23	16	20	18	16
height of	22+	20—	24—	ca. 20	18
Propodal finger, length of	19	15+		14	13
Dactylus finger, length of	22+			14	20
			(anterior portion missing)		
Carpus, length of				10	
height of				16	

This species is closely related to both *C. muratai* NAGAO and the preceding one from the Takinoue bed and the Proronai series of Hokkaidô, the latter two being almost indistinguishable from each other except for the fingers. The form, convexity and thickness of the palm are quite identical and the ornamentation is also similar in these three species. Many characters of the fingers in the present form are somewhat intermediate to those two Hokkaidô species, as stated below.

The species under consideration has a palm rather short, usually being higher than long. The dactylus finger is relatively much longer than in *C. muratai*, being as long as those of *C. elongatodigitata*, more strongly bent downward and more robust, than in the last form, but its anterior end is much less bent downward than in *C. muratai*. The lower margin of the outer surface is intermediate, being more excavated than in *C. elongatodigitata* but much less than in *C. muratai*, with a low, elongate excavation in the middle length, and finely crenulated as seen in the *C. elongatodigitata*. The posterior part of the lower surface is almost similarly granulated as in *C. muratai*.

The propodal finger has the prehensile margin finely serrated as in *C. elongatodigitata*, with a low, elongate convex median length instead of the prominent tooth seen in *C. muratai*.

Plagiolophus, BELL.*Plagiolophus exoensis* nov.

Pl. XXVI, Figs. 1, 2.

Carapace nearly as long as broad, subquadrate in outline, antero-lateral border very short with three small tubercles, of which

the anterior or orbital one seems to be inconspicuous, the middle one lying on the hepatic region distinct but small, and the posterior one situated on the epibranchial lobe projected outward and the most prominent of all. Postero-lateral border also decorated with three close-set teeth, of which the anterior two small ones lie on the mesobranchial lobe, while the most posterior one on the antero-lateral corner of the metabranchial lobe is the largest and most prominent.

Front well in advance of the orbit, narrowly rounded anteriorly with a broad median furrow. Posterior margin of the carapace very slightly convex and relatively long with a raised border.

Regions or lobes very distinct, elevated and covered with closely set, fine, and depressed granules; intervening furrows rather broad, deep and apparently smooth. Lobes arranged in three transverse rows, of which the anterior one is composed of the hepatic and protogastric lobes, the middle one of the gastric and mesobranchial, and the posterior one of the metabranchial and cardiac. On the anterior and posterior ones of these rows respectively there is observable a discontinuous transverse ridge, the posterior ridge being the most prominent and extended almost across the carapace. Epigastric lobe small and close to the front, the protogastric oval and very broad. Mesogastric lobe rather small, situated almost centrally, elongated anteriorly into a slender process which reaches nearly to the front, and separated posteriorly from the metagastric by a shallow transverse groove. Hepatic lobe extremely small, being represented by a round knob. Orbit incomplete, but seemingly opens directly forwards extending as far as the inner border of the hepatic region and with an indication of a median notch.

Measurements :

	Breadth	Length
type	17 mm.	15 mm.
	28 mm.+	23 mm.+

Two specimens are at hand, of which the smaller one (the type) is rather well preserved but does not show the under side, and the other is weathered dorsally. The present form is tentatively placed under *Plagiolophus* BELL⁽¹⁾, being closely similar to *Plagiolophus*

(1) BELL: Monogr. Foss. Malacostracous Crustacea Great Britain. Pt. I. Crustacea of the London Clay. Palaeontograph. Soc., London, 1948, p. 19. BEURLIN: Vergleichende Stammgeschichte; Grundlagen, Methoden, Probleme unter besonderer Berücksichtigung der höheren Krebse. Fortschritte der Geologie und Paläontologie, Vol. VIII, no. 26, 1930, p. 360.

wetherellii BELL⁽¹⁾, the genotype, from the London Clay of England. *Plagiolophus vancouverensis* WOODWARD⁽²⁾ from the Upper Cretaceous of Vancouver Islands, which was included in this genus by WOODWARD with some doubt, is also closely akin to ours. The Japanese form may be a local variety of the Vancouver species, but a more precise comparison is impossible at present due to the bad state of preservation of the Canadian specimens. However, the former seems to be provided with a narrower, more produced front which is not sharply truncated, if these features are not due to different preservation.

