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A NEW SPECIES OF FRESHWATER LIMPET,
GENUS *GUNDLACHIA*, FROM JAPAN¹

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DURING a recent study of various snails that serve as intermediate hosts of human helminth parasites in Japan, Dr. Hiroshi Itagaki of the Azabu Veterinary College presented me with a collection of freshwater limpets (Mollusca; Gastropoda; Ancyliidae) taken from a pool at his residence. According to shell characters they belonged to the ancyloid genus *Gundlachia*, heretofore unknown from the Orient. It is on these specimens that this paper is based.

Ever since it was described by Pfeiffer (1849) for a series of septate ancyliiform shells from Cuba, the genus *Gundlachia* has included those freshwater ancyloid limpets having shells with internal septa. Mirolli (1960) named a second septate ancyloid genus (*Watsonula*) for his new species, *W. wauteri*, from southern Europe. The relationship of that species to *Gundlachia*, or to other ancyliids, is obscure. Although other freshwater limpet-like snails have septa (e.g. *Latia*, *Latiidae*; *Amphigyra*, *Planorbidae*) they do not belong to the Ancyliidae. To date some 23 species have been named and included in the genus *Gundlachia*. For a brief review of the species, and for questions concerning the validity of the genus, see Basch (1959b). Species of *Gundlachia* have been described from the United States, Cuba, Guatemala, Honduras, Trinidad, Brazil, Bolivia, western Europe, Egypt,

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South Africa, New Zealand, Australia, and Tasmania. None has been reported previously from either the Orient or Asia.

An outline and discussion of ancyloid classification has been given by Burch (1962a, b). In those papers the Ancyliidae were considered to comprise 3 subfamilies (or 4 if one recognizes Ancylostruminae as distinct from the Ancyliinae, *s.s.*): Ancyliinae (*Ancylus*, *Ancylostrum*, and *Rhodacmea*), Laevapecinae (*Anisancylus*, *Burnupia*, *Laevapex*, and *Uncancylus*), and Ferrissiinae (*Ferrissia* and *Hebetancylus*). This classification is based mainly on dorsal shell adductor muscles, but also, to some extent, on the reproductive organs, radulae, and chromosome numbers. *Brondelia*, *Petancylus*, *Probancylus*, *Watsonula*, and *Gundlachia* were not considered in that classification because sufficient detail was not known. In the *Gundlachia* described below, the arrangement of the dorsal adductor muscles is like those of the Ferrissiinae.

***Gundlachia (Kincaidilla) japonica*, new species**

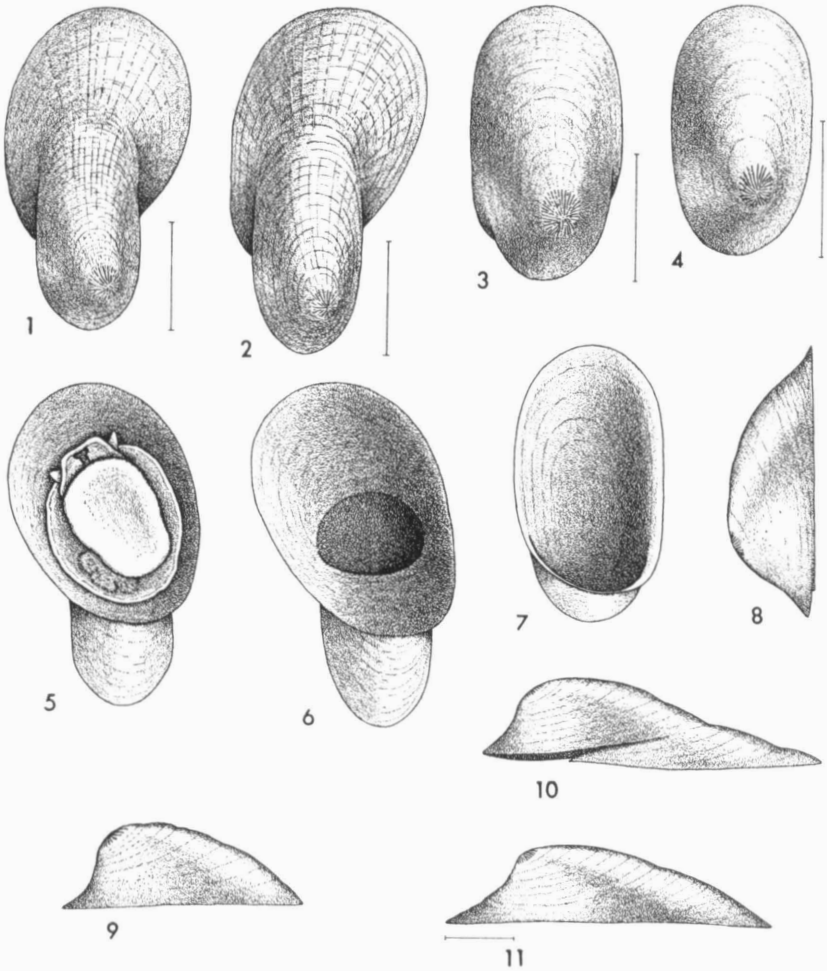
(Figs. 1-10)

HOLOTYPE.—UMMZ 216831. Tokyo, Japan. Figs. 1, 5.

