NEW ARCHAEOLOGICAL INFORMATION REGARDING THE EXPLOITATION OF ANDESITE IN *MĂGURA UROIULUI* (HUNEDOARA COUNTY)[1]

MARIUS GHEORGHE BARBU
Muzeul Civilizației Dacice și Romane, Deva
barbumarius0216@yahoo.com
IOAN ALEXANDRU BĂRBAT
Muzeul Civilizației Dacice și Romane, Deva
ioan_alexandru_barbat@yahoo.com

Keywords: archaeological researches, sources of raw materials, quarry, prehistory, Roman period
Cuvinte cheie: cercetări arheologice, surse de materie primă, carieră, preistorie, epocă romană

The present stage of research on this subject shows that the earliest evidences of the use of the andesite from the Măgura Uroiului *volcanic hill were found during a survey of certain dwellings from the Early Neolithic period in Rapoltu Mare. The volcanic rock was used throughout the Bronze Age and the Iron Age, when two fortifications were erected on the terraces of Măgura Uroiului.*

The andesite quarry was systematically exploited during the Roman period. The traces of the ancient techniques of extracting stone blocks are still visible today. The site's strong connection with the Micia Roman stonemasons' centre lead to the discovery, in the Uroi exploitation site, of an anthropomorphic representation in an early stage of manufacture, a representation that bears the artistic marks of the Micia sculpture practices.

The Uroi andesite was also used throughout the Middle Ages, as proven by a nearby fortification. Evidences of medieval and modern exploitations are also still visible through different markings left in the native rock.

Introduction

In the context of the recent systematic or survey archaeological endeavours made in the areas around the villages near the volcanic hill, namely around Uroi and Rapoltu Mare, between 2014-2017[2], a reassessment of an apparently "worn out" subject in the archaeological scholarly literature regarding the exploitation of andesite in the *Măgura Uroiului* (Hunedoara County) quarry is absolutely necessary. Given the extent of the subject and the ongoing archaeological research projects, we shall attempt to illustrate the main results obtained in the aforementioned time interval. In a future study, we shall provide a more detailed presentation of the archaeological discoveries that can be attributed to the exploitation of andesite in the *Măgura Uroiului* promontory.

[1] A Romanian version of the present study will be published in the journal *Banatica*, 27/2017.

[2] Băeștean *et al.* 2015a, p. 120-122; Băeștean *et al.* 2015b, p. 122-123; Băeștean *et al.* 2016, p. 67-68; Barbu *et al.* 2016, p. 273-321; Băeștean *et al.* 2017, p. 109-111.

Localization

The *Măgura Uroiului* archaeological site, also known as *Măgura, Dealul Uroiului*[3] (*Uroi Hill*) or *Muntele de Aur* (*The Golden Mountain*, or *Arany Hegy*, in Hungarian[4]), is located in south-western Transylvania and it is part of the administrative region of the Hunedoara County: in Rapoltu Mare commune[5], in Rapoltu Mare village, on the outskirts of Uroi village, administrated by the town of Simeria[6] (**Pl. I/1-2**).

The landform under scrutiny is part of the Mureş River Valley Intermountain Depression, in the Sebeş – Deva sector[7], and it outlines the following geographical subunits: the Orăştie Corridor[8] in the north-west, and the Lower Strei Corridor[9] in the North. *Măgura Uroiului* is located on the northern side of the Mureş course and of the county road DJ 107A, Uroi – Geoagiu[10]. The right bank of the aforementioned river, at its confluence with the Strei River, is on the southern side of the foot of the hill[11] (**Pl. II/1**).

Due to its geographical layout, the *Uroi Hill* can be considered to be one of the last mountain formations of the Southern Apuseni Mountains. *Măgura Uroiului* is connected to the Apuseni Mountains through the *Alistrei* mountain pass, resembling a "wedge" in the Mureş Valley[12].

Geology

The present shape of the hill is the product of natural and anthropogenic factors. The latter represented our motivation to elaborate the present article (**Pl. II/2-3, IV/1-2, X/1-2**). In respect to the natural factor, we must mention the fact that there were numerous endeavours made in the attempt to identify the genesis of the volcanic *neck* located between the present rural communities of Uroi and Rapoltu Mare. There were an equally large number of studies whose purpose was to identify the petrographic characteristics of the rock. We must mention the ones that five decades ago concluded that *Măgura Uroiului* belonged to the "late subsequent magmatism", namely to the second phase of the Neogen volcanism[13]. More recently, through K-Ar dating, it has been pointed out that the age of the Uroi volcanic apparatus was 1.9±2 Ma[14]. Recent studies indicate an even later dating – 1.6±0.1 Ma[15] and it is considered to have

[3] Floca, Şuiaga 1936, p. 85; Niculescu-Varone 1945, p. 12.

[4] Téglás 1887, p. 60; Téglás 1902, p. 116; Roska 1942, p. 27; Păunescu 2001, p. 301.

[5] A commune is the lowest level of the Romanian administrative subdivisions. If not marked otherwise, the term will be used in accordance with this meaning.

[6] The GPS coordinates of the *Măgura Uroiului* plateau: latitude: N 45°51'38.47" and longitude: E 23°02'45.51". Regarding the altitude, the data differs from one author to another, namely 389 m (Savu *et al.* 1994, p. 9) or 392 m (Solomon 1939, p. 10; Niculescu-Varone 1945, p. 12).

[7] Zotic 2007, p. 1, fig. 1, pl. 1-3.

[8] Badea, Buza, Cîndea 1987, p. 360-361, fig. 133; Badea, Mărculeț 2012, p. 305; Mărculeț 2013, p. 9, 13, fig. 4.

[9] Marcu 2007, p. 42-49, fig. 1-2.

[10] Savu *et al.* 1994, p. 9.

[11] Solomon 1939, p. 10; Trufaş 1962, p. 171, 175, fig. 1-3.

[12] Trufaş 1962, p. 171, 175, fig. 1-3.

[13] Savu *et al.* 1968, p. 46; Ianovici *et al.* 1969, p. 393; Ianovici *et al.* 1976, p. 480-481; Mutihac, Ionesi 1974, p. 559; Mutihac 1990, p. 359.

[14] Savu *et al.* 1994, p. 9, 11, 21.

[15] Roşu *et al.* 2001, p. 7; Roşu *et al.* 2004, p. 158, Table 1; Bojar, Walter 2006, p. 504.

appeared due to the volcanic activity that occurred at the end of the Upper Pliocene – Quaternary periods[16].

Due to the petrographic data obtained throughout the years, the *Măgura Uroiului* volcanic "neck" was included in the category of the andesite magmatic rocks with augite[17] and pseudobrookite[18]. Recent geological researches showed that due to the high concentration of potassium oxide (K2O), *Dealul Uroiului* is, petrographically speaking, a trachyandesite[19].

Finally, we must mention the chromatics of the volcanic rock – some opinions consider it to be reddish-grey[20] or red-brown[21], while other studies point out the presence of two shades: one identified in the central part of the hill, bluish (sometimes described as reddish or pinkish), and another greyish shade displayed around the first[22].

Overview of the archaeological research

The first "scientific" approaches of *Măgura Uroiului* were probably made before the first half of the 19th century; however, only later, in 1856, Johann Michael Ackner wrote about the exploitation markings found in the ancient quarry on the eastern bounds of the Uroi village[23] and about the stone blocks that seemed to have been left mid-carving.

At the end of the 19th century, in a repertoire of the Transylvanian archaeological sites, Téglás Gábor provided new archaeological information regarding the prehistoric, ancient and medieval discoveries from *Dealul Uroiului*[24] (**Pl. III/1-2**).

The better part of the archaeological data published at the end of the 19th century and the beginning of the 20th century and later reassessed, showed that, from a topographical viewpoint, *Măgura Uroiului* corresponds with the location of the ancient Petrae (Petris) from *Tabula Peutingeriana* (**Pl. VIII/1**). The arguments in this respect are given by the fact that the toponymy indicated a place that contained stone (a quarry), as well as by its approximately equal distance from the neighbouring localities, Germisara (Geoagiu-Băi) and Aquae (Călan-Băi), which were also present on the ancient map. This idea can also be confirmed today through field research[25].

In 1937, probably through surveys made in the south-eastern area of *Măgura Uroiului*, in the archaeological sites *Corabia Mică*, *Baia Roşie* or *Baia lui June* (**Pl. III/3-4**), a batch of 17 potsherds from the Eneolithic and the Bronze age was

[16] Savu *et al.* 1994, p. 9, 11, 21.

[17] Téglás 1887-1888, p. 57-58; Orosz 1903, p. 206; Floca, Şuiaga 1936, p. 86; Solomon 1939, p. 9-11; Niculescu-Varone 1945, p. 12; Pîrvu 1964, p. 219; TIR 1968, L 34, p. 89; Ianovici *et al.* 1969, p. 500; Wollmann 1973, p. 111; Ianovici *et al.* 1976, p. 481; Wollmann 1996, p. 257; Bălos *et al.* 2010, p. 113.

[18] Savu *et al.* 1968, p. 46; Ianovici *et al.* 1976, p. 480.

[19] Savu *et al.* 1994, p. 9, 19, 21; Roşu *et al.* 2001, p. 7-9; Roşu *et al.* 2004, p. 157, 159; Bojar, Walter 2006, p. 503-504. In the present study we shall use the term andesite, which is used in the archaeological scholarly literature, but we also take into consideration the results obtained by geologists regarding the petrography of the *Măgura Uroiului*, in which case the term trachyandesite is used.

[20] Pîrvu 1964, p. 219; Ianovici *et al.* 1976, p. 481; Mârza 1997, p. 822.

[21] Floca, Şuiaga 1936, p. 86; Niculescu-Varone 1945, p. 12.

[22] Pîrvu 1964, p. 219; Savu *et al.* 1994, p. 9, 11-13, 21.

[23] Ackner 1856, p. 6; Wollmann 1973, p. 106; Wollmann 1996, p. 253, 268.

[24] Téglás 1887, p. 60.

[25] Téglás 1889-1890, p. 110; Téglás 1902, p. 116-118; Roska 1942, p. 27; Niculescu-Varone 1945, p. 12-13; TIR 1968, L 34, p. 89, 116; Tudor 1968, p. 127; Macrea 1969, p. 152, 307; Rusu 1977, p. 539; Branga 1980, p. 85, 110; Popa 2002, p. 207-208; Lazăr, Stârcescu Enăchiță 2008, p. 14-15; Luca 2008, p. 178; Bălos *et al.* 2010, p. 113; Măruia *et al.* 2010, p. 86.

uncovered; the batch became part of the collection held by the Museum of Dacian and Roman Civilization, in Deva[26].

According to the stories told by a villager from Uroi, it would appear that the history professor Beniamin Bassa from Simeria made several surveys in order to identify the Roman road that crossed the foot of the *Măgura Uroiului* in the mid-20th century or in the second half of the 20th century. Unfortunately, we have no documentary information in the form of an archaeological report of these endeavours; they are merely part of the locals' memories[27].

In the vicinity of road DJ 107A, the 1974 discovery of a rectangular grave with brick walls can be attributed to the Roman period. The discovery was made during the contemporary construction work carried out in order to widen a side road south of the volcanic mamelon[28].

At the end of the 20th century, on *Măgura Uroiului*, there was an accidental discovery of a scraper made of brown jasper, attributed to the Palaeolithic period; strong analogies can be made between this discovery and the items from the Mousterian from France[29].

Between 1999-2000, William S. Hanson and Ioana A. Oltean carried out field surveys on *Măgura Uroiului* in order to identify the Early Ion Age fortification that had appeared in aerial photographs a short while before[30].

In January 2001, a fibre optic cable was installed and a salvage archaeology endeavour was carried out at the foot of *Măgura Uroiului*. The research uncovered a rampart (a defensive bank) and several dwelling-type structures. The relevant ceramic materials from the archaeological layers or complexes showed that the discoveries were from the Early and Late Iron Age[31].

