This is the third report of studies on the pelecypods of the Sakamoto formation. The following 13 species of pelecypods including 8 new ones are described on this occasion:

*Opis (Trigonopis) torinosuensis* KIMURA

*Opis (Trigonopis) trigonalis* TAMURA. new species

*Opis (Coelops) tanourensis* TAMURA. new species

*Cobulda globosa* TAMURA. new species

*Lucina tsunoensis* KIMURA

*Eomiodon kumamotoensis* TAMURA. new species

"Eocalista" *regularis* TAMURA. new species

*Anisocardia* sp.

*Tancredia rostrata* TAMURA. new species

*Pleuromya ? punctostriata* TAMURA. new species

*Pholadomya ? ashiyakensis* TAMURA. new species

*Arcnomya* sp.

*Goniomya* sp.

For stratigraphical notes the reader is referred to the first report (1950-1).

The writer wishes his hearty thanks to Prof. T. KOBAYASHI of the Univ. of Tokyo for his untiring guidance and to Mr. I. HAYAMI of the Univ. for his assistances in laboratory works.

**Family Astartidae**

**Genus Opis** DEFRAunce, 1825

**Subgenus Trigonopis** MUNIER-CHALMAS. 1887

*Opis (Trigonopis) torinosuensis* KIMURA


1956. *Opis (Trigonopis) torinosuensis* KIMURA. p. 87. pl. 1. fig. 10.

Several well preserved specimens, though partly deformed, are allied to this species. The Sakamoto form is longer relative to height and is larger and wider than the Torinosu form. Umbonal inflation is distinct in the Sakamoto form.

**Measurements:**

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Occurrence: Locs. 1, 4, 6, 8.

Opis (Trigonopis) trigonalis Tamura, new species
Plate 12, Figures 14-16.

Description:—Shell small in size, probably subequivalve, very inequilateral, prominently convex, much longer than high; postero-ventral margin obliquely elongated; umbo at about 1/4 from anterior end, prosogyrate and a little incurved; posterior and ventral margins long and nearly straight or slightly rounded; anterior margin short and arcuate; lunule short but distinct; surface ornamented with fine and numerous concentric striae; cardinal tooth strong and fang-like in right valve; probably two cardinals in left valve; flat belt along ventral margin narrow; internal margin denticulate; adductor impressions clearly impressed on flat belt of margin; posterior one twice as large as anterior.

Measurements:—

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<td>3</td>
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Observation:—There are several specimens of internal and external moulds. The elongate trigonal form is unusual. The hinge area can not well seen because of the inflated umbo in the internal mould.

Comparison:—Some deformed specimens of Corbula globosa are similar to this species but more globose and have distinct rostrum. The internal marginal denticulation is absent in globosa. This species is distinct from Opis (Trigonopis) torinosuensis by its low shape of the shell.

Occurrence: Locs. 1, 4, 6.

Opis (Coelopis) tanourensis Tamura, new species
Plate 12, Figures 5-7.

Description:—Shell small (L: 5.5 mm, H: 6.0 mm in holotype), trigonal, inflated, slightly longer than high or as long as high; posterior margin straight; anterior margin concave; ventral margin rounded; umbo sub-median or slightly anterior, prosogyrate and strongly incurved; lunule deeply excavated, cordate, bounded by angulation, divided by median groove, smooth; escutcheon defined by angulation, small and indistinct; surface ornamented by about 30 elevated concentric ribs which are regularly disposed and much narrower than their interspaces; internal margin not crenulate. A steep tooth below umbo in right valve.

Observation and Comparison:—Several specimens of internal and external moulds at hand. The lunule and escutcheon are strongly depressed and bounded by two carina-like angulations. The angulations become steep ridges but not carina. The absence of carina, bisected lunule and lanceolate escutcheon are distinct specific characters.

This resembles Opis (Trigonopis) corni lina Damon (Arkell, 1932) at a glance in surface ornaments. It is distinguished from that species by its distinct deep lunule and lack of distinct carina.

Occurrence: Locs. 4, 11.

Family Erodonidae

Genus Corbula Bruguière, 1797

Corbula globosa Tamura, new species
Plate 12, Figures 1-4.

Description:—Shell small for genus,
prominently inflated, globose, inequilateral, nearly equivalve, trigonally ovate in outline; anterior margin short, nearly straight or a little arcuate; posterior margin long and rostrate; ventral margin a little rounded or nearly straight; umbo at about anterior 1/4, slightly incurved, prosogyrate and indistinct; sharp carina bounding depressed posterior area; surface with fine, fairly regular concentric ridges distinct on antero-ventral side but obscure in other part; a strong fang-like cardinal tooth in right valve and a socket in left valve; marginal flat belt distinct, nearly parallel to shell margin; adductor scars strongly impressed on flat belt in which posterior one is much stronger than anterior.

