320. **RADULONECTITES, A NEW PECTINID GENUS, FROM THE LIASSIC KURUMA GROUP IN CENTRAL JAPAN**

(Studies on the Liassic Pelecypods in Japan, 4)

**ITARU HAYAMI**

Geological Institute, University of Tokyo

---

In this paper the writer proposes *Radulonectites* as a distinct pectinid genus. Before its description the writer expresses his sincere thanks to Prof. T. Kobayashi of the University of Tokyo for the privilege of studying his collection and the supervision of this manuscript.

**Family Pectinidae LAMARCK**

**Genus Radulonectites HAYAMI, new genus**

*Type species:* — *Radulonectites japonicus* HAYAMI, n. sp., Lias, Central Japan.

*Diagnosis:* — Shell highly inequivalve, inequilateral in right valve, acarine or slightly opisthocl ine in mature, more or less higher than long; left valve more convex than right; antero-dorsal margin of shell-body profoundly sinuated in right valve, but the sinuation is shallow in left; byssal notch very deep; auricles well defined in each valve; right anterior one protruded forwards as in *Chlamys*, while others are subtrigonal and obtusely truncated at the extremities; almost straight radial grooves appear at first in middle stage, never bifurcate and gradually strengthened; umbonal region almost smooth except for faint concentric lines of growth.

*Remarks:* — *Radulonectites* is characterized by the *Pleuronectites*-like outline and radial grooves in adult stage.

In this paper the writer proposes *Radulonectites* as a distinct pectinid genus. Before its description the writer expresses his sincere thanks to Prof. T. Kobayashi of the University of Tokyo for the privilege of studying his collection and the supervision of this manuscript.

---

*Received Dec. 1, 1956; read Feb. 9, 1957.*
In this type species the intervals among radial grooves look like Chlamys' radial costae, but a close examination soon proves that the smooth surface is curved by radial grooves which appear in middle stage and develop in mature stage. Incidentally, radial ribs, if present, diverge from the very umbones, and shells are almost equilateral exclusive of auricles in many species of Chlamys.

In outline the type species is fairly similar to Pluronectites laevigatus (Schlotheim) (Philippi, 1900; Diener, 1925; Schmidt, 1928) from the Lower Muschelkalk in Germany, which has also a highly inequivalve shell, profound byssal notch and sigmoidal antero-dorsal margin of right valve. In that species, however, the surface is quite smooth except for fine concentric lines of growth.

Pluronectites laterestriatus (Philippi) (1899; Schmidt, 1928), also from the Lower Muschelkalk, has a left valve of similar outline and fine radial striae in the antero-ventral side. That species was referred to Streblopteria McCoy by Philippi (1899) and is regarded as an abnormal species of Pluronectites by Amano (1955). Streblopteria McCoy (1851) was thoroughly discussed by Newell (1937) as a late Palaeozoic genus of the Aviculopectinidae. Judging from the well defined auricles, deep byssal notch and literally partial ornaments, laterestriatus is referable to neither Streblopteria nor Pluronectites but to this genus.

Streblochondria Newell (1937) is characterized by the lattice ornamentation in the umbal area, nearly equivale and poorly defined posterior auricles, although it looks sometimes close to this genus in outline.

Unfortunately, neither hinge structure nor musculature is known in the type species. Therefore, it is indeterminable directly from internal characters whether this genus belongs actually to the Pectinidae or to some other more primitive family. Ctenolia are often met with in Pluronectites, and a clear inner resiliniter is illustrated in P. laevigatus by Schmidt (1928). Because Pluronectites seems the most intimate relative to this genus among the above-mentioned Palaeozoic or Mesozoic pectinids, this may belong to the Pectinidae.

List of species:
1. Pluronectites japonicus Hayami, Liassic, Central Japan.
2. Pluronectites laterestriatus Philippi (1899; Schmidt, 1928), Lower Muschelkalk, Germany.

