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ON THE OCCURRENCE OF A DIPTERIDACEOUS  
FERN FROM THE TETORI SERIES OF  
TOYAMA PREFECTURE

By

Saburô ÔISHI

*With 1 Text-figure*

(Contribution from the Department of Geology and Mineralogy,  
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A few days ago Professor S. IMAMURA of the Toyama Higher School sent the present writer for examination a fossil plant which he collected from the Tetori Series (Upper Jurassic) of Toyama pref. The locality of the fossil is Omatagawa, Higasitane, Sirahagimura, Naka-Niikawa-gun, Toyama prefecture<sup>(1)</sup>. The fossil is an impression of a frond as figured in the annexed text-figure and impressed on a slab of sandy shale of brown colour. The same slab bears some impressions of imperfect needle-like leaves probably belonging to the coniferous plant generally known under the generic designation *Pityophyllum*, but its specific name is hardly determinable<sup>(2)</sup>.

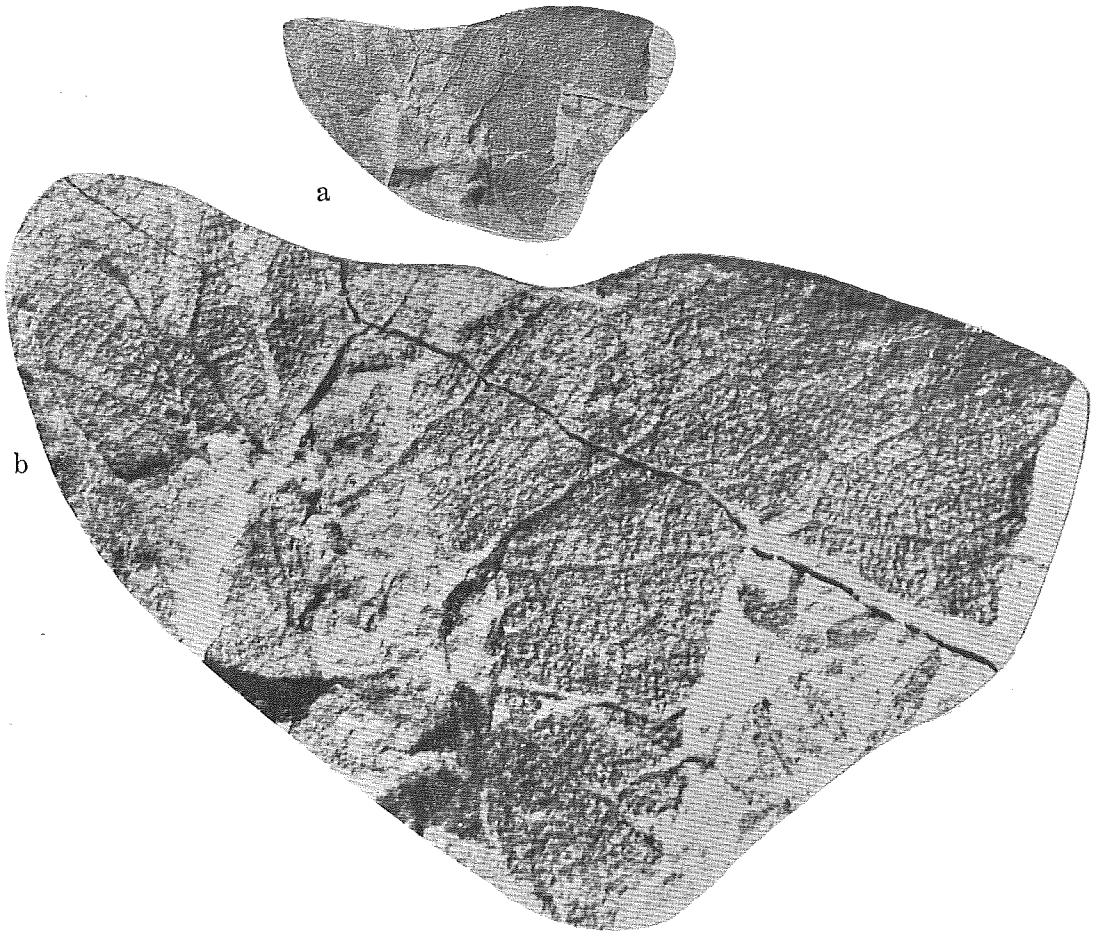
The fossil under consideration shows, though it is imperfect, a characteristic anastomosing nervation of dipteridaceous fern and the general habit of the lamina suggests that the plant may be a fragment of *Hausmannia* (s.l.)<sup>(3)</sup>. The lamina is somewhat broad,

