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A DINOTHERIUM SKELETON FROM ČESKÁ TŘEBOVÁ

KOSTRA DINOTHERIA OD ČESKÉ TŘEBOVÉ

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Abstract

Musil, R., 1997: A dinotherium skeleton from Česká Třebová. *Acta Mus. Moraviae, Sci. geol.*, 82:105–122 (with Czech summary).

The article deals with the history of the determination of the genus *Deinotherium* in the last century and then the find circumstances of skeletons in the Česká Třebová region (West Bohemia, Czech Republic).The old find of the juvenile skeleton from this locality is described (deciduous and permanent teeth, tusk fragment, fragments of ribs, carpal bones, metacarps, phalanges). The find of the dinotherium skeleton belongs to the species *Deinotherium cuvieri*. In that region a greater number of those juvenile animals have been found. The landscape can be pictured as a swampy region with lakes and with rich vegetation, a region serving as watering-places for animals.

Key words: Miocene of West Bohemia, skeleton of *Deinotherium cuvieri*.

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Introduction

In autumn 1996 I. Pek of Palacký University, Olomouc informed me that in the Municipal Museum, Česká Třebová, there were two boxes of bones evidently belonging to a dinotherium coming from the surroundings of Česká Třebová. Thanks to Mr Jiří Pištora of that museum this material, including 62 pieces, was handed over to me for processing.

The territory around Česká Třebová and finds of terrestrial mammals

Dinotheria have been known for more than 280 years (the first report is by Réaumur dating to 1715). But few of the fossil mammals have been classified so differently as this animal. It may have been due to the fact that at the beginning there were always only finds of individual bones, above all parts of skulls and free teeth, and it took a long time to establish that it was not a water or even a sea animal, but a terrestrial one.

The first descriptions of dinotheria are known from the beginning of the 18th century. The views about what the animal was like differ very much: I. Kennedy 1785 first classified dinotheria as proboscideans on the basis of their discovery in Bavaria in 1785, but he thought they were near relatives of the Siberian mammoth. Cuvier, a well-known French anatomist and palaeontologist, the author of the correlation law, drew a very correct conclusion that their teeth very much resembled those of the tapir (1798) and he denoted the animal as a big tapir (Tapirs gigantesques) in 1822. This consideration did not lack substantiation. Cuvier had available teeth whose morphology

really corresponds to the morphology of tapir teeth. The similarity of the teeth is, however, purely analogous, evoked by the same kind of food and in no case does it say anything about a close relation. Later, in the reconstruction of the skull, he even turned the tusks of the mandible upwards, i.e. in the opposite way to that in reality.

The genus name *Deinotherium* was established by Kaup in 1829. At that time he was of the opinion that it concerned an animal related to the hippopotamus. In 1836, without giving any reasons, he set a new name of the genus, *Dinotherium*, which took root in denoting those animals in Czech texts. In 1853 the same author determined dinotheria as an independent family which, according to him, was to be found between the genus *Mastodon* and the genus *Bradypus*. Also all further assumptions about dinotheria are more or less speculative: Buckland 1835 – a water animal similar to a whale, Blainville 1837 – dinotheria belong to the same family as the genera *Halicore* and *Manatus* (the order of sirens), Strauss 1837 – a water animal standing near cetaceans and forming an independent family, Jaquemin 1837 – dinotherium is found between rhinoceroses and elasmotheria, Koch 1845 – dinotherium belongs to proboscideans, Falconer 1846 – dinotherium is a relative of mastodons, Gervais 1848 – dinotherium, together with mastodons, forms the order of proboscideans, Wagner, Girard, Pictet – dinotherium belongs to the order of sirens, Agassiz 1854 – it is a herbivorous cetacean, Giebel 1855 – it belongs to the order of sirens and is near the genus *Halitherium*, Salaro 1864 – it is a marsupial, Falconer 1835 dtto, Peters 1871 denotes the dinotherium as an animal that spent more than a half of its life in the river, Zittel 1895 – an animal between mastodons and elephants, Holländer 1877 – a water animal, a proboscidean with a skull similar to that of sirens.

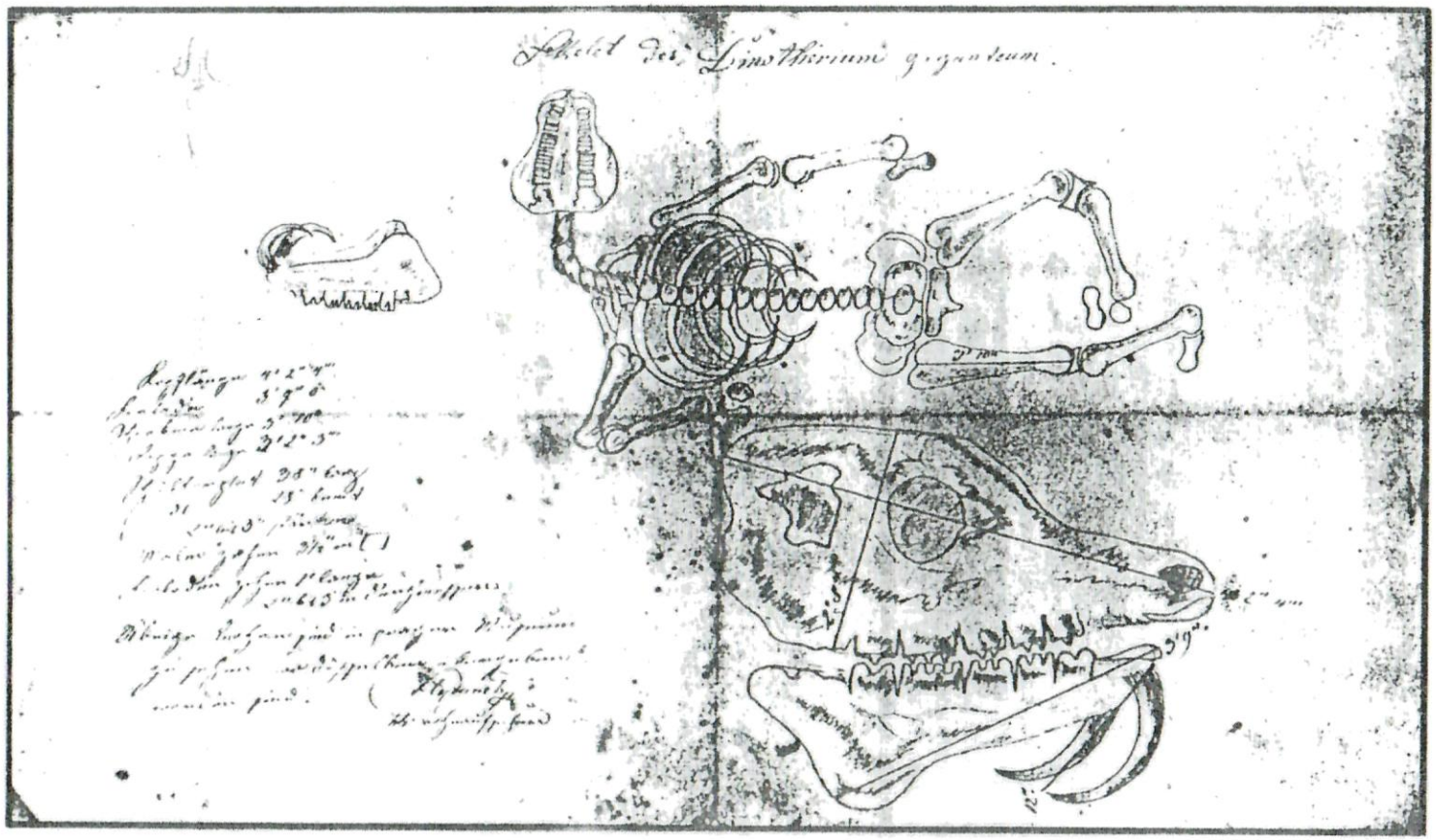
I omitted a number of further assumptions of where the dinotherium belongs, but even so great hesitations can be seen as to what the animal is like and which are its closest relatives. This was due to the fact that its extremities were not known and it was even assumed that it did not have any. The dinotherium was ranked with the sirens, which was due to the fact that its mandible was bent downwards, which shape recalls to a certain extent the mandible of that order.

