

***Gomphotherium angustidens* (CUVIER, 1806)  
(*Proboscidea*, *Mammalia*) from the Miocene of Bełchatów  
and the Proboscidean Datum in Poland**

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**Abstract:** Two isolated molars of *Gomphotherium angustidens* belonging to a destroyed skull have been collected from the coal seam in the brown coal mine of Bełchatów in Central Poland. This seam is situated directly below a tuffite dated at  $18.1 \pm 1.7$  MA. Limnic sediments of the same geological level as that bearing the mastodont teeth, known as Bełchatów – C contain a rich fauna of small mammals pointing to mammalian zone MN 4. If the dating of the tuffite is correct, this discovery suggests that the Proboscideans appeared in Poland more than 18 MA ago.

**Key-words:** fossil mammals, *Proboscidea*, stratigraphy, Miocene Poland.

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## I. INTRODUCTION

The brown coal mine of Bełchatów in Central Poland contained Miocene shells of molluscs and remains of small mammals in the layers of limnic sediments intercalated between coal seams. Three main horizons with animal remains have been discovered: the upper, called Bełchatów – A, the middle one, Bełchatów – B and the lowermost, Bełchatów – C (STWORZEWICZ, SZYNKIEWICZ 1989, STUCHLIK et al. 1990, KOWALSKI 1993a and b). Recently, for the first time remains of large mammals have been found in brown-coal layers. One of them was the skull of a proboscidean discovered by the senior author in a thin brown coal seam between limnic sediments overlaying the main coal seam of the Bełchatów mine. They form a part of the fossiliferous horizon known as Bełchatów – C. The skull was in a very bad state of preservation and became partly destroyed during the exploitation of the coal, so that only two molars could be saved. They are the object of the present study.

Directly above the layer with the remains of *Gomphotherium* a conspicuous layer of tuffite can be seen in the section. The circones in the tuffite were dated by track method

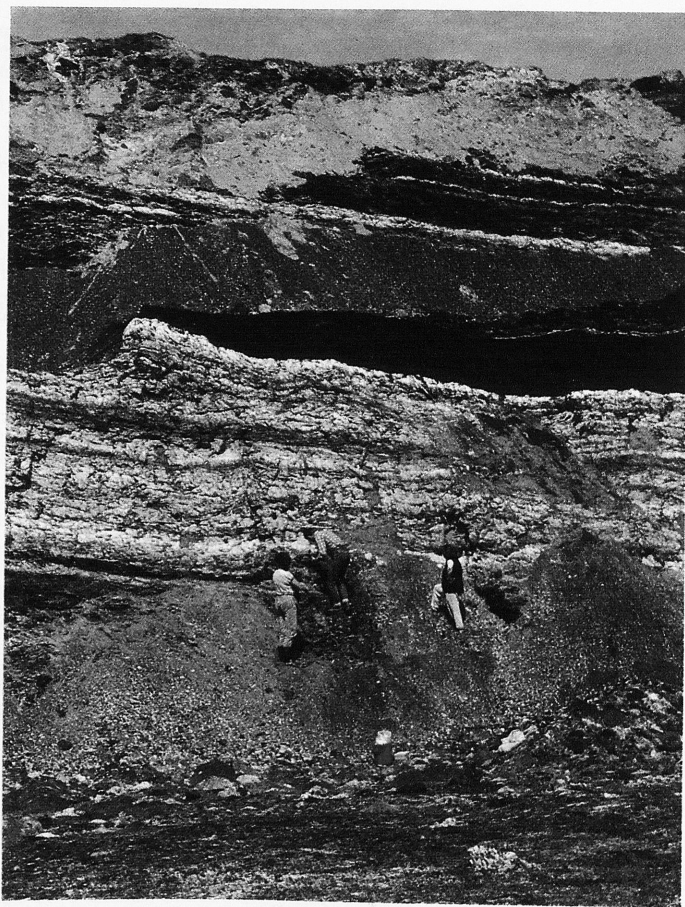


Fig. 1. The section of fossiliferous layers of Bełchatów – C. Mastodon teeth were found at the base of the white limnic sediments. Phot. K. KOWALSKI.



Fig. 2. *Gomphotherium angustidens* (CUVIER, 1806).  $M^2$  -  $M^3$  dex., Bełchatów, Poland. Occlusal view, ca. 0.3 of natural size. Phot. H. KUBIAK.



