THE NEOLITHIC RADIOLARITE MINING SITE OF WIEN - MAUER-ANTONSHÖHE (AUSTRIA)

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The northern fringe of the Eastern Alps is formed by the so called "Flyschzone" and the "Klippenzone/Klippenbelt" (cliffzone) with series of small solid rocks of upper Jurassic age, which is shifted by tectonic processes during the folding of the Alps (lower Tertiary) to their present position (*Fig. 1.*). In the southwest of Vienna the easternmost parts of the "St. Veit Klippenbelt" achieves at the "Antonshöhe" an altitude of 356 m above see level. The core of the St. Veit Klippenbelt is made of limestone with mainly grey and red chert types (*Fig. 5.*), shaly clays and sandstones, which were formed during the upper Jurassic (Thitonian) and the lower Cretaceous (Neocomian) period. It was the time of the maximum ground´s deepening of the Tethys sea and therefore it is a primary deepwater-sedimentation. Those sedimentary rocks are surrounded by a cover, built up by marls, clay marls, sandstones and shaly clays out of the upper Cretaceous (New Red Sandstone series).[1]

At the Antonshöhe (23rd district of Vienna) an area of 400 to 120 m these Upper Jurassic, reddish limestone and whitish, Lower Cretaceous limestone are exposed and had been quarried since the 19th century till the mid of the 20th century. As in 1924 human bones were discovered, archaeologists became interest in and Josef Bayer (Director of the Prehistoric Department of the NHM-Wien) controlled 1929-1930 the site, collected finds and registered four shafts of a complex mining system associated with human burials. After his death some observations had been done in 1938 by Lotte Adametz, who was associated with Bayer. In 1949 further investigations by Alfred Neumann from the Historical Museum of Vienna positioned the former shafts and other archaeological evidences in the enlarging quarry. In total six graves with seven individuals (two adult males, three adult females, one child and one infant) had been found. The shafts were refilled after their abandonment with debris of the mining activities and till nowadays it is quite easy to collect raw material and artifacts in the former quarry.

Due to death of Bayer (1931) and Adamec (1966) merely one preliminary reports existed.[2] In 1958 Franz Kirnbauer[3] published the geology of the site and considered about the mining methods without information about the field documentation done by Bayer and Adamec. It was then Elisabeth Ruttkay, with access to the documentation (which is not easy to read and to understand) and the archaeological objects in the NHM-Wien, who wrote in 1970 the basic article about the Neolithic radiolarite mining site at Antonshöhe near Mauer in Vienna.[4]

Sum up the results we can observe, that Mauer-Antonshöhe is still today the only one known (Neolithic) chert mine with deep shafts in Austria. As we know, deep-shaft mining starts in early Neolithic (Casa Montero near Madrid (Spain), Arnhofen-Abensberg in Lower Bavaria (Germany), Sąspów (Poland), Krumlov forest (Moravia, Czech Republic) and is common till the Bronze Age or even later.[5]

[1] KIRNBAUER 1958, 122-126., THINSCHMIDT 2000.

[2] BAYER 1930.

[3] KIRNBAUER 1958.

[4] RUTTKAY 1970.

[5] TRNKA 2011.

At Antonshöhe four shafts had been documented with depths of 2-8 meters and width of rather 1-2 meters. Josef Bayer mentioned small gallery-like extensions which cannot be really certified by the present photographs and the fragility of the limestone will not guarantee such a thesis. In total seven individuals (two adult males, three adult females, one child and one infant) had been found in between 1924-1930 in the shafts or wastes. The finds and the burials were reconstructed after they had been found by the workers of the quarry - it means, that no archaeologist has never seen an authentic evidence.

Shaft I (1929) with some internal parts yielded grave 4 (*Fig. 3.*) - a double burial with a child (9-10 years) and an infant (0-0,5 years) with a fragmented pot (*Fig. 4.*). In the upper parts of the same shaft also grave 5 had been found (1929), containing a 25-35 years old female with a bowl (*Fig. 4.*).

Graves 1 and 2 were found in shaft IV (1924) at a depth of 3-3,75 m. Unfortunately there is no photograph. In grave I a 25-35 years old female was buried at the bottom of the shaft and superimposed by 80 cm by a burial of a male of 25-35 years old (grave 2) in an upright or sitting position deduced from of one meter the shaft.

Grave 3 (1927), a 25-30 years old female, was found east of shaft IV in the waste.

Some scattered bones of an adult male (1930?) were later labelled as grave 6.