The holotype of the dinotherium comes from the locality Eppelsheim in Germany. It concerned the mandible of 1829, at which J. J. Kaup found differences between tapirs and dinotheria, in 1835 the whole skull was found in the same place and was bought by the British Museum in London, but which was completely destroyed during transport, so that today only castings of it are available. This skull is sometimes wrongly considered to be the holotype of the genus.

In 1832 J. J. Kaup divided all finds of dinotheria into two species, *D. giganteum* and *D. cuvieri* which was of smaller size. The latter species was later, in 1833, called *D. bavaricum* by H. v. Meyer.

It is of course a synonym of the species *D. cuvieri*. And since that time the number of the individual species of dinotheria has been increasing immensely, so that altogether 15 of them have been suggested. The situation in the number of species is not quite clear even today, although not so many of them are recognized. Most specialists distinguish in Europe the species *D. cuvieri*, *D. levius*, *D. giganteum*, *D. gigantissimum*, but some of them believe that it is always more or less one species, *D. giganteum*, and the differences in size are more or less an expression of sex differences and age differences of the animal.

And these relatively great confusions are confronted with the find of a dinotherium skeleton near Opatov (Bohemia, Czech Republic). Most of the earlier European finds were in fact only individual parts of the skeleton (with the exception of the dinotherium



Tab. I. A sketch of the deposition of the dinotherium skeleton found in 1853 when building the railway track from Česká Třebová to Brno near Opatov. The sketch was made at the site of the find by Mr. Štěpánek, the skeleton should have been situated on Badenian marls (J. Augusta 1938).

Tab. I. Náčrt uložení kostry dinotheria nalezené v roce 1853 při stavbě železniční trati z České Třebové do Brna, a to u Opatova. Náčrt byl proveden na místě nálezu panem Štěpánkem, kostra měla ležet v badenských téglech (J. Augusta 1938).

skeleton found near Františkovy Lázně (West Bohemia) in 1833 which got into the museum in Vienna), in this case it was again almost a whole skeleton, which of course permits a higher number of conclusions than individual bones. The presence of extremities showed that it could not be a cetacean, but only a terrestrial animal standing relatively close to other proboscideans. Unfortunately this statement was only written in Czech and thus it did not penetrate at all to the professional public outside our territory. That is why even in 1854 and 1855 there are considerations about dinotheria being animals standing between sirens and elephants. Only after 1855, in a publication about the find of Opatov, written in German by A. E. Reuss, does this find immediately reach the awareness of other European palaeontologists. Reuss writes: "Recently an interesting find has taken place in Bohemia. In the marl near Opatov, close to the Moravian frontier, numerous remains of the skeleton of the species *D. giganteum* have been found. Besides the skull, completely broken with all teeth all extremity bones have been found, the first and the second neck vertebrae and some tail vertebrae. All bones were accumulated on a small area. The find proves that including dinotheria among cetaceans is erroneous." Reuss wanted to process the find of Opatov in detail, but this, unfortunately, did not take place, even though at that time it was one of the two whole skeletons found in Europe, both finds coming from the territory of Bohemia. That is why speculative views of dinotheria appear again and again (1871 – an animal living in water or in 1864 – an elephant-like marsupial).

Find circumstances of the dinotherium from Opatov

Thanks to a paper by J. Augusta (1938) who deals with the history of the find at Opatov we know that in the archives of Prof. J. Perner there existed a manuscript report about it with a sketch of the deposition of the skeleton in the sediment (Table I). The find dates back to 1853, when the railway line from Česká Třebová to Brno was built, and according to this report the skeleton was situated in Neogene marls. A year before tusks, teeth and bones of a dinotherium were to have been found in those places, which should have passed to the museum in Vienna. Unfortunately, they got lost there and only a report by E. F. Glockner exists about them, which gives another year, and the find is described as *D. giganteum*. It cannot be excluded that also in this case it was a complete or a partial dinotherium skeleton.

However, in 1888 paper appears in which its author Kafka says that the first ever find of the dinotherium from Opatov comes from 1846, i.e. much earlier. The same year is given in the paper by A. J. Bernard: In 1846 remains of this gigantic mammal in building a cut for the railway line near Opatov (Abtsdorf, east of Litomyšl). Later in 1852, when the clay in this cut slid onto the track and it was necessary to take it away, parts of the skull and individual bones were found in it. So much for Bernard's report.

There are more time data about the finds of Opatov. J. Augusta (1938) states that the find took place in July, 1853. The same year is also mentioned by V. Zázvorka (1940). But the more correct date will be the year 1852. Also, Augusta writes that the find was deposited in Miocene clay which slid into the cut, and thus the skeleton of this animal appeared. The above sediment and the contents of fossils in it are described in detail by V. J. Procházka (1895) who ranks them stratigraphically and writes that according to the fauna they are brackish clays. The very first reports, but evidently about another find, come from A. J. Bernard, who writes that east of Litomyšl, near Opatov, two animals were found in 1846, one of them lying under a gigantic trunk; another report is by E. F. Glocker, who in 1852 describes the find of teeth and bones of the species

D. giganteum in the marl. Another article comes from J. Sax (1853): The find is from near the railway track near Opatov, it concerns *D. giganteum* and is deposited in the National Museum in Prague. According to the author the skeleton was lying in a clay in which many shells of sea lamellibranches and unclear prints of plants were found. Beside the skeleton there was a big pine trunk whose wood was well preserved. The bones were soft when lifted and they were dilapidating (the skull, scapulae, pelvis, long bones). Some parts of the skeleton were missing. The author thinks that before their final deposition they were transported by rolling. The same also concerned the pine trunk. From the find circumstances he deduces that the clay in which the skeleton was found had been deposited at the sea shore, maybe in the mouth of a river.

Dating back to 1860 there is a report about the find of Opatov by A. E. Reuss who states that the find dates back to 1853 and writes that a considerable part of the skeleton is missing, the bones were badly preserved and fragmentary. Somewhat different is the report by A. Frič (1869, 1906) who states that a big charred trunk was lying on the skeleton, a part of the skeleton lying to the right of it, and the other part to the left.

There is, however, also a written report about the Opatov find from the archives of Prof. J. Perner by Mr Štěpánek, who was an eye witness of the find, it might be said at first hand. It says: In the cut of the railway track, near the house of the guard No. 82 there was a slide of the blue coloured clay in which some bones were found. Near the bones there were many pieces of wood in the form of soft coal (evidently lignite – my note). Only one individual is mentioned and its drawing is attached (Table I).