The following species are similar to this genus, though the generic references cannot be warranted.
5. Chlamys sp. Dietrich (1933, pl. 8, fig. 130), Tendagururusichten, S. E. Africa.
6. Chlamys sp. Dechaseaux (1936, pl. 4, fig. 6), Bajocian, Paris Basin.

Radulonectites japonicus Hayami, n. sp.
Plate 16, Figures 1-7.

Description:–Shell highly inequivalve, inequilateral especially in right valve, slightly opisthoclone, higher than long. Pluronectites-like in outline; posterior area develops more than anterior; left valve moderately convex but the convexity of right one is weak; hinge-margin straight; in right valve antero-dorsal margin of shell-body remarkably sigmoidal but not so much in left; postero-dorsal one almost straight in
Radulonectites, a New Pectinid Genus, from the Liassic Kuruma Group

Each valve; ventral one gently arcuate, passing into postero-dorsal one, but incurving somewhat abruptly at the junction with antero-dorsal one in right valve; umbo fairly pointed, located slightly posteriorly and scarcely rising above hinge-margin even in left valve; apical angle about 110 degrees in adult stage, but it is much smaller in juvenalia; auricles large, well defined; right anterior one protruded forwards, linguiform, supported by a triangular auricular sulcus below; left anterior one fairly convex, slightly undulated, truncated subvertically; posterior one depressed, triangular, truncated with an obtuse angle of 120 degrees or more at the extremity in each valve, but its posterior margin slightly concave in left valve and feebly convex in right; both valves similarly ornamented with 65 to 70 almost straight radial grooves in maturity, although umbonal region is smooth except for faint concentric lines of growth; radial grooves unbranching, curving slightly outwards in anterior part, broadened gradually, almost as wide as their interspaces near ventral periphery; auricles sculptured also by several weak radials in adults except for right anterior one; ventral side and auricles marked with strong concentric lines of growth; ctenolium, resilifer and muscle system unknown.

<table>
<thead>
<tr>
<th>Measurement in mm.</th>
<th>Length</th>
<th>Height</th>
<th>Thickness</th>
<th>Apical angle*</th>
<th>Grooves**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holotype (MM 2689) bivalved</td>
<td>45.5</td>
<td>50.0</td>
<td>8.5</td>
<td>110</td>
<td>67</td>
</tr>
<tr>
<td>Paratype (MM 2690) right valve</td>
<td>42.0</td>
<td>47.0</td>
<td>5.0</td>
<td>105†</td>
<td>66</td>
</tr>
<tr>
<td>Paratype (MM 2691) right valve</td>
<td>30.5</td>
<td>34.0</td>
<td>4.5</td>
<td>95†</td>
<td>68</td>
</tr>
<tr>
<td>(MM 2692) juvenile right valve</td>
<td>17.0</td>
<td>19.0</td>
<td>2.5</td>
<td>95†</td>
<td>12</td>
</tr>
</tbody>
</table>

Observation:— Many right valves and three bivalved specimens are at hand. The holotype (Figs. 2a, 2b, 2d) and adult paratype (Fig. 1a) are more or less compressed secondarily, but they show the outline and ornamentation in adult stage of this species. The aspects of the middle and early stages are represented respectively by a paratype (Fig. 6a) and a small right valve (Figs. 3a, 3b).

The juvenile shell is acline to slightly prosocline and somewhat Chlamys-like in outline. Its apical angle is comparatively small due to the sinuation of the antero-dorsal margin of the shell-body. The byssal auricle is fairly large, if compared with those of adults, and ornamented with two or three radial ribs which become obsolete later.

The surface of shell-body is almost smooth, and radial grooves appear, if present, very narrow, small in number and restricted to the antero-ventral side. It shows that radial grooves appear earlier in the antero-ventral than in the other part.

