THE DISCOVERY OF THE RIGHT WHALE SKULL IN THE KISAGATA SHELL BED

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INTRODUCTION

A skull of a big whale was discovered during the excavation work of constructing embankments at Kisagata Harbor, Akita Prefecture, on November 24, 1965. The skull was subsequently treated to be kept at the Kisagata-cho Aquarium. The news was delivered with photographs and a few materials to Nishiwaki through Prof. Mitsumasa Hashimoto and Prof. Yaichiro Okada.

Nishiwaki and Hasegawa visited Kisagata to identify of what skull it was and to witness the place of excavation in the summer of 1966. The exact point of excavation, however, could not be witnessed because the construction of embankments had been so advanced since the time of the discovery that the very point was not preserved as it had been. Consequently, informations of the situation and the environment of the discovery were collected and based on the observation on the exposed strata of the other point near by, the level of the layer where the skull had been buried in was presumed.

GEOLOGY

The skull had been buried in the lower part of the upper sand and gravel beds containning assemblages of molluscan shells. The result of the examination indicates that the beds were accumlated near the ancient coast line. Development of coastal dunes is remarkable in the area around the Kisagata Harbor. The thickness of dune sands near by the harbor is 1 to 2m. Under the dune sand, lies sand and gravel beds, 4 to 5m thick, are divided into two parts of layers by the border of milky white precipitate derived from mineral springs. Although there is no special difference between the two parts, the lower layers contained comparatively larger gravels. In the case of recognizing above mentioned border, the two parts can be separated.

Kisagata Shell Bed: The upper part of the upper sand and gravel beds is named here as the Kisagata Shell Bed. This layer is seen partly lenticular. The following 15 species were found in it, but *Serpulorbis imbricatus* and *Ostrea gigas* were most dominant in number.

1. *Tegula* (*Omphalius*) *rustica* (GMELIN)
2. *Serpulorbis imbricatus* (DUNKER)
3. *Batillaria multiformis* (LISCHKE)
4. *Neverita* (*Glossaulax*) *didyma* (RÖDING)
5. *Purpura* (*Mancinella*) *davigera* KUSTER

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6. *Babylonia japonica* (REEVE)
7. *Oliva mustelina* LAMARCK
8. *Narona* (*Solatia*) *nodulifera* (SOWERBY)
9. *Pseudogrammatodon dalli* (SMITH)
10. *Anadara* (*Scapharca*) *subcrenata* (LISCHKE)
11. *A.* (*S.*) *broughtonii* (SCHRENCK)
12. *Ostrea* (*Crassostrea*) *gigas* THUNBERG
13. *Protothaca jedoensis* (LISCHKE)
14. *Macoma incongrua* (V. MARTENS)
15. *Heteromacoma yantaiensis* (CROSSE et DEBEAOX)