**Measurements:**

<table>
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<td>3.0</td>
<td>1.5</td>
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**Observation:**—Many external and internal moulds of both valves are variable in shape, although some are more or less deformed. It is noteworthy that the H/L and Th/L ratios are larger in small forms than in large form. This means that the shell becomes less inflated and rostrum is more distinct in large form (probably adult form) than in the small form (probably young form).

**Comparison:**—The internal wide belt along the shell margin and the rostrum are characteristics of this species. *Corbula istilensis* Lyc. (Mor. and Lyc. 1853, pl. 37, fig. 7) is closely related to this species but the umbo is more anterior in the latter than in the former. Another similar species is *Corbula borneensis* Vogel from Borneo (Vogel, 1896), but in *borneensis* the position of umbo is nearly mesial or slightly anterior and the flat belt is not so wide as in *globosa*. *Corbula daghaniensis* Cox from Callovian of Somaliland (Cox, 1935) is closely alike to this species but in the latter the rostrum is more developed and the umbo not so elevated.

**Occurrence:**—Locs. 4, 5, 11, 12.

**Family Lucinidae**

**Genus Lucina Bruguier, 1797**

*Lucina tsunoensis* Kimura

Plate 12. Figures 21, 22.


Fine concentric ridges are fairly regularly disposed and about 18 in number. Some specimen from Tsurubami is large (20 mm long and 14 mm high) for the species and shows elongate outline. *Lucina s. str.* in recent taxonomy has no teeth but *Lucina s. l.* in this paper includes the one having teeth.

**Occurrence:**—Locs. 6, 11.

**Family Neomiodontidae**

**Genus Eomiodon Cox, 1935**

*Eomiodon kemamotoensis* Tamura, new species

Plate 12. Figures 17, 18.

**Description:**—Shell medium to small for genus, fairly convex, inequilateral, somewhat quadrate and higher than long: umbo distinct, a little prosogyrate and placed at a little anterior to center; postero-dorsal margin a little rounded; antero-dorsal slightly concave; ventral rounded; lunule depressed and distinct; posterior surface bounded by obtuse
carina-like angulation, a little depressed; surface covered by 9 concentric regularly disposed ridges; 2 diverging cardinal teeth and an anterior short lateral tooth seen in left valve.

Measurements:

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<td>9.5</td>
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Observation:—There are a few internal and external moulds of both valves, but the hinge area is poorly preserved and any precise observation is difficult. The posterior cardinal tooth is much stronger than anterior one in left valve. The posterior depression on surface happen to be impressed on an internal mould (Fig. 13) and the carina is distinct.

Comparison:—This is closely allied to Astarte allissima Cox (1935) from Somalia Jurassic in external characters, but in the latter the internal margin is denticulate as in many Astarte. Eomiodon vulgaris Hayami (1958) from the Liassic Kuruma group is somewhat similar to this but the concentric ribs of this are more regular, smaller in number. The shell of vulgaris is more elongated than this.

Occurrence:—Locs. 4, 6.

Genus Eocallista Douvillé, 1912

"Eocallista" regularis TAMURA, new species

Plate 12. Figures 8-10.

Description:—Shell of medium size (L: 26 mm, H: 20 mm), inequilateral, moderately convex, ovate and longer than high; umbonal region slightly inflated; umbo a little anterior to center, prosogyrate, a little projected above hinge margin; postero-dorsal outline rounded; posterior portion expanded and postero-dorsal outline sloping down to rounded postero-ventral margin; ventral margin slightly rounded; anterior margin rounded and convex, its most anterior part at about the mid-height; antero-dorsal margin excavated; surface ornamented with about 40 fairly regular fine grooves; in right valve 1 well developed, 3b long and not bifid, Al and P1 present (See Text-fig. 1).

Observation:—The holotype left valve is represented by an internal and external mould. Its hinge structure belongs to the Cyprinidae and is similar to one of Eocallista. In Eocallista, however, 1 is not apart from Al (Cox, 1947). This is more developed in hinge than Eocallista but 3a is invisible.

Comparison:—An undifferentiated tooth of 1 and fairly regular concentric fine grooves are characteristic of the species. Eomiodon kumanomotoensis TAMURA and Lucina tsu thermoensis Kimura have fine, concentric, regularly disposed ridges. These ornaments are somewhat similar to those of this species, but they are different in other characters.

Occurrence:—Loc. 5.

Text-Figures 1, 2, 3.

Fig. 1. Hinge structure of a right valve of "Eocallista" regularis TAMURA, new species.
Fig. 2. Hinge structure of a left valve of Anisocorda sp.
Fig. 3. Hinge structure of a right valve of Tancredia elongata TAMURA, new species.
Genus *Anisocardia* Munier-Chalmas, 1863

*Anisocardia* sp.