The systematic archaeological survey of *Măgura Uroiului* started in August 2003. The site was coordinated by a collective of archaeologists from the Museum of Dacian and Roman Civilization, Deva. To this day (2017), spectacular results were obtained regarding the anthropogenic activities on the terraces of the volcanic neck, especially in respect to the Hallstattian defensive system[32] (**Pl. VI/1-2, VII/1**). We must mention that during the archaeological research campaign from the summer of 2004, an andesite platform was discovered on terrace III of *Măgura Uroiului*, where fragments of human and animal skeletons were found more frequently than the anatomically connected skeletons that were found later. The subsequent researches (2005-2016)

[26] Bărbat 2012, p. 28, note 48. The box in which the materials had been deposited, together with some items discovered in Godinești – *Peștera de Sus*, also contained three potsherds from the Early Neolithic period.

[27] Scientific researcher Costin-Daniel Țuțuianu from the Museum of Dacian and Roman Civilization, Deva, was kind enough to provide this information.

[28] Mărghitan 1974-1975, p. 42; Rusu 1977, p. 539-542, fig. 1-4; Andrițoiu 1979, p. 28; Lazăr, Stârcescu Enăchiță 2008, p. 15; Luca 2008, p. 179.

[29] Cârciumaru *et al.* 1999, p. 1-3, fig. 1; Păunescu 2001, p. 301.

[30] Hanson, Oltean 2000, p. 45-49, fig. 1-4; Bălos *et al.* 2010, p. 114.

[31] Bălos 2001, p. 15-16; Bălos, Ardeu 2002, p. 249-250, 439, pl. 87; Ardeu, Bălos 2002, p. 67-81, foto 1-4, pl. I-XVIII; Ardeu, Bălos 2003, p. 183-186, pl. I; Lazăr, Stârcescu Enăchiță 2008, p. 15; Bălos *et al.* 2010, p. 114; Măruia *et al.* 2010, p. 86.

[32] Bălos *et al.* 2004, p. 250-251, 445, pl. 55/B; Pescaru *et al.* 2005, p. 287-288; Pescaru *et al.* 2006, p. 281-282; Pescaru *et al.* 2007, p. 286-287, 461, pl. 57; Lazăr, Stârcescu Enăchiță 2008, p. 15; Luca 2008, p. 178; Pescaru *et al.* 2008, p. 248-249, 393, pl. 55; Pescaru *et al.* 2009, p. 181; Bălos *et al.* 2010, p. 114; Măruia *et al.* 2010, p. 86; Pescaru *et al.* 2011, p. 106; Băeștean *et al.* 2013, p. 113; Băeștean *et al.* 2014, p. 84-85; Băeștean *et al.* 2015b, p. 122-123.

confirmed the fact that the burials were made in the Hallstatian fortification ditch, thus outlining a funeral complex from the Hallstatt B phase[33].

During the same year when the systematic archaeological surveys started, in 2003, archaeological poaching also started to be practiced on terrace II, thus destroying the site that contained bronze items. Out of the artefacts collected from around the illegal dig, only 20 bronze objects could be recovered – items that were weathered, dating to Ha A2-Ha B1[34].

Furthermore, different real-estate investments gave archaeologists the opportunity to carry out certain preventive archaeology campaigns in the sectors neighbouring the volcanic hill. Such is the case of the sites *Pescărie/Nearoş* and *Ciupercărie* in the areas around Rapoltu Mare, where the prehistoric dwellings and the ones from the Migration Period were considerably numerous[35]. We must also mention the results obtained from the preventive archaeology endeavours carried out in advance of the construction of the A1 Deva – Sibiu highway: in the proximity of the Uroi village, in the *Sigheti* and *Pod Mureş/Locu Boilor* points, dwelling-type structures from the Bronze Age to the Early Middle Ages were identified[36].

Another step in the archaeological study of *Măgura Uroiului* was an interdisciplinary archaeological approach[37] (**Pl. II/1-3**). The aerial photographs taken between 1998-1999[38] and the later ones from 2009[39] and 2013[40] are thus relevant. In 2004, magnetometric prospections were made in the site, which showed the existence of certain archaeological structures, as well as several more recent objects from the two world wars[41]. During the archaeological research campaigns from 2006-2007, terraces I and II were studied through soil resistivity testing[42]. The same endeavour was carried out in 2008 in the case of the medieval fortification from Uroi[43]. There is also an ongoing anthropological study of the osteological material found in the Hallstattian fortification ditch, part of which was published in 2006[44].

From a chronological perspective, different terraces of *Măgura Uroiului* can be attested to almost all the ages of prehistory, from the Palaeolithic to the end of the Early Iron Age; the terraces show the presence of archaeological cultures such as Starčevo-Criş, Bodrogkeresztúr III, Coţofeni, Wietenberg, Gáva, Gornea-Kalakača, Basarabi, or cultural groups from the Early Bronze Age, like Gornea-Orleşti[45]. The antiquity is very

[33] Pescaru *et al.* 2005, p. 288; Pescaru *et al.* 2006, p. 281; Pescaru *et al.* 2007, p. 286-287; Pescaru *et al.* 2009, p. 181; Pescaru *et al.* 2010, p. 159; Băeştean *et al.* 2015b, p. 123.

[34] Bălos *et al.* 2004, p. 251; Bălos *et al.* 2010, p. 114, fig. 3; Ardeu, Bălos 2013, p. 175-180, fig. 2/1-20.

[35] Bărbat 2009, p. 11-15; Ţuţuianu, Barbu, Codrea 2012, p. 175-178.

[36] Damian *et al.* 2012, p. 278-279; Bodó *et al.* 2012, p. 293; Marc *et al.* 2013, p. 119-139; Băeştean 2013, p. 241-258; Marc *et al.* 2015, p. 81-86; Beldiman *et al.* 2015, p. 93-96; Bărbat, Tutilă Bărbat, Mitar 2015, p. 289-290.

[37] Bălos *et al.* 2007, p. 205-210; Bălos *et al.* 2010, p. 113-115; Măruia *et al.* 2010, p. 86-89; Crandell, Bălos 2011, p. 157-165.

[38] Hanson, Oltean 2000, p. 45; Lazăr, Stârcescu Enăchiţă 2008, p. 15; Măruia *et al.* 2010, p. 86.

[39] Berecki, Czajlik, Rupnik 2013, p. 90-91.

[40] Czajlik, Berecki, Rupnik 2014, p. 462.

[41] Pescaru *et al.* 2005, p. 288; Bălos *et al.* 2007, p. 206-210, fig. 2-5; Bălos *et al.* 2010, p. 113.

[42] Pescaru *et al.* 2007, p. 287; Pescaru *et al.* 2008, p. 249; Crandell, Bălos 2011, p. 159-160.

[43] Pescaru *et al.* 2009, p. 181.

[44] Pescaru *et al.* 2006, p. 281-282.

[45] Téglás 1887, p. 60; Marţian 1920, p. 41; Roska 1942, p. 27; Andriţoiu 1974-1975, p. 138; Petrescu-Dîmboviţa 1977, p. 72; Andriţoiu 1992, p. 126; Cârciumaru *et al.* 1999, p. 1-3, fig. 1; Hanson, Oltean 2000, p. 45-49; Păunescu 2001, p. 301; Bălos 2001, p. 15-16; Bălos, Ardeu 2002, p. 249-250; Ardeu, Bălos 2002, p. 67-70; Ardeu, Bălos 2003, p. 183-185; Bălos *et al.* 2004, p. 250-251; Pescaru *et al.* 2005,

well represented through the traces of the La Tène dwellings[46] (on terrace III), as well as through the Roman quarry, whose traces are visible on the surface[47]. Dwellings from the post-Roman period are displayed particularly at the foot of *Măgura Uroiului*, near the Mureş Meadow[48]. A fortification from the Middle Ages can be found in the eastern part of the Uroi village, at the base of the volcanic cone. A similar position is occupied by the ruins of a noble court from the beginning of the modern age (?)[49].

Historical periods and andesite exploiting techniques

The results of the field surveys carried out on the rough surfaces of the *Măgura Uroiului* plateau and on the terraces that outline this hill showed numerous traces andesite exploitation. They were divided into multiple categories, according to the mineral extraction techniques; their spatial distribution outlines several areas of activity in this quarry. There were multiple work fronts throughout an extended chronological interval. This idea is sustained by the fact that there are traces of different exploitation techniques, as well as by the fact that different markings left by the andesite extraction can be found on higher or lower terraces of the hill.

Prehistory. We can assume that from the earliest prehistoric periods, *Măgura Uroiului* represented a benchmark for the human communities living in the Mureş Corridor. It is very likely that the people visited the volcanic neck in prehistorical times due to its location, but it might also have been due to the morphology of the andesitic cone and the visibility that the upper plateau of the hill offered over the Mureş Valley. The archaeological researches sustain this idea – they indicate a great intensity of different types of prehistoric habitation on the terraces and promontories of *Măgura Uroiului*; most of them are from the Late Eneolithic, Late Bronze Age and the First Iron Age.

However, given the uninterrupted evolution of the presence of human groups on *Dealul Uroiului* and in its proximity, we could assume that the volcanic cone also held certain spiritual attributes for the prehistoric populations, an idea that is quite difficult to assert merely through the "study" of the products of the material culture.

We could certainly make the assumption that once the Early Neolithic communities settled in the vicinity of *Măgura Uroiului*, the area was prospected in

p. 288; Pescaru *et al.* 2006, p. 281-282; Pescaru *et al.* 2007, p. 286-287; Pescaru *et al.* 2008, p. 249; Luca 2008, p. 178; Pescaru *et al.* 2009, p. 181; Bărbat 2009, p. 11-15; Bălos *et al.* 2010, p. 114-115; Pescaru *et al.* 2010, p. 159; Pescaru *et al.* 2011, p. 106; Băeştean *et al.* 2013, p. 113; Băeştean *et al.* 2014, p. 84-85; Băeştean *et al.* 2015b, p. 122-123.

[46] Bălos 2001, p. 15-16; Bălos, Ardeu 2002, p. 250; Ardeu, Bălos 2002, p. 69-70; Pescaru *et al.* 2005, p. 288; Pescaru *et al.* 2006, p. 281; Pescaru *et al.* 2007, p. 286-287; Luca 2008, p. 178; Pescaru *et al.* 2008, p. 249; Pescaru *et al.* 2009, p. 181; Pescaru *et al.* 2010, p. 159; Băeştean *et al.* 2014, p. 85; Băeştean *et al.* 2015b, p. 123.

[47] Ackner 1856, p. 6; Téglás 1902, p. 116-118; Floca, Şuiaga 1936, p. 86; Niculescu-Varone 1945, p. 12-13; Tudor 1968, p. 127; Macrea 1969, p. 152, 307; Wollmann 1973, p. 111; Rusu 1977, p. 539; Wollmann 1996, p. 257; Boroneanț 2000, p. 146; Hanson, Oltean 2000, p. 43-44; Popa 2002, p. 150, 177, 207; Oltean 2007, p. 151, 153-155, 183, 219, fig. 5.26; Lazăr, Stârcescu Enăchiță 2008, p. 14-15; Luca 2008, p. 178; Măruia *et al.* 2010, p. 86.

[48] Bodó *et al.* 2012, p. 293; Țuțuianu, Barbu, Codrea 2012, p. 175-178.

[49] Téglás 1902, p. 116; Marțian 1920, p. 41; Floca, Șuiaga 1936, p. 86-88; Niculescu-Varone 1945, p. 13; Luca 2008, p. 178. Regarding the issue of the medieval fortress and the noble court from Uroi, see the following link: http://www.cetati.medievistica.ro/cetati/Transilvania/U/Uroiu/Uroiu.htm (Accessed: 25.08.2017).

order to collect lithic material[50]. Our assumptions are especially confirmed by the recent results obtained from the archaeological site from Rapoltu Mare – *La Vie*.

The archaeological research campaigns from 2014 and 2017 provided important information regarding the extraction of volcanic rock from *Dealul Uroiului* in three Starčevo-Criș complexes from Rapoltu Mare – *La Vie*, from the vicinity of the volcanic hill, namely Cx 4/2014, L 1 (**Pl. V/1**) and L 2/2017 (**Pl. V/2**), in which pieces of andesite of different sizes were identified[51]. The current archaeological information was retrieved in the summer and autumn of 2017. Two Early Neolithic dwellings – similar to platforms – were studied (L 1[52] and L 2[53]) and a significant number of ceramic, lithic and fauna material was found, as well as a considerable number of andesitic rock fragments[54] (**Pl. V/1-2**).

