

## Bubalina Remains from the Province of Ōmi.

By

**Tadasu Hiki.**

Near the end of the mesozoic or the beginning of the caenozoic age, the main island of Japan was greatly modified and many depressions occurred, especially in its central part. The region of the province of Ōmi, is one of these depressions. The highest ranges which surround this depression consist mainly of granite at the western and southern sides, and of paleozoic strata in the eastern and northern parts. At that time, this depression was wholly filled with water, and the thick sediment of the lake was deposited. Later the water diminished gradually, and remained only as a lake in the lower part, now known as Lake Biwa. The old lake sediment remained in the form of the platforms and the terraces along the foot of the high mountain ranges, and separated into rugged hills which appear at one time to have been continuous. (Pl. I.).

The hills running along the western coast of the lake rise to the height of from one hundred to two hundred meters above sea level or from thirty to sixty meters above the lake level. They consist mainly of clay and sand in nearly horizontal strata. There are many exposures of which the most eminent is in a cliff at Shimo-Ryuge, where appears bluish plastic compact clay overlaid by fine and homogeneous sand layers. The sand layers of about thirty meters consist of many different alternate layers, and are frequently intercalated with thin bluish plastic clay. The sand is light-colored quartz grains and fine worn rock fragments derived from the neighboring mountains. These sand layers are covered by a thin gravel layer of fragments of quartz-porphry, graywackesandstone and hornstone, which spreads widely in the near provinces. The blue clay may be traced

all over the district to the height of one-hundred and sixty meters above sea level; and, being very thick, its depth is quite unknown in the lower part of the strata. The upper part of the blue clay is always fossiliferous.

About one hundred and eleven years ago, in Ryugatani in the village of Minamishō, a skull and teeth of *Stegodon insignis* were found together with many remains of other undeterminable mammals and shells. Four years ago, in the village of Ōtani, about four kilometers north of Minamishō, a piece of mammal remains, with fresh water shells and pieces of wood, were found in quite the same horizon of clay strata. This village is situated among the hills running along the western shore of the lake, and the writer's attention was called to the remains by Mr. K. Niinomi, a teacher of the Shiga normal school, through whose courtesy the investigation was made.

This specimen is a piece of the right upper jaw with the fourth milk-molar (D4) and the first (M1) and second (M2) molar teeth. (Pl. II and III). The specimen in length and height is about 20 cm., and in thickness about 3 cm., the teeth being comparatively well preserved. These molar teeth are exceedingly predominate in outer folds, thick inner accessory columns, and a length greatly exceeding their breadth. Their dimensions are as follows, (in mm.)

	Length	Breadth at the grinding surface	Breadth at the margin of the jaw	Height above the margin of the jaw	Height of the column
D4.....	27	19	23	20	26
M1 .....	31	16	23	22	—
M2 .....	32	13	—	—	—