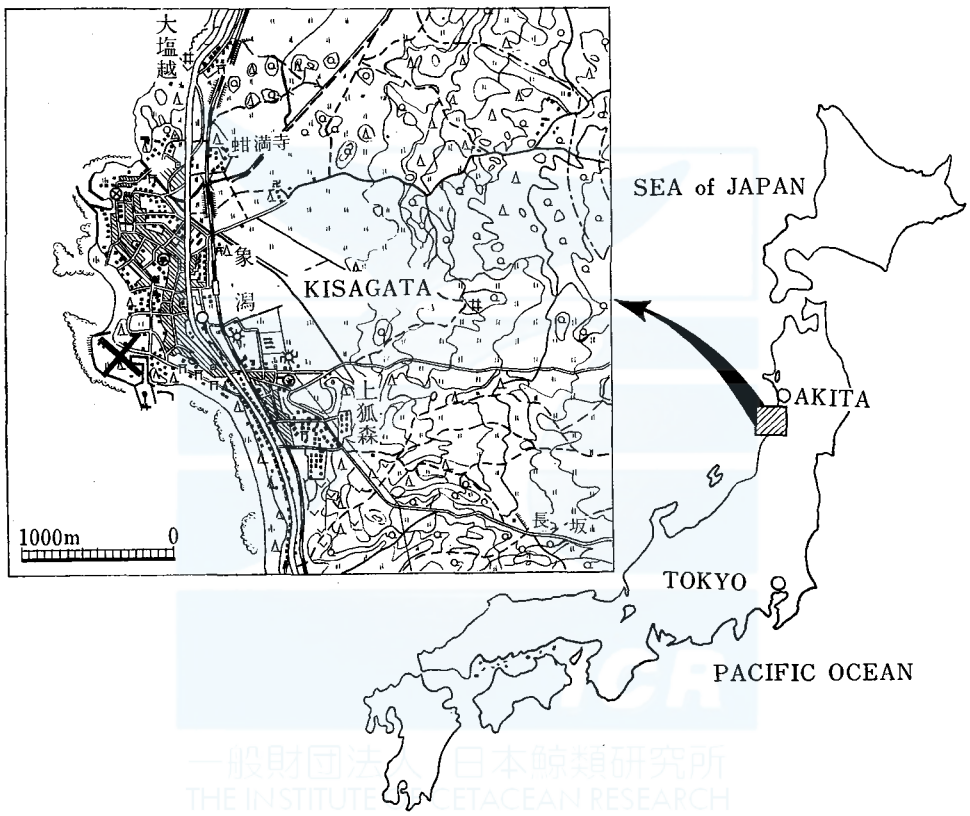

Fig. 1. The place (×) where the skull was found: Kisagata-cho, Akita Prefecture.

All the species are living ones, they inhabit along the coasts near the low tide level in Honshu and other southern islands of Japan. *Ostrea* and *Serpulorbis* are often found adhered collectively to the surface of boulders, this indicates that these species are indigenous to the locality. Discovery of this bed, especially densely contained gravel and shell, verify the ancinet coastline.

According to Gakuro Inamura (1942), the Kisagata area had once been the picturesque sea dotted with literally numberless islets (Fig. 2), however, in 1804 a

great earthquake happened, which caused the upheaval of ground and the beautiful sea was destroyed. The greater part of the area has turned to be paddy fields.

The layer in which the skull was found, was also a bed of sand and gravel mixture, lied just under the Kisagata Shell Bed and about 4m deep from the ground surface. Buried under the layer of coastal deposits, it is evident, the skull had been there since some time before 1804. However, nothing more can be presumed.

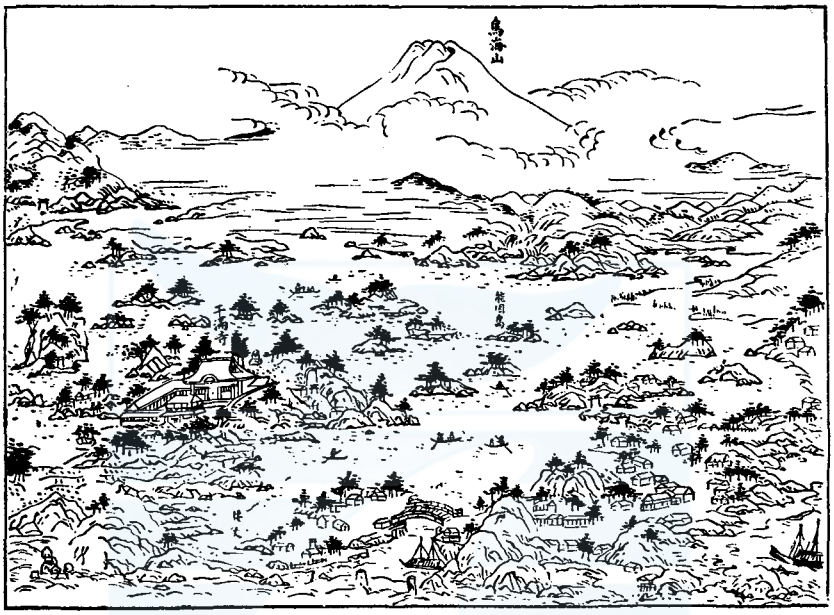

Fig. 2. The picture of the Kisagata area drawn by a local painter before the great earthquake in 1804. The scenery is the beautiful sea dotted with a great number of islets, known by the name of " ninetynine islets ". The point of the discovery is at the lower right corner.