PARATYPES.—UMMZ 216832: 2 septate specimens and 18 non-septate specimens from the type locality. Figs. 2-4, 6-10.

MEASUREMENTS.—Length of shell, 3.1 mm; width, 1.7 mm; height, 0.9 mm. Length of lower shell, 2.3 mm. Length of upper shell, 2.2 mm; width, 1.2 mm; height, 0.6 mm.

DIAGNOSIS.—The shell is divided into an upper septate part and a lower non-septate part. The upper septate portion is situated obliquely to the median line of the larger lower portion, and extends considerably beyond the posterior and right margins of the lower shell. Its apex, slightly off-center, is displaced slightly to the right, making the shell sinistral. The upper septate portion is narrowly ovate with broadly rounded ends and nearly parallel sides. Its anterior margin is evenly and broadly rounded, but the posterior end is more narrowly rounded. The anterior slope is evenly convex, the posterior slope somewhat unevenly concave. The lateral slopes, also concave, are rather steep and nearly parallel just before they reach the summit. The anterior slope passes directly into that of the main or lower shell, leaving a slight depression where the two shells join. The septum covers two thirds of the underside of the upper shell and forms a flat or slightly convex surface. The aperture of the septate shell is oblique



FIGS. 1-11. Japanese freshwater limpets: 1 and 5, holotype of *Gundlachia japonica*; 2-4 and 6-10, paratypes; 11, *Ferrissia* sp. from Lake Biwa; length of line 1 mm. Figs. 2, 6, and 10 are of the same adult shell; Figs. 3, 7, and 8 are of the same young shell with a partially formed septum; Figs. 4 and 9 are of the same young shell without a septum.

to the median line of the lower shell. It is quite convex anteriorly and flattened posteriorly.

The lower non-septate portion of the shell is about twice as wide as the upper portion and is rather broadly ovate, wider anteriorly. Its anterior margin is widely and evenly rounded. The posterior margin is gently rounded on the right side, more sharply rounded on the left. The anterior, posterior, and lateral slopes are nearly straight, although the anterior slope has a depression about two-fifths its length from the anterior margin.

The sculpturing of the shell consists of fine regular growth lines crossed by delicate radial lines. There is a faint indication of radial ribbing on the upper shell, but on the holotype it is hardly visible on the lower shell. The apex of the shell is radially striate, a character which places this species in the subgenus *Kincaidilla* Hannibal, 1912.

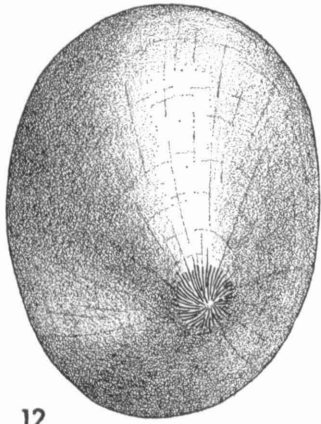
The animal is nearly devoid of pigment, except for a few flecks on the dorsum of the head. There is no apparent pigmentation on the mantle. On the young non-septate specimens the pattern of the three dorsal shell adductor muscles is like that of the genera *Ferrissia* and *Hebetancylus*, i.e., two anterior (right and left) and one left posterior adductor.

REMARKS.—*Gundlachia japonica* is known from only one population, that of the type locality. This population contained both older septate and younger septate and non-septate individuals. The shells of young individuals were 1.5 to 2.6 mm long. Apparently this species begins forming a shell septum when it reaches a length of about 2 mm. The upper shell of the mature specimens looks identical to the young shells which have not yet begun forming the lower shell. No old non-septate specimens were found.

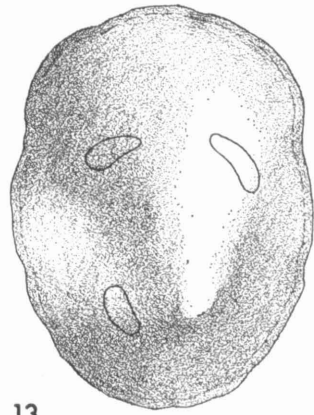
COMPARISON WITH OTHER JAPANESE ANCYLIDS.—Two other species of Ancyliidae, both referable to *Ferrissia*, are presently known from Japan (Figs. 11–15). One of them is as yet undescribed.

In the past the distribution of *Ferrissia baconi* (Bourguignat, 1853) of Bengal was considered to extend to Japan (e.g., see Annandale and Prashad, 1921). Kuroda (1949) did not consider the Japanese species with which he was familiar to belong to *F. baconi*, so he described a new species, *Protancylus (Laevapex) nipponicus*. The type lot is presumably from the vicinity of Kyoto, although he did not designate a type locality.

