279. A NEW FOSSIL CHLAMYs FROM THE ENVIRONS OF UTSUNOMIYA CITY, JAPAN

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Introduction and Acknowledgements

During his geological studies in the northern border of Utsunomiya City, Tochigi Prefecture, the junior writer collected several interesting fossil scallops in association with other molluscan shells from a tuffaceous sandstone at Niiya, Tawara-mura, Kawachi-gun, Tochigi Prefecture. Of those scallops, the one herein described as new to science also occurs among the collection of fossil scallops obtained by the senior writer from a medium- to coarse-grained sandstone of the Oido formation at Oido, Wakuya-machi, Tôda-gun, Miyagi Prefecture.

As the result of comparative study of these geographically remote specimens it was found that they represent a new species to which the present article is devoted.

Acknowledgements are due to Dr. Kotoro HATAI of the Department of Geology, College of Education, Tohoku University, for kindly supervising the present work.

Geological Notes

The stratigraphy of the Tertiary strata developed in the northern border of Utsunomiya City, was classified into the following formations by the junior writer, from upper to lower:

Ôzo formation:—Consisting of light gray, tuffaceous, fine grained sandstone and siltstone with nodules, in which lenticular conglomerate is intercalated. Mollusca, Foraminifera and Echinoida are abundant.

Yamamoto formation:—Consisting of yellowish brown, tuffaceous coarse-grained sandstone, in which is intercalated hard sandstone, tuff breccia, tuffaceous conglomeratic sandstone and massive tuffaceous siltstone.

* Read Oct. 9, 1954; received July 20, 1955.
Molluscan shells and shark's teeth occur.

Nagaoka formation:—Consisting of light gray, massive pumiceous tuff. In the northern part of the area the pumiceous tuff laterally changes into brecciated tuff in which is intercalated pebbly conglomerate and tuffaceous coarse-grained sandstone. Molluscan shells occur in the sandstone.

Yokoyama formation:—Consisting of massive pumiceous tuff, brecciated tuff and an alternation of tuffaceous sandstone and siltstone.

Ôya formation:—Consisting of basal conglomerate, massive pumiceous tuff, brecciated tuff and pumiceous fine-grained tuff, and intercalating and alternation of tuffaceous sandstone and siltstone with some molluscan shells. Kazamiyama andesite (two pyroxene-andesite) interfingers with the lower part of this formation.

Kogashi older rocks:—Consisting of slate, sandstone, chert and quartz-porphyry.

The fossil scallop described in this article was collected from the Nagaoka formation in association with such molluscan shells as Acila sp., Mytilus gigantis HOIMBERG, Cryptopecten yanagawaiensis (NOMURA and ZINBO), Chlamys cf. misataiensis OTUKA, Cardium n. sp., Cardium sp., Trachycardium shiobaraseae (YOKOYAMA), Dosinia anguloides NOMURA, and Nautilus sp.

Studies on the stratigraphy of this area are being continued by the junior writer, and the details will be published by him at another opportunity.

Description

Family Pectinidae

Subfamily Pectininae

Genus Chlamys (BOLTEN) RÖDING, 1798

Chlamys hataii MASUDA and AKUTSU, n. sp.

Pl. 20, figs. 1-6.

Shell moderate in size, rather thick, moderately inflated, orbicular, equilateral except for auricles; valves radiately ribbed; pointed at top, forming an angle of about 90°.

Right valve with about 20 elevated, squarish, round-topped, smooth radial ribs and fine intercalary threads; radial ribs wider than interspaces on the upper half of disc and tend to become subequal in breadth near the ventral margin, usually they bifurcate at about middle part of disc, and become a little imbricated at lower half; intercalary threads usually appear at upper half of disc, and are a little imbricated near margin; anterior auricle larger than posterior, furnished with deep byssal notch and more or less wide byssal area, and imbricately ornamented with several radial threads and concentric lines; posterior with a greater number of radial threads than anterior. Left valve nearly equally convex or very slightly more convex than the right and with sculpture similar to that of the right, though the radial threads are less imbricated than the right. Hinge of right valve with ctenolium, distinct cardinal crura and rather deep resilial pit provided with lateral ridges which have straight borders, acutely pointed apically, and rapid-
ly widening vertically. Internal surface nearly smooth, except for characteristic marginal serration.

**Dimensions (in mm.):**

<table>
<thead>
<tr>
<th>Valve</th>
<th>Right*</th>
<th>Right</th>
<th>Left</th>
<th>Left</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>54.2</td>
<td>55.0</td>
<td>34.2</td>
<td>65.0</td>
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<td>52.0</td>
<td>33.4</td>
<td>57.5</td>
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<td>Hinge-length</td>
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<td>28.8</td>
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<td>30.0</td>
<td>33.0</td>
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<tr>
<td>Depth</td>
<td>10.7</td>
<td>18.3</td>
<td>13.0</td>
<td>9.6</td>
<td></td>
</tr>
</tbody>
</table>

* Holotype specimen.

