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An Upper Cretaceous Plesiosaur (Family Elasmosauridae) from the Wakkanai area, Hokkaido

By

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Abstract Locality, horizon and preservation of newly excavated elasmosaur from the Middle Yezo Group in Japan is described. The specimen is assignable to the superfamily Plesiosauroidea since the ischia are relatively short and the humerus is massive. It is assigned to the family Elasmosauridae because the coracoids show a well-developed intercoracoid vacuity. From the evidences of the associated fauna of ammonites, radiolarians, and foraminiferans, we conclude the horizon of the elasmosaur to be Cenomanian.

Introduction

The remains of vertebrates including reptiles and fishes occur commonly in the sedimentary deposits of the Middle and Upper Yezo Groups [Cretaceous] of Hokkaido, together with ammonites, bivalves, gastropods and echinoids; yet to date only a few specimens have been described (e.g. by SHIKAMA, 1963; OBATA *et al.*, 1972; MATSUMOTO *et al.*, 1982; and SUZUKI, 1985). In 1985 one of us [Y.K.] found and collected a well-preserved and relatively complete postcranial skeleton of an elasmosaurid plesiosaurian from the Middle Yezo Group of the Wakkanai area of northern Hokkaido. Because this discovery is of palaeobiogeographical significance we now give a preliminary account of the locality, horizon and identification of the specimen.

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Locality

The specimen comes from the coastal cliff exposure at Chenaibo (Fig. 1A), which

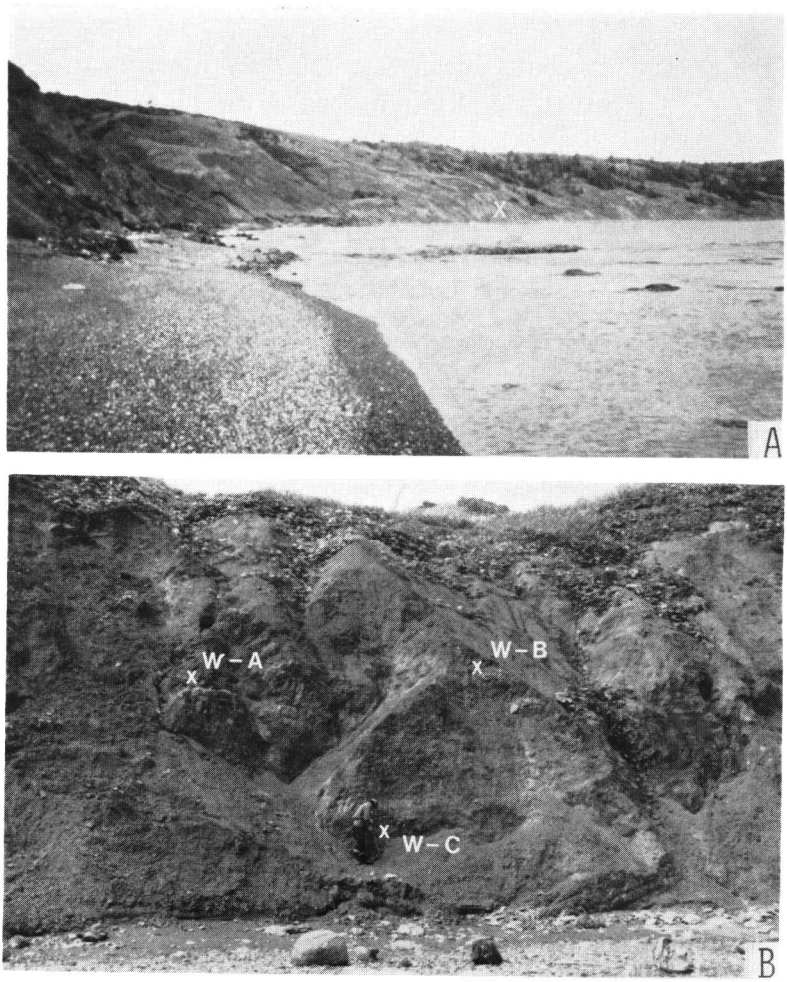

Fig. 1. The strata of the Middle Yezo Group exposed along the coastal cliff at Chenaibo in the Wakkanai area (A) and the sample positions (B).

is situated about 1 km to the north of Higashiura in the Wakkanai area, northern Hokkaido (Fig. 2). The bones are embedded in a large calcareous nodule, which came from a shale bed containing a few plant fragments.