EXAMINATION ON THE SPECIMEN

The squamosal was protruded horizontally, the mastoid process was largely swelling down, and compared the shape and the measured values of the occipital condyles with that of the living right whale, close similarity between them was found. Then discovered specimen can be identified as a right posterior part of skull of a right whale, *Eubalaena glacialis*. The skull had not been much fossilized. The whole skull, especially the part of occipital condyles were seen worn out and a stone of a human fist size had cracked into it. If readers reffer the formally published report by Omura (1958, and the report contained in this volume) in which the skeletons of this species are described, above comparison can be understood well.

This is the first record of discovery of part of remain of a right whale in the sediment on the coast of the Sea of Japan.

According to Tawnsend (1935), a considerable number of right whale population was found in the Sea of Japan about 100 years ago. Although in the North Pacific, several hundreds of right whale are presumed to be inhabited today and the number of whales seems to be increasing, very few have been found in the Sea of Japan. (Tago, 1900; Matsuura, 1936; Kuroda, 1938, 1940; Tomilin, 1957; Nishiwaki, 1965, 1967)

TABLE 1. DIMENSIONS OF THE SPECIMEN

	cm
Distance between center of ventral part of occipital condyles and outer end of squamosal	150
Distance between basal part of mastoid process and outer end of squamosal	90
Minimum height of squamosal at posterior end	43
Minimum antero-posterior length of squamosal	43
Antero-posterior length of mastoid process	45
Maximum width of mastoid process	40
Length of alar canal	21
Mimimum breadth of vomer	17
Distance between posterior end of occipital condyles and posterior edge of alar canal	74
Maximum thickness of occipital condyles (horizontal)	42+
Height of occipital condyle (vertical)	35+
Maximum breadth of occipital condyle	21+
Maximum breadth of foramen magnum	14
Length of a part of premaxilla	160
Maximum width of a part of premaxilla	16
Anterior width of a part of premaxilla	40
Thickness of premaxilla at sutual end	14

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EXPLANATION OF PLATES

PLATE I.

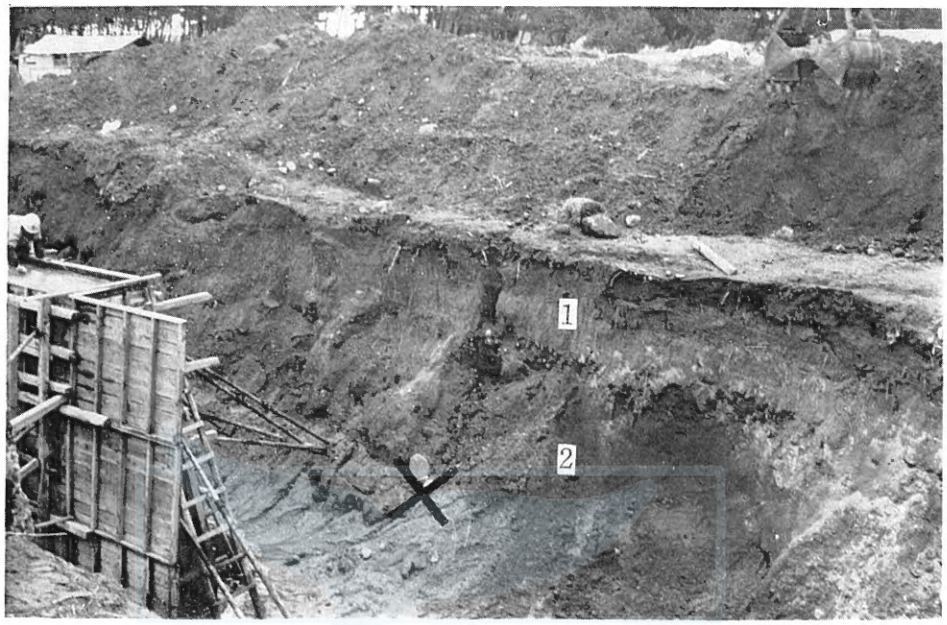
A. Environment of the spot of discovery.
   1. Dune sand at surface.
   2. Upper sand and gravel bed.
   X. approximate locality of the skull
B. Shells in the Kisagata Shell Bed.
C. Enlarged part of B.
   Surpulorbis and *Ostrea* are seen adhered to the surface of a boulder.

