Bulletine of the Osaka Museum
of Natural History, No. 11
March, 1959

# ON THE MIOCENE FORAMINIFERA *VAGINULINA YOSHIHAMAENSIS* INOUE ET NAKASEKO*

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*Vaginulina yoshihamaensis* was originally described by INOUE et NAKASEKO(1951) from the Middle Miocene Sakuma Formation, Chiba Prefecture, Japan. ASANO(1951) recorded this species in his Illustrated Catalogue.

Since then, ASANO (1953) reported this species from the Middle Miocene Higashi-innai Formation at Wasumi, Yanagida-mura, Fugeshi-gun, Ishikawa Prefecture, Japan, but neither description nor figure was given in his paper.

The writer found the same species, together with abundant *Migoypsina kotoi* HANZAWA, from the uppermost part of the Middle Miocene Taniguchi Formation at Oodamari, Nanao-shi, Ishikawa Prefecture, during the course of his biostratigraphic study of the Nadaura district in Toyama Tertiary basin.

As the specimens, which were available to INOUE et NAKASEKO, were broken ones, the complete description has not been published as yet. Fortunately, the writer has obtained well preserved, complete specimens of this species from the fossiliferous sandstone of the Higashiinnai Formation at Ukazuka, Noto-cho, Fugeshi-gun, Ishikawa Prefecture. The rock samples in which these specimens were found, were collected by Mr. S. ISHIDA, Geol. Inst. of Kyoto University.

The present work is based on the above-mentioned speciemens collected by Mr. Ishida to whom the writer wishes to express his appreciation.

## *Vaginulina yoshihamaensis* INOUE et NAKASEKO, 1951

plate 11, figs. 1, 2.

1951 *Vaginulina yoshihamaensis* INOUE et NAKASEKO, Jour. Geol. Soc. Japan, **57** (664), p. 10, text fig. 2.
1951 *Vaginulina yoshihamaensis*, ASANO, Ill. Cat. Jap. Tert. small, Foram. Pt. 15, p. 16, fig. 79.
1953 *Vaginulina yoshihamaensis*, ASANO, Short Paper, Inst. Geol. Paleont. Tohoku Univ. p. 10. (listed)

*Original desription*: "Test elongate, gradually increasing in diameter toward apertural end, the first few chambers closely coiled, the later ones becoming uncoiled, initial end round, peripheral margin acute but not keeled; chambers 13 or more, sutures distinct, limbated, slightly depressed; aperture unknown. Length over 1mm."

The examination of the present specimens has confirmed the presence of most of these features, but it is necessary to make some emendations and additional des-

* Contribution from the Osaka Museum of Naural History, no. 46

criptions. The writer gives the following redescription.

*Revised description*: Test elongate, about four times as long as broad, side nearly parallel, initial end broadly rounded, apertural end rather flattend or slightly tapering, peripheral margin of early portion acute but not keeled, gently rounded in later rectilinal portion, where it is elliptical in transverse section; about six chambers in early portion closely coiled, ten to twelve chambers in later portion becoming uncoiled and somewhat oblique, each chamber about three times as broad as high, slightly increasing in height toward the apertural end; sutures distinct, strongly limbated, slightly curved; wall calcareous, vitreous, very finely perforated, surface smooth; aperture radiate, slightly projecting at the peripheral angle of the last chamber.

*Measurement*: Specimen of figure 1(OMNH Reg. no. F1917F)—Length; 3.65 mm., greatest diameter, 0.90mm. Specimen of figure 2 (OMNH Reg. no. F1918F)—Length, 3.05 mm., greatest diameter; 0.80 mm.

*Stratigraphic distribution*: This species, originally described from the Middle Miocene Sakuma Formation ($F_3$)*, is accompanied by *Lepidocyclina makiyamai* MORISHIMA, and *Miogypsina kotoi* HANZAWA. The Higashiinnai Formation of Ishikawa Prefecture from which ASANO's Noto specimens and the present specimens were obtained, contains the *Miogypsina—Operculina* Zone, which may be traced into adjoining Tertiary basins along the Japan Sea coast and indicates the $F_3$ stage of the Japaese Neogene, together with another overlying foraminiferal zone which is called under various names in each sedimentary basin. ASANO described that his specimens were collected from a siltstone, conformably overlying the *Miogypsina—Operculina* Zone. The materials in which the present specimens are contined, were collected at the horizon, equivalent to the *Miogypsina—Operculina* Zone. In the Nadaura district, this species is contained in *Miogypsina* sandstone, which corresponds to the uppermost part of the *Miogypsina—Operculina* Zone. Thus, stratigraphic evidences suggest that this species is useful as a good key-species, indicating the $F_3$ stage of the Japanese Neogene.

