Descriptions of Some Fossil Opisthobranchiata from the Diluvial Deposit of Japan

BY

GORDON YAMAKAWA.

II.

6. Retusa minima Yamakawa nov. sp.

Pl. XI. Figs. 21—24.

Shell small, thin, cylindrical, somewhat compressed in the middle; upper end depressed, concave, retuse, with a plicated nucleus in the centre of the bottom; lower end obtuse; suture deep; whorls four, flattened; body-whorl long, occupying the whole length of the shell; surface smooth, only with many obtuse fine longitudinal lines of growth; aperture as long as the shell, narrow, linear, with the lower one-third abruptly expanded; pillar-lip with an obtuse fold; outer lip curved forward in the middle.

Alt.	Diam.
3.0 millim.	1.5 millim.
2.2 ,,	1.0 ,,

Fossil localities: Ōtake, Shimosa; Ōji, Musashi.

A species related to this one is figured in Martini und Chemnity's Conchylien Cabinet, Bd. I, Abth. 9, Taf. 4, Figs. 26—28. But strange to say, there is neither description nor name for it. But judging from the figure, it is decidedly a different species, as it has a more slender form and the aperture broader in its posterior portion.

7. Cylichna sibaënsis Yamakawa nov. sp.

Pl. XI. Figs. 25—29.

Shell small, thin, conically ovoid, convolute, elongated, narrow and truncated above, wide and rounded below; surface smooth, with fine transverse lines in the anterior as well as in the posterior region, and also with faint and obtuse striæ; vertex deeply sunken, perforated, with the spire hidden, margined with a very prominent, roundly angulated edge; aperture as long as the shell, club-shaped, produced beyond the truncated top, linear, very narrow in the middle, abruptly swollen inward in the lower portion, broadest at the place about one-fourth the length from the bottom, rounded below; lips thin, simple; outer one long, straight curved below; inner one only present on the columella, short, straight and with an obtuse fold.

Alt.	Breadth (at the widest part).	Diam. at the vertex.
5.2 millim.	2.5 millim.	1.0 millim.
3.5 „	1.5 „	0.7 „

Fossil localities: Ōji and Kuruma-chō, Musashi.

This species seems to resemble *Retusa Phiala* A. Adams (not figured) if we except the transverse striations both of the upper and lower regions, and also the contraction at the anterior part of the body-whorl. It also differs from *Retusa cœlata* Bush of the Atlantic Ocean by having neither riblets which curving over the top of the body-whorl extend down for a short distance nor numerous fine spiral lines extending to its middle part. *Retusa ovata* Jeff. also of the Atlantic which has no striations and whose top is not so narrow possesses a broader shell with the posterior end of the aperture ⌐—shaped. *Cylichna pyramidata* A. Adams of the China Sea is a very closely related species, but owing to the presence of some longitudinal grooves and also of the broader vertex and aperture, it must be considered as a different one.

In general we find it sometimes difficult to distinguish *Pyrunculus*, a section of *Retusa*, from *Cylichna* s. str. But from the general habitus of the shell I am inclined to treat our species as a *Cylichna*.

8. Volvula acuta (Tokunaga.)

Pl. XI. Figs. 30—32.

Cylichna acuta Tokunaga, Fossils from the Environs of Tokyo, Journ. Coll. Science, Imp. University, Tokyo, Vol. XXI, Art. 2, p. 32, pl. II, fig. 13.

Tokunaga describes this species as follows:—

"Shell small, thin, subfusiform, convolute; spire hidden; outer lip elevated and so elongated at the upper part as to give it the appearance of having an acuminated apex, rounded at the lower part; surface smooth; aperture linear, expanded below, with an obsolete fold on the columella."

The surface is smooth, but it has a few microspic lines in the lower part. The outer lip is slightly arcuate; the callus is situated at the upper part of the aperture-wall.

Alt. (in millim.).	Diam. (in millim.)	Alt.: Diam.	Loc.
6.0 ?	2.2	2.7 ?	Kurumachō
5.0 ?	1.9 ?	2.6 ?	,,
4.8	1.9	2.5	Ōji
4.5	1.7	2.6	Kurumachō
4.4	1.8	2.4	Ōji
4.2	1.6	2.6	,,
4.0	1.7	2.3	,,
5.0	2.0	2.5	,, (after Tokunaga).

