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330. LIASSIC *VOLSELLA*, *MYTILUS* AND SOME OTHER DYSODONT SPECIES IN JAPAN*

(Studies on the Liassic Pelecypods in Japan, 6)

ITARU HAYAMI

Geological Institute, University of Tokyo

本邦産ライアスの *Volsella*, *Mytilus* その他の貧歯二枚貝類：　来馬および志津川層群に産する *Volsella*, *Arcomytilus*, *Mytilus*, "*Ostrea*", *Pteria*, *Oxytoma* (?) について検討した結果 5 新種を含む 12 型が識別された。*Mytilus* はいづれも歯を欠き，*Volsella* からの移行形で，ジュラ紀に普遍的な *Falcimytilus* 亜属に属する。*Arcomytilus* は従来 *Mytilus* 又は *Brachidontes* の亜属と見做されて来たが，独立した属として扱うべきである。

速水　格

The Mytilidae and Ostreidae are fairly common in the Liassic Kuruma group. KOBAYASHI (1935) reported the occurrence of *Mytilus* and *Arcomytilus* from the group, but they remain undescribed. Lately the writer added a large amount of fossils to the Kuruma-Shizukawa collection including some *Volsella* and *Pteria* (s. l.) in the Lower Hettangian *Geratrigonia hosourensis* bed of the Shizukawa group. In the present paper are described the following species:—

Volsella bakevelloides HAYAMI, new species.
Volsella sp. indet.
Arcomytilus dairensis KOBAYASHI and HAYAMI, new species.
Arcomytilus sp. indet.
Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI, new species.
Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI, subsp.
Mytilus (*Falcimytilus*) *heranirus* HAYAMI, new species.
Mytilus (*Falcimytilus*) *heranirus* HAYAMI, subsp.
Mytilus (*Falcimytilus*) sp. indet.
"*Ostrea*" a sp. indet.
"*Ostrea*" b sp. indet.
Pteria (s. l.) *kitakamiensis* HAYAMI, new species.
Oxytoma (?) sp. indet.

* Received April 5, 1957; read June 15, 1957.

Family **Mytilidae** FLEMING

The classification of the family is principally based on the anatomy which is, however, inapplicable to fossils. In consequence the classificatory criteria are inevitably restricted to the hinge-structure, ligament-structure, umbonal septum, external outline, umbonal position and surface ornamentation.

The earliest of this family is *Volsella* in the Devonian. Since then, the genus persisted through the long geological ages without any striking modification. It is most reasonable to regard the genus to be the trunk of the Mytilidae, whence *Mytilus* and many other related

genera have branched off. *Mytilus* has been produced from *Volsella* by the shifting of the umbo from subterminal to terminal.

Living *Mytilus* has some umbonal teeth and weak anterior adductor, while the hinge-area is edentulous in *Volsella*. Nevertheless it is not always easy to distinguish these two as for Jurassic forms, because many forms are found to be intermediate between *Volsella* and *Mytilus* with regard to outline and umbonal position. Therefore, the former is considered by some authorities as a subgenus of the latter.

Cox (1937) established *Falcimytilus* as a subgenus of *Mytilus* for some Jurassic species with terminal umbones and edentulous hinge areas. He is of opinion that true *Mytilus* is absent in the pre-Jurassic, although there are many so-called *Mytilus* species in the Triassic and several in the Permian. But it is possibly a little prior to Lias that *Falcimytilus* was derived at first from *Volsella*, if considered that *Mytilus* (*Falcimytilus*) *nasai* KOBAYASHI and ICHIKAWA and its varieties (1950; ICHIKAWA, 1954) are known from the Carnic in the Kochigatani series in Japan. Putting aside this problem, *Falcimytilus* is really closer to *Volsella* than *Mytilus* s. str. in the edentulous hinge, although it agrees better with *Mytilus* s. str. in the terminal umbo. As suggested by Cox (1940), the subgenus may include most Jurassic species of *Mytilus*, because no Jurassic species has umbonal teeth. The present five Liassic forms are probably included in its category.

Arcomytilus AGASSIZ (1842) is characterized by the modioliform outline and radial markings on the surface. Cox (1937, 1940) considered it as a subgenus of *Brachidontes* SWAINSON (1840). In *Brachidontes* s. str., however, the shell is ovate and the anterior area more expanded than in *Arcomytilus*. As mentioned by Cox, dysodont teeth are frequently observable in Recent *Brachidontes* but absent in *Arcomytilus*, although AGASSIZ mistook the marginal impression of radial ribs for them. In the Middle and Upper Jurassic there are many radially ribbed species of *Arcomytilus*. Some of them have modioliform or even mytiliform outlines and nearly terminal umbones. Radial markings are commonly met with also in *Septifer*, *Musculus* and *Crenella*. But *Arcomytilus* differs essentially from *Septifer* in the absence of the umbonal septum for adherence of the anterior adductor, and from two others in the trigonal outline.

Although certain phylogenetical relationship may exist between *Arcomytilus* and *Brachidontes*, the writer thinks plausible to regard *Arcomytilus* to be a distinct genus derived from the main trunk of the Mytilidae comprising *Volsella* and some related genera.

So far as the writer is aware, *Arcomytilus* is scarcely known from the Lias. The two forms in this paper which have explicit radial ornaments may be its old representatives, but the materials are too poor to give their descriptions in detail.

Genus *Volsella* SCOPOLI, 1777.

(=*Modiolus* LAMARCK, 1799;
Modiola LAMARCK, 1801;
Eumodiolus IHERING, 1900)

Type species:—*Mytilus modiolus* LINNÉ, Recent.

Volsella bakevelloides HAYAMI, new species.

Plate 23, Figures 1-3.

Description:—Shell medium, equivalve, modioliform, elongated postero-ventrally, non-carinated, strongly inflated, slightly to fairly longer than high; test thin; hinge-margin slightly convex, fairly long, occupying about two-thirds of shell-length; posterior margin gently arcuate; anteroventral one of shell-body almost straight, but sinuated at its junction with anterior margin in front of developed anterior area; umbonal angle between hinge-margin and antero-ventral one about 45 degrees; anterior area wide, well inflated, clearly defined from shell-body by a shallow groove, somewhat similar to anterior wing in *Bakevellia*, rounded at the extremity; anterior slope of shell-surface steep, nearly vertical; the greatest convexity lying close to antero-ventral margin, and posterior area comparatively flattened; whole surface marked with more or less regular coarse concentric lines. Internally, ligament probably subinternal, occupying greater part of hinge-line, supported by an internal ridge which is narrow and subparallel to hinge-line, running behind umbonal area to postero-dorsal corner; umbonal septum absent; hinge edentulous; adductors unknown.

Measurement in mm.	Length	Height	Thickness
Holotype (MM 2719) Right valve	44.0	39.0	8.0
Paratype (MM 2720) Left valve	30.5	29.0	7.0
Paratype (MM 2721) Left internal mould	42.0	39.0	7.5

Observation and Comparison:—The holotype (Fig. 1) is a well preserved specimen, showing the complete outline of right valve. In the paratype (Fig. 3) umbonal and dysodont teeth are absent. Internally, the anterior area seems not so well defined as externally. The small paratype (Fig. 2) is fairly different in outline from the holotype; its umbonal angle much larger. Seeing the occurrence from the same fossil bed and the similar surface-markings, however, such differences are considered individuality.

This species, though its outline is variable to this extent, is safely referable to *Volsella* by the edentulous hinge and developed anterior area. *Volsella* persisted from Devonian to Recent without any striking evolution, and there are a great number of comparable species to this. If compared with most Upper Triassic and Jurassic species, this is characterized by a well defined and inflated anterior area and strong concentric line on the shell-surface which are fairly regular at the intervals and widely spaced.

Modiolus imbricatus (Sowerby) (1818, *Vol. 3*: Morris and Lycett, 1853; Loriol, 1883; Cox, 1935, 1940) is a well known Middle Jurassic species with a wide distribution. It has a more expanded and flattened anterior area, weaker concentric lines and a smaller umbonal angle than the present species. *Mytilus jurensis* Roemer (Cox, 1935, pl. 15, figs. 15–17) from British Somaliland seems to vary to some extent in the development of anterior area, and Cox (1937, 1940) regarded it as an intermediate form between *Volsella* and *Mytilus*. Among the Somaliland specimens the one in figure 16 is fairly similar to this species in the outline and surface-markings, but the anterior area of *jurensis* is generally not so well developed. *Mytilus arbenzi* Renz (1935) from the Upper Jurassic "*Mytilus*-Schi-

chten" of Alps differs from this also in the less developed anterior area, although the concentrics and general outline are very similar to those of the holotype. *Modiola hoffmanni* NILSSON and *M. lusotanica* in BOEHM (1903) from the Lias in Portugal may be related forms to this. But the concentrics are more delicate than in the present species.

Occurrence:—All specimen procured from a black shale of lower Hettangian Niranohama formation of Shizukawa group at Niranohama in Utatsumura, Miyagi Prefecture (Province of Rikuzen).

Volsella sp. indet.

Plate 23, Figure 4.

Only a fragmentary left valve (MM 2722) is at hand. This form is considerably similar to the preceding species in the modioliform outline and development of anterior area. But the concentric lines are by far weak than in ***bakevelloides***, and there are numerous fine radial riblets on the antero-ventral slope of shell-body.

Occurrence:—Black shale of Domerio-Toarcian Shinatani formation of Kuruma group at the upper stream of Teradani in Daira, Asahi-machi, Toyama Pref.

Genus *Arcomytilus* AGASSIZ, 1842.

Type species:—*Mytilus pectinatus* SOWERBY (1821), Upper Jurassic.

Arcomytilus dairensis KOBAYASHI and HAYAMA, new species.

Plate 23, Figures 5 and 6.

Description:—Shell small, mytiliform, well inflated, much longer than high (holotype, MM 2734, 25.0 mm. long; 18.5 mm. high; 5.0 mm. thick); test thin; umbo terminal and sharply pointed with an umbonal angle of about 50 degrees; hinge-margin nearly straight, short, passing gradually into evenly arcuate posterior margin; anterior margin almost straight; anterior carination weak, marginal, leaving no anterior area; surface ornamented with many radial ribs which are fairly prominent in central area and crossed by conspicuously wide-spaced concentric lines of growth; nothing is known of internal structure.

Observation and Comparison:—Only two imperfect left valves are given. If compared with ever-described species of *Arcomytilus* from Middle and Upper Jurassic, its anterior area is undeveloped and its umbo very terminal. The radial ribs are comparatively weak in the posterior area of the holotype and neither bifurcated nor divaricated.

Occurrence:—Procured at the lower stream of Daira River in Asahi-machi, Toyama Pref., but its exact horizon is uncertain.