**Description:**—Shell small to medium for genus, moderately inflated, slightly inequilateral, elongately subrectangular in outline; dorsal margin nearly straight, almost parallel to ventral margin, anterior and posterior margins slightly rounded and posterior one longer than anterior; umbo fairly elevated, a little projected beyond hinge margin, prosogyrate and slightly incurved, situated nearly mesial; lunule fairly deep but small; carina from umbo to postero-ventral margin sharp and distinct; surface ornaments unknown.

**Measurements:**—

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<td>L</td>
<td>18</td>
<td>14</td>
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**Observation:**—Represented by two internal moulds of left valves having Anisocardian hinge (see Text-fig. 2). It somewhat resembles *Anisocardia elegans* Munier-Chalmas in hinge structure (Cox, 1947), but more or less deviates from the latter. The specimens are more or less deformed and the carina in Fig. 15 is strengthened by deformation. The external characters are unknown.

**Comparison:**—The fairly long and straight dorsal margin is characteristic of this species. *Anisocardia williamsoni* Cox from Scarborough Limestone in England (Cox, 1947) resembles this species in general form but the umbo is more elevated in the former.

**Occurrence:**—Loc. 4.

Family Tancrediiidae

Genus *Tancredia* LyceTT, 1850

*Tancredia rostrata* Tamura,

Plate 12, Figure 23.

**Description:**—Shell medium for genus (28 mm long, 14 mm high), slightly convex, highly inequilateral, ovately subtrigonal and much longer than high; umbo central, slightly prosogyrate, contiguous; antero-dorsal margin a little arcuate, somewhat acutely tapering; anterior extremity forming an angle of about 50° and a little higher from the midheight; postero-dorsal margin slightly rounded but angulate in middle part and shouldered; posterior extremity somewhat angulate at junction with ventral margin, at a little above midheight; ventral margin rounded; surface smooth except for fine growth-lines; a cardinal tooth below umbo in each valve oblique; lateral tooth in left valve short; probably two laterals on right valve.

**Comparison:**—The outline and hinge structure in Infra-Liasic species of *Hettangia* by Terquem which are now included in *Tancredia* has angular outline and shouldered posterior-dorsal margin (Terquem, 1855). In outline, this species is very elongate and acutely tapering anteriorly. The positions of both shell exteriors are at a little higher than the midheight. These are distinction of this species from other species of *Tancredia."

**Occurrence:**—These specimens from Locs. 6, 12.

Family Pleuromyidae

Genus *Pleuromya* Agassiz, 1843

*Pleuromya ? punctostriae* Tamura, new species

Plate 12, Figures 29-32.
Description.—Shell medium to small for genus (Holotype: 34 mm long, 25 mm high), depressed, inequilateral, somewhat rectangular or ovate in outline and gaping posteriorly: umbo at about anterior 1/4, not distinct, orthogyrate: posterior dorsal margin truncated or slightly rounded: posterior margin rounded and a little produced: ventral nearly parallel to dorsal margins and rounded: wrinkles on surface fairly regular and concentric: radial rows of minute granules very numerous on surface: hinge unknown.

Observation.—Several internal and external moulds of both valves are suffered from deformation. Figs. 29-31 are depressed laterally and Fig. 32 vertically. The posterior gape and the distinct carina of Fig. 32 are strongly exaggerated by deformation. As the hinge structure is invisible from the specimens at hand, it is difficult to say whether this belongs to Pleuronyya or to Homomya. Judging from the modification of granulated surface of the Myacids (Morris and Lyckett, 1853), this belongs rather to Pleuronyya than Homomya.

Comparison.—Homomya hortulana Ag. from the Portlandian of Porrentruy (Agassiz, 1840) resembles this species in concentric wrinkles on surface and general outline. But in the strong inflation of the shell this is difference from the depressed form of P. punctostriatae.

Occurrence.—Loc. 4.

Family Pholadomyidae

Genus Pholadomya G. B. Sowerby, 1825

Pholadomya ? ashikitensis TAMURA, new species

Plate 12, Figures 26, 27.

Description.—Shell medium to small for genus, fairly convex, equivate, inequilateral, trigonal in outline: umbo situated nearly posterior end, nearly orthogyrate, not inflated: postero-dorsal margin a little arcuate and long: anterior margin slightly rounded, ventral margin rounded: posterior area depressed: surface ornamented with about 12 discontinuous radial ribs or rows of tubercles but absent on anterior side: growth-lines coarse on ventral side: hinge unknown: test thick.