Fossil localities: Ōji and Kurumachō in Musashi.

A related species is *Volvula acuminata* Brug. from the Mediterranean and the Atlantic which has a slender shell (alt. 2.7 millim, diam. 1 millim. alt.: diam. = 2.7) with some weak striaé both on the summit and the base and a spike-like apex. Another allied species called *Volvula oxytata* Bush of Cuba and of the east coast of the United States has the aperture broader at the upper part, and four or five spiral lines indistinctly punctated with very fine dots. *Volvula opalina* Adams (not figured) is said to possess a short but projecting mucro which forms an angle with the lip. The difference between this species and *V. acuta* lies solely on the above character, and no doubt they are closely related to each other. In the Conchylien Cabinet of Martini and Chemnitz. (Bd. I, Abth. 9, Taf. 3, Figs. 34, 35), there is a species which resembles *V. acuta*, though it has a more slender shell and a smaller aperture. But strange to say, there is neither a name nor a description for it.

9. Volvular artiaperta Yamakawa nov. sp.

Pl. XI. Figs. 33—36.

Shell thin, longly ovate, convolute, most inflated in the region about two-third of the shell-length from the bottom, and slightly compressed below it in the region corresponding to the middle part of the shell, tapering above into an obtuse summit, and below into a rounded base; surface smooth with some faint transverse striæ except in the middle portion; vertex depressed with a sunken spire; aperture as long as the shell, regularly curved, linear and narrow above, dilated below, but not much widened at the base; lip simple, curved inward and rounded below; callus in the posterior portion of the wall of the aperture; pillar-lip of the columella strong, curved forward and with an obsolete fold.

Alt. 3.8 millim. Diam. 1.7 millim. Alt. Diam. = 2.2.

Fossil locality:—Kurumachō, Musashi.

Volvula rostrata A. Adams and *V. sulcata* Watson which are both related to the Japanese species have the aperture broader above; moreover *V. sulcata* has no fissure at its vertex. *Volvula angustata* A. Adams which is another related species has the outer lip contracted in the middle.

10. Bullinella striata Yamakawa nov. sp.

Pl. XI. Figs. 37, 38.

Shell small, thin, cylindrical, short, convolute, slightly compressed in the middle; posterior and anterior ends rounded; surface with obtuse lines of growth and transversely striated, the striæ being very fine, rather distant, somewhat indistinct in the anterior portion; vertex neither depressed nor perforated; aperture entire, narrow in the posterior portion, widened, in the anterior portion, the widening beginning at two-fifth the length from the bottom; lip thin, straight, rounded behind and curved in front.

Alt.	Diam.
2.8 millim.	1·5 millim.
2.2 ,,	1.0 ,,

Fossil localities: Shimo-Suyeyoshi. (Asahimura, Tachibana-gori,) and Dōkwanyama, both in the province of Musashi.

EXPLANATION OF THE PLATES.

Plate X.

Fig. 1—3, Actæon tornatilis Linné var. nipponensis Yamakawa.

Fig. 3, a, Striæ on the upper part of the body whorl;

,, b, Striæ on the lower part. Both magnified.

Fig. 4—7, Tornatina exilis Dunker.

Fig. 8—10, Tornatina longispirata Yamakawa.

Fig. 19, Apical portion. Seen from the side. ×60.

Fig 11—13, Tornatina longispirata Yamakawa var ôtakensis Yamakawa.

Fig. 13, Apical portion. Seen from the side. Magnified.

Fig. 14—16, Retusa globosa Yamakawa.

Fig. 17—20, Retusa truncata Yamakawa.

Fig. 19, Apical portion. Seen from above. Magnified.

PLATE XI.

Fig. 21—24, Retusa minima Yamakawa.

Fig. 24, Apical portion. Seen from above. ×60.

Fig. 25—29, Cylichna sibaensis Yamakawa.

Fig. 30—32, Volvula acuta (Tokunaga).

Fig. 33—36, Volvula artiaperta Yamakawa.

Fig. 36, Apical portion. Seen from the side. Magnified.

Fig. 37—38, Bullinella striata Yamakawa.

Pl. X. Fig. 6, 7, 16,20 and Pl. XI. Fig. 23, 29, 32, 35, Diagramatic Figures showing the longitudinal section.