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ABSTRACT BOOK



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Pleistocene travertine site of Gánovce (northern Slovakia)

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Locality and its research

Travertine mound of Gánovce-Hrádok site (Fig. 1) is one of the most important Pleistocene palaeontological localities in the Central Europe. It is famous mainly for the Neanderthal find – travertine cranial endocast (VLČEK 1969, 1995). The site is situated 3 km SE from Poprad town. The travertine complex of Gánovce is spread along faults of the Podtatranská tectonic line, from Poprad town to Hôrka village. Travertine formations in this area were deposited since the end of Tertiary Period.



Fig. 1. The travertine mound of Gánovce-Hrádok (present conditions).

Travertine mound of Hrádok in Gánovce village belongs to the Late Pleistocene travertine formations. The lowermost layers of the mound were formed at the end of the Saale Glacial Stage. Main layers of compact travertine were deposited in the following Eemian Interglacial Stage. Original travertine mound was about 170 m in diameter and 20 m high, central crater was about 20 m in diameter. Travertine was intensively exploited since the eighties of the 19th century and the mining activities finished just before the World War II. Of the large heap only the torso of central crater was preserved (Fig.2.).

Many fossil remains of animals (mainly molluscs and mammals) and plants from the Late Pleistocene, as well as archaeological artefacts from the Middle and Upper Palaeolithic have been found during the mining of travertine. Artefacts from later cultures (Neolithic, Aeneolithic, Bronze Age, Hallstatt and Roman Period) (VLČEK 1995) have been found in Holocene soil layers. In 1926, several cranial endocasts of large mammals have been found in compact travertine (one of them was later classified as remain of *Homo neanderthalensis*, Fig. 3). Most of the fossil findings are housed in the National Museum in Prague (Czech Republic) and in the Podtatranské Museum in Poprad (Slovak Republic).

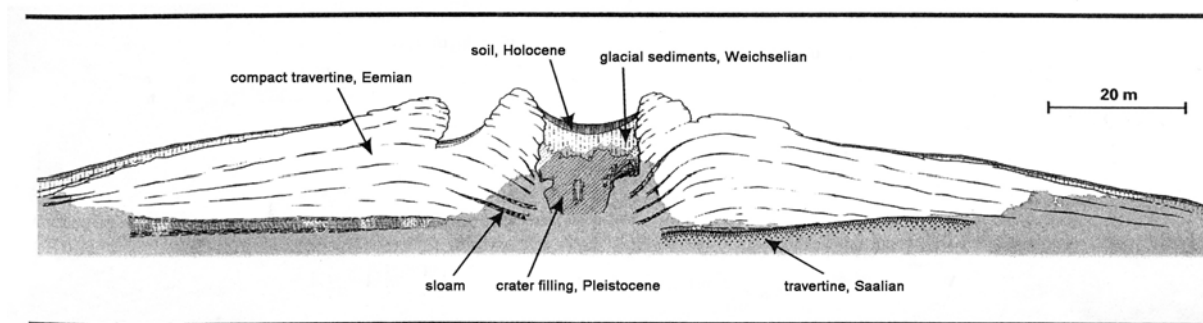


Fig. 2. The travertine mound section of Gánovce-Hrádok – verisimilar situation before exploitation; grey colour – situation in 1960 (VLČEK 1995).

Scientists investigated the locality since 19th century. Complex systematic research of the rest of the travertine mound was carried out in the years 1955-1960. A large team of experts – from the Archaeological Institute of the Slovak Academy of Science (SAV) in Nitra, from the Archaeological Institute of Czechoslovak Academy of Science (ČSAV) in Prague and from the Czech Geological Institute (ÚÚG) in Prague – took part in it. Results of the research have been summarized in a final report (VLČEK et al. 1958) and published in several papers; general results were presented in a monograph (VLČEK 1969).