Fig. 3. Teeth of *Gomphotherium angustidens* in Bełchatów C *in situ*. Phot. K. KOWALSKI.

at 18.1-1.7 MA (BURCHART et al. 1988). The limnic sediments belonging to level Bełchatów – C contained remains of rodents (KOWALSKI 1993 b) which point to mammalian zone MN 4. The discovery of *Gomphotherium* is, on the one hand, important for the dating of this part of sediments of Bełchatów, and on the other hand, it contributes to the determination of the Proboscidean Datum, the age of appearance of the earliest Proboscideans on the European continent.

So far, the remains of *Gomphotherium angustidens* have been known from two Miocene localities in Poland: Opole 1 (WEGNER 1913) and Przeworno 2 (KUBIAK 1975), both in Lower Silesia.

In the coal layer containing remains of *Gomphotherium* a fragment of a mandible with one complete and another fragmentary molar, belonging to *Chalicotheriidae* was also collected.

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The teeth described in the present paper are housed in the collection of the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Cracow (N<sup>o</sup> MF/2142).

## II. SYSTEMATIC PART

Family: *Gomphotheriidae*

Genus *Gomphotherium* BURMEISTER, 1937

*Gomphotherium angustidens* (CUVIER, 1806)

Material (MF/2142/1-2) and dimensions.

M<sup>2</sup> dex.: 105.2 × 65.4 mm

M<sup>3</sup> dex.: 142.0 × 78.0 mm

Length of M<sup>2</sup>-M<sup>3</sup>: 241 mm

Description. Both molars belong to the same individual. Their crowns are well preserved, the roots, however, are lacking.

M<sup>2</sup> is worn. Pretrite trefoils are well developed, also on the third pretrite. The anterior crescentoid 1 is mostly worn. A small enamel pillar is present behind the first posttrite.

M<sup>3</sup> is partially worn, with 4 lophs. Conules on the pretrites are well developed.

The molars show typical characters of bunodont mastodonts (TOBIEN 1973a). The crests are separated from the main cone of the half-loph by well developed furrows which produce the typical trefoil pattern on the pretrite half-loph.

Relationships. *Gomphotherium angustidens* is the first mastodont appearing in the European Miocene. It has a polymorphic nature (GINSBURG, ANTUNES 1966), particular populations showing structural and dimensional variation in dental elements, incisors and molariforms. Several generic and specific names used for particular populations from the Portuguese and French Miocene are synonyms of *Gomphotherium angustidens* (TOBIEN 1973b). The specimen with M<sup>2</sup>-M<sup>3</sup> of "*Mastodon angustidens* forma *subtapiroidea*" described in 1917 by SCHLESINGER from Eibiswald in Austria, renamed "*Serridentinus subtapiroides*" and illustrated by OSBORN (1936, Fig. 352) is very similar to the specimen from Bełchatów described above. They both belong evidently to *Gomphotherium angustidens*.

## III. DISCUSSION

*Gomphotherium angustidens* was broadly distributed in entire Europe where it lived from MN 4 to MN 8.

The appearance of proboscideans in Eurasia is connected with the beginning of the Miocene interchange of Eurasian and African mammals. BERGGREN and VAN COUVER-

ING (1974) introduced a concept of "Proboscidean Datum", which they estimated to be 17.5 MA, on the basis of the earliest known occurrence of *Gomphotherium* in Portugal. ANTUNES (1990) reanalysed the data from Portugal and came to the conclusion that the appearance of the first proboscideans took place at  $17.0 \pm 0.5$  MA.

BERNOR et al. (1987) discuss the African mammalian faunal assemblages from the time of the Miocene connection between this continent and Eurasia. The faunas calibrated at about 22 MA do not contain evident Asian immigrants. On the contrary, the African fauna of ca. 19 MA (Songhor) contains numerous Asian elements. This will place the beginning of interchange between Africa and Eurasia and of migration of proboscideans between 23 and 18 MA.

In Hungary oldest proboscidean remains were recovered from the Zagyvapalfalva Variegated Clay Formation ranging below the 19.6 MA-old Gyulakeszi Rhyolite Tuff Formation (KORDOS 1992).

The discovery of *Gomphotherium angustidens* in Bełchatów in layers probably older than 18 MA also corroborates the relatively early date of the appearance of proboscideans in Europe and therefore that of the African - Eurasian connection.

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