For sure the shafts with the human bones can be interpreted as underground Neolithic burials contemporaneous with the mining activities in the area. The deceased were buried with grave goods (ceramics) in the open or partly refilled shafts and must belong to the nearby settlers.

Both stylistic and technical analyses of the ceramics determined a middle Neolithic age in the second half of the 5th millennium BC (late phase (IIb) of the western group of the Lengyel culture.[6]

This chronological attribution has been recently confirmed by three radiocarbon dates on human skeletal samples. *Tab. 2*. Vienna - Mauer-Antonshöhe (Austria). Radiocarbon datations. Calibrated (OxCal 3.10).[7]

Wien - Mauer-Antonshöhe - Schacht 4, Grab 2, Individuum 2 = VERA-228: 5312 ± 31 BP

68.2% probability: 4230 BC (13.2%) 4190 BC - 4180 BC (11.7%) 4150 BC - 4140 BC (43.3%) 4050 BC

95.4% probability: 4240 BC (95.4%) 4040 BC

Wien - Mauer-Antonshöhe - Grab 3 = VERA-229: 5650 ± 32 BP

68.2% probability: 4525 BC (68.2%) 4450 BC

95.4% probability: 4550 BC (84.5%) 4440 BC - 4430 BC (10.9%) 4370 BC

Wien - Mauer-Antonshöhe - Schacht 1, Grab 5 = VERA-230: 5662 ± 29 BP

68.2% probability: 4520 BC (68.2%) 4455 BC

95.4% probability: 4560 BC (93.2%) 4440 BC - 4420 BC (2.2%) 4390 BC

The importance of Mauer-Antonshöhe is the fact, that the middle Neolithic society disposed their deceased in the shafts or near by in the mining field. Obviously the dead were attributed with goods (ceramics) and the shafts had not been (re)filled with debris before. The pots (*Fig. 4.*) allow an archaeological dating to the later Lengyel culture (west group) and this corresponds to the radiocarbon dates.

It is quite rare, that humans were buried in shafts of flint or chert mines. We have evidence from the mining sites in the Krumlov forest in southern Moravia, Cissbury and Grimes Graves in England, Spiennes in Belgium etc. Some are badly documented or found in the 19th century without prove anymore. The famous “miners” from Obourg and Strépy in Belgium have been identified as a forgery and are dated by radiocarbon of late bronze age and early medieval age.[8]

The St. Veit Klippenbelt at Mauer-Antonshöhe marks the easternmost part of the pre-Alps, ending in the west of Vienna and is continuing in the White Carpathians in northwestern Slovakia and adjacent parts of Moravia with mining activities.[9]

We supposed that also on other hills in the west and southwest of Vienna with outcrops of radiolarite (*Fig. 2*) some mining activities took place, but no recent field activities were initiated till yet. A first step towards that is a digital terrain model of the forests at the Antonshöhe (*Abb. 2*) derived from an airborne laser scanning (ALS, LiDAR).

In the deposit of the Prehistoric Department of the NHM-Wien is a large collection of presumed mining tools (pics and fragments of deer antler, stone axes, hammer stones etc.) and boxes of

[6] RUTTKAY 1970. 77-78.

[7] STADLER et al. 2006. Tab. 1, STADLER—RUTTKAY 2007. Tab. 1.

[8] DE HEINZELIN et al. 1993. Tab. 1.

[9] CHEBEN—CHEBEN 2010. 21-24., Fig. 6.

debitage, flakes and many others (*Fig. 5.*). The determined stone tools for mining were made of different raw materials and are from various provenience (even from the basin of Prague Palaeozoic), but they should be examined more in more detail again.[10]

[10] NIEDERMAYR—CADAJ 1970, THINSCHMIDT & TRNKA 2000.

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ÚJKŐKORI RADIOLARIT KITERMELŐHELY WIEN - MAUER-ANTONSHÖHE (AUSZTRIA)

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Kulcsszavak: *radiolarit, kovabánya, lengyeli kultúra, sírok, kőeszközök*.

