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著者	OTSUKA Hiroyuki
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A FOSSIL DEER FROM THE LATE PLEISTOCENE ÔE FORMATION, KYUSHU

By

Hiroyuki OTSUKA

(Institute of Earth Sciences, Faculty of Science, Kagoshima University)

Introduction

The Ôe Formation is Late Pleistocene deposits which are exposed in a small hill of the Hara-jô (= Hara castle) ruin, Minamitakaki-gun, Nagasaki Prefecture, northwest Kyushu. It covers unconformably the eroded surface of the "Aso welded tuff" member and the Kuchinotsu Group. On the western part of the sea cliff, where the Ôe Formation is typically exposed, it is mainly composed of sand and silt and bears abundant shells in the middle part of the sequence, as shown in Fig. 1. Judging from the molluscan and the pollen fossils, this formation seems to have been deposited under the condition of rather warm climate. Recently the Ôe Formation has been correlated to the Second Interglacial age of Würm based on the result of the carbon isotope age determination (Ariake Bay Research Group, 1965). At this type locality of the Ôe Formation an immature specimen of fossil deer referable to *Cervus* was found.

This discovery may contribute to the knowledge of the late Pleistocene mammalian fauna of the country and to the Late Pleistocene stratigraphy of the Japanese Islands,

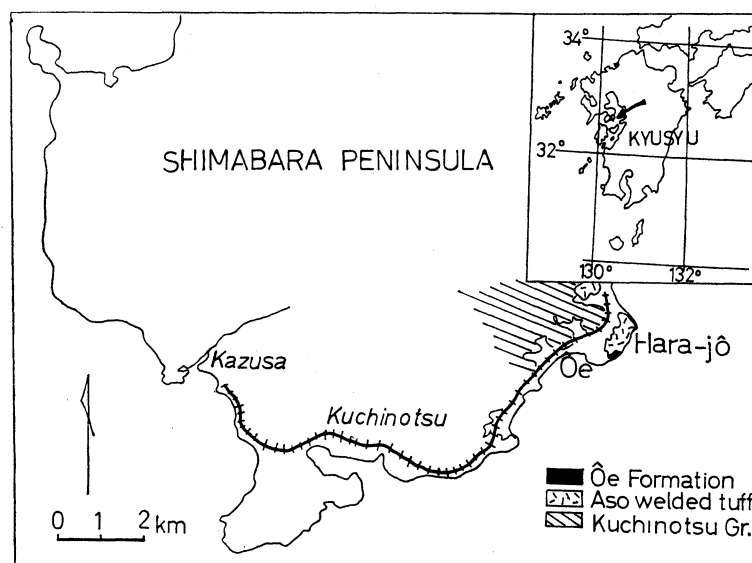


Fig. 1. Map showing the locality of the Ôe Formation

even though the fossil is fragmentary. I describe it in this paper.

I wish to express my hearty thanks to Professor Tatsuro Matsumoto of the Department of Geology, Kyushu University, for reviewing the manuscript. I thank also Mr. Tokiwa SÔDA, a teacher of the Kôka High School, who provided me the valuable specimen for study.

Paleontological Description

Order Artiodactyla

Family Cervidae GRAY, 1821

Genus *Cervus* LINNAEUS, 1758

Cervus (Deperetia ?) sp.

Material.—ESK*) Reg. No. F-5006 (Plate. 3), a fragmental left jaw of immature specimen, found by Mr. T. SÔDA from the lower part of the Ôe Formation, at the western cliff of the Hara Castle Hill of the Minamitakaki-gun, Nagasaki Prefecture, now preserved in the Kagoshima University.

Description.—In this lower jaw specimen is preserved the anterior part of the horizontal ramus between the posterior end of the DM2 and the mental foramen.

The jaw is very small, slender for the cervids; the horizontal ramus is very low and thin, and its ventral border is slightly curved upward. The symphysis is moderately narrow, short and not constricted.

The lower teeth are preserved in the posterior half of DP4, DM1 and DM2, in which the premolar series is short and the molar series is long. All the other teeth are lacking.

DP4 is moderately large and has weak folding. The inner wall of the crown is almost straight or slightly undulated. DM1 is large and has three lobed. The anterior and the middle lobes are nearly of the same size, but the third lobe is larger than the others. The accessory columns are developed on the outer wall between the anterior and the median lobes and between the median and the third lobes. They are moderately large and cylindrical. The valley is rather shallow. DM2 is smaller than DM1 but has relatively distinct folds on the inner wall.

