



Title	A New Variety of <i>Toucasia Carinata</i> (Matheron) from the Lower Cretaceous of Japan
Author(s)	Nagao, Takumi
Citation	Journal of the Faculty of Science, Hokkaido Imperial University. Ser. 4, Geology and mineralogy, 2(2), 163-168
Issue Date	1933-10
Doc URL	<a href="http://hdl.handle.net/2115/35752">http://hdl.handle.net/2115/35752</a>
Type	bulletin (article)
File Information	2(2)_163-168.pdf



[Instructions for use](#)

A NEW VARIETY OF TOUCASIA CARINATA  
(MATHERON) FROM THE LOWER  
CRETACEOUS OF JAPAN

By

Takumi NAGAO

*With 2 Plates*

The pachyodont bivalve is very poorly represented in the Japanese Mesozoic rocks, the unique species hitherto known of the sort being *Praecaprotina yaegashii* (YEHARA)<sup>(1)</sup> from the Lower Cretaceous of the province of Rikuchû, Honshû, and the province of Ishikari, Hokkaidô. Along the left bank of the lower course of the Sorachi-gawa<sup>(2)</sup>, between Ponmoshiri<sup>(3)</sup> and Shimanoshita<sup>(4)</sup>, province of Ishikari, there is developed a thick complex of the Lower Ammonite Beds<sup>(5)</sup> (Aptian to Gault) in the lower part of which is intercalated a thin lens of limestone (*Orbitolina* limestone)<sup>(6)</sup>, containing, beside *Praecaprotina yaegashii*, *Orbitolina discoidea-conoidea* var. *ezoensis* YABE and HANZAWA, calcareous algae including *Petrophyton miyakoense* YABE<sup>(7)</sup> and *Nipponophycus ramosus* YABE and TOYAMA<sup>(8)</sup>, reef-building corals, and a thick-tested Nerinea.

---

(1) S. YEHARA: A Pachyodont Lamellibranch from the Cretaceous Deposits of Miyako in Rikuchû. Jour. Geol. Soc. Tôkyô, Vol. XXVII, 1920, pp. 39-44, Pls. XI, XII. H. YABE and T. NAGAO: *Praecaprotina*, nov. gen., from the Lower Cretaceous of Japan. Sci. Rep. Tôhoku Imp. Univ., Ser. II, Vol. IX, 1926, pp. 21-24, Pl. VII. T. NAGAO: On the Orbitolina Limestone in Hokkaido. Jour. Geol. Soc. Tôkyô Vol. XXXIX, 1932.

(2) 空知川.

(3) 奔茂尻.

(4) 嶋ノ下.

(5) H. YABE: Zur Stratigraphie und Paleontologie der oberen Kreide von Hokkaido und Sachalin. Zeitschr. d. deutsch. geol. Gesell., Vol. LXI, 1909, p. 406; Cretaceous Stratigraphy of the Japanese Islands. Sci. Rep. Tôhoku Imp. Univ., Ser. II, Vol. XI, 1927, p. 38.

(6) H. YABE and S. HANZAWA: Geological Age of *Orbitolina*-Bearing Rocks of Japan. Ibid., Vol. IX, 1926, pp. 13-20.

(7) H. YABE: Ueber einige gesteinsbildende Kalkalgen. Ibid., Vol. I, 1912, p. 6, Pl. II, figs. 1-8; text-fig. 4. H. YABE and S. TOYAMA: On Some Rock-forming Algae from the Younger Mesozoic of Japan. Ibid., Vol. XII, 1928, p. 141.

(8) H. YABE and S. TOYAMA: Ibid., p. 142, Pl. XVIII, figs. 1-6; Pl. XIX, figs. 1-4; Pl. XXIII, figs. 2, 3.

In the summer of 1931 Messrs. Y. HATTORI and S. IKEGAMI, Students of our Department, when they were studying the stratigraphy of the district, found numerous specimens of another pachyodont bivalve in this same limestone. A few better specimens of this mollusc were collected last summer from the same limestone exposed at the north-western foot of Mt. Ashibets<sup>(1)</sup> in this district by Mr. W. HASHIMOTO, a student of the Institute of Geology and Palaeontology in Sendai and kindly submitted to the writer for examination. These specimens, more than fifty in number, are all more or less imperfect, test being eroded on surface, the umbo of the lower valve frequently broken and the upper valve almost always missing. They have, however, as stated below, many points in common with *Toucasia carinata* (MATH.)<sup>(2)</sup>, a well known and widely distributed Lower Aptian species of Europe.

*Toucasia carinata* (MATH.) var. *orientalis* nov. var.