**Type locality and geological horizon:** Niiya, Tawara-mura, Kawachi-gun, Tochigi Prefecture (lat. 36°37'39" N., long. 139°54'06" E.). Nagaoka formation. Miocene (Early).

**Repository:** Department of Geology, College of Education, Tohoku University, Sendai, Japan. Reg. No. 1370 (Holotype).

**Remarks:** This species is named in honor of Dr. Kotora HATAI of the Tohoku University.

This species is characterized by having about 20 elevated, squarish, round-topped, smooth radial ribs, which are wider than the interspaces in breadth at the upper half of disc, a little imbricated with bi- or tri- or very rarely quadrifurcated radial ribs at lower half of disc, slightly imbricated, fine intercalary threads, deep byssal notch, distinct cardinal crura, conspicuous lateral ridges of resilial pit, and characteristic marginal serration in the right valve. The left valve is characterized by having the sculpture similar to that of the right valve.

Although the specimens collected from the Miocene Oido formation at Oido, Wakuya-machi, Tôda-gun, Miyagi Prefecture, are much smaller than the type specimens, with obtuse network and usually smaller proportion of shell height to hinge-length, their external sculpture are similar to *hataii* (Figs. 7–9). So, it is open to question whether those specimens can be identified with the type specimens of *hataii*. Further material are necessary to settle this problem.

This species is closely related to *Pecten insolitus* YOKOYAMA (YOKOYAMA, 1925, p. 18, pl. 5, fig. 3) by having a small shell, about 20 subequal, broad and squarish radial ribs, and an intercalary thread in their interspaces. YOKOYAMA's species was based upon a single right valve, which is said to have been collected from the Shigarami formation at Shimosoyama, Shigarami-mura, Kami-Minochi-gun, Nagan Prefecture. But YOKOYAMA's species differs from the present one by the smaller shell, undivided radial ribs, and hardly developed byssal notch. *Chlamys meisensis* (MARIYAMA) (MARIYAMA, 1926, p. 136, pl. 13, fig. 4) from the Miocene Bankôdo formation of Korea, is another related species, but it differs from the present specimens by the more inflated left valve and a greater number of radial ribs (23 to 27).

**Chlamys akitana** (YOKOYAMA) and *Chlamys nisataiensis* OTUKA (MASUDA, 1954, pp. 111–116, pl. 12, figs. 1–17) resemble the present species, but they can be distinguished from *hataii* by the greater number of radial ribs (23 to 25), rare occurrence of intercalary thread in the right valve in *akitana*, and the rather compressed shell, greater number of (25 to 32) and less elevated radial ribs in *nisataiensis*. *Chlamys jordani* (ARNOLD) (ARNOLD, 1906, p. 114, pl. 44, figs. 1, 1a–b) described from the Pliocene and Pleistocene formations of California also resembles this species, but it is distinguishable from the present new species, by the greater number of radial ribs (23 to 25), absence of intercalary threads in the right valve, lack of bifurcation of the radial ribs of the left valve.
References


Explanation of Plate 20

Figs. 1a-b. Chlamys hataii MASUDA and AKUTSU, n. sp. Holotype, Reg. No. 1370.
   a. Right valve, × 1.

Fig. 2. Chlamys hataii MASUDA and AKUTSU, n. sp. Paratype, Reg. No. 1367. Right valve, × 1. Loc. Same as above.

Fig. 3. Chlamys hataii MASUDA and AKUTSU, n. sp. Paratype, Reg. No. 1368. Right valve, × 1.

Figs. 4a-b. Chlamys hataii MASUDA and AKUTSU, n. sp. Paratype, Reg. No. 1376.
   a. Right valve, × 1.
   b. Internal view of 4a, × 1. Loc. Same as above.

Fig. 5. Chlamys hataii MASUDA and AKUTSU, n. sp. Paratype, Reg. No. 1368. Left valve, × 1. Loc. Same as above.

Figs. 6a-b. Chlamys hataii MASUDA and AKUTSU, n. sp. Paratype, Reg. No. 1376.
   a. Left valve, × 1.
   b. Hinge area of 6a, × 1. Loc. Same as above.

Figs. 7a-b. Chlamys cf. hataii MASUDA and AKUTSU, Reg. No. 2616.
   a. Right valve, × 1.

Figs. 8a-b. Chlamys cf. hataii MASUDA and AKUTSU, Reg. No. 1378.
   a. Right valve, × 1.
   b. Internal view of 8a, × 1. Loc. Same as above.

Figs. 9a-b. Chlamys cf. hataii MASUDA and AKUTSU, Reg. No. 2616.
   a. Right valve, × 1.
   b. Left valve, × 1. Loc. Same as above.