Arcomytilus sp. indet.

Plate 23, Figure 7.

Only a small right valve is before hand. Shell subtrigonal, modioliform with a developed anterior area, much longer than high (MM 2736, 19.5 mm. long; 12.0 mm. high); hinge-margin fairly convex; anterior area rounded, elongated along anterior margin of shell-body, defined from it by a shallow groove; umbo not terminal, located at about a fifth of hinge-line from the anterior end; anterior carination very weak; surface ornamented with roughly spaced radial ribs which become fairly strong in ventral area.

The radial ornaments of this form remined one of *Arcomytilus*, although the anterior area is similar to that of *Volsella*. Its specific identification is deferred until sufficient materials will be procured.

Occurrence:—Sandstone of Domerio-Toarcian Shinatani formation at Shinatani in Omi-machi, Niigata Pref.

Genus *Mytilus* LINNÉ, 1758.

Type species:—*Mytilus edulis* LINNÉ (1758), Recent.

Subgenus *Falcimytilus* COX, 1937.

Type species:—*Mytilus suprajurensis* COX (1935), Upper Jurassic.

Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI, new species.

Plate 23, Figures 8-11.

Description:—Shell large, equivalve, sickle-shaped, weakly carinated, moderately convex, more or less longer than high; test thick for genus; hinge-margin slightly sinuated, forming an apical angle of about 50 degrees with hinge-line; umbo terminal; anterior area very narrow, ill-defined; weak carina running close to anterior margin, incurving behind beak; anterior slope in front of carination very steep and nearly vertical, while posterior area is comparatively flattened; surface marked with fine concentric lines of growth and numerous dense radial capillae which are persistently perpendicular to growth-lines and fairly prominent in early stage. Internally, a narrow ridge for adherence of ligament elongated close and subparallel to hinge-margin; umbonal and dysodont teeth absent.

Measurement in mm.	Length	Height	Thickness
Holotype (MM 2726) Bivalved specimen	72.5	68.5	29.0
Paratype (MM 2727) Right internal mould	75.5	74.5	?
Paratype (MM 2728) Left valve	24.0	19.5	3.5

Observation and Comparison:—In a juvenile left valve (Fig. 8) anterior area is not developed, if compared with the adult holotype (Fig. 9). The numerous radial capillae, which are charateristic of this species, are seemingly weakened out through growth.

The sickle-shaped outline and thick test are similar to those of *Lycettia* COX (1937), especially of *Lycettia lunularis* (LYCETT). Faint radial capillae are also discernible in the lectotype of that species (COX, 1937, pl. 17, fig. 4), although he mentioned nothing of the capillae. This species, however, cannot be referred to *Lycettia*, because of the narrow ligament area and absence of umbonal septum. The edentulous hinge area is more likely to that of *Falcimytilus*.

Occurrence:—Common in sandstones of Domerio-Toarcian Shinatani formation at Shinatani in Omi-machi, Niigata Pref. and rare in black shales of Liassic "Tsuchizawa formation" at Kuruma in Kitaotari-mura, Nagano Pref. (Prov. of Shinano.)

Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI subsp.

Plate 24, Figures 1 and 2.

There are two similar specimens to the preceding species, which are bro-

ken and secondarily deformed. If compared with typical *stricapillatus*, this form has a more elongated hinge-margin and a more gently curved ventral one.

Occurrence:—Rare in sandstones of the Middle Liassic Negoya formation at Neiridani in Kurobe National Forest, Toyama Pref.

Mytilus (*Falcimytilus*) *heranirus*
HAYAMI, new species.
Plate 24, Figures 3 and 4.

Description:—Shell medium for genus, subtriangular, mytiliform, weakly carinate, not strongly inflated; test thin; hinge-line nearly straight, very long, occupying more than two-thirds of shell-length; anterior margin straight, forming an umbonal angle of about 50 degrees with hinge-line; umbo terminal and pointed; anterior carination becoming obscure towards ventral side, leaving a narrow anterior area in its front, which is scarcely defined from anterior slope; the greatest convexity lying close to anterior margin, and posterior area well flattened; surface smooth except for fine concentric lines of growth. Internally, umbonal and dysodont teeth absent; ligament borne by an internal ridge which runs subparallel to hinge-margin.

Measurement in mm.	Length	Height	Thickness
Holotype (MM 2723) Right valve	43.0+	31.0+	4.5+
Paratype (MM 2724) Right valve	49.0	42.5	9.5

Observation and Comparison:—The tribal name in KOBAYASHI's manuscript is applied in the specific denomination. The holotype (Fig. 4) is possibly more or less compressed secondarily, while the paratype (Fig. 3) is slightly broken in postero-dorsal area.

Judging from the terminal umbo, distinct carination and edentulous hinge-area, this species may be referred to subgenus *Falcimytilus* Cox. The subtriangular outline, narrow anterior area and long hinge-margin are distinguishing characters of this species. *Mytilus mirabilis* LEPSIUS var. *timorensis* KRUMBECK (1923) from the middle Liassic *Mytilus*-bank of Timor is somewhat similar to this, but in that variety the hinge-margin is much shorter and the anterior margin deeply sinuated. Shell-convexity is very strong in *timorensis*, but rather weak in the present species. *Mytilus* (*Falcimytilus*) *sublaevis* SOWERBY (1823, *Vol. 5*; MORRIS and LYCETT, 1853) from the Bathonian in England also resembles to this in the triangular outline. In the British species, however, the antero-ventral margin is more or less sinuated, while it is nearly straight in this species.

This species differs from the proceding *stricapillatus* in the more trigonal outline, elongated hinge-line and absence of radial capillae on the surface.

Occurrence:—Common in black shales of Liassic "Tsuchizawa formation" at Tsuchizawa and Kuruma in Kitaotari-mura, Nagano Pref. (Prov. of Shinano).

Mytilus (*Falcimytilus*) *heranirus*
HAYAMI subsp.
Plate 24, Figure 5.

There are two large right valves which are fairly similar to the preceding species. But the shell is more

strongly inflated with a sharp anterior carination than in typical *heranirus*. The anterior margin is almost straight in *heranirus*, but fairly sigmoidal in this form. On the other hand, this form is somewhat similar to *Mytilus* (*Falcimytilus*) *suprajurensis* Cox in the strong carina and broad anterior slope before it, but the anterior margin is more abruptly sinuated below the umbo than in that species.

Occurrence:—Rare in black shales of lower (?) Liassic Kitamatadani formation of Kuruma group at Kitamatadani in Asahi-machi, Toyama Pref.

Mytilus (*Falcimytilus*) sp. indet.

Plate 24, Figures 6 and 7.

Only two internal moulds are given. Shell medium, crescentic in outline, strongly inflated, almost as long as high (MM 2733, 42.0 mm. long, 39.0 mm. high, 13.0 mm. thick); hinge-margin rather short, convex, passing gradually into posterior margin without any angulation; antero-ventral margin gently sinuated; carination very weak; anterior area small, ill-defined from anterior slope of shell body in internal mould; umbo terminal, pointed; internal ridge running subparallel and close to hinge-margin; umbonal and dysodont teeth absent.

This form resembles *Mytilus mirabilis* Lepsius var. *timorensis* Krumbeck (1923) in the general outline and strong shell-convexity. But judging from the growth-lines of *timorensis*, that variety seems more trigonal than this form.

Occurrence:—Sandstone of Negoya formation at Neiridani.

Family **Ostreidae** Lamarck

Genus *Ostrea* Linné, 1758.

Type species:—*Ostrea edulis* Linné. Recent.

"*Ostrea*" a sp. indet.

Plate 24, Figure 8.

Represented by an internal mould of a left valve. Shell large, inequilateral, vertically elongated, strongly convex, thick (MM 2742, 44.0 mm. long, 81.5 mm. high, 15.5+ mm. thick); ligament area wide, striated, provided with a large deep opisthocline acute-triangular central pit, which is bordered on each by a convexity; adductor monomyarian, located slightly posteriorly to center; inner surface irregularly folded, lacking any radial plications.

Judging from the irregular outline and ligament structure, this is safely placed in the wide sense of "*Ostrea*". Douvillé (1904) established genus *Liostrea* on the basis of *Ostrea sublamellosa* Dunker. The genus has been said to be distinguished from *Ostrea* (s. s.) by being more equivalve and by lacking radial ribs on the left valve. The name has been hitherto applied for the greater part of Jurassic non-coiled "*Ostrea*" by most authors. The present form belongs probably also to *Liostrea*. But the specific determination is impossible at present, because the right valve and the exterior of the left valve of this form are as yet unknown.

Occurrence:—Procured from a sandstone of Domerio-Toarcian Shinatani formation at Shinatani.

"*Ostrea*" b sp. indet.

Plate 24, Figure 9.

There are several smaller *Ostrea*-like shells which were collected from the Kuruma group at various localities. It

is difficult to say, however, which is most typical as a species, because its outline is very variable.

The illustrated specimen is an internal mould of a right valve. Shell small, pyriform, fairly convex in early stage but later it becomes concave; ligament area narrow, having a nearly acline obtuse-trigonal central pit bordered on each side by a weak convexity; adductor single, circular, posterior to center; inner surface smooth.

This form resembles "*Ostrea*" sp. (NAKAZAWA, 1955) from the Carnic Nabae group in the pyriform outline and the reversing of shell-convexity in the middle stage, but the central pit is wider than in the Carnic form.

Occurrence:—The illustrated specimen procured from the Liassic "Tsuchizawa formation" at Tsuchizawa in Kitaotari-mura.

Family **Pteriidae** MEEK

Genus *Pteria* SCOPOLI, 1777.

(=*Avicula* BRUGUIÈRE, 1791)

Type species:—*Mytilus hirundo* LINNÉ, Recent.

Explanation of Plate 23

Volsella bakevelloides HAYAMI, new species. ..... p. 156

Fig. 1. Right valve (MM 2719) ×1, holotype. Loc. black shale of Lower Hettangian Niranohama formation at Niranohama in Utatsu-mura, Miyage Prefecture (Province of Rikuzen).

Fig. 2. Left valve (MM 2730) ×1, paratype. Loc. ditto.

Fig. 3. Internal mould of a left valve (MM 2721) ×1, paratype. Loc. ditto.

Volsella sp. indet. ..... p. 158

Fig. 4. Clay cast from the external mould of a left valve (MM 2722) ×1, Loc. black-shale of Toarcian (?) Shinatani formation at the upper stream of Teradani in Kurobe National Forest, Toyama Pref.

Arcomytilus dairensis KOBAYASHI and HAYAMI, new species. ..... p. 158

Fig. 5. Left valve (MM 2734) ×1, holotype. Loc. fine sandstone at the lower stream of Daira River in Asahi-machi, Toyama Pref. KOBAYASHI coll.

