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## Paleontological Notes on Few Brachiopods from Pliocene Naha Limestone

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## Paleontological Notes on Few Brachiopods

from Pliocene Naha Limestone †

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### Abstract

Four species of brachiopods such as *Campages nipponensis* (Yabe and Hatai), *Jolonica macneili* Cooper, *Terebratulina subcarinata* Cooper, and *Kikaithyris hanzawaii* (Yabe) were studied from point of growth series. The study indicates that there is a close interrelation among sizes of valves of these four species.

### 1. Introduction

The present study is based on about four hundred specimens of brachiopods which were collected from Pliocene Naha Limestone of Machinato and Gushikawa during the summer of 1968 (Fig. 1) .

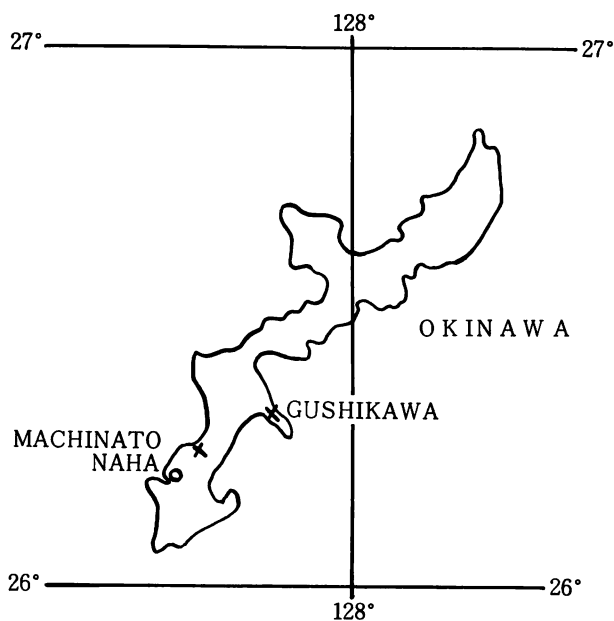


Fig. 1 Index map of sampling localities.

† Received Oct. 31, 1969

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The samples of *Kikaithyris* came from the lower part of a cliff at Machinato where Naha Limestone is yellowish at the lower part of the outcrop and whitish at the upper part. The limestone crops out about twenty meters thick. At the outcrop the upper part of the limestone is hard and the lower part is soft. All of the brachiopods discussed in this paper came from the lower part (Fig. 2) .

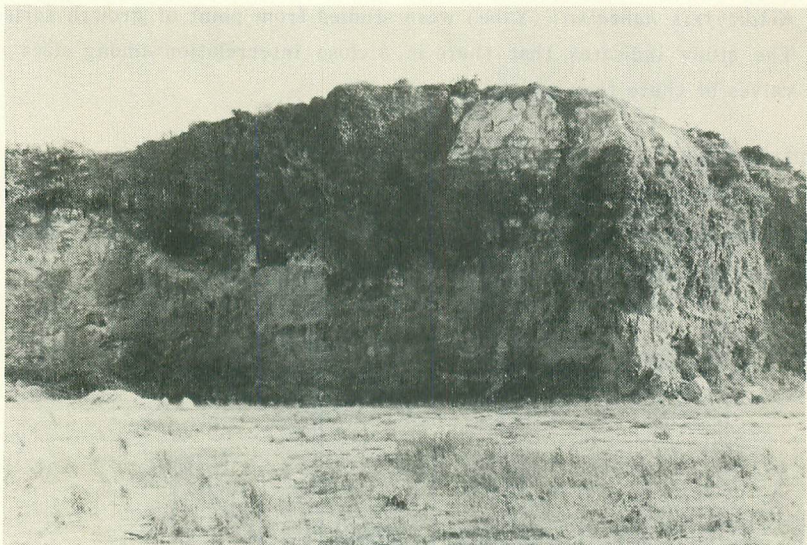


Fig. 2 The outcrop of the Ryukyu Limestone at Machinato.