Measurements in mm:

(Jaw)

Preserved length of ramus	108 (+)
Preserved length of symphysis	38 (+)
Depth of ramus at the posterior end of symphysis	16.0
Depth of ramus at the posterior of DP4 on outer side	20.8
Depth of ramus at the posterior of DM1 on outer side	23.6
Depth of ramus at the posterior of DM2 on outer side	25.5
Thickness of ramus posterior to symphysis	8.5
Maximum thickness of ramus below DP4	10.6
Maximum thickness of ramus below DM1	12.4

*) Abbreviation for the Institute of Earth Sciences, Faculty of Science, Kagoshima University.

Maximum thickness of ramus below DM2	14.1
(Teeth)	
DP4 width	7.0
DM1 width	8.0; length
	21.2
DM2 width	7.7; length
	17.5
Total length of DP4-DM1	60(+)

Comparisons.—The present specimen is undoubtedly referred to the genus *Cervus*. But it is very difficult to determine the definite subgeneric and specific names, because it is much fragmentary and is considered to be immature.

The milk tooth of the present specimen is closely allied to that of the first molar (DM1) of the type specimen (Reg. No. 65576) of *Cervus (Deperetia) praenipponicus* SHIKAMA, the type species of the genus *Deperetia* from the Upper Pleistocene Kuzui Formation in having three lobes, each one of which has distinct accessory columns on the outer wall, as well as in size. Furthermore, the general outline of the ramus of the present specimen is also similar to that of the SHIKAMA's specimen.

Because of the absence of some important skeletal parts, I cannot compare the present species with other species of Japanese *Cervus*. The final decision of the specific name must be reserved until more material is obtained.

Further Remarks

The Ôe Formation, exposed in a small hill of the Hara-jô, southern part of the Shima-

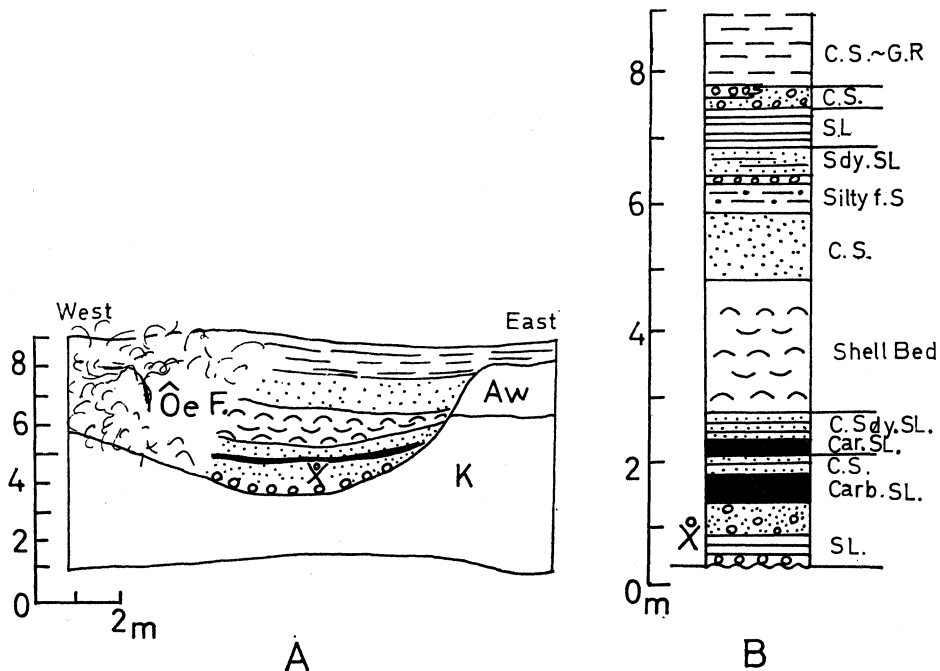


Fig. 2. A: The diagrammatical figure of the western cliff of the Hara-jô.
 B: Columnar section of the Ôe formation.
 K: Kuchinotsu group, AW: Aso welded tuff, Ôe F.: Ôe formation.

bara Peninsula, covers unconformably the eroded surface of the "Aso-welded tuff" member and the early Pleistocene Kuchinotsu Group (Ariake Bay Research Group, 1965). Since this formation was discovered by AMANO (1953), many geologists have discussed of its geological age and faunal significance based on the molluscan fossils.