Locality and geological horizon. Sanusibezawa,⁽³⁾ Hobetu-mura, Yûhutu-gun, province of Iburi. Hakobuti beds, Senonian.

EXPLANATION OF THE PLATE XXVI

(All figures are of natural size)

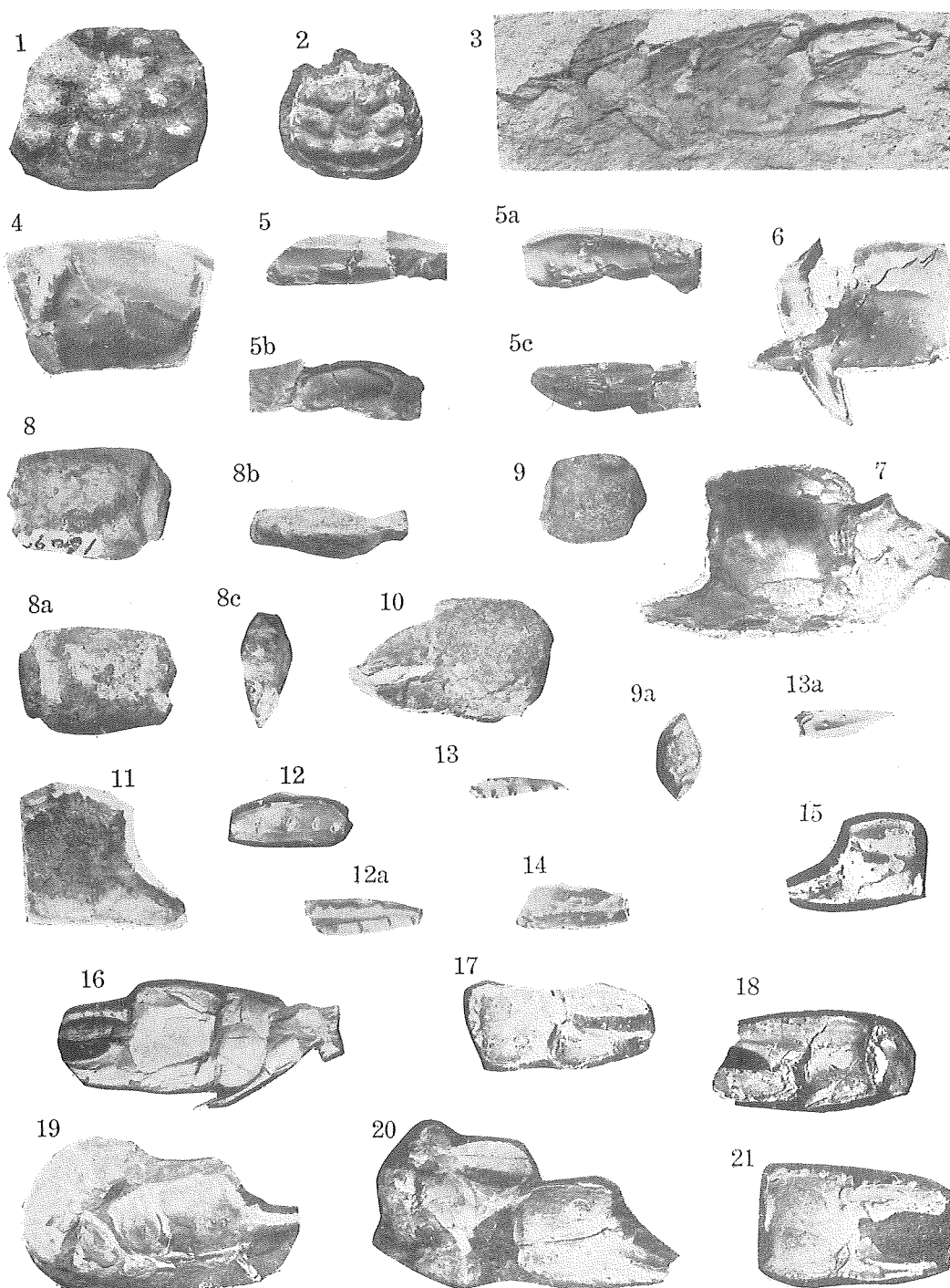
- Figs. 1, 2. *Plagiolophus ezoensis* nov. Sanusyubezawa, Hobetu-mura, province of Hidaka; 1, Upper Hakobuti beds, 2, Lower Hakobuti beds.
- Fig. 3. *Callianassa titaensis* nov. Hongo-mura, Ena-gun, Gifu Prefecture; Iwamura group, Miocene. A right cheliped.
- Figs. 4-7. *Callianassa titaensis* nov. Kosa, Toyohama-mura, Aiti Prefecture; Morosaki bed. 4, a left manus, external view; 5, the dactylus finger of the same, 5 in dorsal, 5a in internal, 5b in external, and 5c in ventral view. 6, a right manus with the fixed finger and the detached dactylus finger in internal view. 7, a right cheliped in internal view.
- Figs. 8, 9. *Callianassa* sp. Iwasaki, Inatuki-mura, province of Tikuzen (Tikuhoh Coal-field). 8, a left manus; 9, a carpus. 8 in external, 8a in internal, 8b in dorsal, and 8c in distal view. 9a in proximal view.
- Figs. 10, 11. *Callianassa* sp. Dosi, Hôsyuyama-mura, province of Tikuzen (Asakura Coal-field); Kawamagari beds. 10, a left manus with the two fingers. 11, another left manus without the dactylus finger.
- Figs. 12, 14. *Callianassa elongatodigitata* nov. Takutakubeobetu, a tributary of the Tyaro-gawa, province of Kuriso. Tyaro beds. 12, a right dactylus finger; 13, a left dactylus finger.