The shell-surface is liable to exfoliate, but the characteristic ornaments are completely preserved on the external moulds of three type specimens (Figs. 1b, 2c, 6b). None of artificial internal moulds*** reveals either resilifer or

* Maximum umbonal angle between antero-dorsal and postero-dorsal margins of shell-body.
** Number of radial grooves on the shell-body exclusive of auricles.
*** NEWELL (1937) calls such a specimen a subinternal mould.
muscle system. It may be primarily due to the complete erosion of inner aragonite layers on which those internal organs adhered.

Comparison:--The holotype left valve (Fig. 2b) is very similar to that of *Pleuronectites laterestriatus* (Philippi) (1899; Schmidt, 1928) in outline and radial grooves, but the radial striations are much finer and more partial in *laterestriatus* than in this species. That species is possibly a collateral ancestor to this species, although the right valve is fairly different in outline.

*Pecten* (Camplonectes) *lens* Leanza (1942) (non Sowerby) is another intimate species to this, judging from its ornamentation. But that species is different from this in the more Chlamys-like outline i.e. less sinuated antero-dorsal margin of shell-body and denser radial striae.

Chlamys sp. by Dechaseaux (1936, pl. 4, fig. 6) has a similar outline to the smaller paratype (Fig. 6a), although radial ornaments are entirely absent in that form. If it is a juvenarium, the French form may be more or less related to this.

Occurrence:--Common in the Liassic Kuruma group at Kuruma and Tsuchizawa in Kitaojiri-mura, Kitaazumi-gun, Nagano Prefecture (Province of Shinano).

**Radulonectites japonicus** var. *convexus* Hayami, new variety.

Plate 16, Figure 8.

Represented by a right internal mould whose anterior part is broken. It dif-

---

**Explanation of Plate 16**

*Radulonectites japonicus* Hayami, new species ................... p. 90

Fig. 1a. Right valve, Paratype (MM 2690), X1. Loc. Coarse sandstone of the Liassic Kuruma group at the lower stream of Tsuchizawa, Kuruma in Kitaotari-mura, Nagano, Pref. Prov. of Shinano).

Fig. 1b. Gypsum cast of the same external mould, X 1.

Figs. 2a-2b. Bivalved specimen, Holotype (MM 2689), X1. Loc. ditto.

Fig. 2c. Gypsum cast of the same left external mould. X 1.

Fig. 2d. Radial ornaments in the ventral side of the same external mould, Holotype. X 2.

Fig. 3a. Juvenile right value (MM 2692). X1.5. Loc. Black shale of the same group at Kuruma.

Fig. 3b. External mould of the same specimen, X 1.5.

Figs. 4a-4b. Bivalved specimen, (MM 2693). X1. Loc. same as Fig. 1a.

Fig. 5. Left valve (?), (MM 2694), X1. Loc. same as Figs. 3a-3b. Collected by Kobayashi.

Fig. 6a. Right valve, Paratype (MM 2691) X1. Loc. Black fine sandstone of the same group at the middle stream of Tsuchizawa, Kuruma.

Fig. 6b. Gypsum cast of the same external mould, X 1.

Fig. 7. Left valve (MM 2695), X1. Loc. same as Fig. 1a.

*Radulonectites japonicus* var. *convexus* Hayami, new variety. ................... p. 92

Fig. 8. Gypsum cast of a right external mould (Holotype MM 2696), X 1. Loc. same as Fig. 6a. Collected by Matsuzawa.

All illustrated specimens are kept in the Geological Institute, University of Tokyo.
fers from typical *japonicus* in the more inflated shell-body and radial grooves beginning earlier. Collected by Matsu-

References


Dechaseaux, C. (1936). Pectinidés Jurassi-


Dietrich, W. O. (1933). Zur Stratigraphie und Paläontologie der Tendaguru-Schi-


land, Vol. 83*, Pt. 3.


Philippi, E. (1899). Ueber zwei neue Zwei-

schaler-Arten von paläozoischem Habi-

tus aus deutschem Muschelkalk. *Zeit.

deut. geol. Gesell., Vol. 51*.


deut. geol. Gesell., Vol. 52*.