The exposed strata near Chenaibo are of Upper Cretaceous age (e.g. ETO, 1951; OSANAI *et al.*, 1957; MATSUMOTO and OBARA, 1971; MATSUMOTO, 1982). OSANAI *et al.* (1957) included the locality within the Chenaibo Formation (Cr_1) of the Middle Yezo Group. MATSUMOTO and OBARA (1971) stated that the strata are of Cenomanian to Santonian age according to the evidence of the ammonite and inoceramid fauna, and they have a complicated geological structure. Our field survey indicates that the detailed stratigraphy is obscured by extensive landslips.

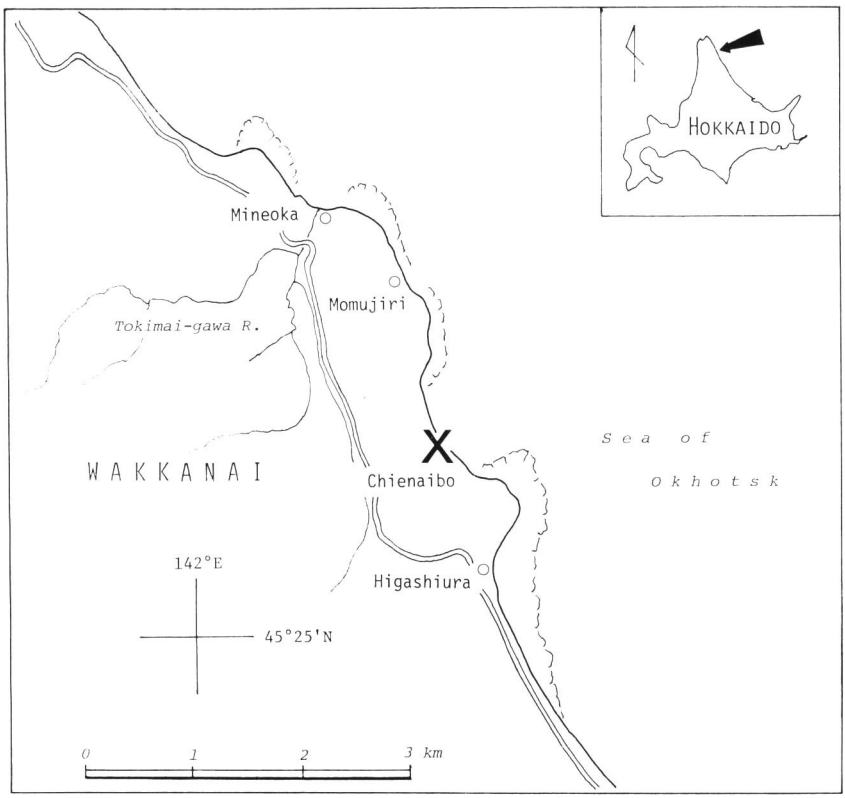

Fig. 2. Index-map of the Wakkanai area in northern Hokkaido.

Horizon

Numerous invertebrate fossils were recovered from 3 sample positions (Fig. 1B) within calcareous nodules from the same bed as the plesiosaur: the species are listed in Table 1. Of the ammonites the following geological ranges are known: *Parajaubertella kawakitana* is recorded from the Upper Albian to the Cenomanian in Hokkaido, and *Zelandites inflatus* from the Middle Cenomanian (MATSUMOTO, 1959) and *Puzosia nipponica* occurs in the Middle and Upper Cenomanian. Geological age ranges for the micro-fossil assemblages can be deduced: the planktonic and benthic foraminiferans are assignable to the *Rotalipora* and *Textularia hikagezawaensis* Range-zones (of MAIYA and TAKAYANAGI, 1977), respectively, and indicate the Cenomanian; and the radiolarian species are assignable to the *Diacanthocapsa euganea-Thanarla elegantissima* Zone (of TAKETANI, 1982), which indicates Upper Albian to Cenomanian. Thus we conclude the horizon of the plesiosaur to be Cenomanian.