Pl. XXI (I), Figs. 1 a-b; Pl. XXII (II).

Shell rather small, very inequilateral with the lower (left) valve attached to a foreign body and the upper (right) free. Test thin.

Lower valve allied in form to that of *Toucasia carinata* (MATH.) and composed of two relatively loosely coiled volutions including a well rolled umbo, increasing its diameter rather rapidly; anterior side compressed and nearly flat, not depressed along the carina which is rounded and separates the posterior side from the anterior; posterior side moderately and evenly convex; surface covered with a dark-coloured thick epidermic layer and ornamented with longitudinal striae and transverse lines of growth; longitudinal striae fine and crowded, a broader one alternating with a few finer, while the lines of growth are also crowded and sometimes distinct. A shallow longitudinal

(1) 芦別岳.

(2) A. D'ORBIGNY: Paléont. Franç., Terr., Crét., T. IV, 1847-51, p. 248, Pl. 576, fig. 1 (*Requienia Lonsdalii*). F. J. PICTET and G. CAMPICHE: Foss. Terr. Crét. Ste. Croix. Matér. Paléont. Suisse, Sér. 5, Pl. CXXI, figs. 2, a, b, c (*R. Lonsdalei*). H. DOUVILLÉ: Sur quelques formes nouvelles ou peu connues de la famille des Chamidés. Bull. Soc. géol. Fr., Sér. III, Vol. XV, 1887, p. 762, Pl. XXVIII, fig. 2; Rudistes du Crétacé inf. des Pyrénées. Ibid., Vol. XVII, 1889, p. 630, figs. 1, 2. V. PAQUIER: Les Rudistes urgoniens. Mém. de la Soc. géol. de Fr., Paléontologie, Mém. No. 29, 1903, p. 41, Pl. V, figs. 4, 5. Pl. VI, figs. 1, 2. H. DOUVILLÉ: Les Réquiénidés et leur evolution. Bull. Soc. géol. Fr., Sér. 4, Vol. XIV, 1914, p. 385, Pl. XI, figs. 3, 4.

groove of "interband" which is not well represented in the accompanying figures, occurs on the posterior surface, nearly corresponding in position to the posterior myophoric lamina and separating the two siphonal zones.

Upper valve small, oval in contour in upper view, rather deep with a distinct but probably round carina; surface in front of this carina flat or slightly convex, sloping slowly towards the anterior margin, while that behind the carina very steeply and sometimes nearly vertically inclined downwards. Umbo not well preserved.

Hinge not perfectly visible in all specimens but apparently not differing much from that of *T. carinata*; posterior myophoric lamina of the upper valve well developed, triangular in cross-section, distinctly separated from the cardinal plate, and elevated from, and perpendicular to, the inner surface of the posterior wall of the valve and very oblique to the plane of commissure of the two valves; that of the lower valve also strong and much elevated from the wall almost perpendicularly as shown in Pl. I, Figs. 1c, 1d.

Localities: Two points, one about 2 km. southeast of Ponmushiri and the other about 2 km. north of Shimanoshita, along the left bank of the lower course of the Sorachi-gawa, province of Ishikari; the upper course of the Nokanan-gawa<sup>(1)</sup>, a tributary of the Sorachi-gawa, at the north-western foot of Mt. Ashibets in the same province.

Horizon: *Orbitolina* Limestone of the Lower Ammonite Beds.

Geological age: Aptian (probably Lower Aptian).

Remarks: From the above description it is beyond doubt that the present form belongs to *Toucasia*<sup>(2)</sup>. This genus of pachyodont bivalve, with its genotype *Requienia carinata* MATHERON which has been precisely illustrated by H. DOUVILLÉ and V. PAQUIER, is characterized by having a well developed posterior myophoric lamina on both valves as *Apricardia* GUER.<sup>(3)</sup> of the Upper Cretaceous (Cenomanian to Maestrichtian). DOUVILLÉ, moreover, has recognized two groups in *Toucasia*, the group of *T. carinata* and that of *T. santanderensis* DOUVILLÉ<sup>(4)</sup>; the posterior myophoric lamina of the upper

(1) 野花南川.

(2) H. DOUVILLÉ: Sur quelques formes de Chamides. Op. cit., 1887, p. 762; Rudistes du Crétacé inf. des Pyrénées. Op. cit., 1889, p. 630; Les Réquiéniés et leur évolution. Op. cit., 1914, p. 385.

(3) H. DOUVILLÉ: Sur quelques formes de Chamides. Op. cit., 1887, p. 763.

