442. SOME JURASSIC TRIGONIIDS FROM THE TETORI GROUP
IN THE KUZURYU DISTRICT. CENTRAL JAPAN*

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Introduction

The Jurassic-Cretaceous Tetori group is well exposed along the upper tributaries of the Kuzuryu river in Fukui Prefecture (Prov. Echizen). Describing the following four species of trigoniids, KOBAYASHI (1956, 1957) concluded that the Yambarazaka alternation of the district is uppermost Jurassic in age.

\[ \text{Vanguonia yambarensis} \]
\[ \text{KOBAYASHI} \]

\[ \text{Latitrigonia tetoriensis} \]
\[ \text{KOBAYASHI} \]

\[ \text{Latitrigonia orbicularis} \]
\[ \text{KOBAYASHI} \]

\[ \text{Myophorella (Promyophorella) orientalis} \]
\[ \text{KOBAYASHI and TAMURA} \]

Lately the writer made a collection of trigoniids from the Yambarazaka alternation at the east end of Goribashiri on the Taniyamadani (谷山川), a tributary of the Kuzuryu (九頭龍) river.

Because the alternation yielding Kra
naosphinctes matushimaui, Peltoceratoides sp. and Ptychophylloceras sp. is middle Oxfordian, all of the trigoniids below listed are Oxfordian.

\[ \text{Latitrigonia horii MAEDA, new species} \]

\[ \text{Latitrigonia kasaii MAEDA, new species} \]

\[ \text{Ibotrigonia tetoriensis MAEDA, new species} \]

\[ \text{Vanguonia kuzuryuensis MAEDA, new species} \]

\[ \text{Myophorella (Promyophorella) orientalis} \]
\[ \text{KOBAYASHI and TAMURA} \]

Here the writer expresses his sincere thanks to Prof. T. KOBAYASHI of the University of Tokyo for his kind advices, to Dr. M. TAMURA of the Kumamoto University and Dr. I. HAYAMI of the Kyushu University for the suggestion, and also to Messrs T. KAWABE, S. KAWAMATA, I. SUZUKI, A. OURA and S. SAZUKA for assistance in fossil collection.

Stratigraphical notes

The group in this district can be classified, in descending order, into the following formations:

The Shimoyama conglomerate containing subangulated pebbles of gneiss, granite, sandstone, slate, cherty rock, limestone and so forth is well exposed at Shimoyama, Ono and Asahi.

The Tochimochiyama sandstone, Kaizara black shale, Yambarazaka alternation and some parts of the Oidani alternation and Yambara conglomerate exposed at Shimoyama, Nakatatsu and Kaizara are marine sediments, while the others are brackish or lacustrine deposits.

According to SATO (1960) the Kaizara black shale is divisible into three ammonite zones in descending order as follows:


2) Grossouvreia zone: *Grossouvreia* cf. *subtilis* (Neum.), *G. laevradiata* SATO, G. sp., *Kepplerites* (Seymourrites) *japonicus* Koba-


1) *Neo* *meniceras* zone: *Neoqueniceras* yoko-
The ammonites show the Callovian age of the Kaizara black shale. Though the shale is extensive from Kaizara to Ono, no occurrence of trigoniids has hitherto been known in it.

The Yambarazaka alternation consists of conglomeratic coarse-grained sandstone and micaceous sandy shale, presumably indicating a regression of the Tetori sea. The Yambara conglomerate which is typically developed at Yambara along the Itoshiro river, lies unconformably on the Yambarazaka alternation and contains boulders of gneiss, granitic rock, quartz-porphyry, sandstone, slate, limestone and so forth. It is remarkable that the sandstone boulders derived from the Kuzuryu subgroup are abundant. The Ashidani alternation well exposed along the Itoshiro river, consists of alternation of fine- to coarse-grained sandstone and micaceous sandy shale and contains Ostrea sp. at some horizons. The Itsuki alternation consists of fine- to coarse-grained sandstones and micaceous black shale, and yields Ostrea sp., Corbicula (Mesocorbicula) teloriensis KOBAYASHI and SUZUKI and other non-marine molluscs and fossil plants such as Onychiopsis elongata (GEYLER), Cladophlebis denticulata (BROUNNIART), C. exiliformis OISHI, Xenoxylon latiporosum (CRAMER) and so on. The Akaiwa sandstone in this district consists mainly of arkosic coarse-grained massive sandstone. Several plant fossils occur at some horizons, but no molluscan fossil has hitherto been found. The Kitadani alternation is characterized by the presence of reddish or greenish tuffaceous rock facies and yields Onychiopsis elongata (GEYLER), Cladophlebis denticulata (BROUNNIART), C. exiliformis OISHI, Nilssonia orientalis HEER, Podozamites lanceolatus (LINDLEY and HUTTON), P. Reinii GEYLER and so forth. The alternation is early Cretaceous in age.