On the one hand, considering the stratigraphic position and the sharp edges of the rocks, it would be difficult to compare such andesitic platforms with the concept of floors[55]. On the other hand, we must note the abundance of rocks that are mostly between 5 and 10 cm in diameter, and the ones larger in diameter bear markings that might have been left by carving (?). These items were brought from *Dealul Uroiului*, 1 km away from the location in which the Neolithic dwelling was identified (**Pl. V/1-2**). What is strange is that although the area in which the dwelling-type complex was discovered is abundant in limestone, the geological structure of the terrace is made of the travertine that was visible on the surface in prehistoric times; this type of rock, together with mica schists and pebbles were less preferred in the construction of dwelling-type structures (L 1 and L 2/2017)[56].

Given the preliminary results obtained from the surface structures studied in the site from Rapoltu Mare – *La Vie*, we can assert that the andesites were exploited by the Early Neolithic communities and they were used in the architecture of two possible dwellings[57]. In respect to the exploitation techniques, in the present state of research, we can assume that the members of the Neolithic settlements could choose to either collect the volcanic rocks from the debris on *Măgura Uroiului*, or, through direct percussion, to detach rock fragments from the mamelon or from the andesitic occurrences on the surface[58]. The final exploitation technique from the Early Neolithic is illustrated in the

[50] Luca 2008, p. 137; Bărbat 2009, p. 11-17; Bărbat 2012, p. 43, note 200; Barbu *et al.* 2016, p. 281-283, 286-287.

[51] Băeştean *et al.* 2015a, p. 121-122; Barbu *et al.* 2016, p. 281.

[52] L 1 was studied in the trench C 5, in the eastern part of the Roman *villa*; the complex occupies the entire surface of the survey, 3 × 2 m, which is why we believe that the dimensions of the Neolithic dwelling could have been much greater.

[53] L 2 was studied in Sp II, in the western half of S 2; the entire archaeological complex extends in the north and west profiles; the eastern and northern sides of the Neolithic dwelling were also partially studied.

[54] The results of the researches are currently being processed and will be published in due time.

[55] See the discussions in the archaeological scholarly literature regarding the complexes on this type of stone platforms (Lazarovici 1984, p. 73; Lazarovici, Maxim 1995, p. 63-64; Ciută 1998, p. 1-12; Ciută 2005, p. 72-73; Lazarovici, Lazarovici 2006, p. 99-106), and more recent discussions regarding the roles played by the river stones (pebbles) or rock fragments from the Early Neolithic dwellings from Cristian I (Luca *et al.* 2014, p. 7-10, fig. 1-6, reconstruction 1-3; Luca 2015, p. 91-92, 127-132, 135, fig. 70-77, 90-95, 98-103, 105, reconstruction 1-4, photo 83-88; Lazarovici 2016, p. 16-17, 19-23, fig. 8/1-4, 10-15).

[56] Pîrvu 1964, p. 226; Trufaș, Stanciu 1983, p. 9, fig. 3; Barbu 2014, p. 81-84, fig. 3-6.

[57] Bărbat 2014, p. 13-23.

[58] The rock was probably heated and then abruptly cooled, which facilitated the detachment of certain andesitic blocks of considerable sizes.

site from Coşkuntepe, in north-western Turkey, whose community was specialised in exploiting and processing volcanic rocks[59].

A new phase in the extraction of andesite from the volcanic neck is, on a much larger scale, represented by the construction of two typically Hallstattian fortifications with moats and defensive banks on terrace III of *Măgura Uroiului* (**Pl. VII/1**) and on its plateau (**Pl. VI/1-2**)[60]. The andesite was used exclusively in the construction of the stone ramparts and we consider that its large scale exploitation is obvious, through the size and mass of the boulders that had to be manoeuvred in order to create the defence system. In light of the recent research, the people of the Gáva culture appear to have been the ones who made the efforts to fortify the Hallstattian settlements on the terraces of the volcanic hill from Uroi[61].

It is very likely that the detachment techniques used in the case of the blocks from the rocky cliff of *Măgura Uroiului* during the Ha A-Ha B were much more advanced and diverse than the ones from the previous periods, like the Neolithic and the Eneolithic. We must emphasise the fact that the use of certain metal tools to detach the andesitic blocks is not out of the question, not to mention other means of exploitation used in the Early Neolithic.

Antiquity. Before we present the evidence of andesite exploitation between Uroi and Rapoltu Mare during the Roman period, we must mention that until recently, in the Romanian archaeological scholarly literature, scholars asserted that the quarry from *Măgura Uroiului* should be regarded as a type of structure similar to the ones used by the Dacians in the religious and/or military architecture from the Orăştie Mountains[62], although petrographic analyses carried out two decades ago by the geologist Ioan Mârza indicated something entirely different[63]. Even though the hill from Uroi was not the source of andesite used by the Dacian nobility in the construction of the buildings in the capital Sarmizegetusa Regia, the andesite from the *Măgura Uroiului* mamelon could have been exploited by the La Tène communities that lived in its vicinity, as proven by the volcanic rock fragments found in the archaeological complexes on terrace III (**Pl. VII/2-3**)[64], as well as in the archaeological site from Uroi – *Pod Mureş*[65].

During the Roman period, *Măgura Uroiului* was one of the most important quarries from Roman Dacia. The high quality of the volcanic rock, the pleasant appearance and colour and the relatively short distance from the great stonemason centre from Micia (**Pl. VIII/2**) lead to the large scale use of the Uroi andesite both as construction material and as raw material in sculptural monuments or in inscriptions.

[59] Takaoğlu 2005, p. 425-431, fig. 6-10; Takaoğlu 2006, p. 705-706, 708, fig. 2/1-3, 3/4-6, 4/1-3, 5; Takaoğlu, Özdemir 2013, p. 36-37, 42, fig. 7; Bărbat 2014, p. 11-12, fig. 1.

[60] Bălos, Ardeu 2002, p. 249-250, 439, pl. 87; Bălos *et al.* 2004, p. 250-251, 445, pl. 55/B; Pescaru *et al.* 2005, p. 287-288; Pescaru *et al.* 2006, p. 281-282; Pescaru *et al.* 2007, p. 286-287, 461, pl. 57; Pescaru *et al.* 2008, p. 248-249, 393, pl. 55; Luca 2008, p. 178; Pescaru *et al.* 2009, p. 181; Pescaru *et al.* 2011, p. 106; Băeştean *et al.* 2013, p. 113; Băeştean *et al.* 2014, p. 84-85; Băeştean *et al.* 2015b, p. 122-123.

[61] Bălan 2013, p. 271; Băeştean *et al.* 2014, p. 84-85.

[62] Pîrvu 1964, p. 220; Glodariu, Iaroslavschi 1979, p. 105; Ferenczi 1979, p. 265-266; Glodariu 1985-1986, p. 100; Oltean 2007, p. 102.

[63] Mârza 1997, p. 822.

[64] Pescaru *et al.* 2007, p. 286; Băeştean *et al.* 2015b, p. 123.

[65] Unpublished material, held by the archaeology repository of the Museum of Dacian and Roman Civilization, Deva, obtained through the preventive archaeological research carried out in the summer and autumn of 2011; scientific coordinators: Romică Pavel and Gică Băeştean, PhD.

The Roman engineers and architects differentiated numerous categories of rocks that were useful in construction; the sturdier ones were obviously the preferred choice[66]. However, often enough, for financial reasons, lower quality rocks were also used, raw material that could be found at shorter distances from the great Roman metropolises[67]. According to their toughness, Jean-Pierre Adam classifies construction rocks in six categories, from softest to toughest. The first groups include chalkstones and the sedimentary rocks, like slate, as well as certain types of tophus, while the opposite categories include marble and whinstone[68].

In Roman Dacia, there were quite a significant number of stone quarries, since the predominantly mountain and hilly terrain ensures a wide variety of rocks, many of which hold great construction qualities. The first mentions regarding the Roman stone quarries in Dacia appeared in the second half of the 19th century, when scholars such as Johann Michael Ackner, Téglás Gábor or Torma Károly noted different traces of ancient rock exploitation in the Transylvanian mountains[69].

By analysing a remarkable number of Roman monuments, Volker Wollmann managed to establish the nature and origin of some wide categories of rocks used in the cities and castra of the Roman Dacia[70]. Therefore, he classified them according to their geological nature[71]: "a) extrusive igneous rocks (the tuff of pyroxene-andesite from the Gurghiu Mountains, the Uroi andesite from *Măgura Uroiului*, the Deva andesite from *Dealul Pietroasa*, the basalt breccia from the Hoghiz region), b) volcanic tuff (the dacite tuff from the *Măgura* of Moigrad, the Dej tuff from the northern part of the Transylvanian basin), c) sedimentary rocks (the quartz slates from the *Jibold Hill* from the Zlatna region, the carbon slate from the vicinity of Deva), d) limestone (the crystalline/marble limestone of Bucova, the Eocene limestone from the Cluj region, the Tortonian limestone from the eastern part of the Apuseni Mountains, as well as from the southern part of Transylvania)"[72].

Judging by the analyses made by the aforementioned researcher, we can note an increased variety of rocks from a petrographic viewpoint, as well as a distribution of sources strongly linked to the great centres of Roman Dacia. In these circumstances, the location of the *Măgura Uroiului* quarry upstream from the Micia Roman site is understandable. Besides, the great stonemason centre here, which even attested a lapidary college[73], held multiple quarries for the extraction of different types of rocks, out of which the most utilised seems to have been andesite. Situated at approximately 20 km East of Micia, the stone quarry from *Măgura Uroiului* proved to be extremely viable in supplying raw material. Due to the fact that both settlements were located on the banks of the Mureş River (**Pl. VIII/2**), the transportation of the rocks was easier, since the water currents carried the rafts or the weirs loaded with rocks, which was much cheaper and easier than on land. The field surveys have shown that a plateau on the southern part of *Dealul Uroiului*, near the river, could have been a loading point for the rocks exploited in the open quarries in the volcanic neck (**Pl. VIII/3**). The site contained multiple andesite blocks that bore traces of processing, but whether the site

[66] Vitruvius II, 7.
[67] Vitruvius II, 7.
[68] Adam 1984, p. 23.
[69] Ackner 1856, p. 6; Téglás 1889, p. 157.
[70] Wollmann 1973, p. 111-116; Wollmann 1996, p. 257-268.
[71] All fragments from Volker Wollmann's work present in this article were translated from Romanian.
[72] Wollmann 1973, p. 111-116; Wollmann 1996, p. 257-268.
[73] IDR III/3, p. 141.

was a loading point or a stone carving workshop remains to be established by future archaeological researches.

The strong connection with the settlement and the castrum from Micia considerably influenced the evolution of the Uroi quarry, whose establishment and expansion could be directly linked to the evolution of the Micia community. We do not know for certain the moment in which the Roman administration opened the first andesite exploitations in Uroi, but a considerable development seemed to have occurred in the mid-2nd century AD, when the great castrum from Micia was rebuilt in stone[74]. The fortification's walls were 2 m thick and over 4 m tall; it covered an area 180 m wide and 360 m long, which must have required a considerable quantity of stone; most of this raw material consisted of the andesite blocks brought from *Măgura Uroiului*[75]. This detail could indicate the idea that the military troops stationed in Vețel were implicated in the management and exploitation of the quarry, probably in a manner similar to the quarry from Deva – *Bejan*, with the oversight of the *vexillatio* of the *legio XIII Gemina*, who dedicated an inscription to the gods Hercules and Silvanus within that exploitation[76]. Beginning with the third quarter of the 2nd century AD, at the time of the establishment of the "sculpture school" of Micia, specialised in Uroi andesite funerary monuments[77], the quarry gained even more importance, since it is very likely that sculpture workshops were established around it, as was the case of other quarries that produced raw material so sought after by sculptors and artists[78].