What is, however, interesting, is the fact that some further reports resting on the material from this locality at the National Museum (such as Kafka, Bernard, Procházka) write about several individuals. Kafka, 1889: From Opatov 2–3 individuals of different size originate, of the species *D. giganteum*, some smaller bones belonging perhaps to the species *D. levius*. Procházka, 1929: The find from Opatov dates back to 1852, it is already a second find, the first being made somewhat earlier and getting to Vienna, where it was lost. J. Augusta (1938) explains these discrepancies by the fact that although the finds in the National Museum of a greater number of individuals exist they must be not only the find of 1853 (correctly evidently 1852), but some finds of another date. This view would to some extent confirm also the above ticket which was found attached to the bones (3 pieces of bones from near Opatov of 1846, see also the above time date by Kafka).

The find situation and the determination of the Opatov find is dealt with in great detail by V. Zázvorka (1940). It is in fact the last paper concerning this find which in an exhaustive way gives all accessible information and compares the find with other European finds. He determines the Opatov find as the species *D. levius*, which species he considers well distinguishable from the species *D. cuvieri* as well as from the other species. From the Opatov find the following bones are found at the National Museum: points of tusks, 10 teeth from the mandible, 10 free teeth from the maxilla, considered to belong to at least two individuals, the reason being that some teeth are missing, whereas others are repeated. Besides, he draws the attention to the M_3 dex from the same locality, but dating from 1936. Further finds are metapodia, carpal and tarsal bones, fragments of long bones and indeterminable fragments.

The teeth of the Opatov find belong to a juvenile, it was the deciduous dentition considerably abraded, but the last molars are not yet worn out. The animal perished at the time of the exchange of the deciduous dentition for the permanent one. The young age of the animal is indicated by the epiphyses on long bones and vertebrae, which have not yet grown together.

From the above it is clear that there exist at least two finds of dinotherium skeletons from Opatov made at different times and probably two further specimens of the same year of find. It is obvious that a number of different opinions have been pronounced about the reasons of the death of the dinotherium from Opatov. Kafka, Frič and Bernard think that the animal was killed by the fall of the pine trunk lying beside it. Kafka writes the same in 1846 and 1852 and repeats the same in 1888: two individuals, one of them lying under a big stock. Many bones were found with people living in the surroundings who carried them home as bones of the giants. But in 1899 he already states that it concerned two or three individuals of different sizes.

The drawing made by Mr. Štěpánek immediately after the discovery then shows that one of the finds, the last one, belonged only to one individual. The animal was lying on its back, the skeleton, but for the mandible, was in anatomical order. It is therefore necessary to assume the doom of the animal by natural death and a relatively quick burial by the sediment, because major processes of disintegration had not yet started. The trunk of the pine did not lie on the animal. The carcass of the animal was, according to J. Augusta, carried by stream to the place of the find, like the branches found around it which, according to the author, were withheld by its body.

The finds of dinotheria are evidently more numerous in the given territory, and they concern two individuals discovered at two different times. It cannot evidently be excluded that, besides the skeleton described, bones of another individual also may have been found in the same place. This would be witnessed by the descriptions of the find circumstances, one of which stating that the tree trunk was lying across the skeleton whose bones were found on both sides of the trunk, the other the fact that the trunk was lying close to the skeleton. They are two different descriptions which might point to two different finds. The doom of those animals was a quite natural death. It was evidently a water or a swamp environment where the animal carcasses got to, like the branches and the trunk of the pine. Today, unfortunately, on the basis of earlier reports nobody will find out whether they were swamps covered with vegetation, and in this case organic material (animals and plants) would not have been carried by a stream of water, but would be found in the original place, or whether they were sediments from the mouth of a water stream. The former view is opposed to some extent by the finds of twigs, as far as they were really withheld by the body of the animal. If that were really the case, their direction would also have to be perceptible, and then it might be the mouth of a water stream. What is, however, interesting, is the fact that they were always finds of young to very young individuals and that there were evidently more of them on a relatively small territory.

The find circumstances of a skeleton from Česká Třebová in 1889

Česká Třebová is situated north of Opatov, and also in that locality the find was found at a landslide in the cut of the railway track, probably in a slide of clay. It was again the whole skeleton, of which only the front part was lifted in 1889, the second half of the skeleton probably still lying in that place. The analysis of the find shows that it belongs to one relatively young individual. Near the skeleton there was a strongly abraded tooth of a rhinoceros (*Rhinocerotidae*, gen. et sp. indet.).

What follows from the above finds of mammals in the space between Česká Třebová and Opatov:

1. They are not only isolated or accidental finds, but it is a place with a number of whole skeletons of animals living near the water or near swamps. This accumulation is not

accidental and it must be assumed that it was due to the then suitable conditions. Theoretically it may have been a delta orifice of a water stream or rather extensive swamps. Due to the fact that they are only young individuals, the latter explanation is more probable.

2. Finds hitherto are probably only a small fraction of what might still be found in this region. It can be expected with great probability that relatively not very deep under the present surface one might find further terrestrial fossils, and not only of dinotherium.
3. It is therefore quite an exceptional and, from this point of view, unique region without any parallel far and wide, whose systematic investigation might considerably contribute not only to its regional cognition, but to palaeontological and palaeoecological conclusions concerning the flora, fauna and paleogeography at that time.
4. The finds of bones do not with the greatest probability come from marine sediments, and if so, they would be redeposited.
5. The whole region between Česká Třebová and Opatov is therefore for that reason quite unique and would unconditionally require for the above reasons a systematic comprehensive field investigation, both from the geological and from the palaeontological points of view.

Descriptive part

Order:	*Proboscidea*
Sub-order:	*Deinotherioidea* (Osborn, 1935)
Family:	*Deinotheriidae* (Bonaparte, 1845)
Genus:	*Deinotherium* Kaup, 1829
Species:	*Deinotherium cuvieri* Kaup, 1832

The bones found: two fragments of the mandible, fragments of skull bones, a fragment of the tusk, free teeth of the maxilla, fragments of ribs, metapodia, phalanges, carpal bones, indeterminable fragments. Finds come from a young individual. All bones have brown to brown-grey coloured surface.