(4) H. DOUVILLÉ: Sur quelques Rudistes du terrain crétacé inf. des Pyrénées. Op. cit., 1889, p. 632, text-figs. 4, 5.

valve is, in the first group, perpendicular to the inner surface of the wall of the valve, while it is curved distally to become subparallel and knee- or T-shaped in cross-section in the second. Our form in question is doubtlessly included in the first of these two groups, as suggested by triangular cross-section of the said lamina, as figured in Pl. XXI (I), Fig. 1 c.

It appears that the typical examples of *T. carinata* have a rather shallow upper valve with its anterior surface slightly more convex and the posterior inclined more slowly, forming a smaller angle with the plane of commissure of the valves, than in ours. These features, however, seem to be variable to some extent among different individuals; two specimens from Orgon, France, one of the type localities, and stored in the Collection of our Department, which belong certainly to this species, are quite identical with ours under consideration in these respects. One of them is figured for comparison in an accompanying plate [Pl. XXI (I), Figs. 2 a-e] in various views together with two cross-sections to show the posterior myophoric laminae of the two valves. On the other hand, the present form stands near *T. transversa* PAQ.<sup>(1)</sup> from the Lower Aptian of France, judging from its deep upper valve with a well developed posterior part, the surface of which inclines very steeply backwards. PAQUIER's species which was separated by him from *T. carinata* is, however, distinguished from ours in having its upper valve provided with a more developed posterior part which is distinctly projecting beyond the posterior surface of the lower valve. There are, moreover, three forms which deserve comparison with ours; *T. carinata* var. *compressa* PAQ.<sup>(2)</sup> from the Aptian of France, var. *euxina* ASTRE<sup>(3)</sup> from the Upper Barremian or Lower Aptian of Asia Minor, and *T. lonsdalei* (Sow.)<sup>(4)</sup> from the Aptian of England. The first of these foreign forms is much compressed at the anterior side of the lower valve with a sharper carina than in ours, while the second is more closely related to ours, being almost identical in form of the lower valve, but its upper valve is larger, longer and, moreover, not cari-

(1) V. PAQUIER: Les Rudistes urgoniens. Op. cit., 1903, p. 44, Pl. V, figs. 6, 8; Pl. VI, figs. 5, 6.

(2) V. PAQUIER: Les Rudistes urgoniens. Op. cit., p. 43, Pl. VI, figs. 3, 4.

(3) C. ASTRE ET F. CHARLES: Note sur des petites *Toucasia* d'Anatolie, suivie des considerations stratigraphiques que en découlent sur la région de Tarla-Agzy (Bartine). Bull. Soc. géol. Fr., Sér. V, T. 1, 1931, p. 698, text-fig.

(4) See H. DOUVILLÉ: Les Réquiéniés et leur évolution. Op. cit., 1914, Pl. XI, fig. 5.

nated. As to *T. lonsdalei*, this species is known very imperfectly, the original specimen being represented by an internal mould. In short, the Japanese fossil under consideration closely resembles *T. carinata* itself, though it is smaller with a less pronounced carina and finer longitudinal striae of the lower valve. Under these conditions, a varietal name *orientalis* nov. is proposed for it.

It is worthy of note that the present form is the first example of *Toucasia* from Asia except Asia Minor where *T. carinata* and var. *euxina* ASTRE, above referred to, have been reported. *T. carinata* is found in Europe in France, the Iberian Peninsula, Switzerland and Bulgaria and var. *compressa* PAQ. in France. Thus this type of *Toucasia* has a wide geographical distribution and is now known to occur as far as afield as in Japan, being represented by the present variety.

The *Orbitolina* Limestone of Hokkaido certainly belongs to the Urgonian facies and indicates the far eastern prolongation of "la M<sup>er</sup> m<sup>ésogé</sup>en" of DOUVILLÉ, being characterized by a peculiar assemblage of organisms described before. The geological age of this limestone is considered by YABE and HANZAWA as Aptian; this is also provided with strong support by the occurrence of the present pachyodont bivalve. DOUVILLÉ has shown that the degree of the separation of the posterior myophoric lamina of the upper valve from the cardinal plate was accelerated progressively with the geological ages among various forms of *T. carinata* and allied species. The new variety is doubtlessly more advanced in this respect than *T. praecarinata* DOUVILLÉ<sup>(1)</sup> from the Upper Barremian (Lower Urgonian) of France and corresponds to the stage of *T. carinata* itself and var. *euxina*, the said lamina being distinctly separated from the cardinal plate. *T. carinata* and var. *euxina* are understood to indicate the Upper most Barremian or more probably Lower Aptian age.