During the pre- and protohistoric periods, the human communities who used the Uroi andesite only exploited unfinished rocks, but once the Roman administration was established, they started using the Mediterranean exploitation methods and techniques. These techniques focused primarily on obtaining massive, even-shaped blocks of stone of specific dimensions which could later be transformed into finished construction materials, architectonic or sculptural elements, or different types of monuments. Of course, the processing activities left behind a large quantity of unfinished stone, which constituted the raw materials for the buildings erected through the masonry construction[79].

Depending on the types of rocks and the morphology of the source, the Romans opted for different types of methods for extracting the stone blocks. Most of the time, surface exploitation was employed, but, in some cases when the bedrock was softer and of lower quality, better and deeper loads were used in order to conduct subterranean exploitation, as is the case of the tuff quarries from the vicinity of Rome[80] and Syracuse[81], the slate quarry from Coves del Llorito (Spain)[82] or the travertine quarry from Rapoltu Mare, Hunedoara County[83].

Surface quarries were the most numerous and they usually employed exploitation in the form of stepped terraces; the stonemasons used the geological strata

[74] Tudor 1968, p. 122; Macrea 1969, p. 223; Andrițoiu 2006, p. 27.
[75] Andrițoiu 2006, p. 35; Barbu 2013a, p. 119, fig. 107.
[76] Tudor 1968, p. 127.
[77] Țeposu-Marinescu 1982, p. 71; Andrițoiu 2003, p. 207.
[78] Diaconescu 2003, p. 425-427.
[79] Barbu 2013a, p. 119-131.
[80] Adam 1984, p. 28.
[81] Ginouvès, Martin 1985, pl. 11/1.
[82] Gutiérrez Garcia-Moreno 2009, p. 189.
[83] Barbu 2014, p. 82.

and the natural cracks in the rocks in order to create work fronts[84]. The sizes and the methods of the exploitations varied depending on the petrographic types of the deposits, as well as on the quantities of rocks that needed to be dislocated. Wherever it was possible, the quarries covered large plane surfaces that provided easy exploitation[85], but they were most often stepped, canted exploitation planes and, after they were exhausted, they left behind large vertical stone walls[86]. This approach was also employed in the case of the Roman quarry from *Măgura Uroiului*. The exploitation in the form of stepped terraces is still visible in the southern part of *Măgura Uroiului* (**Pl. XI/1-2, XII/1**) and the vertical walls formed on the southern side of the hill provide the evidence of the intense stone extraction activities (**Pl. X/1-2**). This area of the volcanic hill was not chosen randomly as an exploitation site – besides the morphology of the land, the vicinity of the Mureș River course, used as a means of transporting the andesite to Micia was also an important factor.

The techniques of exploitation in the Roman quarries were chosen depending on the characteristics of the rocks and the users' needs. Three main types of stone extraction can be identified in the quarries throughout the Roman Empire[87]. The first and most wide-spread[88] of these techniques implied cutting small channels into the rock in which iron or wooden wedges were hammered until deep, linear cracks were obtained, which managed to break away blocks with straight edges[89] (**Pl. IX/2, XIII/7**). This type of traces of stone processing are visible in many Roman quarries, such as Los Covachos (Spain)[90], La Bueta (Spain)[91], or in the andesite exploitation points around Deva (Hunedoara County)[92].

The second technique implied cutting channels around the item that needed to be obtained and the final detachment was made through the pressure applied by a lever[93] (**Pl. IX/1**). This technique was most often used in order to extract certain parallelepiped-shaped blocks with very precise dimensions and polished edges, but it was also sometimes used in order to cut certain architectonic items, such as the column spindles found in the quarries from Chemtou (Tunisia) or Aliki (Thasos)[94]; the same method was probably used in the case of the column fragments that were still visible in the 19th century in the marble quarry from Bucova (Caraș-Severin County)[95]. In order to obtain the parallelepiped-shaped stone blocks, this type of approach implied creating horizontal planes and the extraction was made downwards, leaving traces in the form of steps (**Pl. XIV/5**), as is the case of the quarries from Saint-Boil (France)[96], Syracuse (Italy)[97], Montjuïc (Spain)[98], Maritima Residencial (Spain)[99], Los Covachos (Spain)[100] or Rapoltu Mare (Hunedoara County)[101].

[84] Ginouvès, Martin 1985, p. 78-79.
[85] Ginouvès, Martin 1985, pl. 10/1.
[86] Ginouvès, Martin 1985, p. 80.
[87] Chatziconstantinou, Poupaki 2002, p. 63.
[88] Blagg 1976, p. 155.
[89] Adam 1984, p. 32-34; Ginouvès, Martin 1985, p. 80; Wollmann 1996, p. 269.
[90] Rodriguez *et al.* 2012, p. 648, fig. 5.
[91] Gutiérrez Garcia-Moreno, Royo, Andreu 2012, p. 655, fig. 10.
[92] Wollmann 1996, pl. CXIII/1; Barbu 2013b, p. 35, fig. 6-8.
[93] Adam 1984, p. 28-30; Ginouvès, Martin 1985, p. 79.
[94] Adam 1984, p. 27.
[95] Wollmann 1973, p. 107; Bărbulescu 2003, p. 57.
[96] Adam 1984, p. 25.
[97] Ginouvès, Martin 1985, pl. 11/2.
[98] Miró, Revilla 2012, p. 683, fig. 3.

The third technique used a type of pendulum saw, known as the "Carrara saw", which used sand in order to cut hard rocks, such as marble and basalt. Pliny the Elder explained the functional principle of this tool, which employed the sand stream into a "back and forth" motion that, in time, managed to cut the hard stone[102] (**Pl. IX/3**). The ancient author suggests that this technique was especially used to cut marble blocks in order to obtain slabs, but some archaeological discoveries made in Anatolia[103] and Thasos[104] prove that this method was also used in the extraction of quarry rocks.

The Roman quarry from *Măgura Uroiului* covered the entire southern part of the volcanic hill, since the andesite could only be found in this hill. The rock was thus extracted both horizontally and vertically. The stepped terraces on this side of the hill indicate an intensive stone extraction activity that ranged from the Mureş River (in the areas where the native rock was close to the surface) to the upper part of the hill. On the lower levels, there are exploitation areas similar to those in the quarry from Byllis (Albania)[105]. The cliffs cut in the shape of stepped terraces are visible in several places on the upper part of the hill (**Pl. XI/1-2, XII/1, 3-4**). Here, in the immediate vicinity of the margin of the upper plateau, two circular pits with flat bottoms were identified, dug into the native rock. The orifices are 20 cm in diameter; they are 15 cm deep and are situated at 0.90 m distance away from each other, parallel to the edge of the cliff, 0.60 m away (**Pl. XII/2**). It is very likely that wooden poles were mounted in these orifices – the pillars of a construction or constituting elements of an installation used in the stone extraction, like a scaffold or a sheave.

The better part of the ancient quarry was destroyed by later proceedings, during the Middle Ages and the modern period, the methods of stone extraction characteristic to these periods (fire-setting) are visible on wide surfaces, on large and easily accessible terraces located in the proximity of the county road that connects Uroi and Rapoltu Mare (**Pl. XVII/1-2**). However, there are more isolated or more inaccessible points, such as the area of the piedmont located on the south-eastern side of the main cliff or in the area south of the aforementioned road, points in which, even today, traces of the Roman stone extraction practices are still visible (**Pl. X/1-2, XIV/1-4**).

Starting with the mid-19th century, traces of ancient stone quarries have been identified on the entire southern and south-eastern front of the hill, at the foot of the hill, in an area packed with pits and terraces in which massive blocks detached from the cliff are still visible, as well as a great quantity of rock debris[106]. Many of the blocks have almost smooth surfaces, a fact which suggests that they had been cut – the stonemasons most likely used the natural cracks of the lodes. Some of the cliffs bear the marks of the ancient techniques of detaching the rocks. For example, we managed to identify a massive block whose surface bears multiple marks left by tools. The block has an east-west orientation; it is 2.60 m long, 1.80 m wide and 0.8-1.2 m thick; its southern and western sides show that it had been cut. It also shows an incised groove in the east-west direction. The groove has a rectangular surface and a triangular profile in depth; it is

[99] Gutiérrez Garcia-Moreno 2009, p. 129, fig. 133.
[100] Rodriguez *et al.* 2012, p. 648, fig. 6.
[101] Barbu 2014, p. 82, fig. 5.
[102] Plinius XXXVI, 7.
[103] Wollmann 1996, p. 270.
[104] Kozelj, Wurch-Kozelj 2012b, p. 721, fig. 10-11.
[105] Kozelj, Wurch-Kozelj 2012a, p. 622, fig. 5.
[106] Ackner 1856, p. 6; Téglás 1889, p. 157; Wollmann 1973, p. 106; Wollmann 1996, p. 253, 268.

21 cm long, 5 cm wide and 9 cm deep[107]. Another massive block detached from the cliff is oriented north-south and is 2.40 m long, 1.60 m wide and 0.80-1 m thick. The southern end seems to have been cut, which implies that another stone segment had been detached. At a distance of 0.60 m from this southern end, on the upper side of the block there is a sequence of three consecutive incisions that form a line, displayed from east to west across the width of the block. The rectangular grooves with triangular transversal profiles are between 17.5 and 18.5 cm long, 3.5-4.5 cm wide and 9-12 cm deep. The intervals between these incisions are 22-25 cm[108] (**Pl. XIII/1**). Other blocks on the same level curb bear similar marks of the stone cutting technique of using wedges; the dimensions of their grooves and of the spaces between them are very similar to the ones described above (**Pl. XIII/2-6**). Even though the wedges technique continued to be used during the periods that followed antiquity, the general appearance of the area, the dimensions and the evenness of the grooves dug into the stone suggest that they originated in the Roman period. There are very compelling analogies with, for example, the marble blocks used in the construction of the forum from Ostia[109], in the quarry from La Buerta (Spain)[110], or the Dacian architectonic fragments reused by the Roman army in the structures built after the year 106 in Sarmizegetusa Regia[111].

On the south side of the county road that connects Uroi and Rapoltu Mare, there is another area that contains traces characteristic to a Roman quarry (**Pl. XIV/1-4**). This small exploitation area covers approximately 400 square metres and it is located near the Mureş riverbed. It affected an isolated stone cone that was partially above the surface in the south-western part of the Uroi andesite source[112]. The quarry seems to be a stepped terrace, its main front extends in a south-west direction, where a significant quantity of stone seems to have been exploited (**Pl. XIV/1-2**). Its better part is covered by soil and vegetation, but in the autumn of 2014, the rock was uncovered on an area of approximately 20 square metres, thus making the archaeological survey on the upper part of the work front possible. The traces of characteristic Roman stone exploitation were thus clearly identified. The upper extremity, in the form of a relatively plane plateau, is crossed from east to west by a line that marks an exploitation level along which the traces of stone detachment technique through the use of wedges are visible. On the north-western side of this line, the cliff is slightly flattened, while the south-eastern side shows traces of the fact that several rectangular blocks had been extracted, cut out by digging a narrow, straight groove with a chisel. Three blocks seem to have been extracted in steps, in downwards motions (**Pl. XIV/3**). The upper step had been prepared for the extraction of other items and it bears the markings of the extraction of an andesite block, 1.20 m (four feet) long on the east-west line, 0.60 m (two feet) wide on the north-south line and 0.30 m (one foot) high. The middle step is in the shape of a rectangular prism. It is 0.65 m wide on the north-south line and it indicates the fact that a two-foot-wide block had been extracted; the 5-6 cm difference represents the width of the groove dug around the block, but it also indicates the use of a narrow chisel (*caelum dens*), or rather of a pick[113]. The depth of the mark is 0.30 m, which could also include

[107] Barbu 2013b, p. 36.
[108] Barbu 2013b, p. 36.
[109] Adam 1984, p. 41.
[110] Gutiérrez Garcia-Moreno, Royo, Andreu 2012, p. 655.
[111] Glodariu 1965, p. 121-127.
[112] In September 2014, the villager Tiberiu Florian from Uroi village told us about the traces of the ancient exploitation and about the presence of an anthropomorphic representation.
[113] Ginouvès, Martin 1985, p. 75.

the length of the step below, since the exploitation was done downwards; therefore, the east-west length of the block can no longer be estimated. The height of the extracted block was measured to 0.29 m. The step below is in the shape of a rectangular trapezoid and it was also affected by the extractions from its lower part; the present depth is of 0.23 m on the southern side and 0.40 m on the northern side. The width of the mark of the extracted andesite block is of 0.66 m; therefore, the final piece was probably two feet wide. Just like the other two markings, the height of the carving is of 0.29-0.30 m. The western side of the cliff was made into a vertical wall that limited this exploitation front. The three markings provide important information on the lapidary items obtained from this point on *Măgura Uroiului*. We can thus conclude that the stone elements extracted here were in the shape of rectangular prisms, approximately two feet wide and one foot thick. The exploitation techniques hinder our assessment of the length of these stone blocks. The 1.20 m (four feet) length of the marking on the upper step, together with the present depth of the marking on the middle step (0.30 m), indicates the fact that the stone extracted here was at least 1.50 m (five feet) long. In this case, we can assume that a certain category of 0.60 m wide, long and relatively thin slabs were obtained.