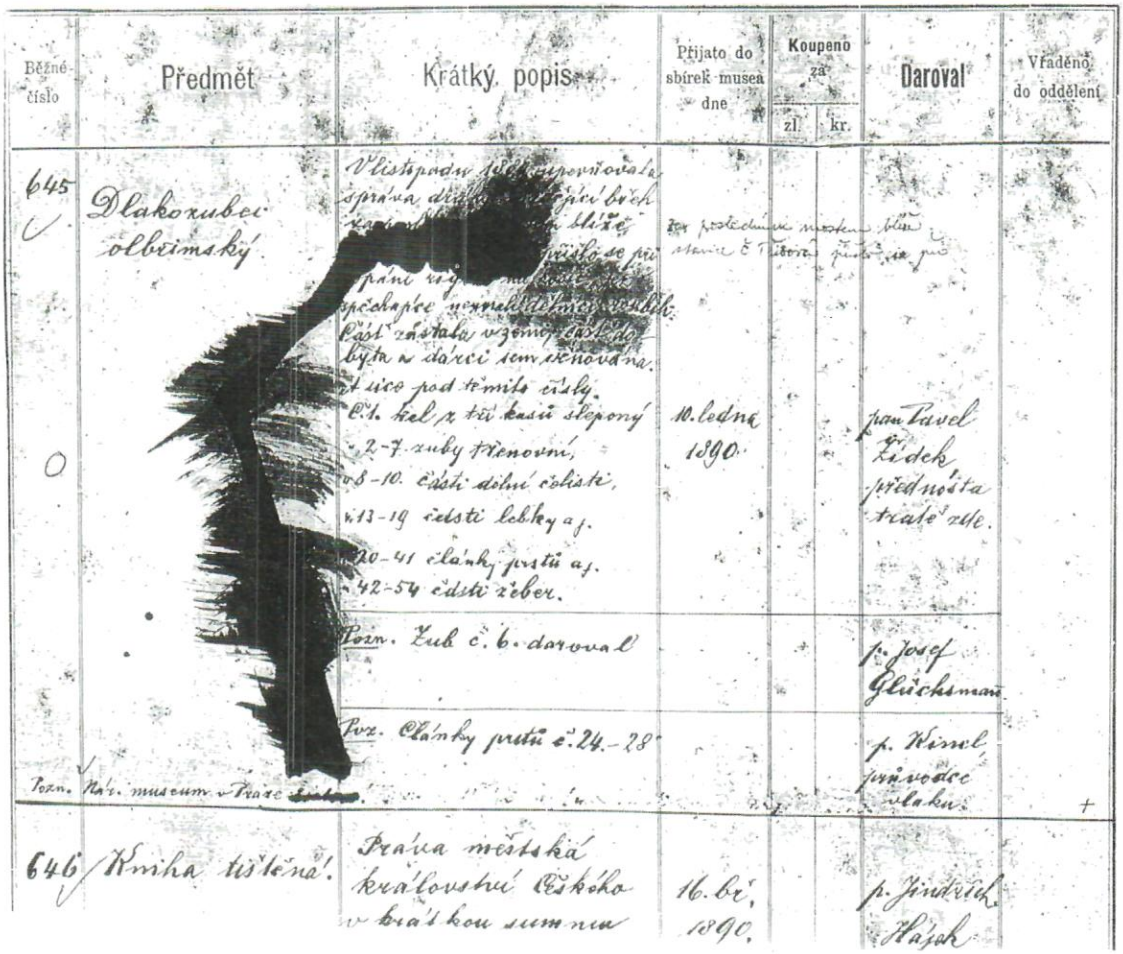
Fragments of the mandible: fragmentarization of the jaw was due to its lifting, alveoli are preserved in which tooth roots are still found (teeth evidently broken at find). They did not get to the museum and evidently ended up in private collections (Table IV, 2).

Tusk fragment: In the prox. part of the tusk the end of alveolus is evident, the tusk tip is artificially broken away. The enamel of coffee-brown colour is preserved only in places, near the tip of the task long longitudinal grooves can be seen, in places interrupted by transversal grooves originating later. All grooves in the enamel were formed while the animal was still alive. They are found only up to the distance of 110–120 mm from the tusk tip (Table III, 5). The tusk is relatively weekly bent, its outer length completed by the missing tip (outer curvature) is 350 mm, the length at the front side is 290 mm and the sagittal max. diameter is 67 mm. The dimensions indicate a young individual (Table IV, 1).

Free teeth: They are four altogether, all of them coming from the maxilla. They are the following teeth: dP^2 sin, dP^4 sin, M^3 sin, M^3 dex. All teeth come from one young individual and it can be assumed that at the time of find there were all of them (Table III, 1–4).

dP^2 sin – The crown of the tooth is slightly abraded, small abrasion can be found in the topmost part of the crests in the protolophus at its distal part, in the metalophus at the proximal part. The protolophus is strongly concave, deflected in the distal direction. The

metalophus, on the other hand, is quite straight. Both the protolophus and the metalophus have a slight depression in the centre, so that on both their ends protruding cusps were formed. This kind of development is most marked at the protolophus. The two crests are connected at the labial and the lingual sides by lower crests which start from the protolophus in the prox. direction, the labial crest being the most abraded of all the parts of the crown. At the lingual side of the crest starting from the protolophus there is a deep V-shaped well, its lingual edge is cuspy. The cingulum in the front part of the tooth is strongly developed with numerous cusps, the talon is relatively weak. Transversal cusps are evident even at the metalophus. The enamel of the whole tooth is of bluish colour. The tooth roots are broken away.



Tab. II. The original record of found bones of the dinotherium skeleton near Česká Třebová of 1889 from the inventory book of the Municipal Museum at Česká Třebová. The find of the dinotherium was at that time determined as *Dlakozubec olbřímský*. The photocopy of the page from the inventory book was kindly granted by Mr. Jiří Pištora.

Tab. II. Původní zápis nalezených kostí kostry dinotheria poblíž České Třebové z roku 1889 z inventární knihy Městského muzea v České Třebové. Nález dinotheria byl tehdy určen jako *Dlakozubec olbřímský*. Fotokopii listu z inventární knihy laskavě poskytl pan Jiří Pištora.

Dimensions: Tooth length at the labial side 52.4 mm, at the lingual side 49.1 mm., max. width of the tooth at the protolophus 60.0 mm, at metalophus 57.6 mm. Max height of the crown at the external side 37.5 mm (Table III, 1).

dP^4 sin – Also this tooth is very weakly abraded, only slightly at the dist. part of the protolophus and metalophus, but no longer at the tritolophus. All transversal crests are deflected in the dist. direction. At the lingual part of the protolophus and the tritolophus there is a triangular drop-shaped well due to the occlusion of the opposite tooth. The protolophus and the metalophus are roughly of the same size, the tritolophus is then substantially smaller. In front of the protolophus two strong cusps are developed, the labial one is abraded. The talon behind the tritolophus is relatively weak and dissected by transversal grooves. Weak transversal grooves can also be observed at the crest of the tritolophus. There were three roots and all of them were broken away when the find was lifted.

Dimensions: tooth length at the labial side 65.6 mm, tooth length at the lingual side 64.8 mm, max. tooth width at the protolophus 57.6 mm, at the metalophus 58.4 mm, at the tritolophus 49.1 mm. Max. crown height is at the external side of the protolophus, 30.0 mm (Table III, 2).

M^3 sin – Protolophus and metalophus are deflected in the dist. direction and slightly abraded at the top dist. part of the crest. In the middle they are weakly concave, so that at the labial and lingual sides this formed cusps of different sizes. The protolophus at its labial side extends proximally by a minor crest concluding the depression between the two transversal crests. This crest is weakly abraded. The cingulum in front of the protolophus is strongly developed and dissected by transversal grooves. The talon formed by two crests lying above each other is also developed strongly and similarly. The roots were broken away during the extraction.

Dimensions: tooth length at the labial side 64.1 mm, at the lingual side 65.7 mm, max. tooth width at the protolophus 68.3 mm, at the metalophus 70.4 mm. Max crown height at the external side of the protolophus is 37.8 mm (Table III, 3).

M^3 dex – This tooth has quite the same morphology of the crown as the preceding one. Only the small crest going from the protolophus in the prox. direction is not so strongly, developed and thus does not close the depression between the two transversal crests. The roots are altogether missing.