PLATE II.

A. Mineral spring's precipitate seen in the bed, and the constructing embankment at the south side of the bay is seen in the left.
   2. Upper bed.
   3. Lower bed.
B. Mineral spring predcipitate is seen between the upper and lower beds. The scene B is continued eastwared to scene A.
C. Shell bed (Sb), near by the scene B.
   1. Dune sand.
   2. Upper sand and gravel beds consist of coarse sand mixed with dispersed gravel.

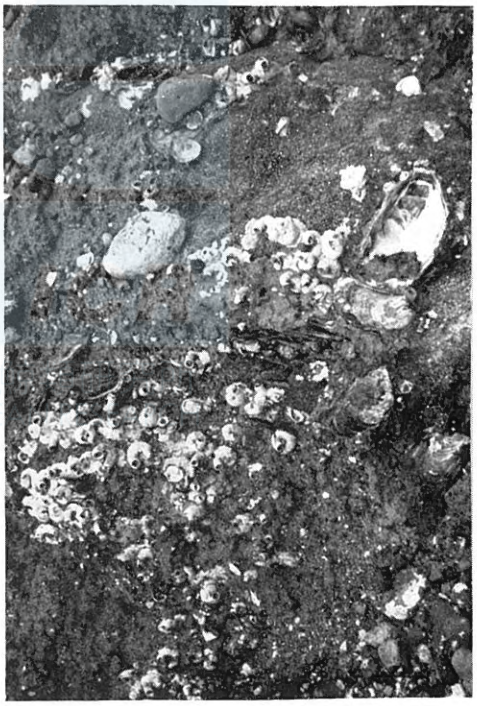
PLATE III. Photographs of the specimen.

A. Caudal view of the specimen.
B. Ventral view of the specimen.
C. A part of left premaxilla of the specimen. (outer side)
D. A part of left premaxilla of the specimen. (ventral side)



A

B



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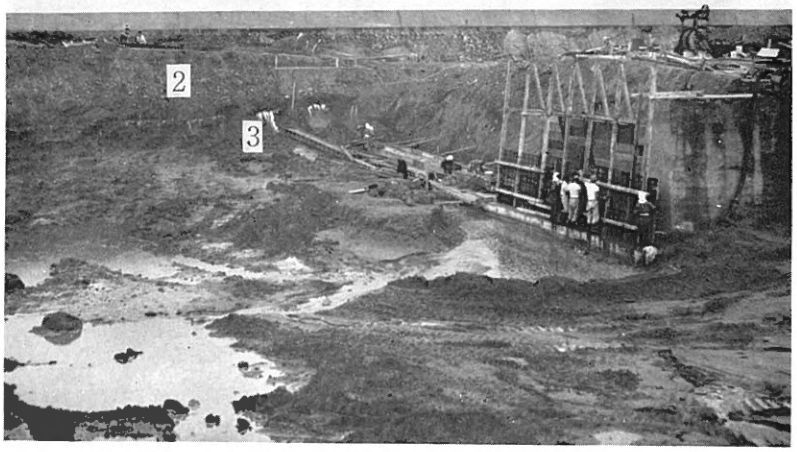

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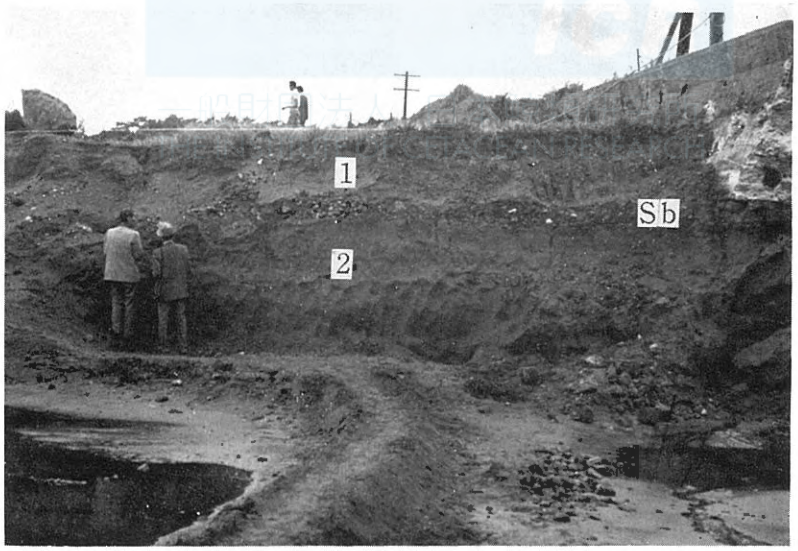