## Reference

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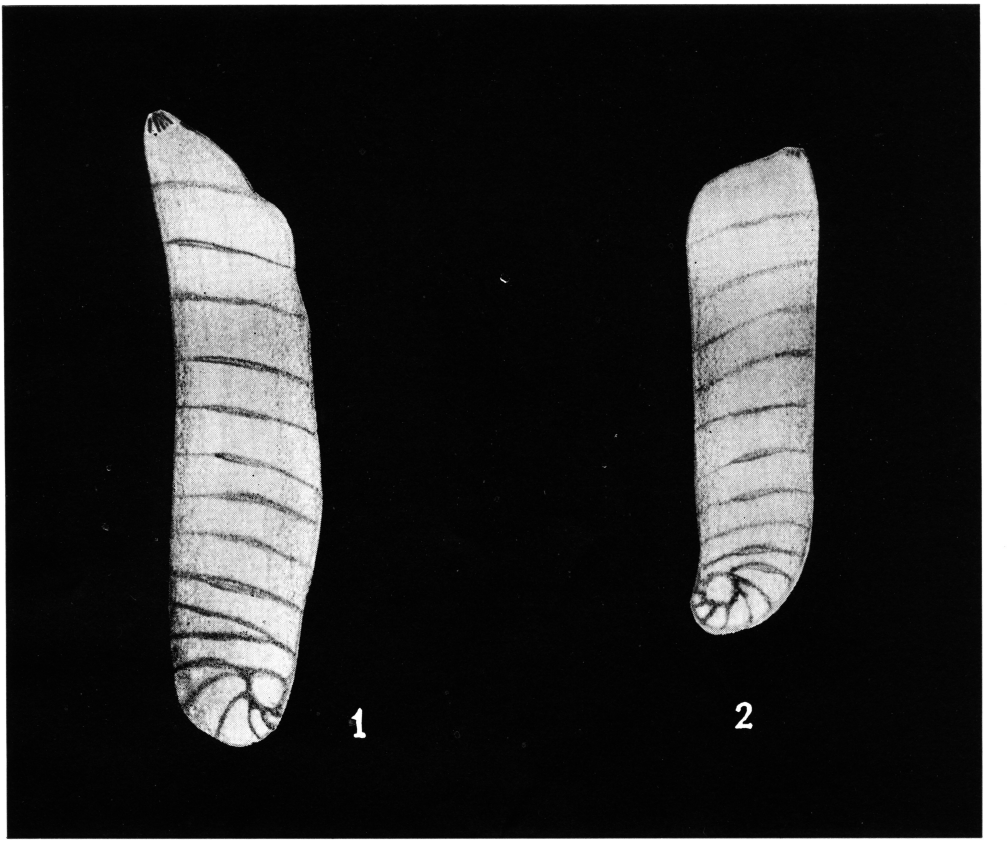
IKEBE, N., (1954); Contributions to the Cenozoic Geohistory of Japan. I;—Cenozoic Biochronology of Japan.; *Jour. Inst. Polytech. Osaka City Univ.* Vol. 1, no. 1, pp. 73-86.

INOUE, H. AND K. NAKASEKO, (1951); Foraminifera of the Miocene Sakuma Formation, Japan; *Jour. Geol. Soc. Japan.* Vol. 57, no. 664, pp. 7-11.

ISHIDA, S. AND K. MASUDA, (1956); Geology of the Northern Region of Noto Peninsula, Japan; *Jour, Geol. Soc. Japan.* Vol. 62, no. 735, pp. 703-716.

* $F_2$, $F_3$ etc. are the age symbols used by IKEBE(1954 etc.), in the biochronological classification of the Japanese Cenozoic. The Miocene Epoch comprises $F_1$, $F_2$, $F_3$ and G, where $F_1$ corresponds to the Early Miocene, $F_2$ and $F_3$ the Middle Miocene and G the Late Miocene.




Explanation of Plate 11:

Figs. 1, 2.; *Vaginulina yoshihamaensis* INOUE et NAKASEKO, ×21, collected from the Middle Miocene Higashiinnai Formation, at Ukazuka, Noto-cho Fugeshi-gun, Ishikawa Prefecture, Japan.