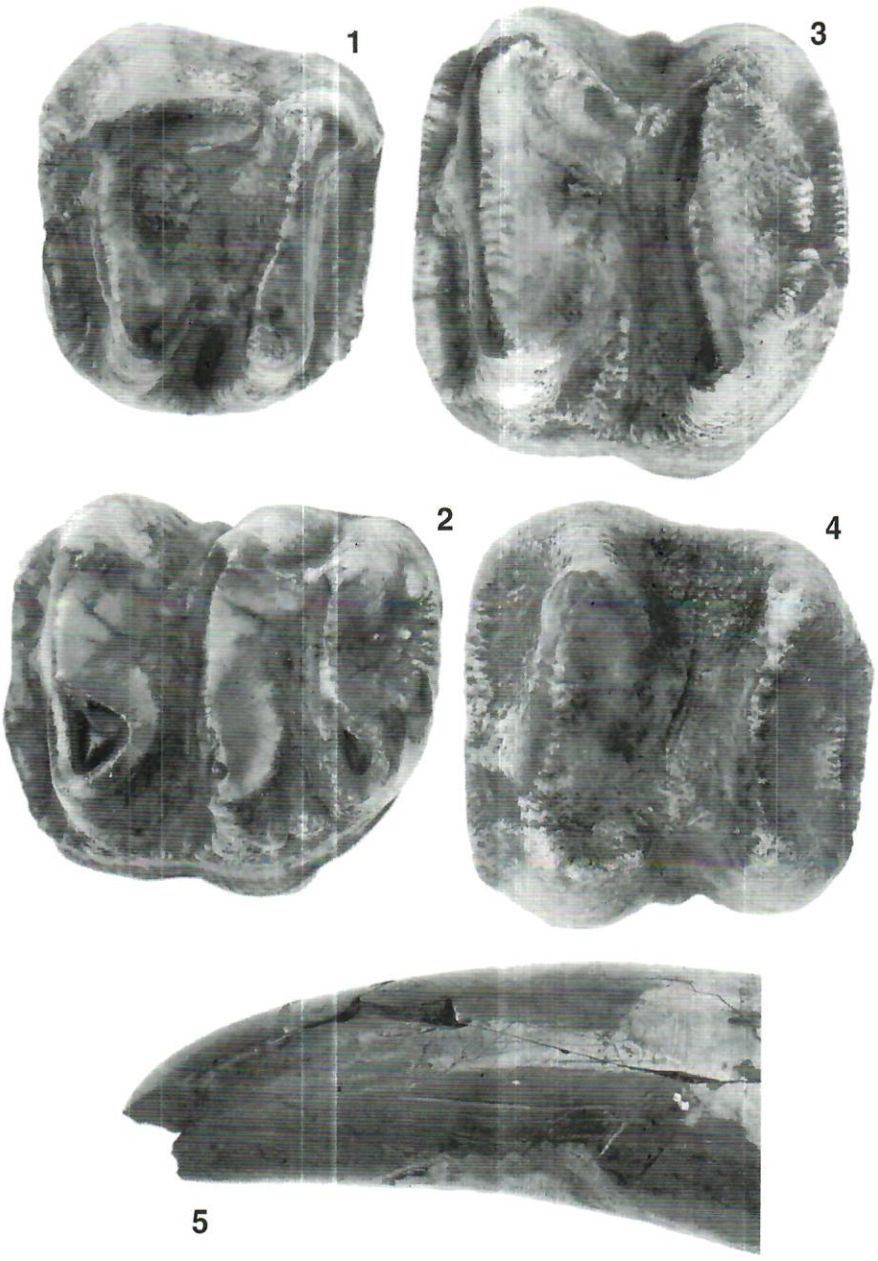
Dimensions: tooth length at the labial side 62.5 mm, at the lingual side 65.0 mm. Max. tooth width at the protolophus 68.4 mm, at the metalophus 62.0 mm. The crown height at the labial side at the protolophus is 34.7 mm. The right M^3 has smaller dimensions than the same tooth from the left maxilla (Table III, 4).

Comparison of the teeth found with other finds

The found dinotherium no doubt belongs among small animals appearing at the beginning of the line of development. Thus, *D. giganteum* as well as *D. gigantissimum* can thus be immediately excluded. Only *D. levius* and *D. cuvieri (= bavaricum)* can come into consideration. As reference material I used dimensions of teeth of some localities abroad.

Lisbon (Zbyszewski 1941), *D. cuvieri*, M^3, max. length 60–62 mm, max. width 59 mm, *D. cuvieri*, M^3, max. length 63 mm, *D. levius*, M^3, max. length 72–80 mm

The Ukraine (Belokris 1960), *D. levius*, M^3, max. length 78–88 mm, max. width 78–94 mm



Tab. III. Česká Třebová, *Deinotherium cuvieri*, 1 – dP^2 sin., 2 – dP^4 sin., 3 – M^3 sin., 4 – M^3 dex., the view of the occlusion surface, 5 – a detail of the tusk point, in the enamel longitudinal and transversal grooves are evident originating during the animal's lifetime by their use. It must have concerned extracting food from the ground (roots of plants?). All photographs actual size.

Tab. III. Česká Třebová. *Deinotherium cuvieri*, 1 – dP^2 sin., 2 – dP^4 sin., 3 – M^3 sin., 4 – M^3 dex., pohled na skusnou plochu. 5 – detail špice klu, na sklovině jsou patrné podélné a příčné hluboké rýhy vzniklé za života zvířete jejich používáním. Muselo se jednat o vyhrabávání potravy ze země (kořínky rostlin?). Všechny snímky ve skutečné velikosti.

Hlohovec (Musil 1956), *D. levius*, M^3, max. external length 74.4 mm, max. internal length 68.5 mm, tooth width on the protolophus 79.0 mm, at the metalophus 69.0 mm

Leoben (Redlich 1906, in Musil 1956), *D. bavaricum (= cuvieri)*, M^3, max. length 60 mm, tooth width at the protolophus 62 mm, at the metalophus 56 mm

Roger 1866 (in Musil 1956), *D. bavaricum (= cuvieri)*, M^3, max. length 63 mm, tooth width at the protolophus 63 mm, at the metalophus 56 mm

Depéret (in Musil 1956), *D. levius*, M^3, max. length 72–80 mm

Chevilly (Cuvier, in Zázvorka 1940), *D. cuvieri* dP^4, max. length 62 mm. max. width 42 mm

Gmünden (Meyer in Zázvorka 1940), *D. cuvieri*, dP^4, max. length 73 mm, max. width 44 mm

Cuvier (in Zázvorka 1940), *D. levius*, M^3, max. length 80 mm, max. width 60 mm

The dimensions of the dinotherium find from Česká Třebová given by us thus correspond unambiguously to the species *Deinotherium cuvieri*.

There still remains the comparison with the earlier find at Opatov. That was determined by earlier author differently. Štěpánek accompanied his sketch with an explanatory text in which he denotes it as *D. giganteum*, similarly also Reuss, Kafka, Laube and Zittel as *D. giganteum* or *D. levius*. Procházka as *D. bavaricum* and as the last one Zázvorka as the species *D. levius*. It is necessary to refuse the species *D. giganteum*, a more complicated situation concerns the species *D. levius*. Zázvorka (1940) gives the following tooth dimensions, I give only those also found at Česká Třebová:

dP^2, max. length 46.7 and 47.0 mm, max. width 38.3 and 38.3 mm

dP^4, max. length 70.1 mm, max width 50.9 mm

M^3, max. length 84.5 and 82.8 mm, max. width 63.6 and 61.5 mm, tooth width at the protolophus 63.6 mm, at the metalophus 57.8 mm

The length of M^3 which can be best compared corresponds to the species *D. levius*, the species *D. cuvieri* is substantially smaller. As for the deciduous molars, the dimensions of the finds are not only similar, but in dP^2 they are conspicuously smaller at Opatov and they would correspond rather to the species *D. cuvieri*. In my opinion it is necessary to take the dimensions of permanent teeth as the decisive factor, in this case M^3, the dimensions of deciduous teeth will vary in the individual species and they are not suitable for the species determination. In the future it would certainly be very interesting to make a critical analysis of the finds from the two localities from the point of view of deciduous and permanent molars.