Description of Species

Subfamily Trigoniniae

LAMARCK, 1819

Genus Latitrigonia KOBAYASHI, 1957

Latitrigonia horii MAEDA, n. sp.

Pl. 1, figs. 1-6.

Description:—Shell subquadrate, well convex, convexity attaining the maximum on marginal carina at about one-third below umbo and nearly as long as high: marginal carina diagonal; test thick. Umbo located at one-fourth or one-fifth from front; anterior margin rounded; ventral broadly arched; siphonal arcuated; anterior and ventral margins disposed with an angle of about 100 degrees between them; hinge typical of Trigoninae: escutcheon carina somewhat distinct; marginal carina more or less sharp, nearly straight and largely tuberculated; area extraordinarily large, divided by a finely tuberculated median carina, growth lines fine and transversal; ante-carinal sulcus wide and shallow; disk ornamented with about 8 concentric costae which are parallel to ventral margin and thickened into a large node at the posterior end.

Measurement (in mm):—

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Comparison:—This species most closely resembles *L. unituberculata* (KOBAYASHI and TAMURA, 1957) from the Bathonian—Callovian Yamagami formation (4th Trigonian zone) of Soma (TAMURA, 1960), but it is easily distinguishable from the latter by having anteriorly situated umbo and less concentric costae on disk and being much longer in outline of the shell. The present specimens are also related to *L. orbicularis* described by KOBAYASHI in 1957 from the same Yambaruza alternation, but they differ from each other in features of the posterior end of costae on the disk and shell-outline. The specific name is dedicated to Mr. Yoshitaka HORI of the Fukui Natural History Museum, who kindly helped the writer in the study of the Tetori group.

Occurrence:—Rare in sandstone of the Yambaruza alternation at the left bank of the Taniyamadani river and the east of Goribashiri, Izumi village, Ono county, Fukui Prefecture.

*Latitrigonia kasaii* MAEDA, n. sp.

Pl. 1, fig. 7.

Description:—Shell subtrapezoidal, about 1.6 times as long as high, gently convex. convexity attaining the maximum on the marginal carina at about two-thirds the shell height; umbo sharp, located about one-third from front; anterior margin well rounded; ventral broadly arched; siphonal slightly arcuate; test thick; hinge typical of Trigonidae. Escutcheon carina distinct, sharply and finely tuberculated; marginal carina straightened, somewhat sharp, and tuberculated postero-ventrally; escutcheon narrow and provided with several concentric costellae near umbo; area divided by tuberculated median carina and with fine lines; ante-carinal sulcus distinct and shallow; disk ornamented with concentric costae which are narrower than interspace, counted about 10, and thickened into a large node at the posterior end; concentric fine lines seen in interspaces.

Observation:—Among several deformed specimens, the holotype is best preserved, although it is slightly broken in posterior. The posterior gaping is presumable from growth-line.

Comparison:—This species resembles *L. unituberculata* (KOBAYASHI and TAMURA, 1957) closely in the shell outline and costation, but differs from the latter in the strong and tuberculate marginal carina, narrower area and stronger costae. *L. unicarinata* (KOBAYASHI and TAMURA, 1957) from the Bathonian—Callovian of Soma district in North Japan has a somewhat similar outline of the shell. But it is very different from the new species in the more densely spaced costae on the disk. The specific name is dedicated to Mr. Keisuke KASAI who was a teacher of the Yamanashi normal school.