---

(1) H. DOUVILLÉ: Le Barrémien supérieur de Brouzet. Pt. III. Les Rudistes. Mém. Soc. géol. Fr., Paléontology, Mém. No. 52, 1918, p. 7, Pl. I, figs. 1-5.

Plate XXI (I)

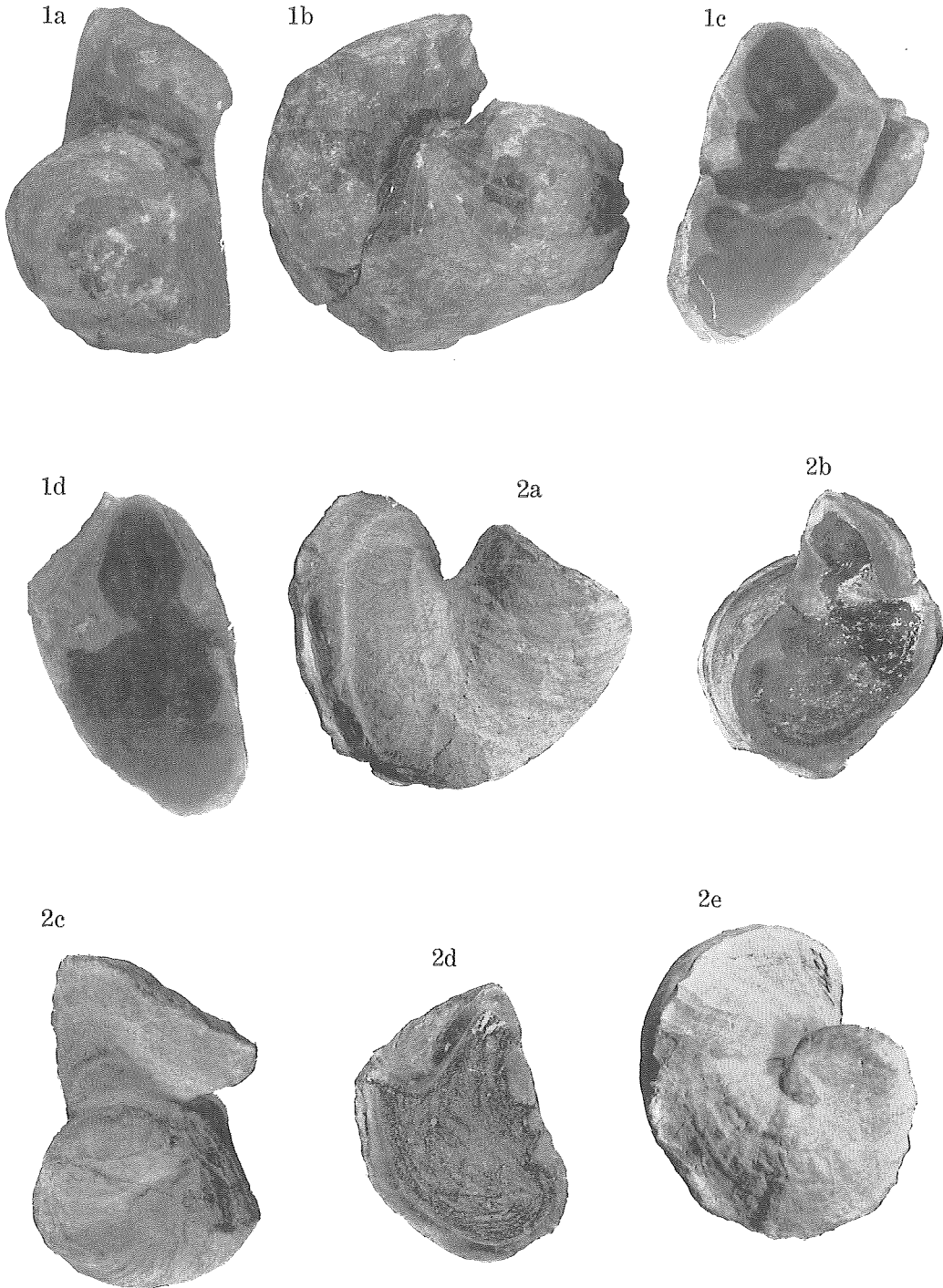
## PLATE XXI (I)

All figures are of natural size.

Figs. 1 a-d. *Toucasia carinata* (MATH.) var. *orientalis* NAGAO. The upper course of the Nokanan-gawa, Sorachi-gun, province of Ishikari; *Orbitolia* Limestone.