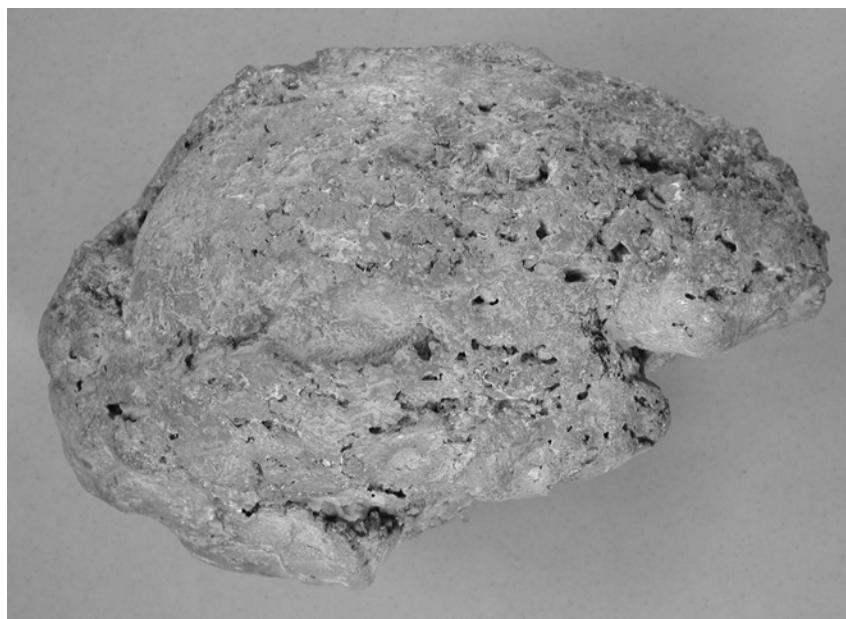


Fig. 3. The endocast of the Neanderthal man (woman?) from Gánovce-Hrádok.

Brief stratigraphical situation on the site (Fig. 2.)

PROŠEK (1958) presented 8 petrographically different layers in two profiles of the mound (profile in the margin of the crater and profile in the centre of the crater). Though the sedimentological situation in both profiles was a little different, their main layers can be mutually correlated. KUKLA (1958) recapitulated the whole structure of the site Hrádok into 4-5 petrographic associations:

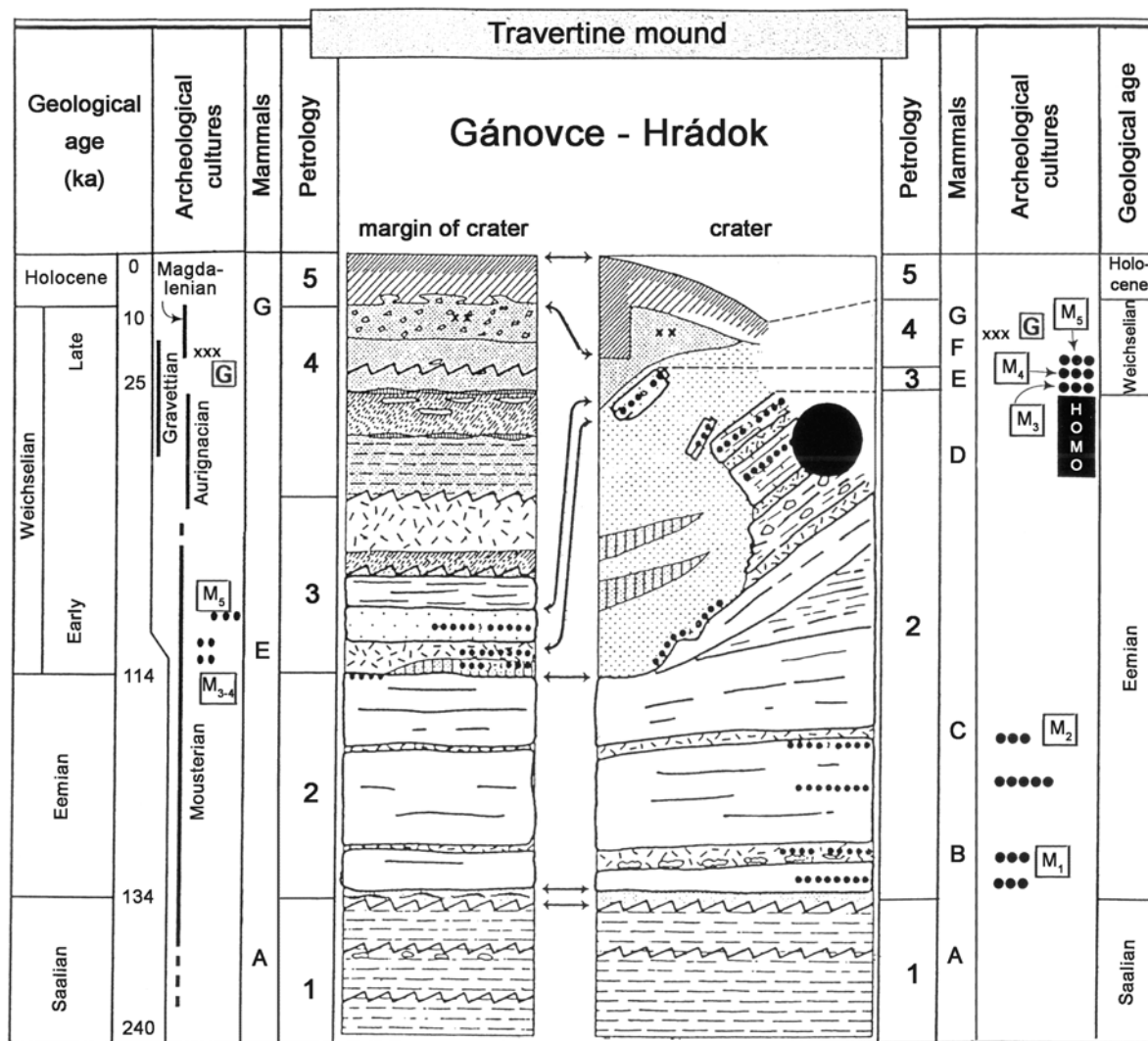


Fig. 3. The travertine mound of Gánovce-Hrádok – stratigraphy, archaeological finds and finds of mammals (modified from VLČEK 1995).

Archaeological artefacts: xxx G – Gravettian, ••• M - Moustertian; Mammalian fauna: A, B – late glacial (Saale) fauna with woolly mammoth and rhinoceros; C – warm forest fauna with forest elephant and rhinoceros; D, E – the most numerous fauna with both the forest and steppe elements; F – glacial fauna (Weichselian) with woolly rhinoceros, reindeer, horse, arctic fox and lemming.

1. Bottom layers consisting of travertine sands, marls and clays form an under-bed of the compact travertine. These layers were affected by cryoturbation. They were classified to the latest period of Saale Glacial.
2. Compact, stratified travertine with occasional intercalations of marls was formed during the last interglacial period (Eemian). The travertine contained many fossil remnants of flora and fauna, which allowing good observation of changes in the site-surrounding environment during the time of the travertine development.
3. Younger, crumbling travertine with soil layers was observed in overlaying beds. Abundant molluscan fauna together with remains of mammals and plants document the cooler climate in comparison to the interglacial maximum.
4. Sediments of the Last Glacial consist of soils in the bottom, then of layer of loess and above it of stony-sandy clay soils. Fragments of travertine often occurred in all layers.



Remains of typical cold mammalian and also molluscan species were found in loess. They indicate subarctic climatic and environmental conditions.

5. Travertine heap was covered with Holocene soils.

The Palaeogene slates and sandstones form the underlying bed of the torso of travertine mound.

Mammalian fauna on the site

During systematic research in 1955-1958, FEJFAR (1958) worked on mammalian fauna from the site (Tab.1). State of preserved osteological material in individual layers was different. Finds were well preserved in clay-soil sediments. Bones from firm travertine were rather disintegrated. Traces of burning have been found on the bones in cultural layers. Accumulation of micro-mammal bones was caused probably by exhalations from thermal waters. Large mammals were often a prey of predators such as cave hyena and wolf. Gnawed bones are evidence of that.