Occurrence:—Very rare in a sandstone of the Yambaruza alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

Genus *Ibotrigonia* KOBAYASHI, 1957

*Ibotrigonia tetoriensis* MAEDA, n. sp.

Pl. 1, figs. 8-9.
Description:—Shell small, subquadrate, nearly as long as high, gently convex, convexity attaining the maximum on marginal carina at about one-third from umbo; test thick. Umbo somewhat small, located at one-third from front; beak opisthogyrous; anterior margin gently rounded, joining ventral margin with an angle of about 110 degrees which the latter is broadly arched; siphonal margin well rounded; post-umbonal margin nearly straight; hinge typical of Trigoniae. Escutcheon carina distinct and tuberculated; marginal carina arcuate, sharp and tuberculated; escutcheon narrow; area fairly large, divided by a finely tuberculated median carina and smooth; antecarinal sulcus narrow and shallow; disk ornamented with about 10 concentric costae which are parallel to ventral margin, broken into tubercles on the posterior side and thickened into a large node at the posterior end.

Measurement (in mm):—

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Comparison:—This species fairly resembles *Ibotrigonia masatanii* KOBAYASHI and TAMURA (1957) from the Yamagami formation (4th Trigonian zone of Soma). Bathonian—Callovian, in the Soma district, North Japan, but it is easily distinguishable from the latter by the ornament and shell outline.

*I. masatanii* var. from the Yamagami formation (KOBAYASHI and TAMURA, 1957) resembles this species in ornamentation on the disk, but in this species the shell outline is subquadrate and costae on the disk are mostly broken into tubercles on the posterial side.

Occurrence:—Rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

Subfamily Vaugoniinae
KOBAYASHI, 1954

Genus Vaugonia CRICKMAY, 1930

*Vaugonia kuzuryuensis* MAEDA, n. sp.

Pl. 1, fig. 10.

Description:—Shell small, gently convex; convexity attaining the maximum on the disk at about one-third height below from umbo; test thick. Umbo a little large, located submedially; anterior margin gently rounded; siphonal well rounded; hinge typical of Trigoniae. Escutcheon carina distinct and scarcely pitted; marginal carina distinct, gently arcuated, pitted and becomes somewhat obtuse postero-ventrally; area divided by a finely tuberculated median carina and provided with fine growth lines and several costellae near the umbo; antecarinal sulcus wide and fairly shallow; disk ornamented with about 8 costae; umbonal three of them gently arcuated; others form Vs at about median portion on disk; accordingly umbonal ones form an obtuse angle with marginal carina but become acute ventrally.

Measurement (in mm):—

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Comparison:—Represented by one external mould with the damaged ventral portion of a right valve. The costae on
the disk are not tuberculated. *Vaugonia niranohamensis* (KOBAYASHI and MORI. 1955) from the Lower Jurassic in Miyagi Prefecture fairly resembles it in general characters, especially in ornamentation on the disk, but in this species the shell-size is much larger and costae on the disk are stronger. Ante-carinal sulcus in the shell is distinct, but in *niranohamensis* it is indistinct.

Though *V. yokoyamai* described in 1955 by KOBAYASHI and MORI from the Niranohama sandstone in Miyagi Prefecture shows some resemblance to this species in shell outline, it differs from that species in costae on the disk.

**Occurrence** :-Very rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

### Myophorellinae

**KOBAYASHI, 1954**

**Genus Myophorella** BAYLE, 1878

*Myophorella* (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA

Pl. 1, figs. 11-12.


Represented by several imperfect external moulds. Shell medium in size; marginal carina distinct and tubercul-
Jurassic Trigoniids

ated. Area with numerous, somewhat coarse and sharp costellae of which about 4 or 5 are in 5 mm. Disk ornamented with arcuate costae which form an acute angle with the marginal carina. The costation is similar to that of KOBAYASHI and TAMURA's form (1955) from compact sandstone (9th Trigonian zone) of the Koyamada formation at Umazawa, Koyamada, Kamimano village, Fukushima Prefecture. Therefore the present specimens are identified with orientalis.

Occurrence:—Rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani and east of Goribashiri, Izumi village, Ono county, Fukui Prefecture.

References


— (1956): Some Jurassic Trigonians from Central and West Japan. Ibid., Vol. 27, No. 1.