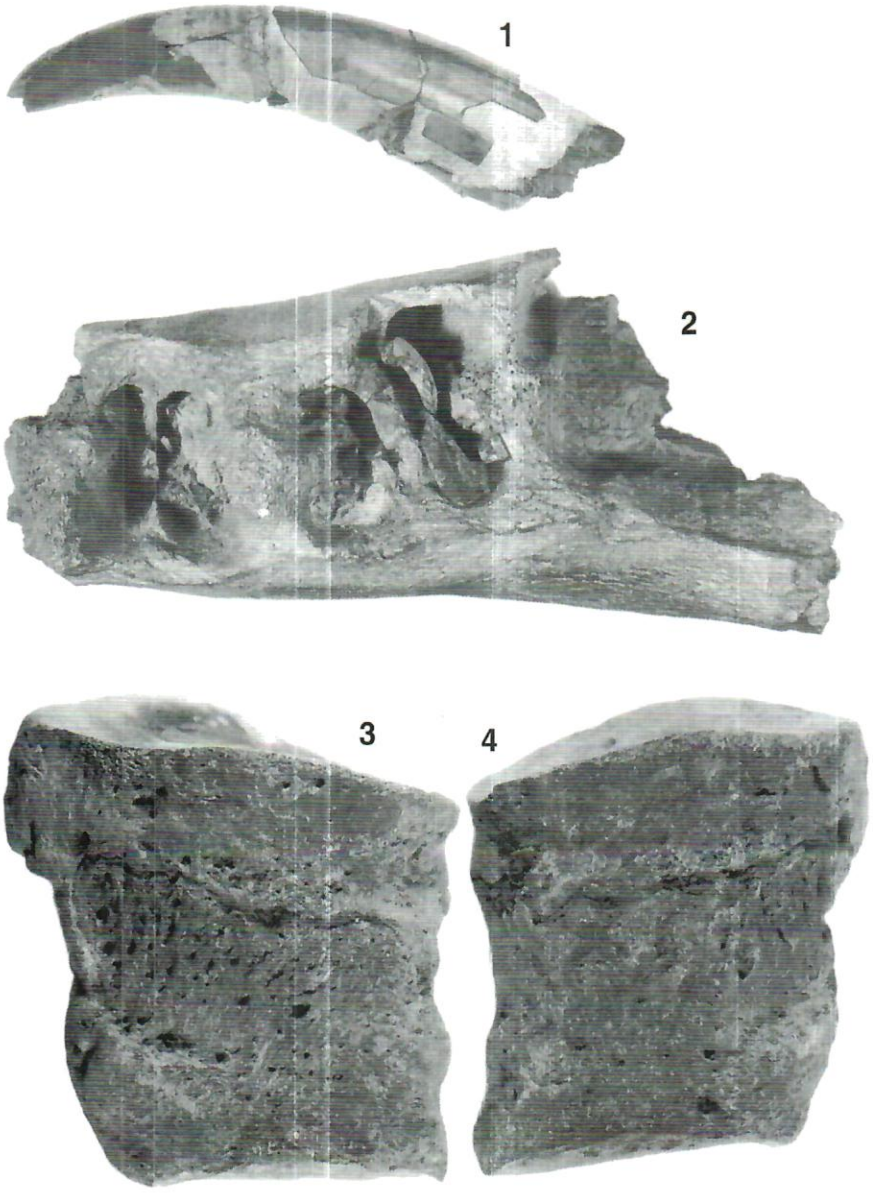
Parts of the postcranial skeleton

Costae

Of the fragments of ribs (eight altogether) only two have proximal ends. In both it is evident that the dorsal attachment to the thoracic vertebrae was not yet permanent. At the dorsal vertebral end the collum costae and the capitulum costae which serve the joint attachment with the body of the vertebra are missing. That is why they were pronouncedly those of a young animal.

Autopodium of the thoracic extremity

From the autopodium of the thoracic extremity carpal bones, metacarps and phalanges are found in the collection, some bones only in small fragments originating in extrac-



Tab. IV. Česká Třebová, *Deinotherium cuvieri*. 1 – tusk fragment, 1/3 of the actual size, 2 – fragment of mandible. Tooth roots are well visible in the alveoli which are remains after breaking up the teeth by the finders. In the jaw channel several cm^3 of earth were found evidently characterizing the find layer. It was therefore submitted to palynological and micropalaeontological analysis. 1/2 of the natural size. 3, 4 – phalanges; well visible in them is the fact that prox. epiphyses had not yet grown together. Actual size.

Tab. IV. Česká Třebová. *Deinotherium cuvieri*. 1 – fragment klu, 1/3 přir. velikosti, 2 – fragment spodní čelisti. Dobře jsou v alveolách vidět kořeny zubů, které jsou pozůstatkem po jejich vylamování nálezci. V čelistním kanále se nacházelo několik cm^3 zeminy, která je zřejmě pozůstatkem nálezové vrstvy a byla proto dána na palynologický a mikropaleontologický rozbor. 1/2 přir. velikosti. 3, 4 – prstní články, velmi dobře je na nich patrné, že prox. epiphysy nejsou ještě srostlé. Přir. velikost.

ting the skeleton. From among carpal bones are present ulnare, magnum and trapezoid, all from one extremity, further os metacarpale tertium and os metacarpale quintum. All those finds bear witness to the fact that only the front part of the skeleton appeared in the wall, i.e. only the skull and the front extremities.

Some dimensions:

Mc III, total length 170 mm, right-left width of dist. epiphysis 74.7 mm, prox. epiphysis 67.2 mm (Table V, 3–4).

Mc V, dist. epiphysis is fallen away, but present, overall length 131 mm, the right-left width of the prox. epiphysis 65.5 mm (Table VI).

The lengths of the phalanges: 73.5 mm, 69.5 mm, 64.5 mm, 61.7 mm (Table IV, 3–4, Table VI, 1–2)

In another two metapodia the prox. joint surface is missing. Not even in one had the prox. joint surface grown together with the bone body, in one metapodium this surface is fallen away. From one metapodium there remained only a fallen off dist. joint surface.