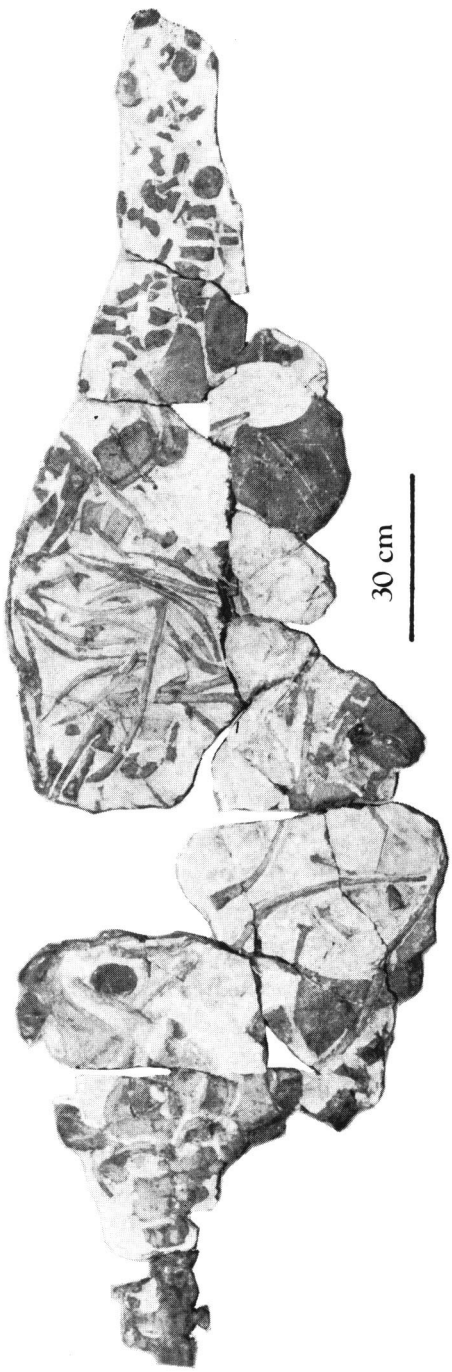

Fig. 3. The incomplete postcranial skeleton of an elasmosaur from the Wakkanai area.