Fig. 6. Left valve (MM 2735) ×1. Loc. the same as fig. 4.

Arcomytilus sp. indet. ..... p. 158

Fig. 7. Left valve (MM 2736) ×1, Loc. sandstone of Toarcian Shinatani formation at Shinatani in Omi-machi, Niigata Pref.

Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI, new species. ..... p. 159

Fig. 8. Left valve (MM 2728) ×2, paratype. Loc. black shale of Liassic "Tsuchizawa formation" at Kuruma in Kitaotari-mura, Nagano Pref. (Prov. of Shinano).

Fig. 9. Bivalved specimen (MM 2726) ×1, holotype. Loc. the same as fig. 7.

Fig. 10. Left valve (MM 2729) ×1. Loc. ditto.

Fig. 11. Internal mould of a right valve (MM 2727) ×1, paratype. Loc. ditto.

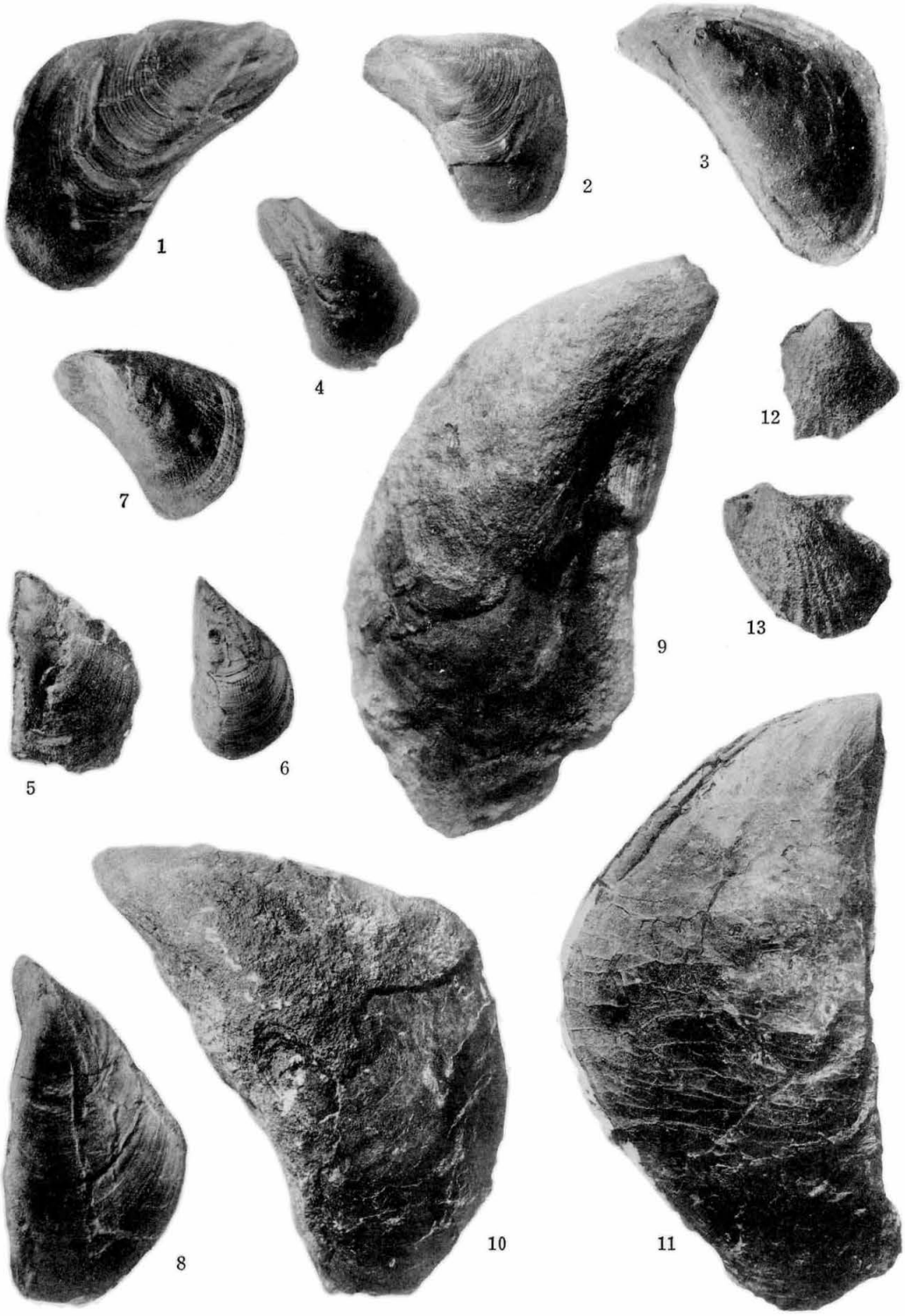
Oxytoma (?) sp. indet. ..... p. 163

Fig. 12. Left valve (MM 2740) ×1.5. Loc. fine sandstone of Domerio-Toarcian Shinatani formation at the upper stream of Kanayama-dani, in Omi-machi, Niigata Pref.

Fig. 13. Left valve (MM 2741) ×1.5. Loc. ditto.

All illustrated specimens are kept in the Geological Institute, University of Tokyo.

Photo by UEKI.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Pteria (s. l.) *kitakamiensis*

HAYAMI, new species.

Plate 24, Figures 10 and 11.

? 1904. *Gervillia trigona* YOKOYAMA, *Jour. Coll. Sci. Imp. Univ. Tokyo, Vol. 18, Art. 6, p. 12*, pl. 2, fig. 8 (non fig. 7)

Description:—Shell highly inequivalve, trigonal, pteriform, compressed; test thin; left valve moderately inflated but right one is nearly flat; hinge-margin straight, almost as long as whole shell-length; anterior margin long, almost straight, forming an angle of 40 degrees or so with hinge-margin; ventral margin short, abruptly curved; posterior one slightly sinuated in dorsal half, forming a small pointed posterior auricle; anterior wing large, elongated along anterior margin, defined from shell-body by an obscure groove in right valve; umbo fairly protruded above hinge-line in left valve, but not in right; surface marked with more or less fluctuated concentric lamellae; inner surface of left valve undulated by some broad radial plications; hinge and ligament structures unknown.

Measurement in mm.	Length	Height	Thickness
Holotype (MM 2737) Right external mould	38.5	24.0	1.5
Paratype (MM 2738) Left internal mould	26.0+	21.5+	7.5

Observation and Comparison:—Six specimens are at hand, but all are more or less broken or deformed secondarily. Though the hinge structure is unknown, the present species is referable to *Pteria* (s. l.) in view of the general outline and horizontal ridge along hinge-margin. The ridge appears in *Gervillia praecursor* QUENSTEDT (HEALEY, 1908) and several species of the Bakevelliidae, but more commonly in Mesozoic "*Pteria*".

This species is so similar to the specimen of *Gervillia trigona* YOKOYAMA (1904, p. 12, pl. 2, fig. 8, non fig. 7) in the trigonal outline and concentric lamellae, that that specimen possibly is conspecific with this. But the specific name, *trigona*, is applied to the form as represented by the other type specimen (fig. 7) which has an explicit ligament structure of *Bakevellia*-type. The writer designated already it as the lectotype of *Bakevellia trigona* (YOKOYAMA) (HAYAMI, 1957, p. 51, pl. 2, fig. 2).

Occurrence:—Rare in black shales of lower Hettangian Niranohama formation at Niranohama.

Genus *Oxytoma* MEEK, 1864.

Type species:—*Avicula inequivalvis* SOWERBY (1818, *Vol. 3*, p. 78, pl. 244, fig. 2, non fig. 3), Middle Jurassic (=*Avicula münsteri* BRONN in GOLDFUSS, 1836.)

Oxytoma (?) sp. indet.

Plate 24, Figures 12 and 13.

Several ill-preserved left valves are at hand. Shell small, prosocline, convex; hinge long, straight with a pointed posterior auricle, below which posterior margin is fairly sinuated; umbo more or less rising above hinge-margin, located at about a third of shell-length from front; surface sculptured with about 15 radial ribs of a single order of prominence.

Nothing is known of the hinge-structure and the right valve. Judging from the general outline and ornamen-

tation, this seems a member of *Oxytoma*, but the specific identification is deferred until sufficient material will be procured.

Occurrence:—Rare in fine sandstone of the Lower Shinatani formation (Domerio-Toarcian) at the upper stream of Kanayamadani in Omi-machi, Niigata Pref.

Explanation of Plate 24

Mytilus (*Falcimytilus*) *stricapillatus* HAYAMI subsp. ..... p. 159
Fig. 1. Internal mould of a left valve (MM 2731) ×1. Loc. sandstone of Middle Liassic Negoya formation at Neiridani in Kurobe National Forest, Toyama Pref.
Fig. 2. Internal mould of a right valve (MM 2732) ×1. Loc. ditto.

Mytilus (*Falcimytilus*) *heranirus* HAYAMI, new species. ..... p. 160
Fig. 3. Right valve (MM 2723) ×1.5, holotype. Loc. black shale of Liassic "Tsuchizawa formation" at Kuruma in Kitaotari-mura, Nagano Pref. KOBAYASHI coll.
Fig. 4. Right valve (MM 2724) ×1, paratype. Loc. ditto.

Mytilus (*Falcimytilus*) *heranirus* HAYAMI subsp. ..... p. 160
Fig. 5. Left valve (MM 2730) ×1. Loc. black shale of Lower (?) Liassic Kitamatadani formation at the upper stream of Kitamatadani in Kurobe National Forest

Mytilus (*Falcimytilus*) sp. indet. ..... p. 161
Fig. 6. Internal mould of a right valve (MM 2733) ×1. Loc. the same as fig. 1.
Fig. 7. Internal mould of a left valve (MM 2725) ×1. Loc. ditto.

"*Ostrea*" a sp. indet. ..... p. 161
Fig. 8. Gypsum cast from the internal mould of a left valve (MM 2742) ×1. Loc. sandstone of Toarcian (?) Shinatani formation at Shinatani in Omi-machi, Niigata Pref.

"*Ostrea*" b sp. indet. ..... p. 161
Fig. 9. Internal mould of a right valve (MM 2743) ×1. Loc. black shale of Liassic "Tsuchizawa formation" at Tsuchizawa in Kitaotari-mura.

Pteria (s. l.) *kitakamiensis* HAYAMI, new species. ..... p. 163
Fig. 10. Internal mould of a left valve (MM 2738) ×1, paratype. Loc. black shale of Lower Hettangian Niranohama formation at Niranohama in Utatsu-mura, Miyagi Pref.
Fig. 11. External mould of a right valve (MM 2737) ×1, holotype. Loc. ditto.