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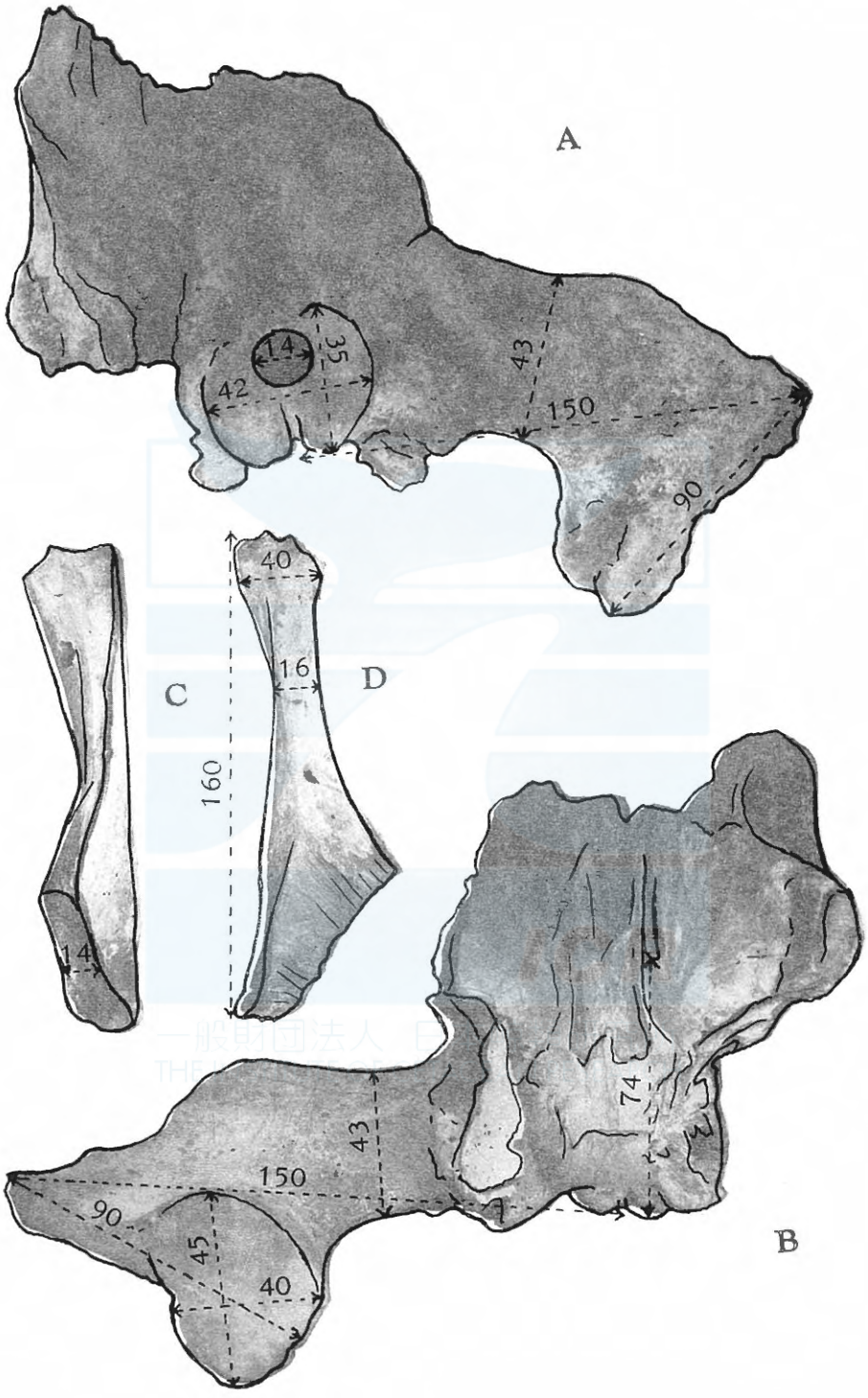
A