If our reasoning is correct, the steps on the south-western side of *Măgura Uroiului*, not far from the Kapi family castle (**Pl. XVIII/2-3**), can be attributed to the manufacturing of certain funerary monuments (*stelae*, walls of *aediculae*, headpieces), like the many items found in Micia, most of which having been made from the rocks extracted from *Dealul Uroiului*[114] (**Pl. XIV/6**).

The northern part of the cliff had also been processed and it shows traces of the wedging technique. On the north-eastern extremity, on the aforementioned andesite massif, there are processing traces, the most important of which being an anthropomorphic sculpture in an early stage. The sculptor chose the edge of a massive cliff as a location for his creation (**Pl. XV/1**); part of the rock had already been subjected to a volumetric analysis, which indicates that if the sculpture was to be finalised, it would have been a statue or a high-relief, since a plane surface is more favourable for a relief. On a surface 0.65 m high and 0.40 m wide there are several curved lines and markings where the head, neck and shoulders of the character would have been (**Pl. XV/1-2**). The artist started by focusing on the head of the sculpture. The facial features can be clearly distinguished, depicting a mature female character (**Pl. XV/3**). The face is in a more advanced stage than the shoulders and the neck, but the sculptor stopped before he could finish the features. Among the traces left by the stonemason tools, the most visible ones are those of the kivel (*ascia*), used to hew the work area (**Pl. XV/2**) and the pick, used to clear the sculptural field and to trace the lines of the shoulders and neck (**Pl. XV/1**). The same tool left deep marks around the right cheek, only partially extricated from the stone massif (**Pl. XV/4**). The pick was also used in order to carve some of the character's curls, since the narrow chisel was used for the initial finishing of the facial features.

Regarding its conservation, the sculpture's nose tip and chin are slightly chipped. The total length of the head (including the neck and hair) is of 0.48 m; the face, from the tip of the chin to the hairline, is 0.27 m long and 0.25 m wide. Judging by the canons described by Vitruvius, according to which the length of the face is one tenth of the character's height[115], the height of the statue (if it were to depict an entire human body in a standing position) would have been over 2.50 m. If the average stature of a

[114] Țeposu-Marinescu 1982, p. 102-224.
[115] Vitruvius III, 1.

woman in that period was about 1.58-1.61 m, the proportions of the statue would have exceeded the natural statue and even the heroic stature, thus reaching colossal dimensions[116].

The face is constructed symmetrically: the length of the forehead occupies one third (9 cm), the length of the nose third and the chin occupied the remaining 9 cm, all in accordance with the canons and proportions of antiquity[117]. The very tall hairstyle (10 cm) leaves enough room to carve numerous details, but in this early stage in which it remained, it only shows a parting in the middle, from the forehead to the apex (as much as the artist managed to carve before abandoning it) and many curls framing the face. On the left side of the face – which was left in a more advanced stage – the curls partially or completely covered the ear. The well outlined nose has a chipped tip, but the nostrils are visible. The cheeks have prominent cheekbones and the chin was well defined, although it is now chipped. Due to the incipient stage of the carving, the eyebrows are barely visible. The 6.5 cm wide eyes are slightly almond-shaped and their iris is schematically depicted; the statue seems to gaze slightly to the right (**Pl. XV/4**). The edges of the mouth are bent downwards and the face thus seems to be sad. There seems to be a bulge around the neck, which is due either to the incipient stage of the work or to the intention to carve a type of jewellery (**Pl. XV/2**).

We can thus assert that, in the quarry from *Măgura Uroiului*, there is an incipient form of a sculpture depicting a mature female character. The nature of this discovery implies a series of questions: "Who carved it and when was it sculpted? What would its final shape have been? Was there even an intention to finalise the sculpture? Who was the depicted character? What was the purpose of this work? Why was it left unfinished?", just to name a few.

Considering the stage in which this sculpture was left, it is impossible to define the sculptural genre in which it could have been included, but its general appearance and the volumetric analysis of the material indicates a voluminous form. If it was meant to be a statue, the proportions of the face greatly exceed the natural human dimensions; therefore, it was most likely supposed to depict either a member of the imperial family[118] or a goddess[119]. But why would a statue be in the Uroi quarry?

The Mician sculptors created many architectonic or funerary monuments, most of which used the andesite from *Măgura Uroiului* as their raw materials, but the lack of andesite statues raises many questions regarding the formation of these masons. The ancient world differentiated stonemasons from sculptors very clearly[120] and their ranks were very different, from simple carvers to artists. Furthermore, there was also a difference between the marble carvers and the ones who manufactured using these rocks, the former being considered superheroes and they were much better remunerated[121]. By assessing the main array of statues on the Dacian territory, we can conclude that most of them were made of marble or fine limestone, just like the one under scrutiny[122]. Alexandru Diaconescu believes that most of these statues were made either by the sculptors who practiced their work in the areas around the marble quarry

[116] Cool 2006, p. 25.
[117] Vitruvius III, 1.
[118] Diaconescu 2004, p. 51.
[119] Diaconescu 2004, p. 131-132.
[120] Diaconescu 2003, p. 421.
[121] Diaconescu 2003, p. 421.
[122] Diaconescu 2004, p. 50-185.

from Bucova, or by the graduates of the sculpture schools from the great centres, such as Apulum and Napoca[123]. Diaconescu states that some of the more roughly manufactured items, or the items made of low quality raw materials could indicate the existence of some craftsmen that targeted a market of more affordable items, mostly in the rural area[124]. The discovery of a female marble statue in the eastern necropolis of Micia determined the aforementioned author to question whether the stonemasons attested to the settlement from the Mureș River Valley were capable of creating such a piece[125]. The "Mician sculpture school", established in the second half of the 2nd century[126], focused on creating funerary monuments with relief decorations (*stelae*, *aediculae*, medallions, pillars), that, by combining the characteristic elements of the Sarmizegetusa and Apulum Dacian Colonies created a unique, recognisable style[127]. The features of the statue described above perfectly matches the model of female figures present on the Mician funerary monuments (**Pl. XV/6**). From this viewpoint, there could be no doubt regarding the origins and professional formation of the person who made the sculpture.

The fact that the artist chose to carve into the native rock instead of an already extracted stone block is not part of the usual practice of creating a statue[128]. The tridimensional nature of the statues and of some complex architectonic items compel the sculptor to work all around the pieces and thus to use stone blocks of certain sizes, as proven by a statue deposited at the lapidary of the National Museum of Transylvanian History in Cluj-Napoca[129]. Therefore, we can assume that the sculpture from the stone quarry in *Măgura Uroiului* was not meant to be a statue and was probably never meant to leave that place. Could it have merely been an exercise or a game? This is hard to believe, since the face was made by the steady hand of an experienced person belonging to the school of Mician sculptors, which most likely also owned workshops around the source of stone from Uroi.

There is no indication as to what the purpose of the human figure from *Măgura Uroiului* could have been. Why would an oversized female character be depicted in the work front of a Roman quarry? What is certain is that this is not a unique case in Roman Dacia. Throughout the 19th century, other anthropomorphic sculptural representations were identified in the ancient stone exploitations from Transylvania[130]. Three human figures were visible in the quarry from Ioneşti, while the quarry from Creaca (Sălaj County) would represent the closest analogy with the sculpture from *Măgura Uroiului* – a "female image dug into the rock"[131]. The colossal statue attested to the vicinity of Porolissum, depicting a female character holding a basket above her head was destroyed in 1842[132] by dismantling, but it was mentioned in the Roman quarry work front, which confirms the fact that the sculpture from *Măgura Uroiului* was also not an accidental occurrence. Another representation found in a possible Roman quarry, this time in the Dobrogea region, depicts a male character, which Grigore Florescu considers to be

[123] Diaconescu 2003, p. 427.
[124] Diaconescu 2003, p. 427.
[125] Diaconescu 2004, p. 113-114.
[126] Țeposu-Marinescu 1982, p. 71.
[127] Țeposu-Marinescu 1982, p. 71; Bărbulescu 2003, p. 65.
[128] Bărbulescu 2003, p. 69.
[129] Diaconescu 2003, p. 422-423.
[130] Bărbulescu 2003, p. 57.
[131] Macrea 1969, p. 308; Boroneanț 2000, p. 134, 144-145; Bărbulescu 2003, p. 57.
[132] Téglás 1898, p. 121-122; Wagner 2011.

Hercules Saxanus, dated based on the iconography of the 3rd century[133]. Petre Diaconu believes that the appearance of the character and the quarry date from the second half of the 10th century[134].

We must also take into account a possible religious side of this issue. Representations and altars dedicated to Hercules and Silvanus, the patron gods of the stonemasons and the quarry workers, were identified in many cases[135]. Could the sculpture under scrutiny be this type of female character, a patron of the stonemasons and of the activities in the stone quarries?

The appearance of the face, the sad mimic and the tall hairstyle, parted on top, with wavy curls that cover the ears are all traits that indicate an incipient work, dating to the first part of the 3rd century, bearing the characteristics of the Severan Dynasty. Here we mention the depictions with Iulia Domna from the Roman Empire, in stone (like busts, statues) or in metal (like coins), very close with the anthropomorphic representation from Uroi (**Pl. XVI/1-4**). The features of the figure from *Măgura Uroiului* somewhat resemble the details of the head of a marble funerary statue discovered in Ulpia Traiana Sarmizegetusa, which depicts a woman of the *La Grande Ercolanese*[136] type (**Pl. XV/5**). However, since the stonemasons' school from Micia[137] formed certain patterns for the representation of the human typology, this type of female iconography could have been perpetuated even after the end of the Severus period. The sculpture was left unfinished, and it was probably abandoned either when the sculptor left the work point (although the work front had not yet been completely exhausted), or when the entire quarry was abandoned, which points to the idea that it could date back to a later time than it was initially thought.

The fact that Roman quarries were identified in the northern and southern extremities of the andesite quarry from *Măgura Uroiului* indicates that it had extended over large surfaces and impressive quantities of rocks had been extracted: construction and sculptural elements cut in even shapes, as well as an immense amount of raw stone and debris, which were useful in the construction of the walls in *opus incertum* and *opus mixtum* that can be seen in all the Roman points within a few kilometres around Uroi. Such constructions are the *villae* from Simeria Veche – *Ferma IAS*[138], Sântandrei – *Aldăcuțu Mic*[139] or Rapoltu Mare – *La Vie*[140] (**Pl. VIII/2**).