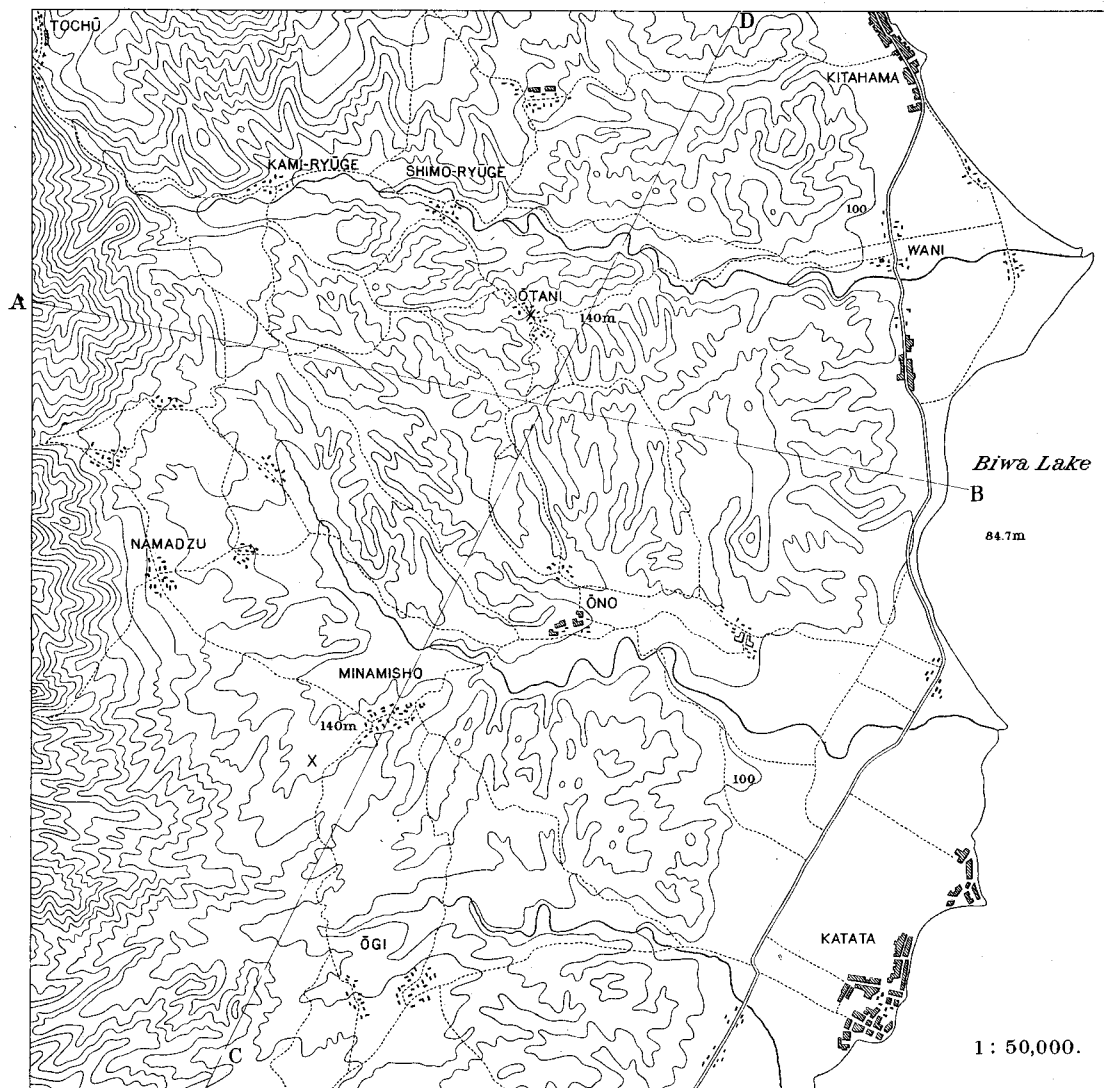
Judging from its dentition, this specimen, according to the determination of Mr. H. Matsumoto of the Tōhoku Imperial University, belongs to the *Bubalina species*. The milk-molar is distinctly worn by rubbing, the first molar is slightly worn, and the second molar rises only slightly above the

jaw with no trace of rubbing, so that the specimen can be considered the jaw of an adult. The color is grayish brown, and the mineralization eminently developed, which proves that the fossil was for a long time preserved in the bottom of the lake or wet strata. This specimen can be compared to *Bubalina* species of India, but of the latter's teeth unfortunately we have no description. It may also be identified with Chinese fossil in the form and dimension of the teeth. This Chinese fossil indicates the upper Pliocene series. The remains of *Stegodon insignis* also belongs to the Pliocene series.

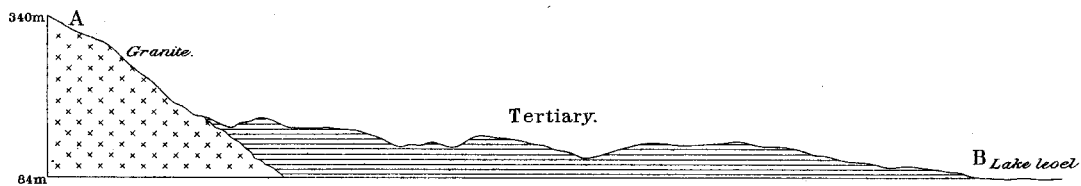
Thus the region of the western part of the province of Ōmi is judged to be a deposit of the Pliocene series.