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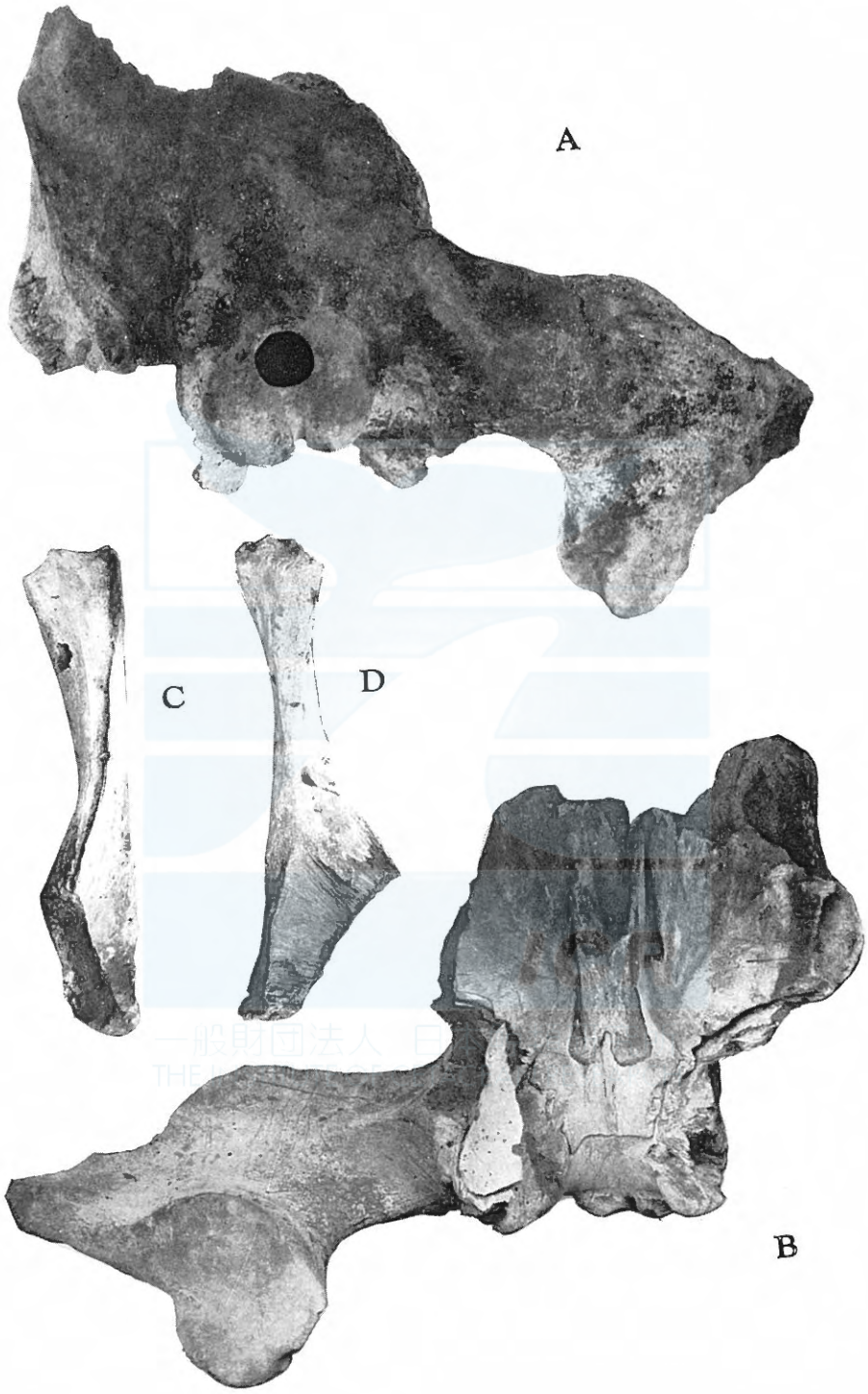
B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