Figs. 2 a-e. *Toucasia carinata* (MATH.) Orgon, France. These figures are given for comparison.





(Takeda Photo.)

*T. Nagao : Toucasia.*

Plate XXII (II)

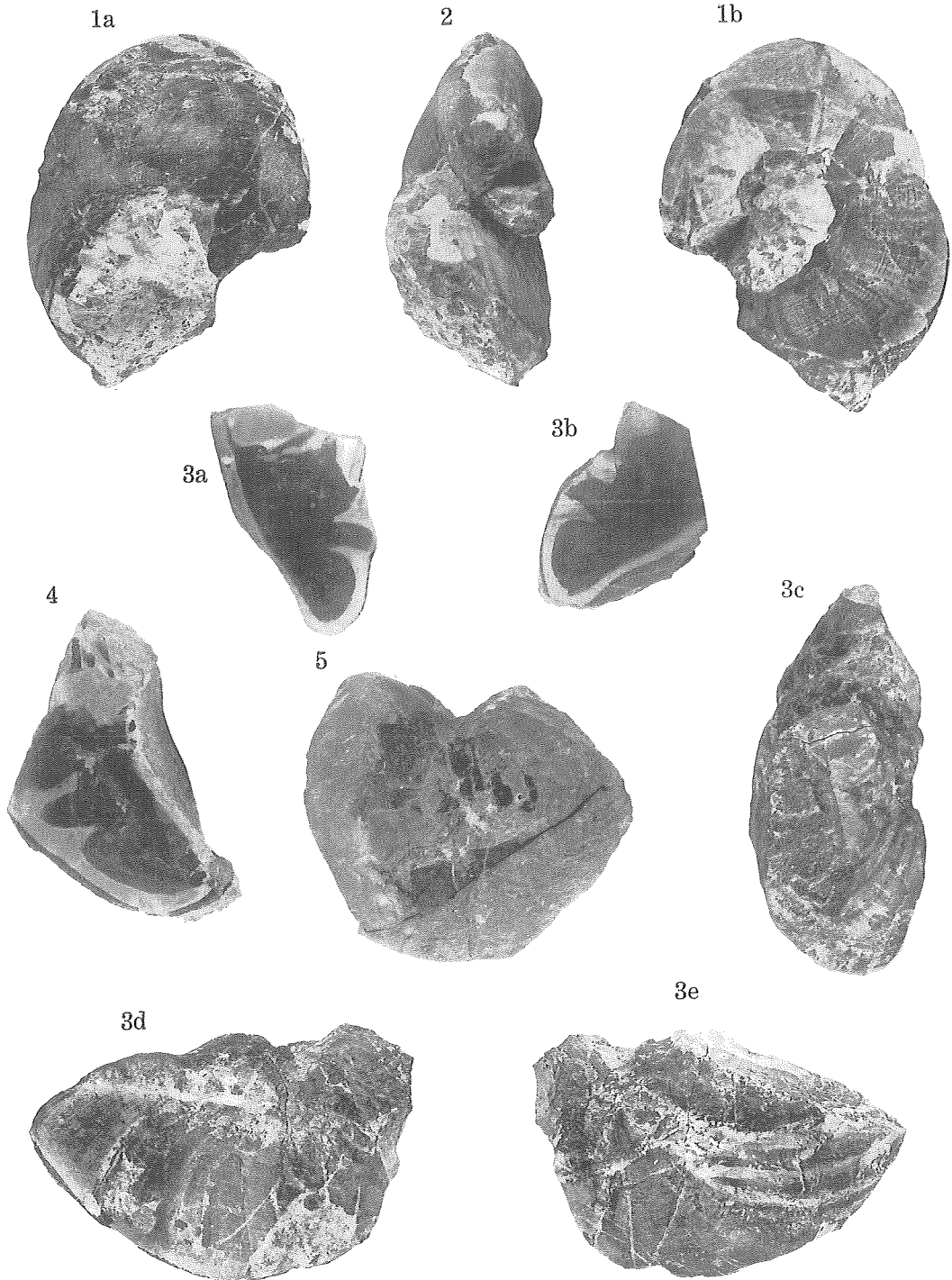
PLATE XXII (II)

All figures are of natural size.

*Toucasia carinata* (MATH.) var. *orientalis* NAGAO.

Figs. 1, 4, 5. Shimanoshita, Sorachi-gun, province of Ishikari; *Orbitolina* Limestone.

Figs. 2, 3. The upper course of the Nokanan-gawa, Sorachi-gun; *Orbitolina* Limestone.



(Takeda Photo.)

*T. Nagao : Toucasia.*