Measurements:—

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<td>R.</td>
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Observation.—This species resembles the Trigoninae in its trigonal form and its thick test (2 mm in the holotype specimen). The posterior margin is absent and the postero-dorsal margin directly joins with the ventral one. The hinge structure is invisible but probably not of the Trigoninae. The fine radial ribs or radial rows of tubercles are very similar to those of Pholadomya. So the writer includes this species in Pholadomya. On the ventral side, tubercles are more distinct than in other part, especially at junction with concentric lines of growth.

Comparison.—This is distinctly different from other Jurassic species by its trigonal shape and its discontinuous radial ribs, judging from the materials available for the writer.

Occurrence.—Loc. 12.

Genus Arcomya Agassiz, 1843

Arcomya ? sp.

Plate 12, Figures 24, 25.

Two deformed internal moulds of left
Explanation of Plate 12

*Corbula globosa* TAMURA, new species

Fig. 1. Plaster cast of the external mould of the holotype right valve; Loc. 4. ×2. (MM 3093)

Figs. 2, 3. Internal moulds of left valves; Loc. 5. ×3. (MM 3094, 95).

Fig. 4. Internal mould of a left valve; Loc. 12. ×3. (MM 3097).

*Opis (Coelopis) tanourensis* TAMURA, new species

Fig. 5. Clay cast of the external mould of the holotype left valve; Loc. 12. ×3. (MM 3091).

Figs. 6, 7. Internal moulds of the holotype left valve: side view (Fig. 6) and anterior view (Fig. 7); Loc. 11. ×3. (MM 3091).

*Eocallista" regularis* TAMURA, new species

Figs. 8, 9. Clay cast of the external mould and internal mould of the broken holotype left valve; Loc. 5. ×1. (MM 3107).

Fig. 10. Internal mould of the holotype left valve: ×1.5.

*Opis (Trigonopis) torinosensis* KIMURA

Fig. 11. Right valve; Loc. 6. ×1. (MM 3087).

Fig. 12. Internal mould of a left valve; Loc. 6. ×1.5. (MM 3089).

Fig. 13. Internal mould of a right valve; Loc. 6. ×1. (MM 3088).

*Opis (Trigonopis) trigonalis* TAMURA, new species

Fig. 14. Left valve; Loc. 6. ×2. (MM 3098).

Fig. 15. Internal mould of the holotype left valve; Loc. 4. ×2. (MM 3099).

Fig. 16. Internal mould of a left valve; Loc. 4. ×2. (MM 3100).

*Eomiodon kumantatoensis* TAMURA, new species

Fig. 17. Internal mould of a right valve; Loc. 4. ×3. (MM 3104).

Fig. 18. Plaster cast of the external mould of the holotype left valve; Loc. 6. ×2. (MM 3105).

*Anisocardia* sp.

Figs. 19, 20. Internal moulds of left valves; Loc. 4. ×2. (MM 3109, 08).

*Tancredia rostrata* TAMURA, new species

Fig. 23. Internal mould of the holotype left valve; Loc. 6. ×1. (MM 3110).

*Lucina tsunouensis* KIMURA

Fig. 21. Clay cast of the external of a left valve; Loc. 11. ×3. (MM 3402).

Fig. 22. Left valve; Loc. 6. ×1.5. (MM 3103).

*Arcomyu* ? sp.

Figs. 24, 25. Internal moulds of left valves; Locs. 11 (Fig. 24), 4 (Fig. 25). ×2. (MM 3121, 22).

*Pholadomya ? ashkitensis* TAMURA, new species

Figs. 26, 27. Internal mould and the modeling cast of the external mould of the holotype right valve; Loc. 12. ×1. (MM 3119).

*Goniomya* sp.

Fig. 28. External mould of the fragment of a right valve?; Loc. 4. ×1. (MM 3123).

*Pleuromya ? punctostriae* TAMURA, new species

Fig. 29. Internal mould of a right valve; Loc. 4. ×1. (MM 3112).

Figs. 30, 31. Plaster cast of a external mould and internal mould of the holotype right valve; Loc. 4. ×1. (MM 3113).

Fig. 32. Internal mould of a bivalved shell: posterior view; Loc. 4. ×1.5. (MM 3114).

All specimens here described are stored in the Geol. Inst., Univ. of Tokyo.
valves at hand are probably included into Arcomya due to its general resemblance to Arcomya and the lack of tooth.

Shell small, inequilateral, a little convex, elongately ovate in outline; umbo a little anterior to middle, incurred and presogyrate; posterior and ventral margins rounded but posterior produced posteriorly; anterior dorsal margin excavated; anterior margin truncated.

Occurrence:—Locs. 4, 12.

Genus Goniomya Agassiz, 1838

Goniomya sp.
Plate 12. Figure 28.

Two fragments showing characteristic V-shaped ornament of Goniomya are at hand.

References cited


