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A NEW SPECIES OF ZAMITES FROM  
THE NISI-NAKAYAMA BED,  
YAMAGUTI PREFECTURE

By

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*With 1 Text-figure*

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The Nisi-Nakayama Bed<sup>1)</sup> is a marine formation of the Upper Liassic age developed in a limited area along the lower course of the Yosida River, and is characterised by the content of a number of species of Ammonites described by Dr. YOKOYAMA. The bed is conformably underlain by the Higasi-Nagano Bed containing Middle Liassic Trigonidae and corals and overlain by the Utano Bed with *Inoceramus* remains. The fossil plant dealt with in this paper was found by Mr. T. KIZIMA from the black shale exposed at the bottom of the river at Tarai<sup>2)</sup>, Toyora-gun, Yamaguti Prefecture, and forwarded to our Department for examination. The slab of black shale with the fossil plant under consideration bears an impression of an Ammonite closely resembling *Hildoceras chrysanthemum* YOKOYAMA characteristic to the Nisi-Nakayama Bed, and there is little doubt that the plant itself is at least not younger than the Upper Liassic. The black shale at Tarai is possibly a north-eastern prolongation of the similar rock exposed at Isimati<sup>3)</sup> from which *Hildoceras chrysanthemum* and some other species of Ammonites have been described by Dr. YOKOYAMA.

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(1) S. ÔISHI: On the Tetori Series, with Special Reference to its Fossil Zones. Journ. Geol. Soc., Tôkyô, Vol. XL, No. 482, 1933, p. 670 (in Japanese).

(2) 手洗 (3) 石町

Some years ago Prof. H. YABE<sup>1)</sup> figured cfr. *Zamiophyllum Buchianum* (ETT.) which is said also to have been found in the Nisi-Nakayama Bed at Nisi-Nakayama, ca 4 km. SW of Tarai. The present writer examined the specimen at the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai: it was indeed closely allied to *Zamiophyllum Buchianum* (ETT.) externally. But the occurrence of a Wealden species from the Liassic rock is quite doubtful, if the specimen was really derived from the Nisi-Nakayama Bed. The present writer thinks that Prof. YABE is certainly careful in calling the specimen cfr. *Zamiophyllum Buchianum*. The writer's own opinion on YABE's specimen and the genus *Zamiophyllum* may be expressed in a separate note in the near future.

*Zamites toyoraensis* sp. nov.

The new species is established on a single fragment of well preserved frond. The diagnosis follows:

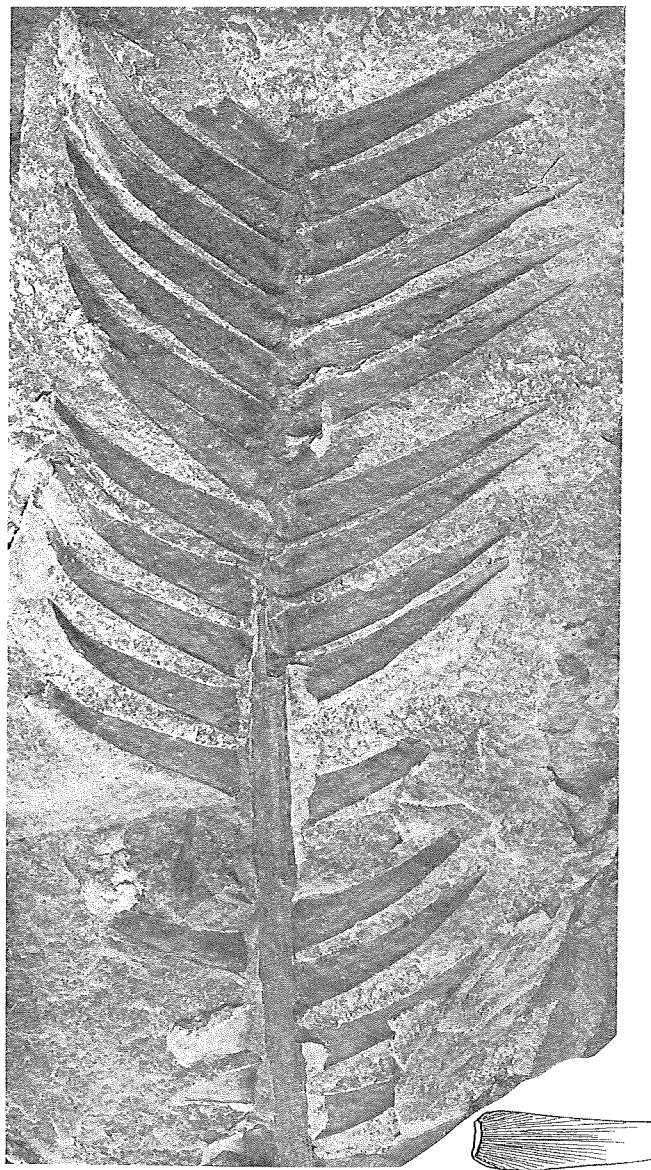
Frond of unknown size and form, more or less linear, more than 14 cm. long, and 7 cm. broad at the broken distal end, narrowing gradually towards the base. Pinnae closely set or somewhat distant, linear, straight or slightly falcate, gradually tapering towards the acuminate apex, and attached to the upper face of the thick rachis 5 mm. across on the impression by a rounded symmetrical and non-auriculate base with callosity, at an angle of 60°–80°. Nerves slender, dense, bifurcating frequently, parallel to each other except at the base where they are somewhat divergent and number 25–30 at the basal broadest portion.

The genus *Zamites* was instituted by BRONGNIART in 1828 including a considerable number of different types of fronds more or less resembling those of the recent genus *Zamia*. The essential external character of this genus as later delimited by HALLE<sup>2)</sup> on the basis of the Graham Land material is that the pinna-base is always symmetrical, a feature through which it can be distinguished from the allied genera, *Otozamites* and *Ptilophyllum*. As mentioned in the above diagnosis, the pinna-base in the present specimen is symmetrical as can be seen in the accompanying text-figure, and there

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(1) H. YABE: Notes on Some Fossil Plants from Japan, Korea and China. Sci. Rep., Tôhoku Imp. Univ., 2nd Ser., Vol. VII, No. 1, 1922, p. 19, Pl. III, fig. 3.

(2) T. G. HALLE: The Mesozoic Flora of Graham Land. Wiss. Ergebn. Schwed. Suedpolar-Expedition, 1901–1903, Bd. III, Lief. 14, 1913, p. 54.



*Text-figure.* *Zamites toyoraensis* sp. nov. Natural size.  
(Reg. No. 6303).

is little development of the anterior lobe of the pinna-base as is characteristic to the genus *Otozamites*.

*Zamites toyoraensis* is closely allied to *Zamites Feneonis* BRONGN. figured by several authors from the Middle or Upper Jurassic rocks of Europe, and certain specimens figured by SAPORTA<sup>1)</sup> seem to be hardly distinct from the present species. However, the reasons why the present writer kept separate the Japanese form from the European one are that, first, the nerves in the former are considerably denser than those in the latter, and secondly, there is a difference in the geological age of the rocks from which the Japanese and the European specimens have been derived.

Locality and geological horizon: Tarai near Nisi-Nakayama, Toyora-gun, Yamaguti Prefecture; the Nisi-Nakayama Bed (Upper Liassic).

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(1) G. DE SAPORTA: *Plantes Jurassiques*, tom. II, 1878, p. 99, Pl. LXXXVIII, figs. 1 and others.