The samples of *Jolonica*, *Campages*, and *Terebratulina* came from the outcrop at Gushikawa where Naha Limestone is yellowish at highly weathered cliffs and whitish at fresh exposed outcrops. The limestone is thinly bedded and exposed about twenty meters in thickness. The limestone includes many algal balls, small brachiopods, a few molluscs, and echinoids (Fig. 3) .





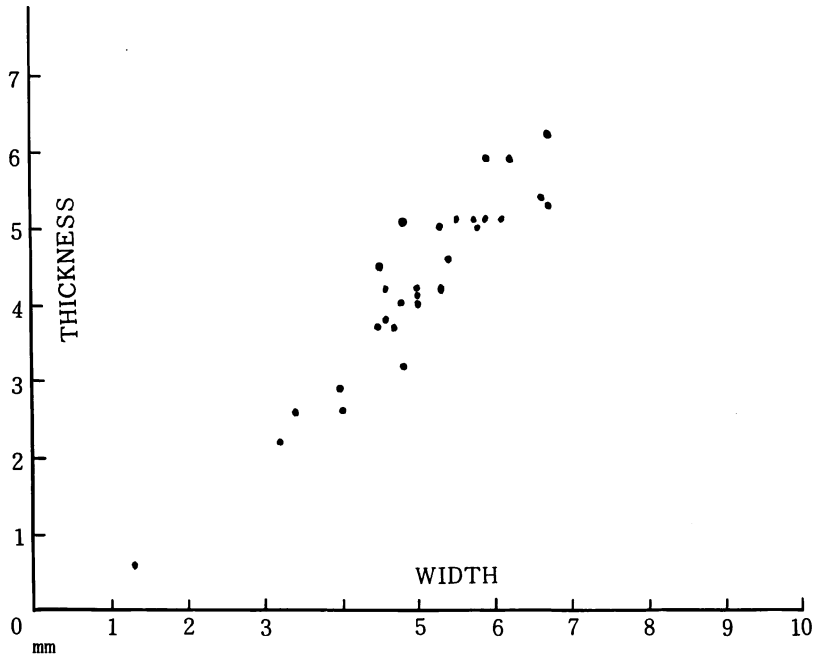


Fig. 5 Size-dispersion diagram for *Campages nipponensis* (Yabe and Hatai).

can be recognized by its elongate-oval outline and the broadly but weakly intraplicate anterior commissure.<sup>1)</sup> The specimens range from 1.8 mm. to 9.3 mm. in length, from 1.3 mm. to 6.7 mm. in width, and from 0.6mm. to 6.2 mm. in thickness. A number of younger shells, which are smaller than 4.5 mm. in length, are not well represented. The size-dispersion diagram for *Campages nipponensis* (Yabe and Hatai) indicates that there is a close interrelation among sizes of valves.

Ninety-nine shells of *Jolonica macneili* Cooper were measured and plotted (Figs. 6 and 7). The species is a slender and small species.<sup>1)</sup> The specimens range from 1.8 mm. to 14.6 mm. in length, from 1.3 mm. to 11.4 mm. in width, and from 0.6 mm. to 8.5 mm. in thickness. Although specimens longer than 8 mm. are not well represented, in general the size-dispersion diagram for *Jolonica macneili* Cooper indicates that there is a close interrelation among sizes of valves (Figs. 6 and 7) .