A Bécs, Mauer-Antonshöhe (Ausztria) kovabánya nyersanyaga az ún. "St. Veit Klippenbelt"-be tartozik, felső jura és alsó kréta korú rétegekből áll. Az itt feltárt őskori kovabánya egy modern kőbánya területén került elő a múlt században. Négy mély aknát dokumentáltak itt, 2-8 méter mélységűt, melyeknek átmérője 1-2 méter volt. Az őskori bányahely elsősorban a bányaműveléssel összefüggésbe hozott sírok miatt vált közismertté. Összesen hét személyt (két felnőtt férfit, három felnőtt nőt, egy gyermeket és egy csecsemőt) találtak itt az 1924-1930 közötti feltárásokon a bányagödrökben, illetve a hulladékban. Ezt később hat sírként rekonstruálták. A sírokat a bennük talált, a lengyeli kultúra IIb fázisára keltezhető kerámia datálja, amit az újabb radiokarbon adatok is alátámasztanak. (V. évezred közepe illetve második fele BC). Ausztriában a mélyművelésű őskori bányászatnak eddig kizárólag az Antonshöhe lelőhelyen találták bizonyítékát. A tanulmány rövid áttekintést ad erről a fontos neolit lelőhelyről, kiegészítve a kőanyagon végzett friss kutatási eredményekkel és felhívva a figyelmet a további vizsgálatok szükségességére. A leletanyag a bécsi Természettudományi Múzeum Őskori Osztályán található meg. (PA - NHM-Wien).

