

On Some New Species of *Trigonia* from the Lias of Prov. Nagato, and the Cretaceous of Prov. Awa.

By

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With 1 Plate.

A) *Trigonia* from Nagato.

In 1904, Prof. Yokoyama described some Ammonites¹⁾ from the shale of Nishi-Nakayama, Prov. Nagato, which was considered to belong to the upper Lias. In 1915, the present writer, on a short visit to the same district, collected specimens of a *Trigonia* and a coral (*Cyclolites*) in a sandy shale underlaid by the pale gray medium grained sandstone of Higashi-Nakayama on the left side of the valley Yoshidagawa, east of the site where Ammonites were found by Mr. Inouye, Direct of the Imp. Geol. Surv. The bed appears to represent an upper horizon of the Ammonite bed.

On the same occasion, the writer also collected the same form of *Trigonia* with many corals (*Cyclolites*) and some other Lamellibranchs in the greenish medium grained sandstone of Higashi-Nagano, in the upper horizon of the former and the lower of the Ishimachi ammonite zone.

In outward appearance, the *Trigonia* resembles *Astarte*, but the hinges clearly bear the characteristic dentition of *Trigonia*. This interesting Lamellibranch is the first species of the *Glabrae* group found in the jurassic bed of Japan.

1) M. Yokoyama: Jurassic Ammonites from Echizen and Nagato. Journ. of the Coll. of Sc. Imp. Univ. Tokyo, Japan. Vol. XIX, Art. 20. 1904.

The Trigonidae of the same group hitherto known in Japan are from the Cretaceous (Cenoman-Gault) strata of Shikoku, and they have been distinguished as *T. Kikuchiana* and *T. rotundata*¹⁾ by Prof. Yokoyama. But on studying a large collection of the Cretaceous fossils of Miyako,²⁾ Prov. Rikuchū, the writer was led to consider *T. rotundata* merely as a variation of *T. Kikuchiana*. *T. Kikuchiana* is characterized by the smooth surface, only with some sulci on the umbonal portion; but the same species (PL. V., Fig. 3) collected by the writer in the Cretaceous of Todai, Prov. Shinano has 14 or more costae on the anterior half of the pallial portion of the valve as is the case in the foreign specimen of this group.

The mutual relation of these Trigonidae must be phylogenetically an interesting problem. As Lycett remarks in the Cretaceous of England, this group is not limited stratigraphically to any one portion of the Mesozoic period, but occurs widely distributed in it. The writer believes the same is the case with the group in the Mesozoic strata of Japan. The following is the description of the new forms found.

***Trigonia Inouyei*, sp. nov.**

Pl. V, Fig. 1,2.

Shell ovately trigonal, convex, considerably inequilateral, length almost equal to height; umbo anteromesial. Anterior margin short and forwardly oblique, passing gradually into the convex ventral margin. Postero-dorsal margin long, sloping obliquely downward and forming an angle with the siphonal border. The ornamentation

1) M. Yokoyama: On some Cretaceous fossils from Shikoku. Journ. Sc. Coll. Imp. Univ. Tokyo, Japan. Vol. IV. Pt. II. 1891.

2) S. Yehara: The Cretaceous Trigonidae from Miyako and Hokkaidō. Sc. Rep. Tōhoku Imp. Univ. Sendai, Japan. (Geology). Vol. II, No. 2, 1915.

consists of strong regular concentric ribs which cover the whole of the shell surface; in adult specimens they are about 24 in number. Escutcheon and area not marked on the surface of the shell.

The species resembles *T. Lingonensis* Dum.¹⁾ from the Middle Lias of England, but is clearly distinguished from it by the absence of area and escutcheon, and the strong regular concentric ribs occupying the whole surface of the shell.

The species is also allied to *T. Kikuchiana* Yok. from the Cretaceous (Cenoman-Gault) of Japan, but is distinguished from the latter by having strong concentric ribs, covering the whole surface of the shell.

Loc. Higashi-Nakayama and Higashi-Nagano, Prov. Nagato.
(長門國豊浦郡東中山村及東長野村)

B) *Trigonia* from Awa.

In 1891, Prof. Yokoyama described three species of *Trigonia* from the Cretaceous of Shikoku. They are *T. pocilliformis*, *T. Kikuchiana*, and *T. rotundata*, of which *T. rotundata* as stated above is identical with *T. Kikuchiana*. But the writer lately found a new species of *Trigonia* belonging to the group *Quadratae* entombed together with *T. pocilliformis* in the *Trigonia* sandstone of Sakamotomura, Prov. Awa, collected by a member of Hirase's Conchological museum of Kyôto. A *Trigonia* of the *Quadratae* group, *T. cfr. Tryoniana* Gabb.²⁾ has already been described by the writer from the Cretaceous of Hokkaido; so the *Trigonia* described below is the second one of the same group found in the Cretaceous of Japan.

1) J. Lycett: A monograph of the British fossil *Trigoniae*. Pal. Soc. 1875. P. 98, Pl. XXII, Fig. 1-4.

2) S. Yehara: The Cretaceous *Trigoniae* from Miyako and Hokkaido. Sc. Rep. Tôhoku Imp. Univ. Sendai, Japan. Vol. II. No. 2, 1915.

Trigonia Sakamotoensis sp. nov.

Pl. V, Fig. 4.

Shell ovately oblong, moderately convex anteally and mesially, umbones small, pointed, scarcely elevated above the superior border; the superior border short, straight, its posteaal extremity forming an obtuse angle with the siphonal border of the area.

Escutcheon not bounded by the carina, narrow, horizontal, depressed, provided with costae. Area not marked anteromesially, though posteromesially distinguished from the other portion of the valve; a row of costellæ divides it into two portions.

The pallial portoin has about 16 elevated costae; the 9 costae nearest to the apex originating at the marginal border of the escutcheon, arranged concentrically or curved obliquely; the succeeding 5 originating at the marginal border of the area and passing obliquely forward either to the anterior or lower border; the last two or more originating at the marginal border of the escutcheon and parallel to the siphonal border.

Loc. Sakatomura, Prov. Awa. (阿波國勝浦郡坂本村)

Explanation of Plate.

- Fig. 1.—*Trigonia Inouyei*, Yehara; an external cast of an adult specimen; Higashi-Nagano Prov. Nagato. Nat. Size.
- Fig. 2.—*Trigonia Inouyei*, Yehara; an internal cast showing the dentition of *Trigonia*; Higashi-Nagano, Prov. Nagato. Nat. Size.
- Fig. 3.—*Trigonia Kikuchiana*, Yokoyama; an external cast of an adult specimen, somewhat pressed; Todai, Prov. Shinano. Nat. Size.
- Fig. 4.—*Trigonia Sakamotoensis*, Yehara; an external cast, anterior and pallial portion badly preserved; Sakamotomura, Prov. Awa. Nat. Size.
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