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Topographical Map of the fossil localities in the province of Ōmi.



X Fossil locality



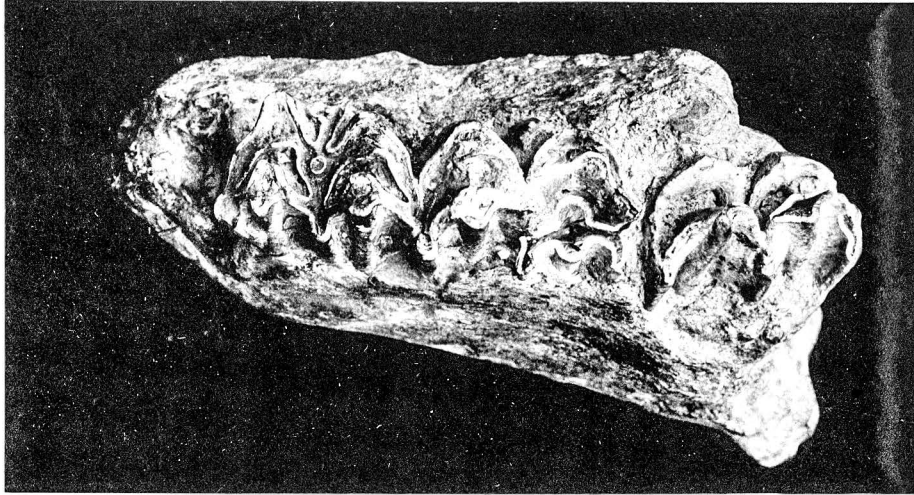


Fig. 1. Upper view of a right upper jaw of *Bubalina* species.  
Nat. size.