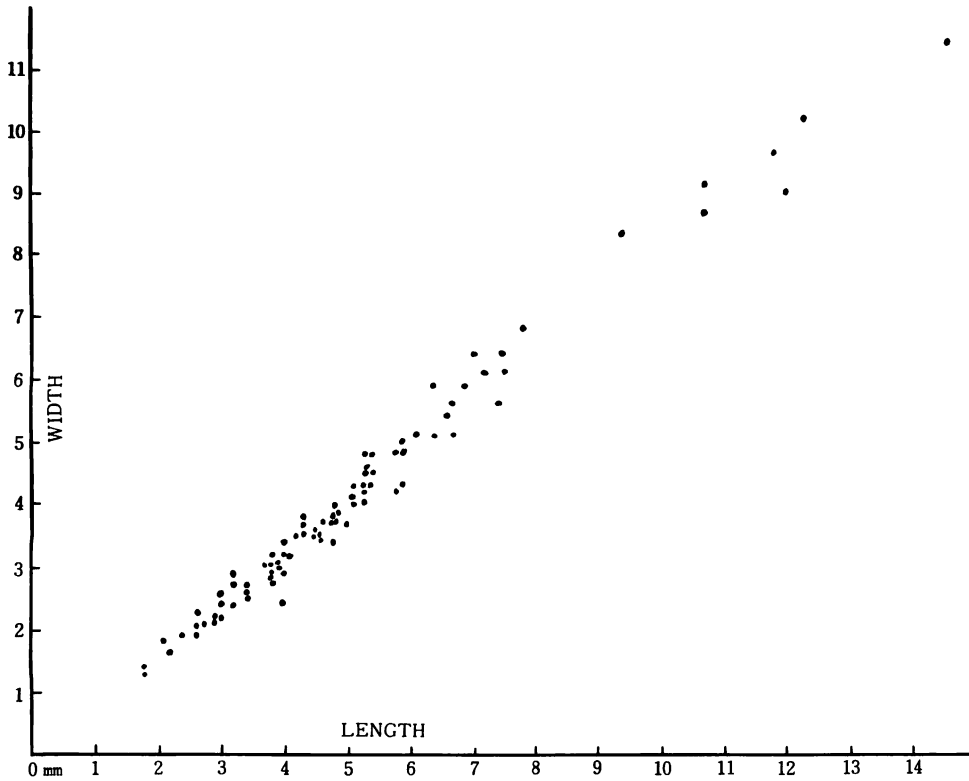


Fig. 6 Size-dispersion diagram (width-length) for *Jolonica macneili* Cooper.

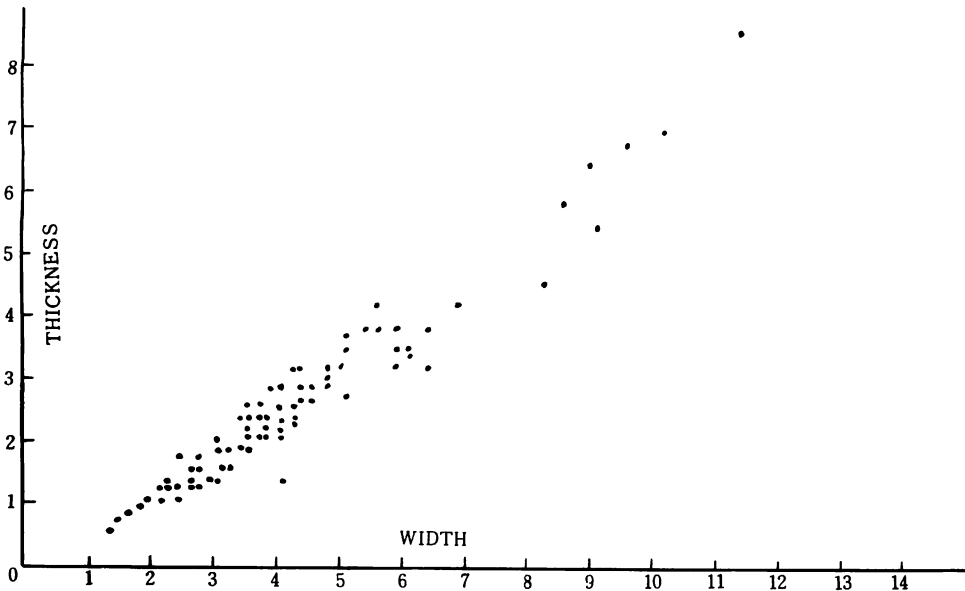


Fig. 7 Size-dispersion diagram (thickness-width) for *Jolonica macneili* Cooper.