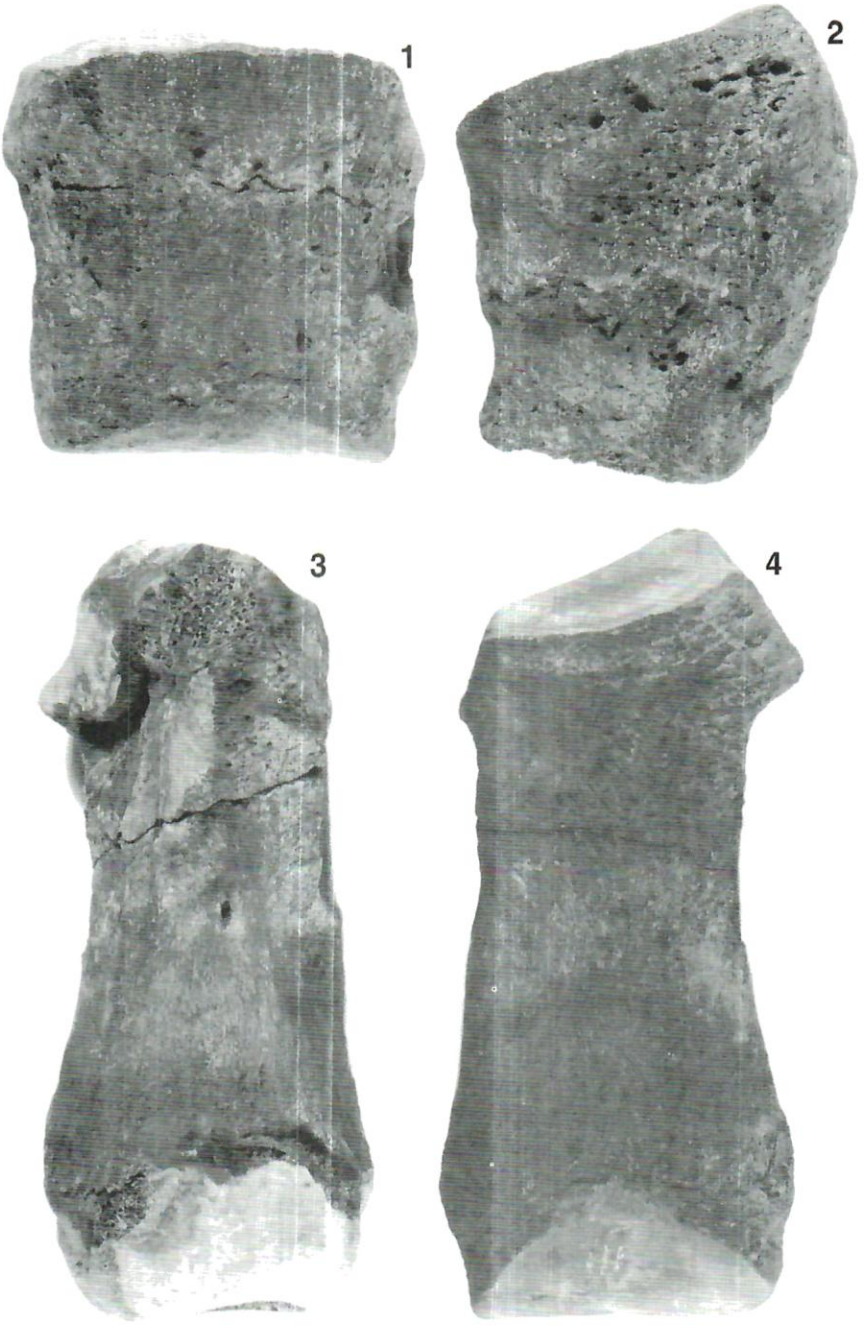
Order: *Perissodactyla*
Sub-order: *Ceratomorpha* Wood 1937
Family: *Rhinocerotidae* Osborn 1845
Gen. et spec. indet.

Together with other osteological material, a strongly abraded tooth of a rhinoceros from the maxilla of small dimensions (38.0×51.4 mm) was also found. Its importance consists in the fact that it hints at finds of other groups of animals than the hitherto mentioned dinotheria.

Conclusion

The find of the dinotherium skeleton at Česká Třebová belongs to the species *Deinotherium cuvieri*. Due to the fact that in that region a greater number of skeletons of those animals has been found, it cannot be an accidental matter, but their presence must be explained in another way. The fact is that the individual skeleton bones were lying more or less in the anatomical order, thus a greater transport cannot be reckoned with. Thus, even the transport of dead animals by streaming water and their deposition in a river delta near the sea coast is improbable. It seems rather that it indicates the presence of small lakes in a swampy region serving as watering-places for animals. The impermeable clayey base of Miocene sediments would evidence this. This type of landscape might thus be dangerous for animals coming to the watering-place and sometimes they might get stuck in the swamps and get drowned. This would be evidenced, besides the impermeable base, also by ample plant remains and mainly finds of only young and therefore inexperienced animals. A certain analogy could be traps in the karst regions, in essence wide vertical crevices open to the surface into which for the most varied reasons only young and inexperienced animals got caught. In accordance with this explanation are also the views of Kafka, Frič and Bernard, who think that one of the animals was killed by the fall of a tree trunk which was lying on the skeleton. There were not even major processes of disintegration, which also speaks of a quick burial by sediment. What somewhat contradicts this explanation, maybe only seemingly, are the finds of marine molluscs, although Procházka states that the found species are typical of brakish clays.

Bohumil Hamršmíd from the Moravian Oil Company made an analysis of foraminifera and calcareous nanoplankton. In the fragment of the lower jaw mudstone was



Tab. V. Česká Třebová, *Deinotherium cuvieri*. 1, 2 – phalanges of the juvenile animal, actual size. 3, 4 – metacarpus III, a view of the volar (3) and the dorsal (4) surface. In the photograph it is well visible that the prox. epiphysis has not yet grown together with the diaphysis. 2/3 of the actual size.

Tab. V. Česká Třebová. *Deinotherium cuvieri*. 1, 2 – prstní články juvenilního zvířete, přir. velikost. 3, 4 – metacarpus III, pohled na volární (3) a dorsální (4) plochu. Na snímku je dobře patrné, že prox. epiphysa není ještě srostlá s diaphysou. 2/3 přir. velikosti.

present. He found by the sluicing process, besides two redeposited species from Cretaceous period, brackish species from Tertiary living in shallow water time-stratigraphic unconvincing: *Ammonia beccarii*, *Porosononion granosum* and *Gyroidinoides soldanii*. Association of calcareous nanoplankton was comparatively abundant: *Micula decussata*, *Watznaueria barnesae*, *Eiffellithus turrisseiffelii*, *Prediscosphaera spinosa*, *Bipodorhabdus brooksii*, *Lithraphidites carniolensis*, *Marthasterites furcatus*, *Tranolithus phacellosus*, *Quadrum gothicum*, *Gartnerago obliquum*, *Heicolithus trabeculatus*, *Placozygus fibuliformis*, *Chiastozygus amphipons*, *Cretarhabdus crenulatus*, *Lithastrinnus septentrionalis*, *Vekshinella crux*, *Eprolithus floralis*, *Kamptnerius magnificus*, *Prediscosphaera cretacea*, *Stoverius achilosus*, *Archangelskiella* sp. etc. These species from the Upper Cretaceous period were redeposited into a Lower Badenian deposit from rocks of Coniacian age.

The pollen analysis was made by Nela Doláková (Department of Geology and Palaeontology, Masaryk University). Pollen spectrum is characteristic of Miocene, with the exception of Tertiary elements, there are grains coming from the Cretaceous (Normapolles). Plant microplankton (*Ovoidites*, *Sigmopollis*, *Tasmanaceae*) is typical for semifresh water. Sporadic finds of *Dinoflagellata* with branching projections and foraminiferal tapetum are typical for sea water with normal salinity. Spores of Fungi were also found.

Tab. VI. Česká Třebová, *Deinotherium cuvieri*. Metacarpus V. While in the other metapodia the prox. epiphysis had not yet grown together with the diaphysis, although it was connected with it, in this case it is completely fallen away. The view of the dorsal and the volar sides. 2/3 of the actual size. All photographs L. Plchová.

Tab. VI. Česká Třebová. *Deinotherium cuvieri*. Metacarpus V. Zatím co u ostatních metapodií nebyla prox. epiphysa ještě srostlá s diaphysou, ale přesto s ní byla ještě spojena, v tomto případě je zcela odpadlá. Pohled na dorsální a volární stranu. 2/3 přir. velikosti. Všechny fotografie L. Plchová.