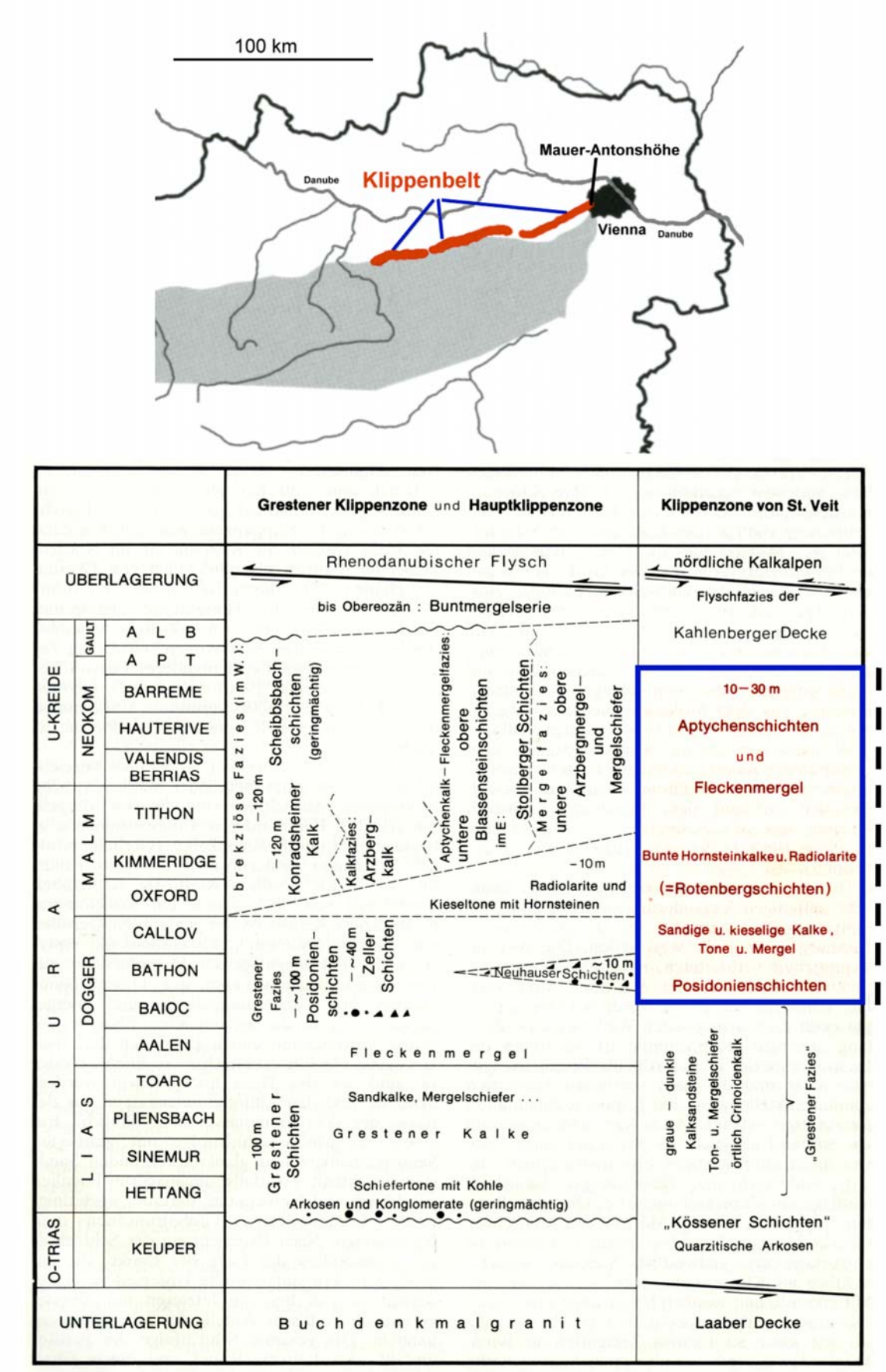

Figure 1.: Geological table after OBERHAUSER 1980. Fig. 44.
1. kép: Geológiai kortábla OBERHAUSER 1980. Fig. 44. nyomán