The medieval, modern and contemporary periods. The exploitation of andesite from *Măgura Uroiului* that followed the Roman period abridged the size of the areas that bear traces of ancient quarries, but they left their own traces and evidence of the activities undertaken by the medieval and modern stonemasons (**Pl. XVII/1-7**). Traces of exploitation through the fire-setting technique were identified on all easily accessible terraces on the northern side of the county road that connects Uroi and Rapoltu Mare. The cliffs with rough and cracked surfaces bear the marks of fire – they are most often blackened by smoke (**Pl. XVII/1-2**). The medieval monuments from around Uroi (**Pl. XVIII/1-3**) and Rapoltu Mare (**Pl. XVIII/4**) were mostly built using the local andesite, extracted from the local quarry. Much of the construction material used in

[133] Florescu 1936, p. 33-46, fig. 7-9; Boroneanț 2000, p. 139-140.
[134] Diaconu 1980, p. 185-194, fig. 4; Boroneanț 2000, p. 140.
[135] Bărbulescu 2003, p. 57.
[136] Diaconescu 2004, p. 107-108.
[137] Țeposu-Marinescu 1982, p. 71; Bărbulescu 2003, p. 65; Andrițoiu 2003, p. 207.
[138] Țuțuianu *et al*. 2012, p. 291.
[139] Barbu *et al*. 2017, in print.
[140] Barbu *et al*. 2016, p. 278-286.

these cases are reused pieces either from already existing Roman constructions[141], or from the blocks and items left behind in the work fronts of the ancient quarry.

Much of the andesite used in the Middle Ages and in the modern period was extracted from the terraces at the foot of *Măgura Uroiului*. The traces indicate that the violent thermic technique had been used in order to detach irregular blocks (which are, in fact, visible in the walls of the medieval fortification from Uroi). In order to obtain even shaped pieces, the carvers of this period seem to have used the claw chisel – this tool was also used in antiquity and the marks left by it are visible in the areas described above (**Pl. XVII/3-4**).

Besides this aspect, several marks connected to the exploitation of andesite in the medieval and modern periods were identified. One of these marks shows two 4 cm letters carved with a chisel in the native rock (**Pl. XVII/5**). The size of the letters "F" and "V" (most likely the initials of a name) and the location of the terrace on which they were discovered indicate that they originate from the medieval or pre-modern period. "1731" is inscribed on another raw stone massif which had been exploited using the thermic technique (**Pl. XVII/6**). The year probably represents the moment that section of the quarry was closed, considering the fact that the traces of exploitation also stop; the event could be connected to the construction/establishment of the Józsika family manor from Rapoltu Mare (**Pl. XVIII/4**) or the Kapi family manor from Uroi (**Pl. XVIII/2-3**).

The andesite from *Măgura Uroiului* continued to be used locally in the modern and contemporary period – many of the buildings and household annexes from the villages around the hill were made from this type of rock (**Pl. XIX/1-4**). Furthermore, throughout the 18th and 20th centuries, the local stonemasons used andesite to create certain architectonic elements or funerary monuments[142] (**Pl. XX/1-7**).

Conclusions

From the dawn of time, stone was an extremely important raw material for humanity. The qualities of the volcanic rocks from *Măgura Uroiului*, as well as the location of this hill determined the human communities to use this andesite ever since the Early Neolithic period. The rock source continued to be used throughout the ages, but it was more intensely exploited once the Hallstattian fortifications were established in the area. In the Roman period, *Dealul Uroiului* was transformed into a very large quarry. Traces indicate an intense activity during the Roman period and the work areas were in the form of surface stepped terraces. The marks are visible on the entire southern side of the hill, both in the upper part and on the wide terraces from the foot of the massif to the Mureş riverbed.

Characteristic marks of the ancient stone exploitation techniques were identified almost on the entire area of the *Măgura Uroiului* site. Massive stone blocks, detached using the wedges technique were studied on the terraces from the foot of the hill. Steps were uncovered in the south-western extremity of the quarry, which indicates the use of the cutting method; the sizes and shapes of these blocks indicate the fact that slabs were extracted in order to create funerary monuments. The location of the quarry, near the Mureş River, allowed for these raw materials to be transported to the stonemasons centre from Micia, the main market for the andesite exploited in Uroi.

[141] Bălos 2001, p. 16-20; Barbu *et al.* 2016, p. 279.
[142] Pîrvu 1964, p. 219-220; Țuțuianu 2001, p. 115.

The presence of Mician sculptors in the quarry from *Măgura Uroiului* is proven by the presence of an anthropomorphic sculpture in an early stage of manufacturing, a sculpture whose features reflect the practices of the Mician sculpture school. The dimensions of the female face carved in the native rock suggest that it would have been a colossal piece. It can be dated to the 3rd century AD.

The exploitation of the volcanic rocks from Uroi continued throughout the Middle Ages and the modern period; this raw material was used in order to build different edifices, like the medieval fortress from Uroi, the Reformed church from Rapoltu Mare, or the mansions of the neighbouring noble families.

Today, the use of the Uroi andesite is visible on a local level, in the villages, since the rock was used in the construction of households or of the locals' funerary monuments.

Acknowledgements

We wish to express our gratitude for the English translation of the text, made by Anca Chiorean, from the "Lucian Blaga" Central University Library of Cluj-Napoca.

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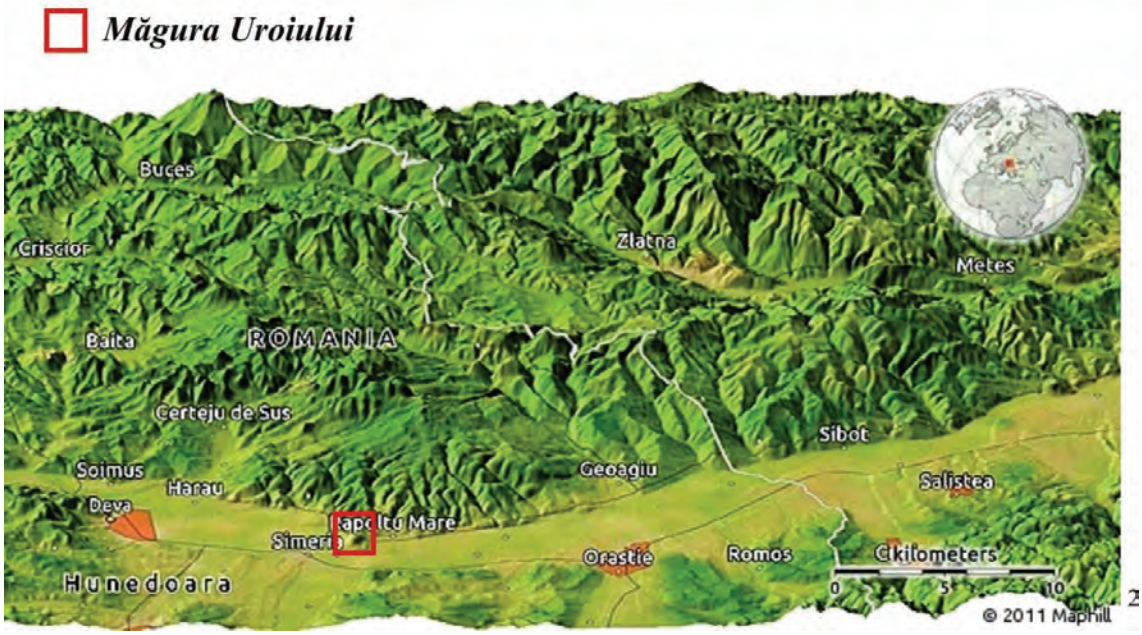

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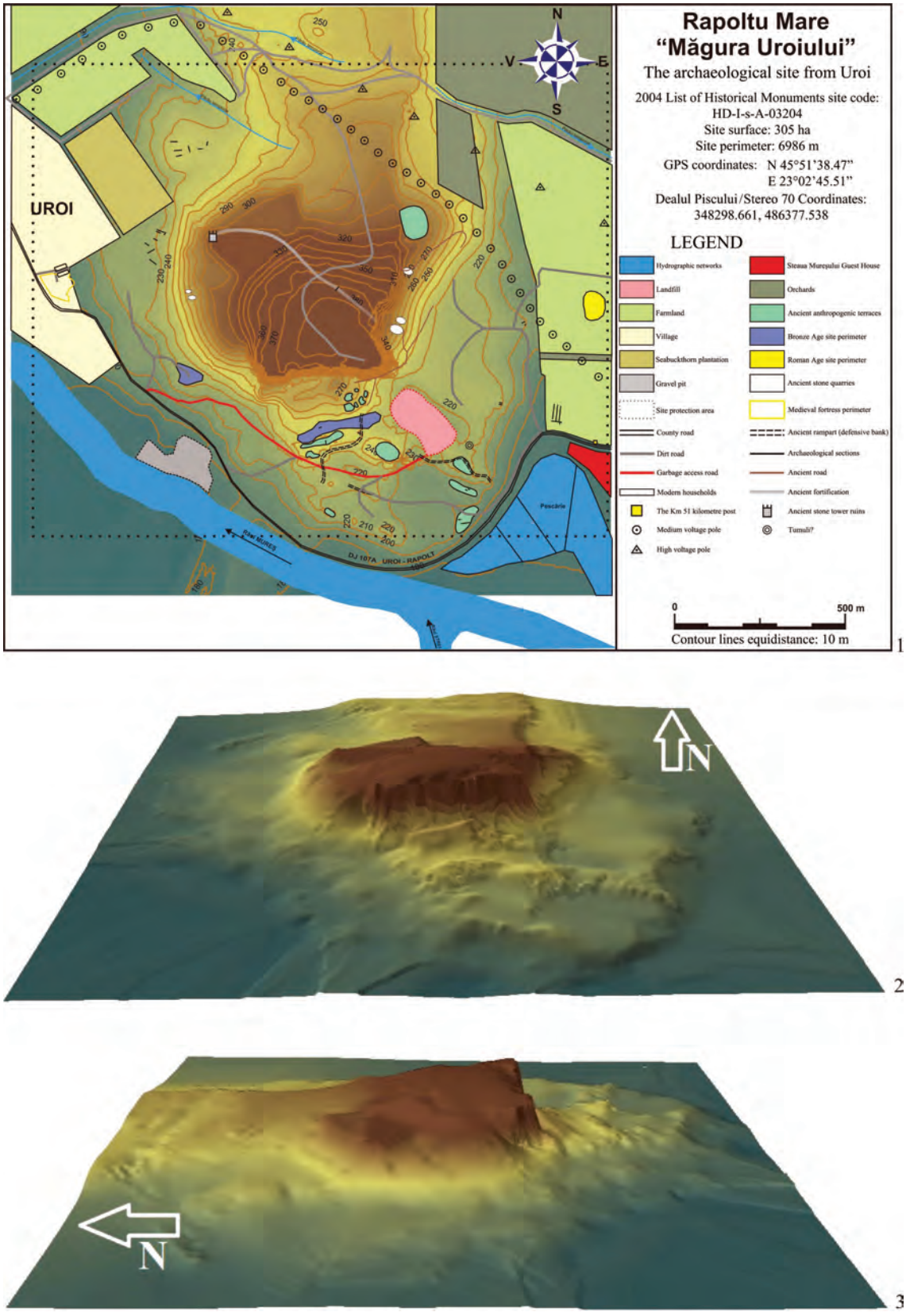
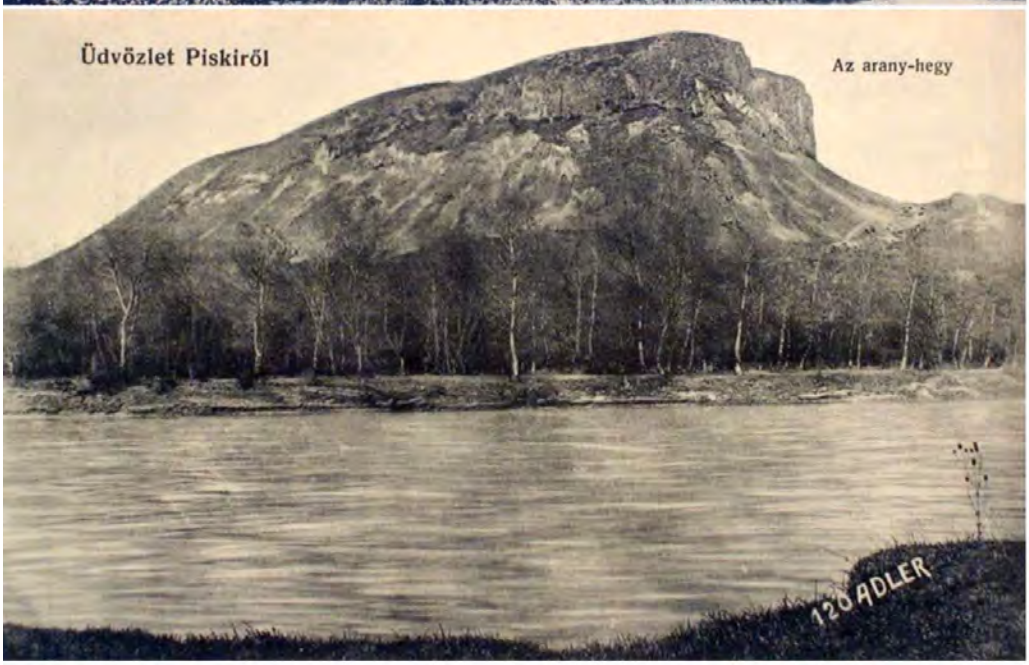
Pl. I. 1. The location of *Măgura Uroiului* on the map of Romania (processed after https://upload.wikimedia.org/wikipedia/commons/thumb/5/59/Relief_Map_of_Romania.png/640px-Relief_Map_of_Romania.png) (Accessed: 12.07.2017); 2. *Măgura Uroiului* archaeological site on the south-west region of Transylvania (processed after http://www.maphill.com/romania/hunedoara/3d-maps/satellite-map/) (Accessed: 12.07.2017)