Pollen- and spores spectrum does not show marked thermophile agents (*Sapotaceae*, *Palmae*). Pollen of *Cyrillaceae*, *Engelhardtia*, *Quercoidites microhenrici*. *Q. henrici*, *Tricolporopollenites cingulum pusillus*, *T. liblarensis*, *Platanus* were found.

Thermophile unpretentious flora comes under these families and genera: *Carya*, *Pterocarya*, *Celtis*, *Ulmus*, *Tiliaceae*, *Oleaceae*, *Carpinus*, *Alnus*, *Betula*, *Fagus*, *Pinus*, *Sciadopitys*. Another finds of these hygrophilous elements: *Taxodiaceae*, *Ilex*, ferns as *Leiotriletes haardti*, *Verrucatosporites alienus*, *Toroisporis* fsp., *Polypodiaceoisporites semiverrucatus*, *Stereisporites* fsp. Flora represents the proximity of moist coast during milder thermal periods of Neogene.

The above landscape can be pictured as a swampy region with lakes of different sizes, with rich vegetation. It is at the same time a habitat which suited these animals very much.

Hitherto finds belong not only to dinotheria, even though they prevail today, but also to other species.

In view of the fact that from the described region three different species of dinotheria have been described, a whole revision of all earlier finds would be necessary. As for the species *D. cuvieri* and *D. levius*, both species may have occurred together in the course of the whole Miocene.

In light of all the above facts, this region seems exceptional not only from the point of view of the Czech Republic, but also that of Central Europe at least. Such accumulation of dinotherium skeletons as exists in this region has no parallel. And this does not concern all the finds, as further ones can be rightly expected. It would therefore be suitable to pay greater attention to this territory and carry out a complex investigation. It cannot be excluded at all that it is a unique and very extensive find site with a greater number of individuals.

SOUHRN

Na podzim roku 1996 mě dr. I. Pek z Palackého univerzity v Olomouci informoval, že v Městském muzeu v České Třebové leží dvě bedny kostí patřící zřejmě dinotheriu a pocházející z blízkosti České Třebové. Laskavostí pana Jiřího Pištory z tohoto muzea byl mně uvedený materiál v počtu 62 kusů předán ke zpracování. Kromě něj jsem dostal i kopii výpisu z inventární knihy, kde byly tyto nálezy zaznamenány, a to 10. ledna 1890 pod inv. číslem 645 a popsány jako *Dlakozubec olbřímský* (tab. II). Jedná se o jméno, které zřejmě vytvořil místní muzejní pracovník, který nebyl seznámen s dřívějším nálezem kostry dinotheria u Opatova v roce 1852, která se dnes nachází v Národním muzeu v Praze (podle Kafky 1888 vyzvedl ji tam prof. Frič v roce 1882 a dal do Národního muzea) a s celou řadou článků z té doby ve Vesmíru a v jiných našich časopisech, které o tomto nálezu psaly. Proto si zřejmě vytvořil svůj vlastní název. Zajímavé je, že si byl vědom nutnosti použít binární nomenklaturu, takže nález má jak rodové, tak i druhové jméno. Je proto pravděpodobné, že se jednalo o člověka, který byl vzdělán v biologii, pravděpodobně o místního učitele. V publikaci „Z minulosti Českotřebovska", kterou vydalo Městské muzeum v České Třebové v r. 1989, je kapitola správce muzea pana Jiřího Pištory, ve které píše, že prvním správcem sbírek byl místní učitel na obecné škole Jan Tykač. Jan Tykač miloval své město a jako pokrokový učitel propagoval vždy češtinu. Psal i povídky pro děti a dospělé. Je proto zcela zřejmé, že autorem zápisu v inventární knize a autorem pojmenování byl tento muž.

Všechny kosti patří jednomu zvířeti, byly vyzvednuty z jednoho místa a dostaly se do několika rukou. Dárci jsou proto tři: pan Pavel Žídek, přednosta železniční stanice, pan Josef Glücksmann a pan Kincl, průvodčí vlaku. Domnívám se však, že větší množství nalezených zubů a kostí skončilo ještě v dalších rukách a do muzea se vůbec nedostalo. To dosvědčují násilím vylámané zuby ze spodní čelisti.

O tomto novém nálezu z roku 1889 byl udělán v inventární knize poměrně přesný popis, který si dovoluji přepsat:

V listopadu 1889 upevňovala správa dráhy sjíždějící blok za posledním mostem blíže stanice Česká Třebová. „... přišlo se při kopání rigolu na kosti, jež spěchajíce neznalí dělníci rozbili. Část zůstala v zemi, část dobyta a dárci sem věnována." A sice pod těmito čísly: Č. 1 kel ze tří kusů slepený, č. 2–7 zuby třenovní, č. 8–10 část dolní čelisti, č. 13–19 část lebky aj., č. 20–41 články prstů aj., č. 42–54 části žeber. Pozn., zub č. 6 daroval p. Josef Glücksmann, pozn. články prstů č. 24–28 p. Kincl. Ještě další poznámka uvádí Nár. museum v Praze.

Tolik inventární kniha. Poznámka o Národním muzeu v Praze není jasná. Není také jasné, proč nebyla použita inv. čísla 11 a 12. Pečlivě provedený a gramaticky správný český zápis pak opět s největší pravděpodobností ukazuje na místního učitele (viz i tab. II).

Počty předaných kusů souhlasí s inventárním zápisem. Znamená to, že nález jako celek ležel s největší pravděpodobností až do dnešní doby netknutý, že se o něj nikdo nezajímal. Ze zápisu zároveň vyplývá, že byla vyzvednuta pouze část kostry, a to její lebka, respektive její fragmenty, dále spodní čelist se zuby, přední končetiny – tedy přední část těla. Druhá, zadní část těla, leží pak v zářezu tratě dodnes.

A ještě jedna zajímavá věc. U tří kusů kostí – bohužel není možné říci u kterých – byl přiložen nově napsaný lístek, zřejmě opis nějakého staršího, na kterém stálo: 3 ks (z r. 1846 – nálezu u Opatova). Nález u Opatova byl však učiněn až v roce 1852. Jedná se proto pravděpodobně o zcela jiný nález z této oblasti, dnes však nedovedeme ony tři kosti, které k tomuto lístku patří, identifikovat. Fosilizace všech předaných kostí je totiž zcela stejná, není proto ani vyloučeno, že se mohlo jednat i o stejné nebo nepříliš vzdálené místo od nálezu z roku 1890. Kostra pochází z jednoho poměrně mladého jedince, který patří druhu *Deinotherium cuvieri*. V zachovaném materiálu byl dále přítomný silně skousaný zub nosorožce.

Z nálezových okolností vyplývá, že se v daném prostoru nejedná pouze o ojedinělé a náhodné nálezy. Nahromadění koster není tam náhodné a bylo zřejmě způsobeno tehdejšími přírodními podmínkami. Buď se jednalo o ústí vodního toku nebo o rozsáhlé bažiny. Druhé vysvětlení se mě zdá pravděpodobnější.

Dosavadní nálezy jsou pravděpodobně pouze malým zlomkem toho, co by se dalo v dané oblasti ještě nalézt. Jedná se proto o zcela výjimečnou a z toho hlediska unikátní oblast, která nemá široko obdoby, a vyžadovala by proto systematický komplexní výzkum.

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