Three hundred fifty-seven specimens of *Terebratulina subcarinata* Cooper were measured and plotted (Figs. 8 and 9). The species is a small and usually strongly costellate<sup>1)</sup>. The specimens range from 1.3 mm. to 9.8 mm. in length, from 1 mm. to 8.2 mm. in width, and from 0.6 mm. to 5.9 mm. in thickness. A number of younger shells one millimeter in size are represented and the size-dispersion diagram for *Terebratulina subcarinata* Cooper indicates that there is a close interrelation among sizes of valves. However X specimen which is isolated from other specimens may belong to another species (Figs. 8 and 9).

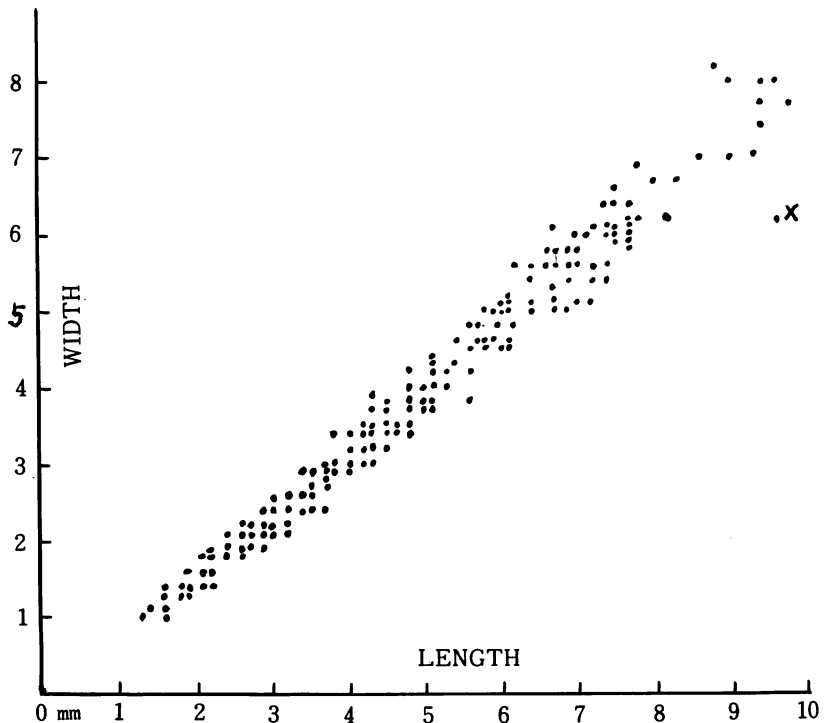


Fig. 8 Size-dispersion diagram (width-length)  
for *Terebratulina subcarinata* Cooper.

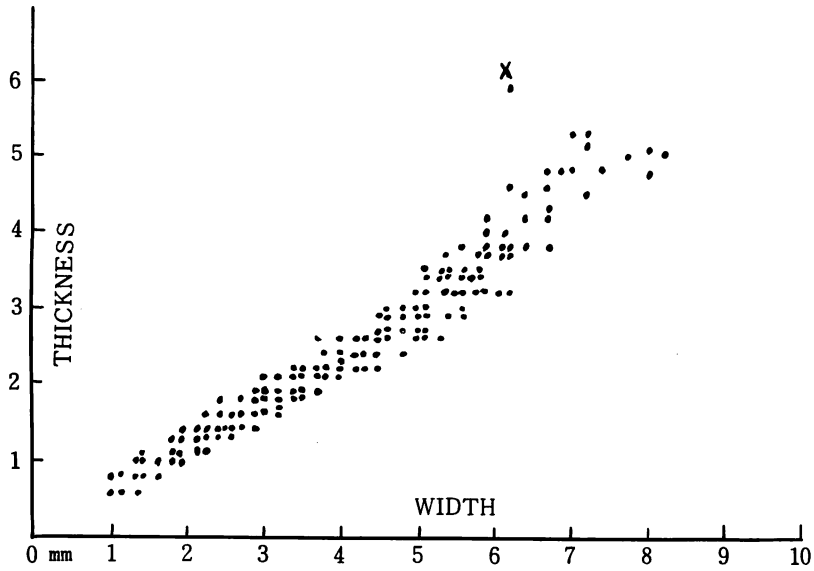


Fig. 9 Size-dispersion diagram (thickness-width) for *Terebratulina subcarinata* Cooper.