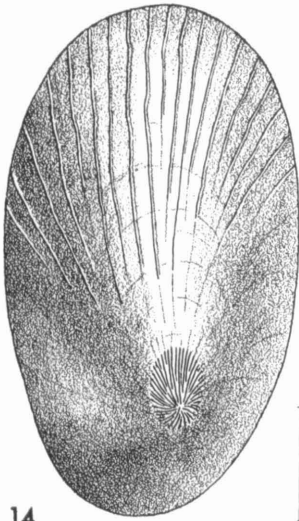
Recently, through the kindness of Drs. Habe and Miura, I have had the opportunity to collect ancyliids from Lake Biwa. Two distinct species are found there, both with shell characters (non-septate shells



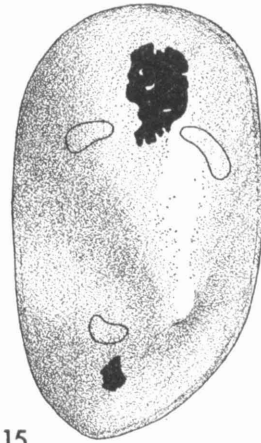
12



13



14



15

FIGS. 12-15. Japanese freshwater limpets: 12 and 13, *Ferrissia nipponica* (Kuroda), dorsal views of shell (Fig. 12) and mantle (Fig. 13); 14 and 15, *Ferrissia* sp. from Lake Biwa, dorsal views of shell (Fig. 14) and mantle (Fig. 15); length of line 1 mm.

with striate apices) that would place them in the genus *Ferrissia* Walker, 1903 (as emended by Basch, 1959a). One of these (Fig. 12) seems referable to Kuroda's *Protancylus nipponicus*. It is a widely ovate shell sculptured with fine lines of growth crossed by fine radial lines. The mantle of the animal (Fig. 13) is almost devoid of pigment, although sometimes there is a slight suggestion of fine black pigment in a small area between the anterior adductor muscles. There are no areas of dense concentration of pigment.

The other species (undescribed) found in Lake Biwa also exhibits shell characters which place it in the genus *Ferrissia*, but the shell is longer and relatively narrower with a lower silhouette (Figs. 11, 14, 15). In addition to radial and concentric growth lines, the anterior half is sculptured with radial ridges. The most conspicuous pigmentation of the mantle is a dense purple-black pigmentation patch between the two anterior adductor muscles, and another posterior to and usually slightly to the right of the posterior adductor muscle (Fig. 15).

Gundlachia japonica differs from both Japanese species of *Ferrissia* by having a septate adult shell. Young non-septate *G. japonica* differ from young *F. nipponica* by being more elongate, with parallel or nearly parallel sides, and often having radial ridges. They differ from young *Ferrissia* sp. from Lake Biwa by having more nearly parallel and steeper sides, a higher silhouette, a blunter apex, and less prominent radial ridges.

The pigmentation of the mantle of *G. japonica* is similar to that of *F. nipponica* from Lake Biwa; there is no dense pigment spot between the two anterior adductor muscles.

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LITERATURE CITED

ANNANDALE, N., AND PRASHAD, B.

1921 Aquatic Pulmonata. *Rec. Indian Mus.*, 22 (4):565-92.

BASCH, P. B.

1959a The anatomy of *Laevapex fuscus*, a freshwater limpet (Gastropoda: Pulmonata). *Misc. Publ. Mus. Zool. Univ. Michigan*, 108:1-56.

1959b Status of the genus *Gundlachia* (Pulmonata, Ancyliidae). *Occ. Pap. Mus. Zool. Univ. Michigan*, 602:1-9.

BOURGUIGNAT, M. J. R.

1853 Descriptions d'Ancyles nouveaux, de la Collection de M. Cuming, précédée d'une courte notice sur le genre *Ancylus*, et d'un Catalogue complet des espèces qui le composent. *Proc. Zool. Soc. London*, 21:76-93 (p. 89), Pl. 25, Figs. 18-25.

BURCH, J. B.

1962a Cytotaxonomic studies of freshwater limpets (Gastropoda: Basommatophora). I. The European Lake limpet, *Acroloxus lacustris*, *Malacologia*, 1 (1):55-72.

1962b Notes on the classification of freshwater limpets. *Amer. Malacol. Union Ann. Rept.*, 1962, 29:8-9.

HANNIBAL, H.

1912 A synopsis of the Recent and Tertiary freshwater Mollusca of the Californian Province, based upon an ontogenetic classification. *Proc. Malacol. Soc. London*, 10:112-211.

KURODA, T.

1949 *In: Illustrated encyclopedia of the fauna of Japan*. Ed.: Seinosuke Uchida. The Hokuryukan Co., Ltd., Tokyo. Pp. 1898.

MIROLLI, M.

1960 Morfologia, biologia, e posizione sistematica di *Watsonula wauteri*, n.g., n.s. (Basommatophora, Ancyliidae). *Mem. Inst. Ital. Idrobiol.*, 12:121-62.

PFEIFFER, L.

1849 Neue Molluskengattungen. *Z. Malakozool.*, 6 (7):97-105.

WALKER, B.

1903 Notes on eastern American ancyli. *Nautilus*, 17 (2):13-18; (3):25-31.

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