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(1) 富山縣中新川郡白萩村東種小又川

(2) After the manuscript of this paper was completed, the writer received from Mr. IMAMURA some additional fossil plants, which occurred in association with the specimen in question. They are *Equisetites ushimarensis* (YOKOYAMA), *Onychiopsis elongata* (GEYLER), *Cladophlebis exiliformis* (GEYLER), and *Nils-sonia orientalis* (HEER).

(3) ÔISHI and HUZIOKA (formerly YAMASITA) once briefly summarised and classified the fossil Dipteridaceae; see S. ÔISHI and K. YAMASITA: On the Fossil Dipteridaceae. Jour. Fac. Sci., Hokkaidô Imp. Univ., Ser. IV, Vol. III, No. 2, 1936.



*Hausmannia (Protorhipis)* sp. Loc. Omatagawa, Higasitane, Sirahagi-mura, Naka-Niikawa-gun, Toyama Prefecture. a,  $\times 1$ ; b,  $\times 3$ .

being more than 3 cm. high and 4 cm. broad; no true margin is preserved. The nervation is distinct and stands out clearly in relief. More than seven primary (?) nerves radiate from the basal central portion of the specimen into the lamina, taking somewhat zigzag course. They seem to fork in their distal parts, but it is questionable whether they do so in regular dichotomy. The secondary nerves are nearly at a right angle to the primaries and form polygonal

meshes with each other and with the primaries. The tertiary nerves are finer and branch out frequently to form finer meshes.

It is by no means easy to settle with any degree of certainty the generic position of the present specimen among Dipteridaceae, but the presence of such well-defined radiating primary nerves and the comparatively broad lamina shows that the specimen may be referable to *Protorhipis*, a subgeneric type of *Hausmannia*. Therefore, the present writer proposes provisionally to call the specimen in question *Hausmannia (Protorhipis)* sp., until better material available for definite specific determination may be supplied.

The present discovery of a fern of *Protorhipis* type is particularly interesting and worthy of attention, the occurrence of Dipteridaceae itself in the younger Mesozoic strata being not frequent in any part of the world. From the younger Mesozoic strata in eastern Asia, there is only a single record of an imperfect specimen of a dipteridaceous fern derived from the Rakutô Series of Tyôsen, and it has provisionally been determined by the present writer as *Hausmannia* ? gen. et sp. indet.<sup>(1)</sup> KRYSHTOFOVICH<sup>(2)</sup> reported the occurrence of *Hausmannia Kohlmanni* RICHTER from the Nikanian Series of Ussuriland, however, with neither description nor illustration.

In concluding the writer wishes to express his cordial thanks to Prof. S. IMAMURA for his kind offer of this plant fossil to the Department for study.

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(1) S. ÔISHI: The Mesozoic Floras of Japan. Journ. Fac. Sci., Hokkaidô Imp. Univ., Ser. IV, Vol. V, Nos. 2-4, 1940, p. 223, Pl. V, figs. 5, 5a.

(2) A. KRYSHTOFOVICH: Baikal Formation of the Angara Group. Trans. U. Geol. Prosp. Serv., U. S. S. R., Fasc. 326, 1933, p. 49. See also A. KRYSHTOFOVICH and V. PRYNADA: Contribution to the Mesozoic Flora of Ussuriland. Bull. U. Geol. Prosp. Serv., U. S. S. R., Vol. LI, Fasc. 22, 1932, p. 367 (as *H. aff. Kohlmanni* NATH.).