Pl. II. 1-3. 2D and 3D maps of the *Măgura Uroiului* archaeological site (© Arheovest)


1



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4

Pl. III. 1-2. Picture postcards from the beginning of the 20th century showing *Măgura Uroiului* (1 – processed after https://kepeslapok.wordpress.com/2014/01/10/piski/piski27/; 2 – after https://kepeslapok.wordpress.com/2014/01/10/piski/piski14/) (Accessed: 12.07.2017); 3. A note describing the location of a batch of archaeological materials discovered in 1937 at *Măgura Uroiului*, part of the collection owned by the MCDR, Deva; 4. Eneolithic and Bronze Age pottery from *Măgura Uroiului* found in 1937 (Photo: I. A. Bărbat)

1

2

Pl. IV. 1. Photograph depicting the archaeological site *Măgura Uroiului* from the South.
2. The same volcanic hill seen from the North (Photo: I. A. Bărbat)

1

2

Pl. V. 1-2. Details of a "stone/andesite bed" from the Early Neolithic dwellings L 1 (1) and L 2/2017 (2) discovered in Rapoltu Mare – *La Vie* (Photo: I. A. Bărbat)

1

2

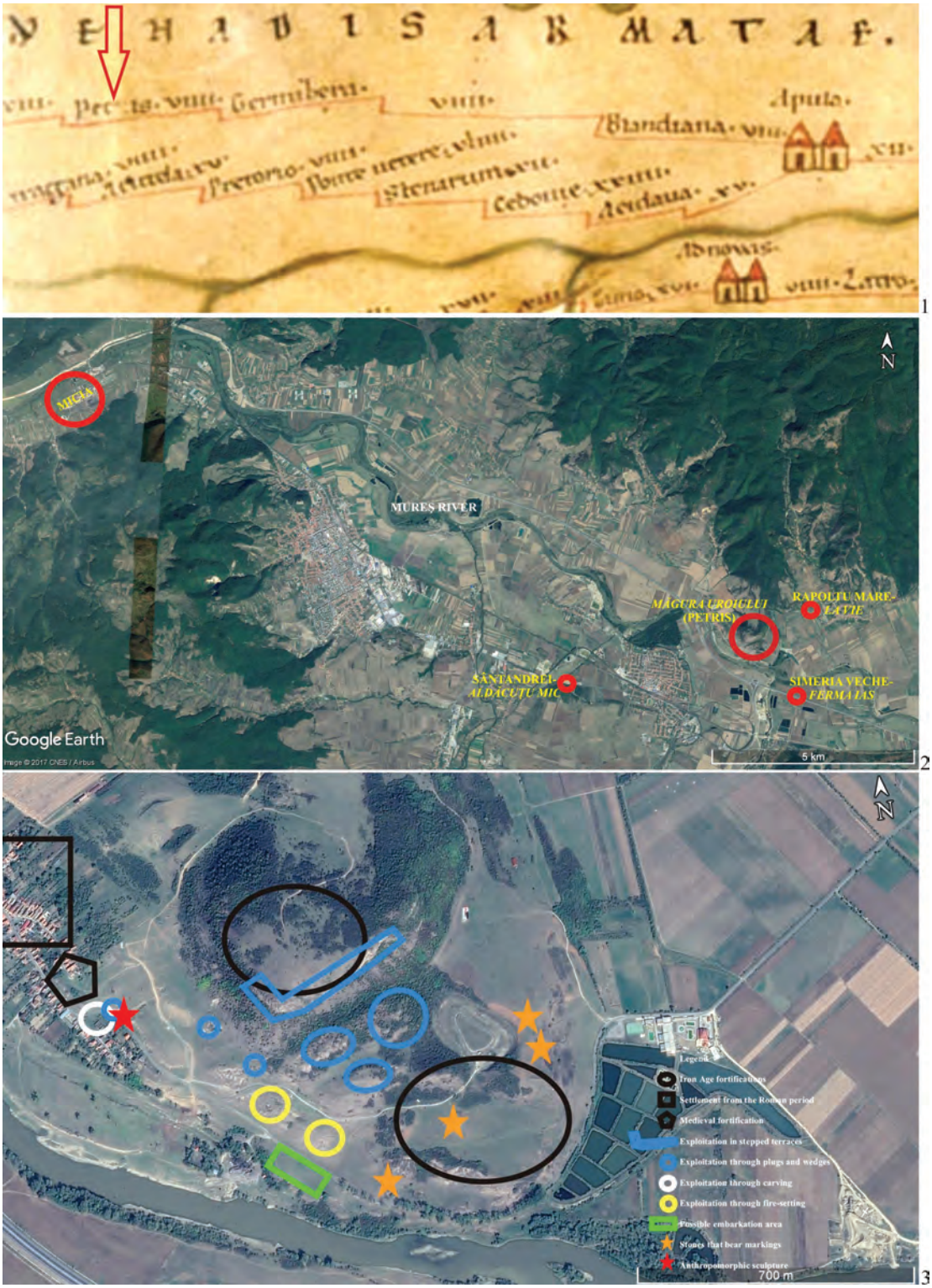
Pl. VI. 1-2. The Gáva culture stone ramparts from plateau of *Măgura Uroiului* hill (Photo: M. G. Barbu)

1

2

3

Pl. VII. 1. Detail of the Hallsttat stone rampart from *Măgura Uroiului* found on terrace III; 2-3. The base of an andesite wall of a La Tène structure from *Măgura Uroiului* (Photo: I. A. Bărbat)



Pl. VIII. 1. The ancient Petris on the *Tabula Peutingeriana* map (processed after http://www.hs-augsburg.de/~harsch/Chronologia/Lspost03/Tabula/tab_or07.html) (Accessed: 25.11.2017); 2. The Uroi andesite distribution from the Roman period in the region around the volcanic hill (processed after Google earth) (Accessed: 25.11.2017); 3. The map of the types of stone extraction from the quarry from *Măgura Uroiului* (processed after Google earth) (Accessed: 25.11.2017)

Pl. IX. 1. The block carving technique (after Adam 1984, p. 29, fig. 30); 2. The wedge technique (after Adam 1984, p. 33, fig. 42); 3. The "Carrara saw" technique (after Kozelj, Wurch-Kozelj 2012b, p. 716, fig. 1c)

1

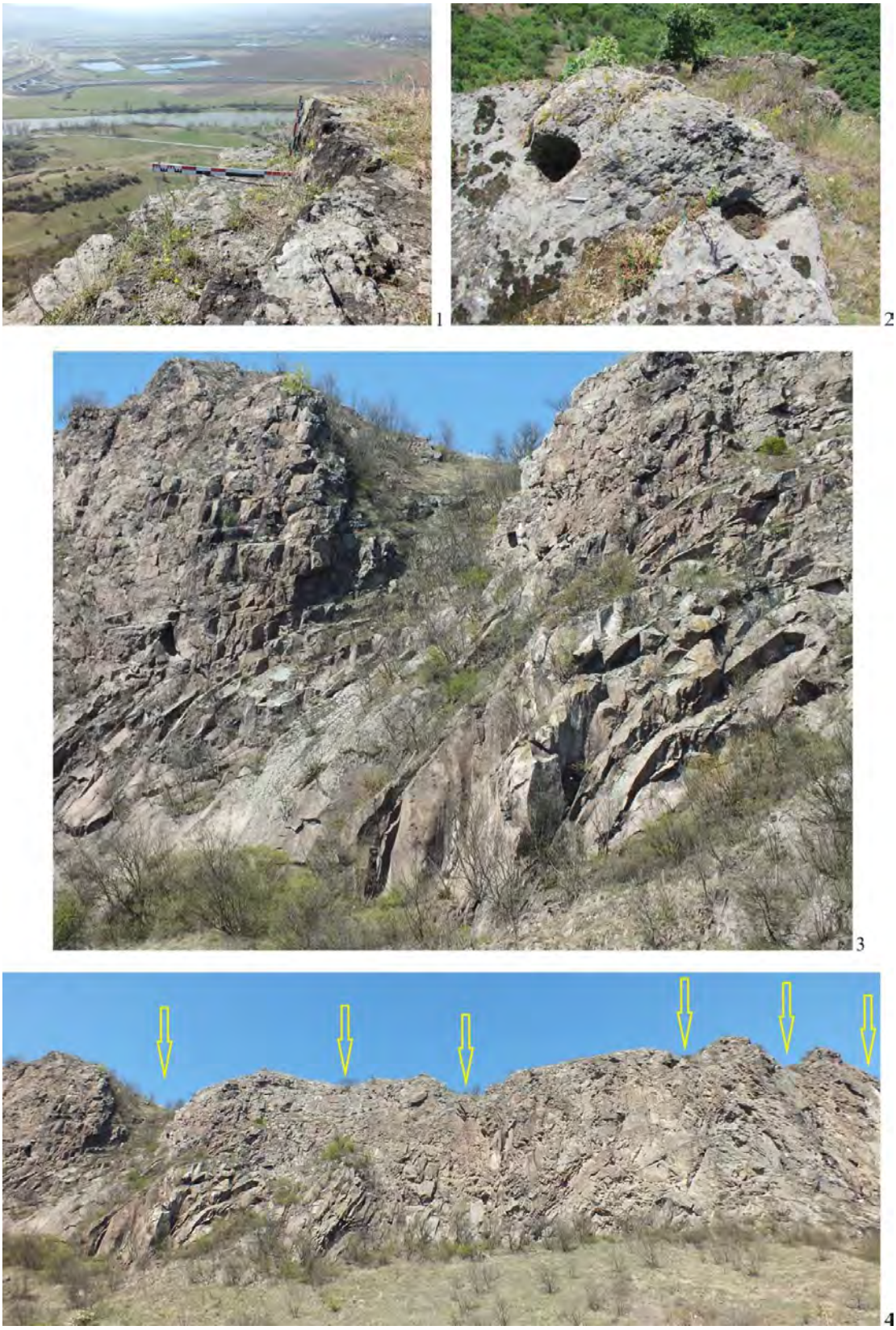
2

Pl. X. 1-2. Overview of the excavation front on the southern slope of *Măgura Uroiului* (Photo: M. G. Barbu)