All illustrated specimens are kept in the Geological Institute, University of Tokyo.

Photo. by UEKI


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Trans. Proc. Palaeont. Soc. Japan, N. S., No. 29, pp. 166-168, pl. 25, April 10, 1958

331. MESOZOIC PLANTS FROM THE TETORI SERIES, CENTRAL HONSHU, JAPAN (Part 1)*

TATSUAKI KIMURA

Senior High School att. Tokyo Univ. of Education.

手取層群の植物化石. その一: 石徹白亜層群 (手取層群) の上部から, *Cladophlebis shinshuensis* TATEIWA が産出したので, これを記載した。本種は日本では, はじめての産出である。 木 村 達 明

Introduction

In this paper the writer describes a marked species collected from the Tc and Td horizons in the section of Tamodani[1]. (T. KIMURA, 1957)

In describing this short report, the writer expresses his sincere gratitude for the helps of Dr. H. FUJIMOTO and S. ENDO who kindly guided him during this study.

Description of species

Pteridophyta

Filicales Incertae Sedis

Form-genus *Cladophlebis* BRONGNIART

Cladophlebis shinshuensis TATEIWA

Plate 25, Figures 1, 2; Text-figure 1.

1929. *Cladophlebis shinshuensis* TATEIWA, fig. 24.

1940. *Cladophlebis shinshuensis* OISHI, p. 285, pl. XX, figs. 5-6; pl. XXI, figs. 5-7.

Diagnosis:—Frond: Bipinnate, probably large in size, rachis, 2-3 mm. thick measured on impression and traversed by 4 weak ridges on its surface.

Pinnae; oblong or obovate in shape, attached to the rachis at a low angle (about 30 degrees) subopposite, flexible in habit, tapering gradually towards the acuminated apex and overlapping each other laterally.

Pinnules; thin in character, set closely together, attached by the lower half of the base or whole of the base, the upper basal edge often making a deep sinus. Variable in shape, mostly long in length and narrow in width, with deeply serrated or lobed margin, each lobe with subacutely or acutely pointed apex.

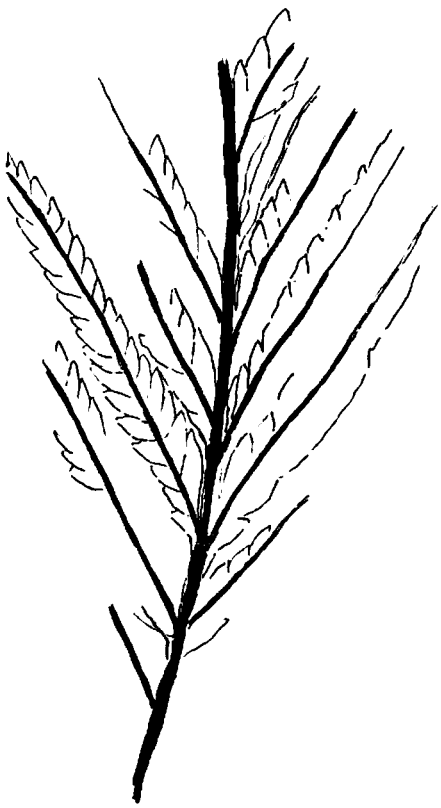
Reproductive organ is not preserved.

Description of specimens:—Pl. 25, fig. 1 shows three imperfect pinnae which are posterior portion of a frond. Pinnae are very flexible in habit, and bending backward at their midcourse. Pinnules are long and narrow, the margin is mostly lobed, each lobe acutely or sub-acutely pointed and acutely directed forward just like the pinnules themselves. Nerves are simple, the mid-nerve is considerably marked, but the secondary nerves are mostly obsolete.

Text-fig. 1 shows a part of pinna of this specimen.

* Received May 10, 1957; read April 3, 1953

1) 田茂谷



Text-fig. 1. *Cladophlebis shinshuensis* TAKEIWA: a part of pinna, ×2. (Td-0001)

Pl. 25, fig. 2 shows the middle portion of frond.

In the ultimate portion of frond, pinnae are very closely set and the margin of pinnule is lobed in the posterior portion and is getting entire towards the ultimate portion.

Remarks:—The writer's specimens are referable to the species figured originally by TATEIWA and described by OISHI (1940) on the same specimens from the Shinshu[1] formation in Korea which is younger than the Naktong[2] formation regarded as Lower Cretaceous in age.

Characteristic features are recognizable, that is being smaller in the size of pinnules, having strongly serrated or lobed margin and showing simple nervation as seen in the present species, in Japanese Upper Jurassic to Lower Cretaceous fern-like species, namely,

Cladophlebis elegantissima OISHI
C. hukuiensis OISHI
C. parvula OISHI etc.

It is difficult to distinguish this species from above mentioned in cases of imperfect specimens and only an isolated pinna.

The occurrence of this species in Japan had been unknown before the writer's present paper.

Horizons:—Tc and Td, in the section of valley Tamodani, the Ryogadani[3] alternating bed of sandstone and shale, the Upper Itoshiro[4] sub-group, Fukui Prefecture.

Sample number:—Td-9173, Td-9151, Td-0001, Td-0002, Td-0003, Td-9159, Td-9143, Td-9160, Td-9161, Td-9164, Td-9149 and others.

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1) 晋州
2) 洛東
3) 菱ケ谷
4) 石徹白

Explanation of Plate 25

Figs. 1, 2. *Cladophlebis shinshuensis* TATEIWA 166
1. Posterior pinnae (Td. Reg. no. Td-0001)
2. Middle portion of frond (Td. Reg. no. Td. 0002)
(Photo. by T. KIMURA, all in natural size.)

Figs. a, b. *Cercis Endoi* SUZUKI, new species 170
Collected by K. SUZUKI from the Middle part of Fujitoge formation exposed along upper of the Hara River, about 900 m. northeast of Kobusegawa, Yamato Town, Yama-gun, Fukushima Prefecture, Honshu, Japan.

Fig. c. *Cercis* sp. 170
Collected by K. SUZUKI, from the lower part of the Fujitoge formation exposed at Shirokozawa Lingite-mine, Yamato Town, Yama-gun, Fukushima Prefecture, Honshu, Japan.
Figures are all natural size.

(The specimens of figs. a-c are stored in the Institute of Earth Sciences, Department of Arts and Sciences, Fukushima University.)

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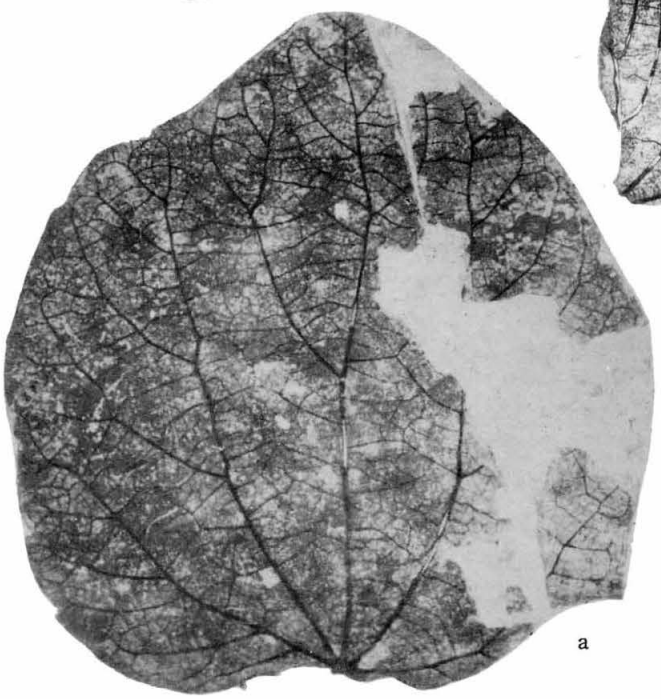
c



a

b

Trans. Proc. Palaeont. Soc. Japan, N. S., No. 29, pp. 168-171, pl. 25, April 10, 1958

332. ON THE OCCURRENCE OF *CERCIS* IN JAPAN*

KEIJI SUZUKI

Department of Arts and Sciences, Fukushima University

日本における *Cercis* 属の産出について：日本では，*Cercis* は絶滅属（野生状態では）だが，この属の化石として 1926 年に KRYSHTOFOVITCH が観音沢より記載したものがある。しかし，これは断片的資料にもとづいているので，*Cercis* にぞくするかどうかうたがわしい。今回，福島県会津亜炭田の藤峠層（上部中新世ないし下部鮮新世）より，*Cercis* にぞくする化石葉をみいだしたので，記載した。その一種を "*Cercis Endoi*" と命名したが，この種は，現生種・化石種との比較上，ともに，中国産のものに近縁である。

鈴木敬治

The genus *Cercis* is one of the old genera of dicotyledonous plants, being known to date back to the Paleogene and is readily recognized by its well marked foliar characters such as outline and nervation. The fossils of this genus are rather common in the Paleogene of North America but show a decline in the Neogene, which is more marked in the Recent.

In North America there are three species recorded from the Paleogene deposits, but only one or two from the Miocene and Pliocene. Besides these there is one species known from Europe (HEER, 1856) and two from Asia. Thus, so far as literature is concerned, the genus seems to be confined in its geological and geographical distribution to the Northern Hemisphere.

Among the Asiatic species, *Cercis miochinensis* HU et CHANEY (1940, p. 51, pl. 26, figs. 3-5) has been reported from the Miocene of Shantung, China, aud *C. japonicum* KRYSHTOFOVITCH (1926, p. 13, pl. 3, fig. 2) from the Miocene of Echigo, Japan. However, of these two species, it is doubtful whether *C. japonicum* really belongs to the genus *Cercis*, because it was described upon poorly preserved material.

Eight living species are known of the genus in the Northern Hemisphere. Of them, two occur in North America, five in China and one grows in the Mediterranean region. The contrasting living and fossil distribution of the genus is interesting, particularly from the present discovery of additional undoubted material from Japan, which is thought to have bearing on the problem relating to the remote distribution of the known species.

The distributions of the known living species are as follows. *Cercis canadensis* LINNAEUS is restricted in distribution to along the Mississippi River and *C. reniformis* ENGLER from Texas to the Sierra Madre, both in the warm temperate region. Of the five Chinese species, *Cercis chinensis* BUNGE is widely distributed in Central and Northern China and *C. racemosa* OLIVER at altitude of 4000-5500 feet in Central China, while the other three species are known only from Central and Northern China.

