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AUTHORS: R H WAGNER

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# ANASTOMOPTERIS, A NEW PLANT FOSSIL GENUS FROM THE CARBONIFEROUS OF ANATOLIA

R. H. WAGNER

N. V. De Bataafsche Petroleum Maatschappij, Holland

**ABSTRACT** — A single specimen of an odontopteroid plant fossil is described from the Westphalian C-D of Azdavay, in northern Anatolia. Its broadly attached pinnules show the presence of sub-parallel nervules which are anastomosing freely. It thus combines the properties of the genera *Odontopteris* and *Linopteris* s. l. (including *Reticulopteris*). Consequently, it should be considered as representing a new genus which stands to *Odontopteris* in the same relationship as *Linopteris* to *Neuropteris*. For this new genus the name *Anastomopteris* is proposed.

## INTRODUCTION AND GENERAL CONSIDERATIONS

In the collections of the Mineral Research and Exploration Institute of Turkey, in Ankara, a single specimen of a curious plant fossil has been found which shows a combination of properties not yet described for, any plant fossil genus from Paleozoic strata.

The specimen in question was collected in 1955 by Dr. W. T. FRATSCHNER in the surroundings of Azdavay, one of the easternmost occurrences of continental Carboniferous strata in northern Anatolia. Unfortunately, the locality has not been specified more exactly, so that the geological age of the specimen remains somewhat obscure. To judge from other collections of plant fossils made in the same region by Dr. FRATSCHNER, however, it may be supposed that it came from strata of Westphalian C or D age. This opinion finds support in the association with fragments of *Linopteris obliqua* var. *bunbyri* BELL which commonly occurs in strata of the cited age.

The specimen discussed here is preserved in a light brown compact shale which has guarded the imprint of the

terminal fragment of a pinna of the last order. It shows a fairly long and slender terminal at the end of two alternating rows of subcuneate, rounded pinnules which are attached by the entire base. The nervation consists of steeply ascending, parallel or sub-parallel nervules which are anastomosing freely. The habit and nervation of the pinnules as well as the shape of the terminal do remind rather forcibly of certain figures of *Odontopteris subcuneata* BUNBURY (cf. BELL, 1938, PL LVII, fig. 5)<sup>1</sup>. However, the latter species does not have anastomosing nervules such as clearly occur in the specimen at hand. This characteristic sets it apart as well from the other species of *Odontopteris* BRONGNIART, as these are all characterized by strictly parallel or sub-parallel nervules without anastomosis.

The only known genera of Paleozoic fern-like foliage which show the anastomosis of nervules, are *Linopteris* PRESL, *Reticulopteris* GOTHAN, *Lonchopteris* BRONGNIART, *Emplectopteris* HALLE and

<sup>1</sup> W. A. BELL (1938) : Fossil Flora of the Sydney Coalfield, Nova Scotia - *Mem. Geol. Survey Canada*, 215, p. 1-115, PL. I-CVII.

*Emplectopteridium* KAWASAKI<sup>2</sup>. It has been observed already by several authors that all these genera, which may be representing Pteridospermae, have their counterparts in other genera featuring pinnales of similar habit and nervation but without the anastomosis of nervules. In this scheme, the following counterparts can be recognized: *Linopteris-Neuropteris* (*Paripteris*); *Reticulopteris-Neuropteris* (*Imparipteris*) incl. *Mixoneura*?; *Lonchopteris-Alethopteris*; *Emplectopteris-Lescuropteris*?; *Emplectopteridium-Callipteridium*. Pairing off in this fashion all the similar looking pinna genera with and without anastomosing nervules, there remains only the genus *Odontopteris* BRONGNIART to be accounted for. This genus obviously belongs in the same alliance as *Neuropteris*, *Alethopteris* and *Callipteridium* and, consequently, could be expected to possess also a counterpart with anastomosing nervules. The open place for this counterpart could seemingly be occupied very well by a genus characterized by those properties as displayed by the specimen figured and described in the present paper. Therefore, it is proposed here to create a new genus, *Anastomopteris*, for the specimen in hand, which combines the features of *Odontopteris* with the anastomosis of nervules.

#### DESCRIPTION OF SPECIMEN

*Anastomopteris* n. gen.

Imparipinnate pinnae with broadly attached pinnales which are characterized by steeply ascending, parallel or sub-parallel, anastomosing nervules.

*Anastomopteris azdavayi*<sup>3</sup> n. gen. et. sp.  
Pl. I, fig. 1a-b.

<sup>2</sup> The Permian genera *Gigantopteris*, *Glossopteris* and *Gangamoptens*, which are also characterized by the anastomosis of nervules, are left out of consideration.

<sup>3</sup> Named after the locality situated in the region of Azdavay, in northern Anatolia (Turkey).

Architecture of frond unknown.

*Pinna* of the last order gradually tapering towards a long and slender terminal.

*Rachis* of the last order smooth and slender.

*Pinnules* attached with the entire base, obliquely inserted, subcuneate in habit, with a rounded apex.

*Midrib* absent or faintly indicated.

*Nervules* steeply ascending, derived from the rachis, parallel or sub-parallel, anastomosing in long and narrow meshes (dimensions: about 2 mm long and 0.5 mm broad) which run parallel to the pinna's margins.

*Fructification* unknown.

#### COMPARISONS

The habit of *Anastomopteris azdavayi* n. gen. et sp. is very similar to the one displayed by certain fragments of *Odontopteris subcuneata* BUNBURY, from which it can be easily distinguished, however, by noting the anastomosis of nervules in the species discussed here.

There is only one other species in literature which shows also a combination of odontopterid features with the anastomosis of nervules. This species has been described under the name of *Reticulopteris odontopteroides* REMY<sup>4</sup>. The genus *Reticulopteris* has been introduced by GOTHAN for imparipinnate species of *Linopteris* s.l., and in particular for *Reticulopteris munsteri* (EICHWALD). The latter species as well as *Reticulopteris odontopteroides* REMY show partly neuropteroid and partly odontopteroid pinnales with a generally distinct midrib and steeply ascending nervules which are

<sup>4</sup> W. REMY (1953): *Reticulopteris* («*Linopteris*») odontopteroides n. sp. und die dazugehörige Fruktifikation - *Geologie*, II, 2, p. 146-149, Taf. I-II.

anastomosing in a network. The combination of neuropterid and odontopterid characteristics of the pinnules makes *Reticulopteris* GOTHAN the counterpart of *Mixoneura* WEISS. Yet, it has been defined more amply to embrace all the imparipinnate *Neuropterids* with anastomosing nervules, so that *Reticulopteris* GOTHAN stands at present as the counterpart of both *Imparipteris* GOTHAN and *Mixoneura* WEISS. Just like there are transitional species between *Mixoneura* and *Odontopteris*, there will be transitional forms between *Reticulopteris* and *Anastomopteris* as well. A case in point may be *Reticulopteris odontopteraides* REMY which

could eventually be ascribed as well to *Anastomopteris* if a more complete material would reveal a predominance of odontopteroidpinnulest.

*Reticulopteris* (*Anastomopteris*?) *odontopteroide*s REMY can be distinguished from *Anastomopteris azdavayi* n. sp. by noting the markedly bigger size of the pinnules as well as the larger dimensions of the meshes between the anastomosing nervules of the former species. Moreover, it could be observed that *Reticulopteris odontopteroide*s REMY has pinnules with a more distinctly developed midrib than those of *Anastomopteris azdavayi* n. sp.

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R.

H.

WAGNER

PLATE-I