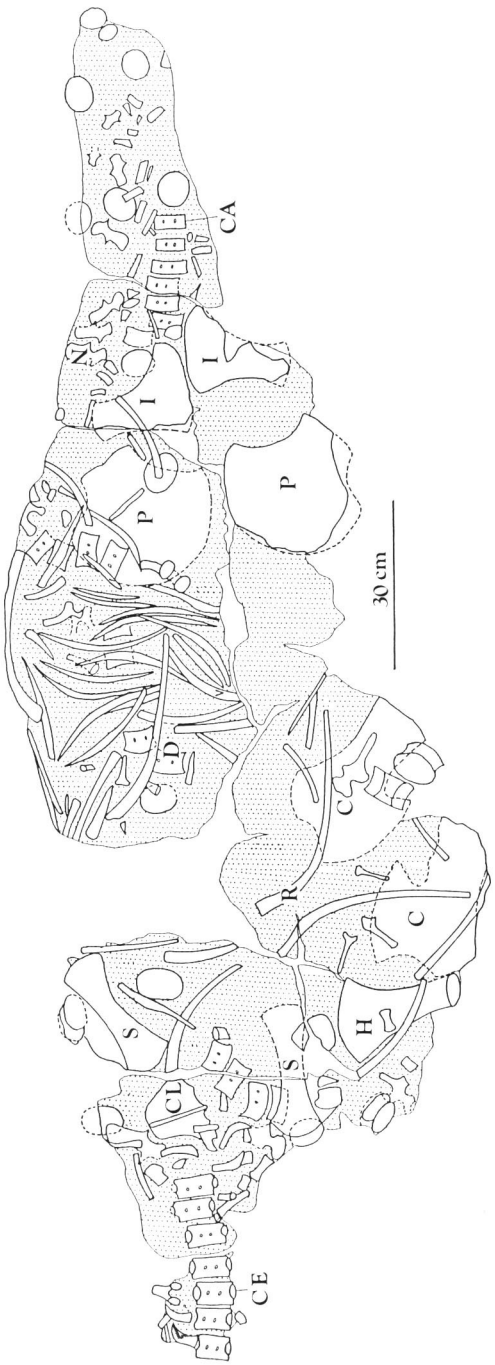

Fig. 4. Drawing of the incomplete posteranial skeleton of an elasmosaur from the Wakkanai area. C, coracoid; CA, caudal vertebra; CE, cervical vertebra; CL, clavicle; D, dorsal vertebra; H, humerus; I, ischium; N, neural spine; P, pubis; S, scapula; R, rib; V, ventral rib.

Table 1. List of the fossils recovered from the same bed as the plesiosaur specimen.

Species	Sample position [see Fig. 1 B]
AMMONOIDEA	
Neophylloceras (?) sp.	W–B
Zelandites cf. *Z. inflatus* MATSUMOTO	W–B
Parajaubertella kawakitana MATSUMOTO	W–B
Puzosia sp. cf. *P. nipponica* MATSUMOTO	W–A
RADIOLARIA	
Archaeospongoprunum cortinaensis PESSAGNO	W–A, B
Stichomitra communis SQUINABOL	W–A
S. (?) *zamoraensis* PESSAGNO	W–A
S. (?) *euganea* (SQUINABOL)	W–C
Thanarla elegantissima (CITA)	W–C
Pseudodictyomitra pentacolaensis PESSAGNO	W–C
P. pseudomacrocephala (SQUINABOL)	W–A, C
Novixitus weyli SCHMIDT-EFFING	W–C
Sethocapsa simplex TAKETANI	W–C
Squinabollum fossilis (SQUINABOL)	W–C
Holocryptocanium barbui DUMITRICA	W–C
H. geysersense PESSAGNO	W–C
FORAMINIFERA	
Hedbergella delrioensis CARSEY*	W–C
Praeglobetruncana stephani (GANDOLFI)*	W–C
Ramulina sp. indet.	W–A
Bathysiphon akanosawensis TAKAYANAGI	W–C
B. alexanderi CUSHMAN	W–C
Glomospira charoides (JONES & PARKER)	W–C
Haplophragmoides asanoi TAKAYANAGI	W–C
H. obesus TAKAYANAGI	W–C
H. calculus CUSHMAN & WATERS	W–C
H. sp. indet.	W–C
Ammodiscus hashimotoi TAKAYANAGI	W–C
Reophax clavulina (REUSS)	W–C
Textularia hikagezawaensis TAKAYANAGI	W–C
Trochammina yubariensis TAKAYANAGI	W–C
Cibicides obiraensis TAKAYANAGI	W–C
Dentalina catenula REUSS	W–C
D. basiplanata CUSHMAN	W–C
D. megaropolitana REUSS	W–C
D. sp. indet.	W–C
Gyroidina globosa (HAGNOW)	W–C
G. globosa rumoiensis TAKAYANAGI	W–C
Lenticulina yabei TAKAYANAGI	W–C
Oolina globosa (MONTAGU)	W–C
O. apiculata REUSS	W–C
Palmula sp. indet.	W–C

Among the foraminiferans the planktonic species are indicated by asterisk (*). All the others are benthonic.

Preservation and Identification

The specimen, which is in a calcareous nodule 2.5 m in length, comprises most of the trunk region together with the posterior part of the neck and anterior part of the tail (see Figs. 3, 4). It was preserved lying on its back, and the neck, tail, scapulae, pubes, ischia and gastralia ('ventral ribs') have remained approximately *in situ*. The dorsal vertebrae have been disturbed, and the coracoids have been displaced to the left side. It is a juvenile individual because the neural arches are not fused to the centra, and because the ratio of height/length and breadth/length of the vertebrae is large. Judging from the distance between the almost undisturbed scapular glenoid and pelvic acetabulum the animal may have had a maximum length of four or five metres.

The specimen is assignable to the superfamily Plesiosauroidea since the ischia are relatively short and the humerus is massive (WELLES, 1962; BROWN, 1981). It is assigned to the family Elasmosauridae because the coracoids show a well-developed intercoracoid vacuity (WELLES, 1962).

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