* Received June 20, 1957; read June 15, 1957

As a result of the writer's geological observations in the Tertiary terrain of the Aizu Basin, Fukushima Prefecture, well preserved specimens referable to the genus *Cercis* have been found. These described in the present article are from the Miocene or Lower Pilocene Fujitoge formation. This formation is rich in plant remains and among them such as the following are characteristics, namely: *Fagus palaeocrenata* OKUTSU, *Zelkova Ungeri* KOVATS and *Liquidambar formosana* HANCE.

Descriptions of *Cercis* species

Cercis Endoi, sp. nov.

Plate 25 Figures a. b.

Description:—Leaves broadly ovate but asymmetric in outline, ca. 9 cm. long and ca. 8.5 cm. wide; asymmetric form especially distinct at the apical part, margin entire, base slightly cordate, apex acuminate. Seven palmative primary nerves stout, lateral primaries on each side of midrib asymmetric, inner ones diverging from the midrib at angles of ca. 30 degrees and outer ones from the midrib at angles of ca. 75 degrees, respectively reached near the margin upcurving toward the apical part. Secondary nerves numerous, the ones diverging from the midrib at angles of 40-50 degrees, and not found in the lower half, the others diverging from the lateral primaries at angles of ca. 40 degrees, making camptodrome near the margin with the primary nerves. Lateral tertiary nerves distinct, making the polygonal meshes with the other certiary nerves. Texture rather thin. Petiole not preserved.

Remarks and Comparison:—The present materials are all asymmetric in form being especially distinct at the apical part, as shown in the annexed figures. The leaves at the tip of the younger twigs of *Cercis chinensis* BUNGE is the most similar to the present one among the living species, and the leaves of *C. racemosa* OLIVER resemble the present one in the leaf form and the nervation. However, the leaves at the tip of the young twigs of *Cercis chinensis* BUNGE, never have very acuminate apex and seven obvious palmative nerves as seen in the present materials.

Of the known fossil species, my specimens resemble certain form of *Cercis miochinensis* HU et CHANEY (1940, p. 51, Pl. 26, Fig. 3) in the leaf form and nervation, but differ from it in the apical form of leaf and in the details of the nervation. Of the American fossil species, none is similar to the present specimens. The present specimens are somewhat similar to *Cercis cyclophylla* A. BRAUN (in HEER, 1856, p. 107, Taf. CXXXIII, Fig. 35) from the Miocene of Switzerland.

Locality:—The upper course of Hara River, about 900 m. Northeast of Obusegawa, Yamato Town, Yama-gun, Fukushima Prefecture, Japan.

Geological horizon:—Middle part of the Fujitoge formation, Upper Miocene or Lower Pliocene.

Cercis sp. indet.

Plate 25, Figure c.

A single fragmental leaf. This leaf is small, and it differs from *Cercis Endoi* SUZUKI by both cordate apex and nervation. The leaves with these characters are sometimes recognizable at the lower part of the twigs of *Cercis chinensis* BUNGE.

Locality:—Shirokozawa lignite-mine, Yamato Town, Yama-gun, Fukushima Prefectiure, Japan.

Geological horizon:—Lower part of the Fujitoge formation; Upper Miocene.

The writer wishes to offer his warmest thanks to Dr. S. Endo for his kind encouragement to my palaeobotanical works. The writer is also indebted to Dr. K. Huzioka for his kind advices.

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Trans. Proc. Palaeont. Soc. Japan, N. S., No. 29, pp. 172-174, April 10, 1958

333. A SHORT NOTE ON *LONSDALEOIDES TORIYAMAI* MINATO*

MASAO MINATO and MAKOTO KATO

Department of Geology and Mineralogy, Hokkaido University.

Lonsdaleoides toriyamai MINATO について：四射珊瑚 *Lonsdaleoides toriyamai* MINATO の模式地および層準について誤報された点を改め，新産地のものについて簡単な記載を行った。

湊　正雄・加藤　誠

Very recently the senior author received several specimens of a fossil coral which were sent by Prof. E. TAKAHASHI of Yamaguchi Univ. for study. All these specimens are specifically identifiable to *Lonsdaleoides toriyamai* MINATO with certainty by microscopical study, as will be later described in this note.

This species was first established by the senior author based on materials presented by Prof. R. TORIYAMA, Kyushu Univ., which were, according to his verbal information, collected by him from the *Fusulinella* limestone developing at Kyowa-Mura, Mine-Gun, Yamaguchi Prefecture.

This was reported by the senior author in a former paper (M. MINATO, 1955).

Meanwhile, information has recently been received through letter from Prof. TORIYAMA that the holotype specimen of this species was not collected from Kyowa-Mura, but was truely derived from the limestone developing at a short distance northeastward from Ohkubo, Ouda (Ohta)-Machi, (now Mito-Machi), Mine-Gun, Yamaguchi Prefecture, and further, that the stratigraphical horizon of this coral is, for certain his so-called Cm α=*Profusulinella* zone. Accordingly it is proposed here to revise the former description in respect to the locality and the geological horizon of the holotype of *Lonsdaleoides toriyamai* MINATO.

The new specimens lately sent by Prof. TAKAHASHI to the senior author were collected, according to his information by letter, from two localities: one is quite the same place, where the holotype specimen of this species was found, while the other locality is at a limestone quarry at Isa, Mine City, Yamaguchi Prefecture.

Although the exact place of the second locality is unknown today to the writers in more exact detail, the specimens must have been discovered at a locality where the Lower Permian limestone should be developed, according to the geological map recently published by Prof. TORIYAMA.

However, it is almost impossible to imagine this coral to show such a long geological range as from the Middle Carboniferous to the Permian in age, therefore inquiry was made of Prof. TORIYAMA, whether the Middle Carbonifeous deposits are really developed near Isa or not.

* Received Feb. 22, 1957; read Sept. 28, 1957.

In this regard Prof. TORIYAMA is kind enough to inform that there develops limestone which perhaps is correlable to his *Profusulinella* zone even in the area near Isa, especially in the north or northeast of Maruyama, although the existence of such formation was not indicated in his geological map lately published. So it is now supposed that this species may have been also derived from the Middle Carboniferous deposits at the second locality near Isa.

Before going into a description of new specimens, the writers wish to express sincere thanks to Professors TAKAHASHI and TORIYAMA for their kind help in this study.

Description of species

Genus *Lonsdaleoides* HERITSCH, 1936
em. MINATO, 1955

Lonsdaleoides toriyamai MINATO

Text-fig.

1955. *Lonsdaleoides toriyamai*, MINATO: Japanese Carboniferous and Permian Corals. *Jour. Fac. Sci. Hokkaido Univ., ser. IV, vol. 9, no. 2*, pp. 165-167, pl. 3, fig. 6; pl. 16, fig. 7; pl. 23, figs. 1, 2, 3; text-figs. 21, 22.

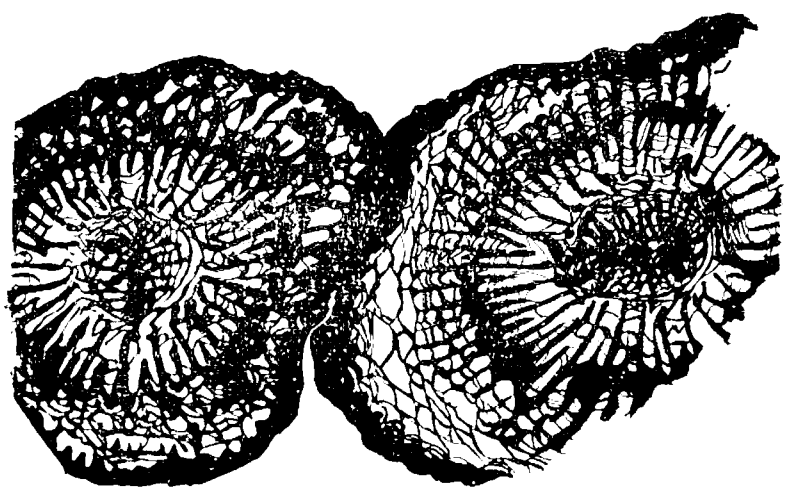
Corallum fasciculate. Corallites cylindrical, usually closely disposed and rarely in contact with each other, while sometimes they are dendroid and new corallites seem to be arisen from the peripheral part of the old ones.

Calicular diameter ranging from 10 to 20 mm. in the ephebic stage.

Outer wall very thick, the inner surface of which represents considerable convexity towards the central area in the interseptal space, as is shown in Text-fig.

Outer zone provided with lonsdaleoid dissepiments in generally very wide, but its width of is not uniform throughout the corallite in a cross section, even in the mature stage; in one side this is more wide than the other and it is often disappearing in one portion. In an immature stage such lonsdaleoid dissepiments are a little developed and in a still younger stage they are completely lacking.

Septa in two orders. Major septa thick, numbering 24 to 34 in the ephebic stage, extend into the columella



Text-fig. *Lonsdaleoides toriyamai* MINATO (× 4)

but never directly unite with it in the ephebic stage, although only the counter septum is firmly united with the columella in the early stage of the ontogeny. The major septa start to grow from the outer wall in the younger stage and there is never left an area entirely without septa near the outer wall. As the corallite grows larger, there appears an area occupied by lonsdaleoid dissepiments and thus the major septa become not connected with the outer wall. Minor septa alternating with the major ones are fairly long, usually about two-thirds the length of the latter. Both of them are strongly thickened at the thecal region to form a distinct stereotheca.

There is no marked fossula.

The axial complex is much complicate in the mature stage, the outline of which is sub-elliptical in cross section. It is composed of a thick median plate, axial tabellae and septal lamellae; all of them are strongly thickend by stereoplasmic deposits, and thus it reminds one of the columella of the genus *Carcinophyllum*.

In neanic stage, the septal lamellae and axial tabellae are, however, more closely disposed with respect to each other and in still younger stage, the axial structure of this species is observed to be a compact, solid columella, like the genus *Cionodendron* or *Lophophyllidium*.

Localities and Registration numbers:— Ohkubo, Oda, Mito-Cho (Machi), Mine-Gun, Yamaguchi Prefecture. U. H. R. 12708 (i-v).

Isa quarry, Isa-Cho(Machi), Mine-City, Yamaguchi Prefecture. U. H. R. 12709 (i-iv).

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Trans. Proc. Palaeont. Soc. Japan, N. S., No. 29, pp. 175-183, pl. 26, April 10, 1958

334. ON SOME CEPHALASPID OPISTHOBRANCHIA FROM THE JAPANESE MIOCENE*

JUNJI ITOIGAWA

Institute of Earth Science, Nagoya University

中新世頭楯後鰓類：瑞浪・綴喜・藤原の3層群から産した頭楯後鰓類 16 種について 属・種の検討を行い、*Pupa hiyoshiensis*, *Retusa* (*Coelophysis*) *shukuboresis*, *Volvulella minoensis*, *V. yamauchii*, *Eocylichna habei*, *E. tokiensis*, *Decorifer ena* の7新種の記載を行った。糸魚川淳二

Introduction and Acknowledgements

Many Recent and fossil species of the Cephalaspid Opisthobranchia of the seas around and the Pliocene and later rocks in Japan have been described and reported by various authors. However, the present knowledge of the Miocene species of this subclass is very meagre, but for some contributions made by M. YOKOYAMA, T. TAKEYAMA and Y. OTUKA. This scarcity of criteria is chiefly attributed to the minute and fragile shells, so as good preservation be rare and as aptly be overlooked.