Figure 2.: Wien - Mauer-Antonshöhe 1929-2010

2. kép: Wien - Mauer-Antonshöhe 1929-2010

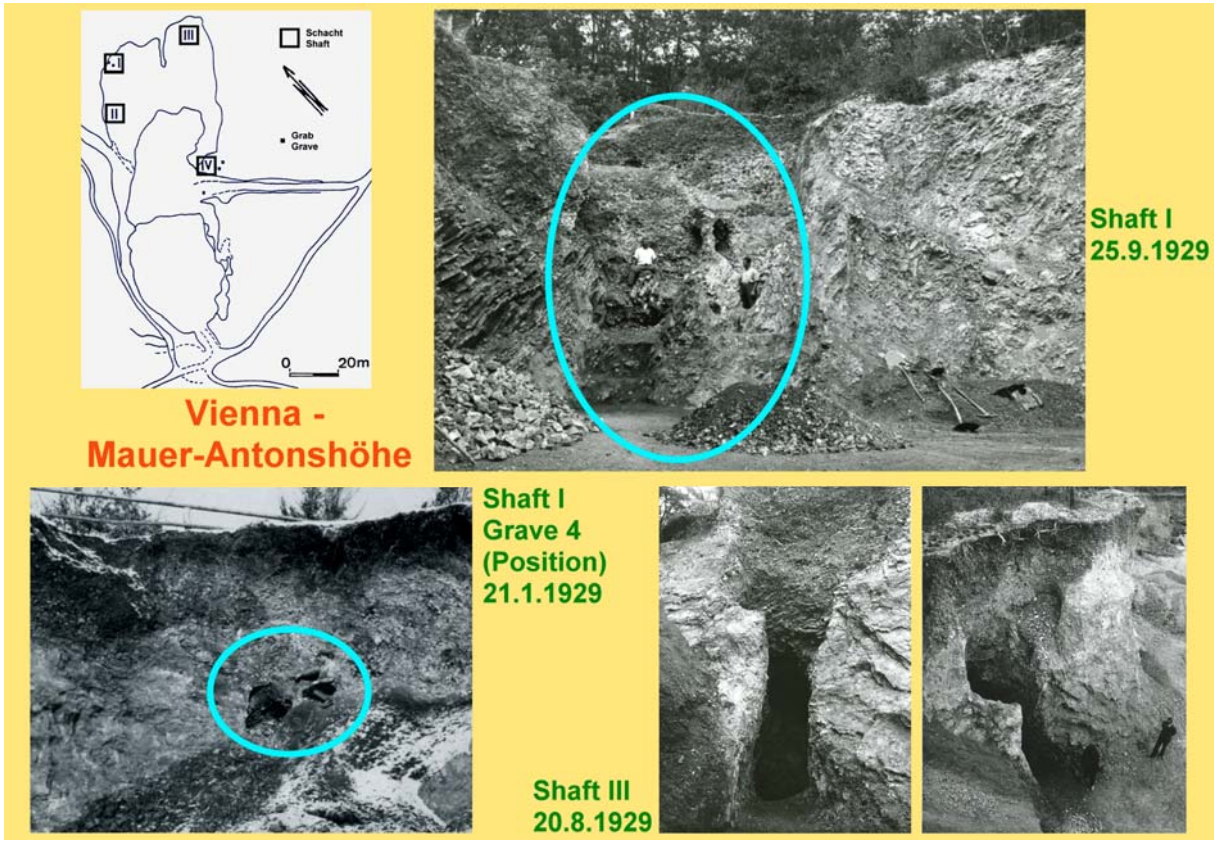

Figure 3.: Wien - Mauer-Antonshöhe 1929. Shaft I and III. Photo: PA - NHM-Wien

3. kép:: Wien - Mauer-Antonshöhe 1929. I és III. akna. Fotó: PA - NHM-Wien

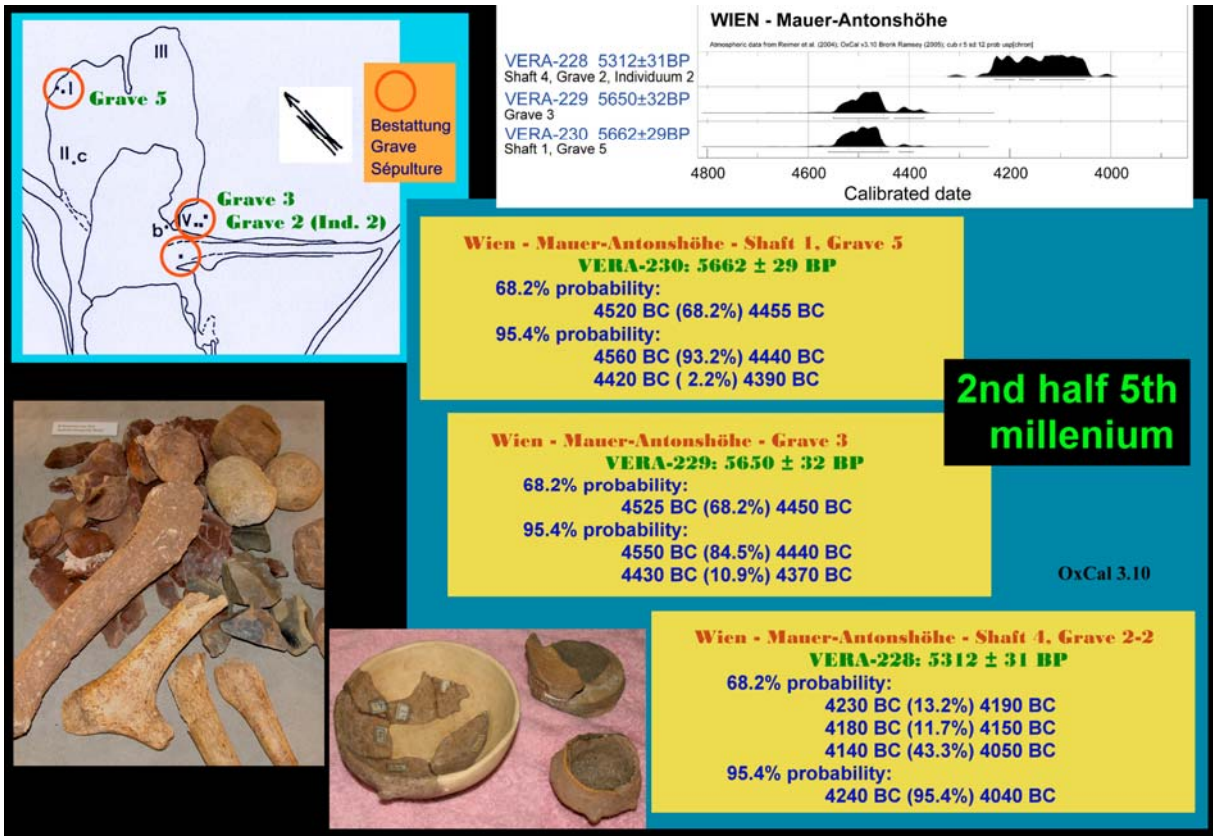

Figure 4.: Wien - Mauer-Antonshöhe 1929. Sketch of the quarry with position of the graves and shafts. Antler tools, debitage and waste (selection in the exhibition of the PA - NHM-Wien)). Pottery from grave 4 and 5. Table of calibrated ^{14}C-dates

4. kép: Wien - Mauer-Antonshöhe 1929. A kőfejtő vázlata a sírok és az őskori bányagödrök (aknák) helyzetével. Agancseszközök, kőeszköz műhelyhulladék (válogatás a Természettudományi Múzeum őskori gyűjteményének kiállítási anyagából). Kerámia a 4. és 5. sz. sírokból. Kalibrált ^{14}C koradatok

Figure 5.: Wien - Mauer-Antonshöhe. Radiolarites, stone and antler tools from the site. Depot of the PA - NHM-Wien. Fotos with permission of the PA - NHM-Wien

5. kép: Wien - Mauer-Antonshöhe. Radiolarit, kő- és agancseszközök a lelőhelyről. A bécsi Természettudományi Múzeum anyagából