	A	B	C	D	E	F	G
<i>Talpa europaea</i> L.				+	+		
<i>Homo neanderthalensis</i> King				+			
<i>Lepus</i> sp.				+	+		
<i>Castor fiber</i> L.				+	+		
<i>Arvicola terrestris</i> L.				+	+		
<i>Pitymus subterraneus</i> Sél.-L.				+	+		
<i>Dicrostonyx torquatus</i> (Pall.)						+	
<i>Microtus arvalis-agrestis</i>			+	+	+		
<i>Microtus oeconomus ratticeps</i> K. Bl.				+	+	+	
<i>Microtus gregalis</i> Pall.						+	
<i>Canis lupus</i> L.				+	+		
<i>Vulpes vulpes</i> L.				+	+		
<i>Alopex lagopus</i> Linnaeus						+	
<i>Ursus spelaeus</i> Ros.				+	+		
<i>Ursus arctos</i> L.			+				
<i>Panthera</i> (cf. <i>spelaea</i> Goldf.)			+	+	+	+	
<i>Crocota spelaea</i> (Goldf.)				+	+		
<i>Mustela</i> sp	+						
<i>Putorius</i> sp.				+	+		
<i>Meles meles</i> L.				+	+		
<i>Palaeoloxodon antiquus</i> F. et C.			+				
<i>Mammuthus primigenius</i> (Blmb.)		+		+	+		
<i>Equus caballus taubachensis</i> F.				+	+		
<i>Equus caballus germanicus</i> N.				+	+	+	
<i>Asinus</i> cf. <i>hydruntinus</i> Regalia				+	+		
<i>Dicerorhinus kirchbergensis</i> (Jäger)			+				
<i>Coelodonta antiquitatis</i> (Blmb.)	+			+	+	+	+
<i>Cervus elaphus</i> L.				+	+		
<i>Capreolus capreolus</i> (L.)			+				
<i>Alces alces</i> L.			+				
<i>Rangifer tarandus</i> L.						+	
<i>Bison priscus</i> Boj.				+	+		
<i>Bos primigenius</i> Boj.				+	+		
<i>Bos</i> seu <i>Bison</i> sp.				+	+	+	

Tab. 1. Overview of found mammalian species (FEJFAR 1958):

Mammalian assemblages found in individual horizons of the profile were divided by FEJFAR (1958) to 6-7 groups, in profile marked A-G (Fig. 3.). These, together with remains of



molluscs and plants form a good picture about climate and environment in the surrounding of Gánovce during sedimentation of the mound. The oldest faunas A and B in underlying layers of travertine with predominance of *Mammuthus primigenius* (Blmb.) and *Coelodonta antiquitatis* (Blmb.) confirm existence of cold open landscape in the surrounding of Gánovce village on the end of Saale Glacial Stage. Mammalian assemblage in firm travertine – fauna C – indicates woodland with typical forest species, such as *Palaeoloxodon antiquus* F. et C., *Stephanorhinus kichbergensis* J., and cervids. Faunas D and E are the most numerous. They are represented by ubiquitous, montane and also steppe species. Species of *Ursus spelaeus*, *Castor fiber*, *Asinus* cf. *hidruntinus*, and *Putorius* sp. were less represented, whereas *Equus* sp. and *Coelodonta antiquitatis* were more frequent. Micromammals are well represented by *Microtus arvalis-agrestis* and *Arvicola terrestris*. Their monotonous occurrence is probably an evidence of inorganic origin of their accumulation (by exhalations). Presented species give the idea of open landscape with inclusions of thin forest in the surrounding of the site. Fauna F represents sub-arctic steppe up to steppe tundra habitat with the presence of reindeer and a small form of horse (*Equus germanicus*).

Apart from fossil mammals, other fossil vertebrates have also been found on the site. Of the reptiles, it was a travertine cast of carapace of *Emys orbicularis* L. (ŠTĚPÁNEK 1934) and a skeleton of closely unidentified snake in travertine. Birds are represented by a rare feather impression in travertine of the species *Grus cinerea* Bechst (PETRBOK 1937, 1939). However fossil remains of Neanderthal man *Homo neanderthalensis* – the travertine cranial endocast and the casts of long bones (radius sin. and fibula sin.) are the most valuable. They have been found in a top position of compact travertine (VLČEK 1995). These finds have been dated according to travertine age to 105 ka BP (JÄGER 1989).

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