The present writer is studying the stratigraphy and paleontology of the Miocene rocks that are called the First Paleo-Setouchi supergroup (IKEBE, 1951; ITOIGAWA, 1955a, b, 1956). He has already reported his works in part on the Mizunami and Tsuzuki Miocene groups in the mid-west region of this country.

In this paper, 16 forms of the opisthobranch mollusks of the Cephalaspid group are described. These are collected from the Mizunami, Tsuzuki and Fujiwara groups. They are:

"*Acteon*" sp. indet.
Pupa hiyoshiensis n. sp.
Ringicula (*Ringiculina*) *minoensis* TAKEYAMA
R. (*Ringiculina*) sp. indet.
Cylichnatys sp. indet.
Retusa (*Coelophysis*) *shukuboresis* n. sp.
R. (*Coelophysis*) sp. indet.
Volvulella minoensis n. sp.
V. yamauchii n. sp.
V. sp.
Eoscaphander corpulenta (YOKOYAMA)
Eocylichna habei n. sp.
E. tokiensis n. sp.
E. affabilis (YOKOYAMA)
Cylichna sp. indet.
Decorifer ena n. sp.

The writer is indebted to Prof. J. MAKIYAMA for instruction in preparation of this paper and to Drs. T. KURODA and T. HABE for informations on malacology. Thanks are due to Mr. T. SAKAMOTO who kindly offered the specimens of the Fujiwara group and also to Mr. Katsumi YAMAUCHI who assisted the writer in the fields.

Description of Species

Family Pupidae

Genus *Acteon* MONTFORT, 1810

"*Acteon*" sp. indet.

* Received June 22, 1957; read June 15, 1957.

Plate 26, Figure 1.

Shell small, ovate; spire short, conical; protoconch unknown, remaining whorls 5, with deep suture forming a shoulder at the upper edge of the whorls; body-whorl large, occupying about three-fifths of the shell length; surface with about 30 spiral cords in body-whorl (unknown on the upper whorls), separated by narrow sulci; sulci finely latticed by raised lines of growth; aperture ovate, narrow and bluntly pointed above, rounded below; columella part unknown. Length, 8 mm., diameter, 4 mm.

Many cast specimens are at hand. All the columella parts are broken, so that it is difficult to determine the generic status whether *Acteon* or *Pupa*. Apparently it is resembled to *Acteon nipponensis* (YAMAKAWA, 1911), but the latter has a longer and narrower body-whorl.

Geological occurrence:—Toyoda formation, Fujiwara group.

Locality:—SF 6 (Fujiwara Range, Fujiwara, Nara City).

Genus *Pupa* RÖDING, 1798

Pupa hiyoshiensis n. sp.

Plate 26, Figures 2a, b.

Shell small, ovate; spire conical with narrowly canaliculated suture; whorls 7, somewhat convex; surface sculptured with 5 punctured spiral grooves except smooth embryonal whorl; body whorl large, occupying about five-sevenths of shell length; aperture narrow, widened and rounded in front; outer lip arcuated; columella somewhat callus with 2 folds; lower fold strong, upper one weak, narrow.

Dimensions:—Length, 7.0 mm., Diameter, 3.2 mm.

Holotype:—JC1500012, *Paratype*:—JC 1500013.

Remarks:—This species is closely allied to *Pupa strigosa* (GOULD, 1859) in general feature, but it is distinguished from the latter by the features of columella. *Acteon ozawai* OTUKA, 1938, from the Shobara Miocene, is another species allied to this, but present species has a more ovate shell with 2 columella folds.

Type Locality:—M 20, River-side cliff of Shukubora valley about 100 m. SW of the bridge at S of Shukubora, Hiyoshi-cho, Mizunami City.

Geological occurrence:—Shukunohora sandstone, Mizunami group.

Associated fossils:—Same with the one of *Retusa shukuborensis* n. sp.

Family Ringiculidae

Genus *Ringicula* DESHAYES, 1838

Subgenus *Ringiculina* MONTEROSATO, 1884

Ringicula (*Ringiculina*) *minoensis* TAKEYAMA

Plate 26, Figures 3, 4.

1935. *Ringicula* (*Ringiculella*) *minoensis* TAKEYAMA, *The Venus, vol. 5*, p. 84, pl. 6, figs. 36-39.

Geological occurrence:—Shukunohora sandstone, Mizunami group.

Locality:—M 20 (Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture).

Ringicula (*Ringiculina*) sp. indet.

Plate 26, Figure 5.

Shell small, ovately globose, with moderately short spire; protoconch unknown, remaining whorls 4, slightly convex, separated by impressed suture; sculpture consisting of flat-topped spiral ribs separated by narrower inter-

spaces; ribs 9 on the penultimate whorl; last whorl large, slightly less than 3/4 the total shell height; complete aperture, lip and columella unknown except the trace of 2 columella folds. Length, 3mm., diameter, 2.1 mm.

Ill-preserved 4 specimens are at hand. This species is distinguishable from the allied Miocene species such as *R. ninohensis* Otuka, 1934, *R. ninohensis kiiensis* Takeyama, 1935, *R. minoensis* Takeyama, 1935 and *R. fragilis* Takeyama, 1935 in having the globular shell with lower spire and large body-whorl. Investigation will be postponed until discovery of sufficient material.

Geological occurrence:—Toyoda formation, Fujiwara group.

Locality:—SF 6 (Fujiwara Range, Fujiwara, Nara City).

Family Atyidae

Genus *Cylichnatys* Kuroda et Habe, 1952

Cylichnatys sp. indet.

Plate 26, Figure 6.

Shell small, rather thin, ovate, slightly truncated at the apical end, rounded at the lower end; spire concealed, concave, but not perforated; surface with fine spiral striae and longitudinal growth line; aperture narrow, arched, dilated below; outer lip thin, somewhat arched; columella margin short, faintly thickened with a fold; umbilicus narrow, slit-like. Length, 5.0 mm., diameter, 2.7 mm.

Only two specimens were obtained. The ovately subcylindrical shell form is a remarkable feature not known among the Japanese Recent and fossil species. Complete description is postponed.

Geological occurrences:—(1) Kubohara sandstone, Mizunami group, (2) Tsukiyoshi member, Mizunami group.

Localities:—(1) I 111 (Kamigiri, Iwamura-cho, Ena-gun, Gifu Prefecture), (2) M 17'-0 (Anabora, Akiyo-cho, Mizunami City).

Family Retusidae

Genus *Retusa* Brown, 1827

Subgenus *Coelophysis*, Fischer, 1833

Retusa (*Coelophysis*) *shukuborensis* n. sp.

Plate 26, Figures 7a, b, 10.

Shell small, subcylindrical, constricted in the middle, truncated at the apical end, rounded at the lower end; spire deeply sunken; body-whorl equal to whole length of the shell; surface with somewhat coarse longitudinal growth lines; aperture narrow, as long as the shell length, linear above, abruptly widened below; outer lip straight or slightly constricted in the middle; columella lip oblique without fold; umbilicus more or less opened.

Dimensions:—Length, 2mm., diameter, 1.2 mm.

Holotype:—JC 1500002, *Paratype*:—JC 1500003.

Remarks:—This shell is distinguishable from *R. minima* Yamakawa, 1911 in having the shorter shell, more deeply sunken spire, opened umbilicus and not having any columella fold.

Type Locality:—M 20, River-side cliff of Shukubora valley about 100 m. SW of the bridge at S of Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture.

Geological occurrence:—Shukunohora sandstone, Mizunami group.

Associated fossils:—*Miogypsina kotoi* Hanzawa, *Operculina complanata japonica* Hanzawa, *Aloidis nisataiensis* Otuka, *Cavilucina kitamurai* (Hatai et Nisiyama),

Turbo ozawai (OTUKA) etc.

Retusa (*Coelophysis*) sp. indet.

Plate 26, Figure 11.

Shell small, subcylindrical, stuggy, rounded at the lower and upper parts; spire sunken, immersed in later whorls; body-whorl equal to shell length; surface with coarse growth lines; aperture narrow, as long as shell height, linear, slightly expanded at the lower one-third; outer lip straight, more or less constricted in the middle; inner lip oblique, with a fold. Length, 2.6 mm., diameter, 1.8 mm.

Only one specimen is under examination. But stuggy shell is so characteristic as a more material will show the new species. This form differs from *R. shukuborensis* n. sp. in posessing a more stuggy shell with shallow sunken spire and a columella fold.

Geological occurrence:—Tsukiyoshi member, Mizunami group.

Locality:—M 400 (Tsukiyoshi, Akiyo-cho, Mizunami City, Gifu Prefecture).

Genus *Volvulella* NEWTON, 1891

Volvulella minoensis n. sp.

Plate 26, Figures 8a, b, 9.

Shell small, solid, elongately subfusiform, centrally ventricose, with a sharply pointed apex and narrowly rounded base; whorls convolute, only the last visible, produced to a sharp point above, apical part provided with a feeble split; surface polished, sculptured with weak, fine spiral striae on the terminals; aperture as long as the shell, very narrow and sharply arcuate, thin, extending above to the apex and base; inner lip covered by a narrow callus; columella short, oblique; umbilicus narrow, slit-like.

Dimensions:—Length, 3.7 mm., diameter, 1.4 mm.

Holotype:—JC 1500004, *Paratype*:—JC 1500005.

Remarks:—This shell is easily distinguished from *V. radiola* (A. ADAMS, 1862) by the more narrowly fusiform shape with sharp apex and absence of columella fold. *V. tokunagai* MAKIYAMA, 1927 is closely related to this species, but the former has a subcylindrical shell with more blunt apex and columella fold.

Type Locality:—M 20, Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture.

Geological occurrence:—Shukunohora sandstone, Mizunami group.

Associated fossils:—Same with the one of *Retusa shukuborensis* n. sp.

Volvulella yamauchii n. sp.

Plate 26, Figures 13, 14.

Shell small, elongate, subcylindrical, tapering to a pointed apex and narrowly rounded base; whorls convolute; surface polished, smooth in the middle, spirally striated on the terminal portions; striae indistinct, weak; aperture as long as the shell length, narrow, linear, slightly expanded below; outer lip arcuate, thin; inner lip covered by a narrow callus; columella oblique, smooth, without a fold; umbilicus narrow, slit-like.