Twenty-three shells of *Kikaithyris hanzawai* (Yabe) were measured and plotted (Figs.10 and 11). The specimens range from 13 mm. to 27 mm. in length,

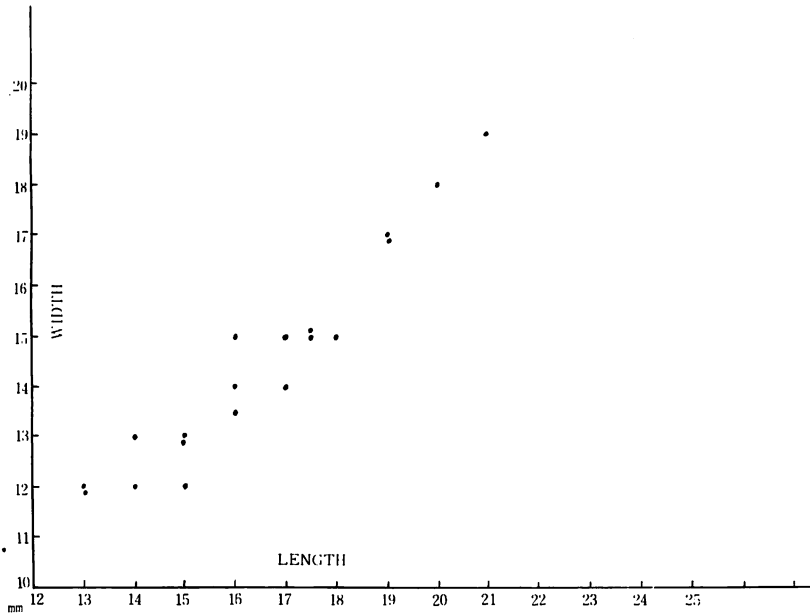


Fig. 10 Size-dispersion diagram (width-length) for *Kikaithyris hanzawai* (Yabe).



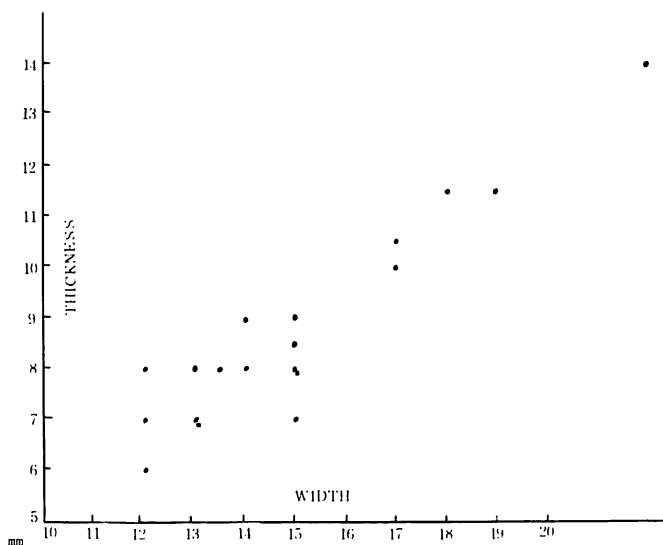


Fig. 11 Size-dispersion diagram (thickness-width) for *Kikaithyris hanzawaii* (Yabe).

from 12 mm. to 21 mm. in width, and from 6 mm. to 15 mm. in thickness. The species is recognized by its large size, shouldered outline, and narrow anterior<sup>1)</sup>. Though enough specimens are not available at present, it is enough to know that the size-dispersion diagram for *Kikaithyris hanzawaii* (Yabe) indicates that there is some interrelation among sizes of valves.

In conclusion, the size-dispersion diagram indicates that there is a close interrelation among sizes of these four species.

### 3. References

- (1) Cooper, G.A.: "Tertiary and Pleistocene Brachiopods of Okinawa, Ryukyu Islands," U.S. Geol. Survey Prof. Paper 314-A. 18 pp. 5 pls.