(1) BELL: Op. cit., p. 19, pl. II, figs. 7-13.

(2) WOODWARD: On some Podophthalmatous Crustacea from the Cretaceous Formation of Vancouver and Queen Charlotte Islands. Quart. Jour. Geol. Soc., Vol. LII, 1896, p. 226, text-figs. 5, 6. WHITEAVES: Mesozoic Fossils, Vol. I, pt. 5, 1903, p. 315, text-figs. 15, 16.

(3) 北海道膽振國勇拂郡穂別村サヌベ澤

- Fig. 13. *Callianassa elongatodigitata* nov. Koikata-horokatyaro ?, a tributary of the Tyaro-gawa, province of Kusiro. Sitakara beds? A left dactylus finger.
- Fig. 15. *Callianassa elongatodigitata* nov. Momiziyama, Yûbari-mati, province of Isikari. Takinoue bed (Lower Kawabata series).
- Figs. 16, 17. *Callianassa elongatodigitata* nov. Takutakubeobetu, a tributary of the Tyaro-gawa, province of Kusiro. Tyaro beds.
- Fig. 18. *Callianassa elongatodigitata* nov. Hobetu, Yûhutu-gun, province of Iburi. Takinoeu bed (Lower Kawabata).
- Fig. 19. *Callianassa elongatodigitata* nov. Ikusyunbetu, province of Isikari; Poronai Shale. A right cheliped, external view.
- Fig. 20. *Callianassa elongatodigitata* nov. Koikata-horokatyaro, province of Kusiro; Sitakara beds. A right cheliped, external view.
- Fig. 21. *Callianassa kusiroensis* nov. Koikata-horokatyaro, province of Kusiro; Sitakara beds. A right cheliped (monotype).
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Kumano photo.