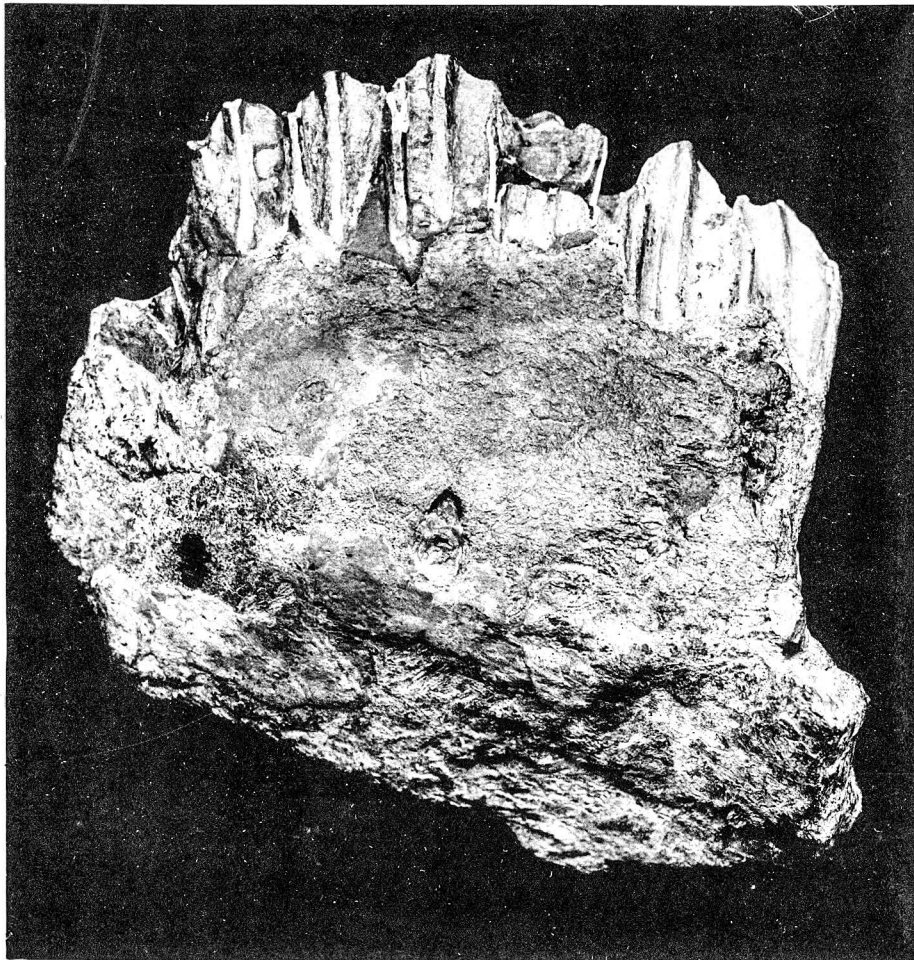


Fig. 2. Side view of the same jaw from outer side.  
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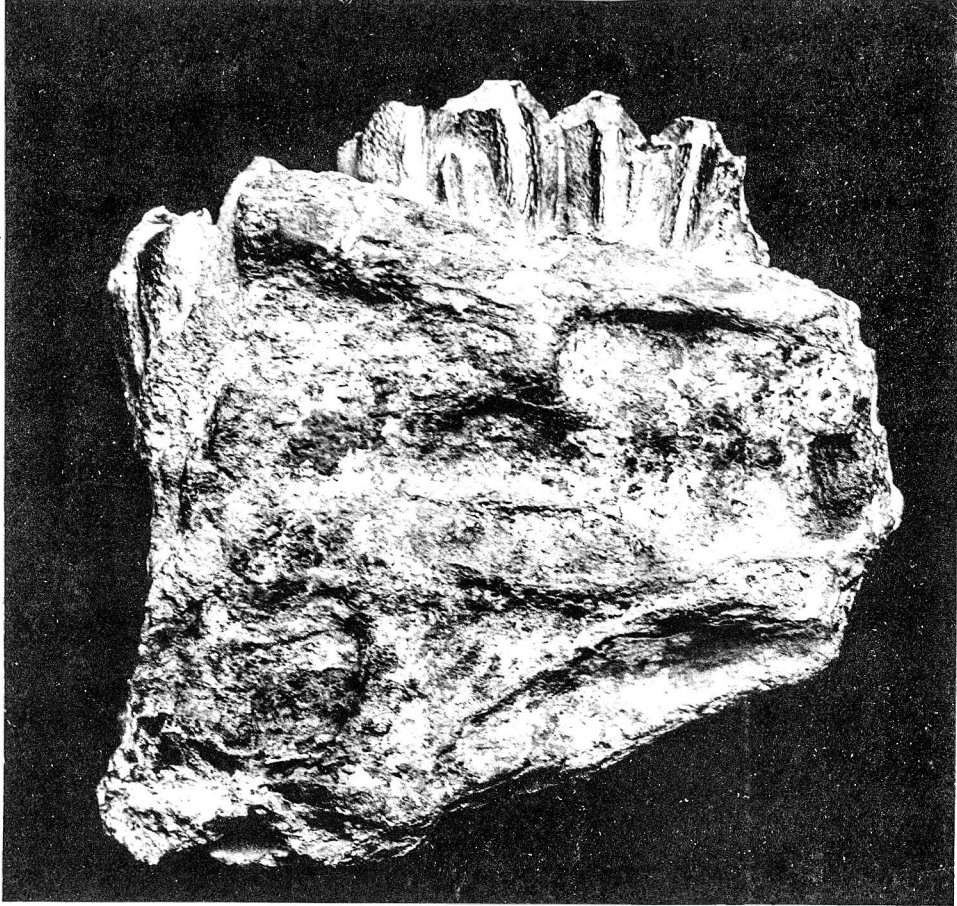


Fig. 3. Side view of the same jaw from inner side.  
Nat. size.