Dimensions:—Length, ca. 5 mm., diameter, 1.5 mm.

Holotype:—JC 1500006, *Paratype*:—JC 1500007.

Remarks:—The elongate form of this new species is the conspicuous feature and is distinguished from the another species. The preceding species is like the present species, but the latter has

the more elongate and narrower shell with the blunt apex. This species is named in honor of Mr. Katsumi YAMAUCHI who helped the writer in the fields.

Type Locality:—M 20, River-side cliff of Shukubora valley about 100 m. SW of the bridge at S of Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture.

Geological occurrences:—(1) Shukubora sandstone, Mizunami group, (2) Toyoda formation, Fujiwara group.

Localities:—(1) M 20 (type locality), (2) SF 6 (Fujiwara Range, Fujiwara, Nara City).

Associated fossils:—(1) Same with the one of *Retusa shukuborensis* n. sp., (2) *Chlamys kokawai* SAKAMOTO (MS), *Crassatellites makiyamai* SAKAMOTO (MS), *Nassarius simizui* OTUKA, *Protorotella yuantaniensis* MAKIYAMA, *Calyptraea tubura* OTUKA.

Volvulella sp.

Plate 26, Figure 17.

Only two imperfect specimens are under examination. It resembles to *V. minoensis* n. sp. but has more elongated and cylindrical shell. Specific determination is postponed.

Geological occurrence: — Tsukiyoshi member, Mizunami group.

Localities:—M 31-1 and M 31-2 (Kujiri, Toki City, Gifu Prefecture).

Family Triclidae

Genus *Eoscaphander* HABE, 1952

Eoscaphander corpulenta (YOKOYAMA)

Plate 26, Figure 21.

1926. *Cylichna corpulenta* YOKOYAMA, *Jour. Fac. Sci. Imp. Univ. Tokyo, sec. II, vol. 1, pt. 7*, p. 217, pl. 28, figs. 3, 3a.

Shell large, thin, ovate, tapering to apical end; whorls convolute, only the last visible; vertex concave but details unknown; surface with spiral threads and growth lines; spirals fine, numerous, broader than interspaces, intercalated by fine, weak striae; growth line fine, cancellate at the interspaces of spirals; aperture large, widened on the lower half; outer lip arched; inner lip short, slightly arched; no umbilicus. Length, 34.3 mm., diameter, 19.5 mm.

Only few ill-preserved specimens were obtained. This is a characteristic species as noted by YOKOYAMA. This species falls to the genus *Eoscaphander* in general feature, i.e. shell form, sculpture etc.

Geological occurrences:—(1) Kubohara member, Mizunami group, (2) Yamanouchi member, Mizunami group, (3) Tsukiyoshi member, Mizunami group, (4) Toyoda formation, Fujiwara group.

Localities:—(1) I 111 (Kamigiri, Iwamura-cho, Ena-gun, Gifu Prefecture), (2) M 52 (Sakuradô, Mizunami City), (3) M 17'-2 (Anabora, Akiyo-cho, Mizunami City), (4) SF 6 (Fujiwara Range, Fujiwara, Nara City).

Genus *Eocylichna* KURODA et HABE, 1952

Eocylichna habei n. sp.

Plate 26, Figures 15a, b.

Shell small, solid, elongated, cylindrical, slightly tapering at both ends, more or less constricted in the middle on the immature specimens; whorls convolute, only the last visible; vertex truncated and deeply excavated; surface polished, smooth except the fine growth lines; aperture narrow, linear, widened below; upper margin produced upwards; outer lip nearly straight descending rounded base; columella

margin short, oblique, with a obtuse fold; umbilicus almost closed.

Dimensions:—Length, 2.7 mm., diameter, 0.8 mm.

Holotype:—JC 1500008. *Paratype*:—JC 1500009.

Remarks:—This shell is similar to *Eocylichna musashiensis* (TOKUNAGA, 1906) but the former has a larger and more elongated shell with the wider dilation at the base of the aperture. *Eocylichna braunsi* (YOKOYAMA, 1920) closely related to this new species in general form but the transverse line in the former species is not visible in the latter.

Type Locality:—M 20, River-side cliff of Shukubora valley about 100 m. SW of the bridge at S of Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture.

Geological occurrence:—Shukunohora sandstone, Mizunami group.

Associated fossils:—Same with the associated fossils of *Retusa* (*Coelophysis*) *shukuborensis* n. sp.

Eocylichna tokiensis n. sp.

Plate 26, Figures 16a, b.

Shell small, solid, cylindrically ovate, centrally ventricose, spire convolute; vertex depressed, concave with a small pit at the bottom; surface polished, smooth, in the middle, spirally striated on the terminal portion; sculpture consisting of 10–13 subequal, distant striae on the base and 7–9 similar ones on the top; growth line visible; aperture narrow, widened at the both ends, upper margin produced upwards and lower margin rounded below; outer lip rather straight; columella somewhat callus with a obtuse fold; umbilical chink narrow.

Dimensions:—Length, 3.9 mm., diameter, 1.9 mm.

Holotype:—JC 1500010, *Paratype*:—JC 1500011.

Remarks:—This shell resembles to *Eocylichna braunsi* (YOKOYAMA, 1920) but differs in its short and ovate shell. It is easy to distinguish the present species from *E. soyoae* HABE, 1954 by the spiral ornamentation on the terminal portions.

Type Locality:—M 20, River-side cliff of Shukubora valley about 100 m. SW of the bridge at S of Shukubora, Hiyoshi-cho, Mizunami City, Gifu Prefecture.

Geological occurrences:—(1) Shukunohora sandstone, (2) Tsukiyoshi member, (3) Kubohara member, Mizunami group, (4) Miyamura member, Tsuzuki group.

Localities:—(1) M 20 (Type Locality), (2) M 17'-0, M 17-1 (Anabora, Akiyo-cho, Mizunami City), (3) I 246 (Nakanishi, Yamaoka-cho, Ena-gun, Gifu Prefecture), (4) O 13-1 (Ôfuku, Ujidawara-cho, Tsuzuki-gun, Kyoto Prefecture).

Associated fossils:—(1) Same with the one of *Retusa* (*Coelophysis*) *shukuborensis* n. sp., (2) *Felaniella usta* (GOULD), *Tapes siratoriensis* (OTUKA), *Turritella s-hataii* NOMURA, *Euspira meisensis* MAKIYAMA, *Nassarius simizui* OTUKA, (3) *Nipponomarcia nakamurai* IKEBE, *Tapes siratoriensis* (OTUKA), *Pillucina yokoyamai* (OTUKA), *Nassarius simizui* OTUKA, *Protorotella depressa* MAKIYAMA, (4) "*Ostrea*" sp., *Nassarius simizui* OTUKA, *Cerithium ancisum* (YOKOYAMA), *C.* cfr. *otukai* NOMURA.

Eocylichna affabilis (YOKOYAMA)

Plate 26, Figures 12, 20.

1926. *Cylichna affabilis* YOKOYAMA, *Jour. Fac. Sci. Imp. Univ. Tokyo, sec. II, vol. 1, pt. 7*, p. 216, pl. 28, figs. 1, 2.

Only ill-preserved cast specimens are at hand. But it seems to fall within

the limit of "*Cylichna*" *affabilis* YOKOYAMA seeing the general features. The deeply excavated but not perforate vertex indicates that this species belongs to the Genus *Eocylichna*.

Geological occurrences:—(1) Maki siltstone, (2) Tsukiyoshi member, Mizunami group, (3) Miyamura sandstone, Tsuzuki group.

Localities:—(1) I 373, I 185 (Agi, Agi-mura, Ena-gun, Gifu Pref.), I 124, I 533, I 383 (NE of Nouchi, Agi-mura), I 158 (Shinbara, Agi-mura), (2) M 32-1 (Kujiri, Toki City, Gifu Pref.), (3) O 113 (Chaya, Ujidawara-cho, Tsuzuki-gun, Kyoto Prefecture.).

Genus *Cylichna* LOVÉN, 1847

Cylichna sp. indet.

Plate 26, Figure 18.

Shell rather medium, thick, cylindrical; spire concealed; vertex truncated, only showing a very small excavation, but not perforated; sculpture reticulated consisting spirals and longitudinal growth lines; spiral threads fine, dense, coarser to the upper part; aperture dilated anteriorly, apertural margin and columella part unknown; no umbilicus. Length, ca. 8.5 mm., diameter, 3.2 mm.

Only two broken specimens are at hand. However, it is evident that this shell belongs to the genus *Cylichna* because of the features of the apex. It appears as a promising unique species.

Geological occurrences:—(1) Kubohara sandstone, Mizunami group, (2) Toyoda formation, Fujiwara group.

Localities:—(1) I 113 (Kamigiri, Iwamura-cho, Gifu Pref.) (2) SF 6(Fujiwara Range, Fujiwara, Nara City).

Genus *Decorifer* IREDALE, 1937

Decorifer ena n. sp.

Plate 26, Figures 19a, b.

Shell small, solid, subcylindrical, pointed above and rounded below; whorls five; spire conical, occupying about two-sevenths of the shell length, somewhat terraced but not shouldered; apex prominent, obliquely immersed in later whorls; suture distinct, shallow, not channeled; surface smooth except for fine growth line; aperture nearly equal to the height of the body-whorl, thin, narrowed above, dilated and rounded below; outer lip straight; inner lip with a callus; columella fold obsolete.

Dimensions:—Length, 5.2 mm., diameter, 2.0 mm.

Holotype:—JC 1300163, *Paratype*:—JC 1300164.

Remarks:—This shell is similar to *D. insignis* (PILSBRY, 1904), but it differs from the living species in having the higher spire but no columella fold. *D. longispirata* (YAMAKAWA, 1911) is another allied species, but it has narrow shell with the terraced higher spire and the folded columella.

Type Locality:—I 246, Nakanishi, Yamaoka-cho, Ena-gun, Gifu Prefecture.

Geological occurrences:—(1) Kubohara sandstone, (2) Maki siltstone, (3) Shukunohora sandstone and (4) Tsukiyoshi member, Mizunami group.

Localities:—(1)-a. I 246 (type loc.), I 446 (Nakanishi, Yamaoka-cho, Ena-gun, Gifu Pref.), I 58 (Agi-mura, Ena-gun, Gifu Pref.), I 110 (Kamigiri, Iwamura-cho, Ena-gun, Gifu Pref.), (1)-b. I 111, I 113 (Kamigiri, Iwamura-cho, Ena-gun, Gifu Pref.), (2) I 1, I 121 (Agi, Agi-mura, Ena-gun, Gifu Pref.), (3) M 20 (Shukubora, Hiyoshi-cho, Mizunami City), (4)-a. M 2, M 5-2 (Tsukiyoshi, Akiyo-cho, Mizunami City), (4)-b. M 17-2, M 17'-0 (Anabora, Akiyo-cho, Mizunami City), (4)-c. M 32-1, M 31-1

(Kujiri, Toki City).