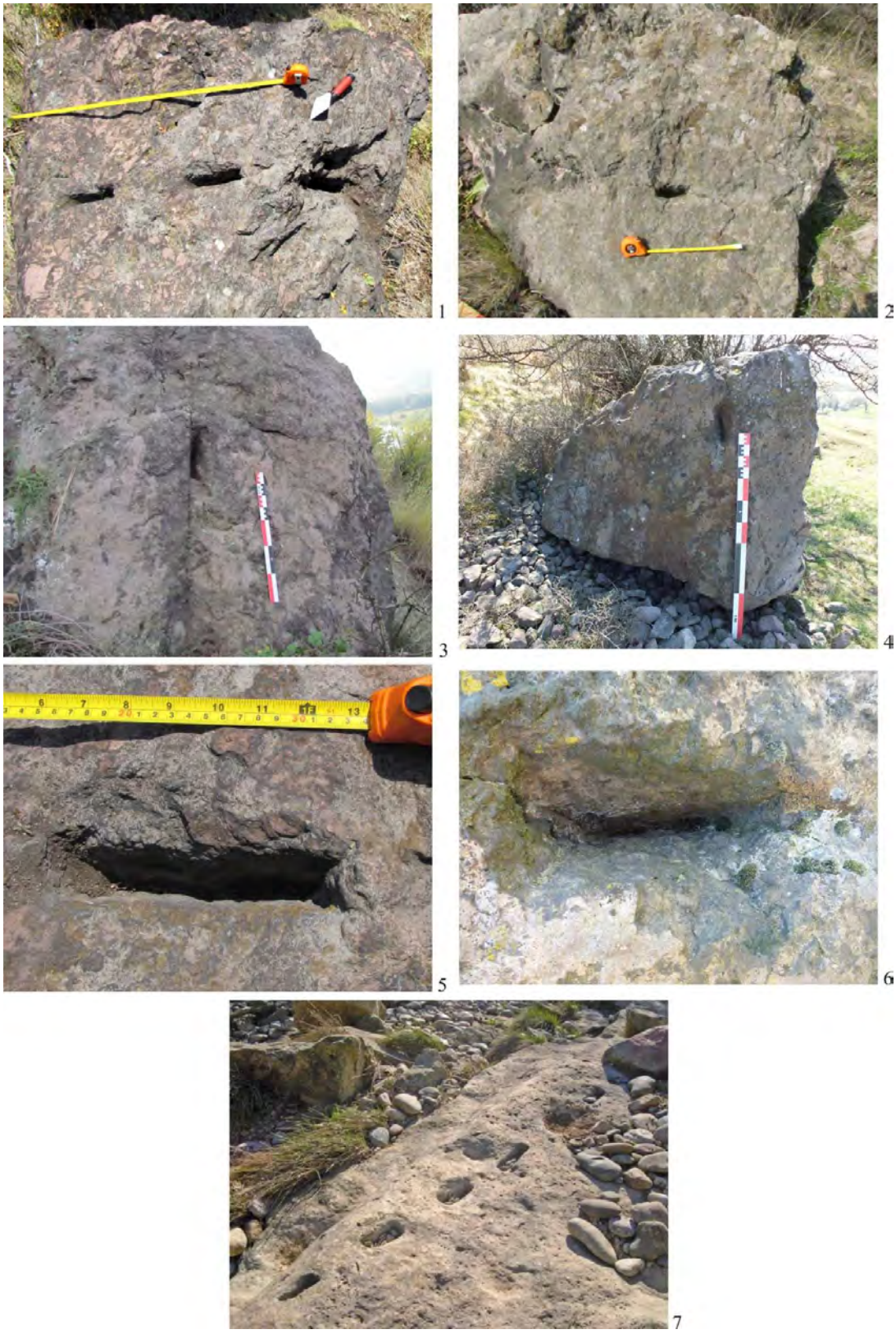
1

2

Pl. XI. 1-2. Details of the excavation front in the Roman quarry from *Măgura Uroiului* (Photo: I. A. Bărbat)



Pl. XII. 1, 3. Details of the excavation front (Photo: I. A. Bărbat); 2. Traces of pole holes dug into the rock (Phtoto: M. G. Barbu); 4. Overview of the excavations fronts, marked with yellow arrows, on the southern slope of *Măgura Uroiului* (Photo: I. A. Bărbat)



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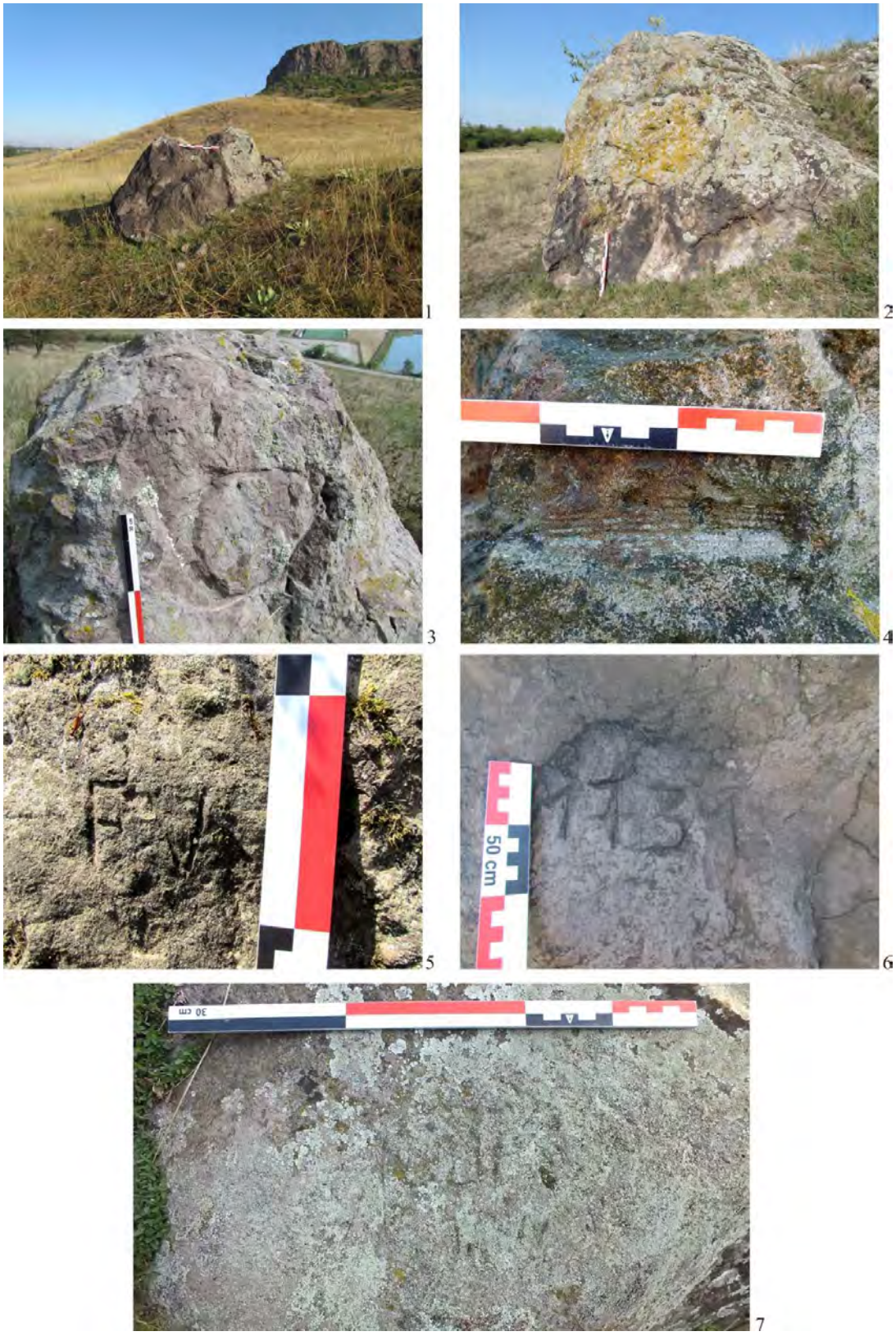

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Noi informații arheologice privind exploatarea andezitului la *Măgura Uroiului* (jud. Hunedoara)

Rezumat

Situl arheologic *Măgura Uroiului* (cunoscut şi prin formele *Măgura*, *Dealul Uroiului* sau *Muntele de Aur* – în limba maghiară *Arany Hegy*) se află în sud-vestul Transilvaniei (**Pl. I/1-2**), pe teritoriul localităților Uroi şi Rapoltu Mare, şi este reprezentativ pentru aproape toate secvențele cronologice şi culturale, din paleolitic şi până în perioada modernă. Probabil că intensitatea locuirilor umane pe terasele *Dealului Uroiului* şi din vecinătatea acestuia a fost influențată de poziția geografică a punctului arheologic, la confluența râului Strei cu valea Mureşului (**Pl. II/1-3**), dar şi din alte raționamente, cum ar fi caracteristicile geologice, forma de relief reprezentând un coş vulcanic (**Pl. IV/1-2**), deci o sursă pentru extracția rocilor (**Pl. IV/1-2**). Din punct de vedere petrografic, dealul aflat în vecinătatea localității Uroi este un andezit, termen folosit în articolul de față pentru desemnarea rocii vulcanice, cunoscută mai recent şi sub denumirea de trahiandezit.

Sub aspect arheologic, cercetările de teren întreprinse în secolul al XIX-lea de către Johann Michael Ackner şi Téglás Gábor au condus la identificarea unor fronturi de exploatare ale andezitului, care au fost apreciate ca fiind antice, locația *Măgurii* fiind coroborată cu anticul Petris de pe *Tabula Peutingeriana* (**Pl. VIII/1**), localitatea antică figurând între Aquae şi Germisara. Cercetările ulterioare, întrepinse de Volker Wollmann şi Ioan Mârza, au arătat că exploatarea sistematică a andezitului la *Măgura Uroiului* a început în epoca romană.

Cercetările arheologice recente (2014-2017), derulate în diferite situri arheologice aflate în vecinătatea *Măgurii Uroiului*, ne confirmă faptul că andezitul de Uroi, cum mai este denumită roca, a fost intensiv exploatat aproape în toate perioadele istorice.

Pentru preistorie, cele mai timpurii dovezi arheologice ale utilizării andezitului au fost întâlnite în momentul cercetării unor complexe aparținând neoliticului timpuriu pe cuprinsul sitului de la Rapoltu Mare – *La Vie*, observându-se preferința aproape exclusivă pentru roca vulcanică în arhitectura locuințelor Starčevo-Criş (**Pl. V/1-2**). Mult mai târziu, comunitățile umane hallstattiene sunt implicate în amenajarea unui sistem defensiv cu sanț şi val, din rocă vulcanică, pe terasa a III-a a *Măgurii Uroiului* (**Pl. VII/1**) şi pe platoul acesteia (**Pl. VI/1-2**).

Odată cu epoca romană, cariera de andezit a fost exploatată sistematic, urmele procedeelor antice de degajare a blocurilor de piatră fiind vizibile până astăzi (**Pl. X/1-2, XI/1-2, XII/1, 3-4**). Prin cercetările desfăşurate în diferite sectoare ale *Măgurii Uroiului* au fost descoperite stigmate specifice tehnicilor antice de exploatare a pietrei. La baza dealului au fost identificate blocuri masive de piatră care au fost desprinse prin metoda icurilor (**Pl. XIII/1-6**). Pe partea sud-vestică a carierei au fost relevate amprente, sub formă de trepte, care ne atestă folosirea metodei decupării blocurilor, dimensiunile şi proporțiile acestora indicând faptul că din acest punct se extrăgeau lespezi utilizate pentru realizarea monumentelor funerare (**Pl. XIV/1-4**).

De asemenea, legăturile anticului Petris cu centrul roman de la Micia sunt confirmate şi de o descoperire în cadrul unui front de exploatare de la Uroi, mai exact a unei sculpturi antropomorfe, în curs de prelucrare, care poartă trăsăturile artistice ale şcolii de sculptură miciene (**Pl. XV/1-4**). Legăturile cu centrul de pietrari de la Micia au fost facilitate şi de amplasarea carierei romane în proximitatea râului Mureş

(**Pl. VIII/1**), fapt care facilita transportarea materiilor prime spre principalul punct de desfacere al andezitului exploatat la Uroi.

Utilizarea andezitului de Uroi a continuat şi pe parcursul evului mediu, acum fiind ridicată o fortificație în apropiere (**Pl. XVIII/1**). Urmele exploatărilor medievale şi moderne sunt de asemenea vizibile, din aceste perioade păstrându-se în stânca nativă şi diverse marcaje (**Pl. XVII/1-7**).

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