The Ôe Formation unconformably overlies the Kuchinotsu Group at the level of about 2 meter above the sea level. It is as thick as 9 meters and is covered with a thin layer of volcanic ash. As shown in Fig. 1, the fossil deer was discovered from the lower part of the sequence. This formation is divided into three parts in lithologic characters. The lower part, about 2.8 m thick, is mainly composed of silt and containing considerable amount of drift woods. The middle part, about 2.8 m. thick, bears gregarious molluscan fossil. It has long been known as the so-called "Ôe shell bed". The upper part, about 4 m thick, is mainly composed of sand and gravels. Judging from the molluscan and the pollen fossils, this formation seems to have been deposited under the condition of rather warm climate (Ariake Bay Research Group, 1965). Recently the Ôe Formation has been correlated to the First Interglacial age of Würm based on the result of the carbon isotope age determination (Ariake Bay Research Group, 1965). That is, the Ôe Formation was formed during the times of Second transgression of Würm glacial age.

The vertebrate faunas of this age have hitherto been known from some localities of the Japanese Islands, of which that of the Upper Kuzuï Formation (SHIKAMA, 1949) is a representative one. A fossil deer from the Ôe Formation is the first discovery from the formation of the glacial age of Würm in Kyushu. The vertebrate fauna of this age in Japan has hitherto been considered as having affinities with northeastern Asia (Manchuria) and interpreted to have migrated from that region to the Japanese Islands through the Tsushima land bridge which was formed during the lowest sea level of the early age of Würm (SHIKAMA, 1949; KAMEI, 1962).

The species of Cervidae of the Ôe Formation appears to be important as an indicator of geological age, palaeogeographic land connection between Japan and the Continent and also of climatic conditions during the Würm age in west Japan, because this formation is situated near the western extremity of the Japanese islands. The final conclusion concerning the fossil deer from the Ôe Formation must be reserved until more material is obtained.

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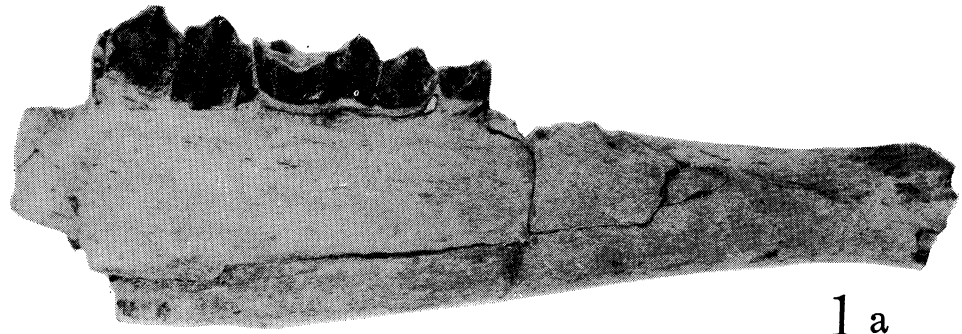
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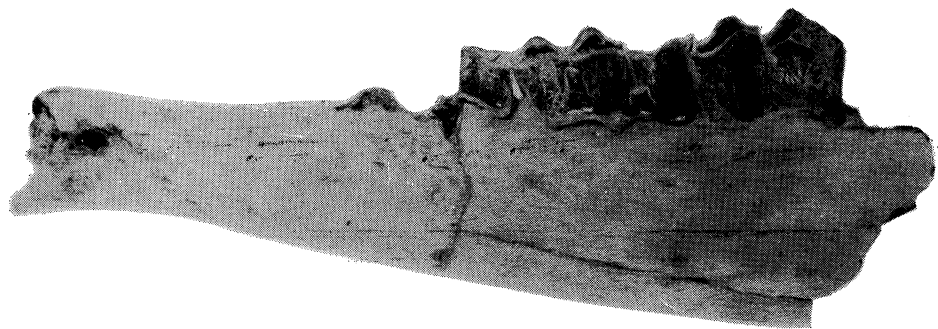
PLATE 3

Explanation of plate 3

Fig. 1. ESK. Reg. No. F-5006, a lower jaw of *Cervus (Deperetia ?)* sp. from the Ôe formation. Outer (a) , inner (b) and upper (c) views, $\times 1$.



1 a



1 b



1 c