Associated fossils:—(1)-a. Same with the associated fossils (3) of *Eocylichna tokiensis* n. sp., (1)-b. *Dosinia nomurai* OTUKA, *Nipponomarcia nakamurai* IKEBE, *Euspira meisensis* MAKIYAMA, *Turritella s-hataii* NOMURA, *Glycymeris minoensis* ITOIGAWA, *Nassarius simizui* OTUKA, (2) *Nipponomarcia nakamurai* IKEBE, *Tapes siratoriensis* (OTUKA), *Euspira meisensis* MAKIYAMA, *Nassarius simizui* OTUKA, (3) same with the one of *Retusa* (*Coelophysis*) *shukuborensis* n. sp., (4)-a. *Cyclina japonica* KAMADA, *Sanguinolaria minoensis* (YOKOYAMA), *Saxolucina k-hataii* (OTUKA), *Vicarya yokoyamai* TAKEYAMA,

Explanation of Plate 26

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Fig. 1. "*Acteon*" sp. indet., ×3, Loc. SF 6(Fujiwara Range, Fujiwara, Nara City)..... 175

Figs. 2a, b. *Pupa hiyoshiensis* n. sp., Holotype, Reg. No. JC1500012, ×3, Loc. M 20(Shukubora, Hiyoshi-cho, Mizunami City, Gifu Pref.). 176

Figs. 3, 4. *Ringicula* (*Ringiculina*) *minoensis* TAKEYAMA, ×5, Loc. M 20(Shukubora, Hiyoshi-cho, Mizunami City, Gifu Pref.). 176

Fig. 5. *Ringicula* (*Ringiculina*) sp. indet., × 5, Loc. SF 6(Fujiwara Range, Fujiwara, Nara City). 176

Fig. 6. *Cylichnatys* sp. indet., ×3, Loc. I 111(Kamigiri, Iwamura-cho, Ena-gun, Gifu Pref.). 177

Figs. 7a, b. *Retusa* (*Coelophysis*) *shukuborensis* n. sp., Holotype, Reg. No. JC1500002, Loc. M 20 (Shukubora, Hiyoshi-cho, Mizunami City, Gifu Pref.). 177

Figs. 8a, b. *Volvulella minoensis* n. sp., Holotype, Reg. No. JC1500004, ×5, Loc. Same as above 178

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Fig. 10. *Retusa* (*Coelophysis*) *shukuborensis* n. sp. Paratype, Reg. No. JC1500003 ×7, Loc. Same as above.

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Fig. 12. *Eocylichna affabilis* (YOKOYAMA), ×2, Loc. I 373(Agi, Agi-mura, Ena-gun, Gifu Pref.). 180

Fig. 13. *Volvulella yamauchii* n. sp., Holotype, Reg. No. JC1500006, ×3, Loc. M 20(Shukubora, Hiyoshi-cho, Mizunami City)..... 178

Fig. 14. *Volvulella yamauchii* n. sp., Paratype, Reg. No. JC1500007, ×3, Loc. Same as above. 178

Figs. 15a, b. *Eocylichna habei* n. sp., Holotype, Reg. No. JC1500008, ×7, Loc. Same as above. 179

Figs. 16a, b. *Eocylichna tokiensis* n. sp., Holotype, Reg. No. JC1500010, ×5, Loc. Same as above. 180

Fig. 17. *Volvulella* sp., ×5, Loc. M 31-1(Kamigiri, Toki City, Gufu Pref.). 179

Fig. 18. *Cylichna* sp. indet., ×3, Loc. I 113(Kijiri, Iwamura-cho, Gifu Pref.). 181

Figs. 19a, b. *Decorifer ena* n. sp. Holotype, Reg. No. JC1300163, × 5, Loc. I 246(Nakanishi, Yamaoka-cho, Ena-gun, Gifu Pref.). 181

Fig. 20. *Eocylichna affabilis* (YOKOYAMA), × 3, Loc. M 32-1 (Kujiri, Toki City, Gifu Pref.).

Fig. 21. *Eoscaphander corpulenta* (YOKOYAMA), × 1, Loc. I. 111 (Kamigiri, Iwamura-cho, Ena-gun, Gifu Pref.). 179

Vicaryella ishiiana (YOKOYAMA), *Cerithium kancharai* FUJITA and OGOSE, (4)-b. same with the associated fossils of *Eocylichna tokiensis* n. sp., (4)-c. *Turritella s-hataii* NOMURA, *Euspira meisensis* MAKIYAMA, *Protorotella depressa* MAKIYAMA, *Tapes siratoriensis* (OTUKA), *Nipponomarcia nakamurai* IKEBE.

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All of the type specimens are preserved in the collection of the Institute of Geology and Mineralogy, Kyoto University.

PROCEEDINGS OF THE PALAEONTOLOGICAL SOCIETY OF JAPAN

「日本古生物学会第68会例会」1957年11月30日九州大学理学部地質学教室に於いて開催した(参会者13名)。例会に於ける講演者並びに講演題目は次の通りである。

1. On the phylogenetic problem of the so-called *Fusulina*. .....Kenichi Ishii
2. Fusulinids from the upper part of the Yayamadake Limestone in the Kuma Massif. .....Kametoshi Kanmera
3. Upper Permian and Triassic Myophoriidae from the Maizuru Zone, Southwest Japan (代読).....Keiji Nakazawa
4. 岩手県門の沢層産 *Lucina* について (代読) .....平山勝美・青木 滋
5. 宮崎層群産 Cardiidae .....首藤次男
6. 宮崎層群産 Olividae.....首藤次男
7. 山口県美禰層産 *Lobatannularia* について... .....今野円蔵・内藤源太朗
8. On the New Nymphaeacean Plants from the Omichidani Beds (Cretaceous System), Ishikawa Prefecture, Innerside of Central Japan (代読)...Hidekuni Matsuo
9. Occurrence of some Crustacean Footprint, *Sendaia tatsunokuchiensis* gen. et sp. nov. from the Neogene Tertiary of Japan (代読).....Rikizo Imaizumi


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CONSTITUTION
of the
PALAEONTOLOGICAL SOCIETY OF JAPAN

Article 1. The Society shall be known as the Palaeontological Society of Japan.

Article 2. The object of the Society is to promote the study and popularization of palaeontology and related sciences.

Article 3. The Society, to execute Article 2, shall undertake the following business:

1. Issue the Society journal and other publications.
2. Hold or sponsor scientific lectures and meetings.
3. Popularize the science by field trips, scientific lectures and other projects.

Article 4. To attain the object of the Society, the Society may, by decision of the General Meeting, establish within it research committees.

Article 5. The Society shall be composed of members who are active or interested in palaeontology or related sciences.

Article 6. The members shall be known as Regular Members, Fellows, Patrons and Honorary Members.

Article 7. Persons desiring membership in the Society are requested to fill out the necessary application forms and receive the approval of the Council.

Article 8. Fellows are persons who have held Regular Membership in the Society for more than ten years, have contributed to the science of palaeontology, have been nominated by five Fellows and approved by the Council.

Article 9. Patrons are organizations supporting Article 2 and recommended by the Council.

Article 10. Honorary Members are persons of distinguished achievement in palaeontology. They shall be recommended by the Council and approved by the General Meeting.

Article 11. The members of the Society shall be obliged to pay the annual dues stated in Article 12. Members shall enjoy the privilege of receiving the Society journal and participating in the activities stated under Article 3.

Article 12. The rates for annual dues shall be decided by the General Meeting. Rates for annual dues are: Regular Members, Yen 600; Fellows, Yen 1,000; and Foreign Members, $ 3.00, for which they will receive special publications in addition to the Society journal; Patrons are organizations donating more than Yen 10,000 annually; Honorary Members are free from obligations.

Article 13. The budget of the Society shall be from membership dues, donations and bestowals.

Article 14. The Society, by decision of the Council, may expel from membership persons who have failed to pay the annual dues or those who have disgraced the Society.

Article 15. The officers of the Society shall be composed of one President and fifteen Councillors, among whom several shall be Executive Councillors. The term of office is two years and they may be eligible for re-election without limitation. The President may appoint several persons who shall be Secretaries and Assistant Secretaries. An Executive Council shall be nominated and approved by the Council. Councillors shall be elected from Fellows by vote of returned mail unsigned ballot.

Article 16. The President shall be a Fellow nominated and approved by the Council. The President shall represent the Society and supervise the business affairs. The President may appoint a Vice-President when he is unable to perform his duties.

Article 17. The Society shall hold regularly one General Meeting a year. The President shall be Chairman and preside over the administrative affairs. The program for the General Meeting shall be decided by the Council. The President may call a special meeting when he deems it necessary. The General Meeting requires the attendence of more than ono-tenth of the members. The President shall call a Special Meeting at the written request of more than one-third of the members. The request shall be granted only if the written statement fully explains the reasons for assembly and items for discussion.

Article 18. Members unable to attend the General Meeting may give an attending member a written statement signed by himself trusting the bearer with the decision of business matters. Only one attending member may represent one absented.

Article 19. The decision of the General Meeting shall be by majority vote. When the number of votes is equal, the President shall cast the deciding vote.

Article 20. The President and Councillors shall compose the Council. The dicision of the General Meeting concerning administration shall be considered and implemented by the Council.

Article 21. The Executive Council shall carry out the decisions of the Council.

Article 22. The fiscal year of the Society shall begin on the first of January each year and end on the thirty-first of December of the same year.

Article 23. The amendments to the Constitution of the Society shall be decided at the General Meeting and must be approved by more than two-thirds of those members who are in attendance.

Addendum

1) Voting in the Council shall be by unsigned ballot.
2) This Constitution become effective on February 1, 1958.
3) Fellows indicated under Article 8 shall be determined this year (only) by the present Council.

日本古生物学会例会通知

	開催地	開催日	講演申込締切日
第69回例会	新潟大学	1958年4月26日	1958年3月31日
第70回例会	北海道大学	1958年6月6日	1958年5月20日
第71回例会	京都大学	1958年9月27日	1958年9月6日
1958年総会・年会	東京大学	1958年12月6,7日	1958年11月15日

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編集者 小林貞一
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購読申込は下記の賣捌店へ申込下さい
東京都千代田区神田神保町1丁目7
大久保書店
電話神田(29)3306番
振替口座東京109140番