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EXCAVATIONS AT PEŞTERA UNGUREASCĂ (CAPRELOR) (CHEILE TURZII, PETREŞTI DE JOS, TRANSYLVANIA) 2003-2004: A PRELIMINARY REPORT ON THE CHIPPED STONE ASSEMBLAGES FROM THE CHALCOLITHIC TOARTE PASTILATE (BODROGKERESZTÚR) LAYERS

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1. Preface

Cheile Turzii is located some 9 kilometres west of Turda, in the Petreşti de Jos district in central Transylvania. It is a Natural Reserve in the limestone Trascăului Mountains formation, crossed by the Hăşdatelor River, which flows in a northwest-southeast direction through a narrow gorge some 3 km long surrounded by peaks, which reach the maximum altitude of some 800 m (fig. 1 top). The gorge is very rich in caves (*Barbulescu M., 1992*), 42 of which have yielded traces of prehistoric or historic occupation. Of particular importance is *Peştera Ungurească* that opens at 46°33'49" N and 23°40'44" E on the right side of the gorge, at the foot of a steep cliff called *Peretele Vulturilor* (fig. 1 bottom), some 100 m above the course of the river. The cave, whose opening, about 19 m wide, faces north-north-east (fig. 1 bottom), is some 75 m long (*Lazarovici Gh., et al., 1995*, fig. 2).

The first excavations at the site were carried out by E. Orosz around the end of the XIX century. They were followed by those of N. Vlassa (1976) who opened a 4x6 m test-trench in the right side of the cave entrance, just below the vault, the edges of which were still visible in 2003. Further excavations were conducted by Gh. Lazarovici (*Lazarovici Gh., et al.*, 1995).

These latter were resumed by one of the writers (P.B.) and Gh. Lazarovici of Resița University in August 2003 and continued during the same month of 2004 (*Biagi P., Spataro M.,, 2004*; *Biagi P., 2005*).

The scope of the new excavations, funded by the Italian Ministry of Foreign Affairs (MAE) and the Prehistoric Society (London), was to redefine the stratigraphic sequence discovered by N. Vlassa, the preliminary results of which were published by *Gh. Lazarovici et al.* (*Lazarovici Gh., 1995*). The Holocene sequence, some 1.50 m thick, is composed of ash and charcoal levels and sterile, sandy layers, from which several structures, among which are pits, hearths and an oval-shaped clay kiln, were brought to light (fig. 2). This sequence is of unique importance, because it is the only stratigraphy with traces of occupation, which cover a long time-span between the Middle Neolithic, Cheile Turzii-Lumea Nouă-Iclod (CCTLNI) (*Lazarovici Gh., 2000*) and the Bronze Age Coțofeni Cultures (*Roman P., 1976*). A layer, some 20 cm thick, which yielded almost exclusively micromammal remains and no material culture finds, was discovered below this sequence. The uppermost occupation is represented by pits and other structural remains from the Bronze Age Wietenberg Culture, through the classic Roman period up to the Hungarian migration (XI-XII century AD)

The 2003 and 2004 excavations covered a surface of some 5 sq. m. Given the absence of any water supply in the close proximity of the cave, all the excavated soil was transported manually down to the Hăşdatelor River in plastic containers and water-sieved with a 1 mm grid. This procedure led to the (almost) complete recovery of the material culture, archaeozoological and archaeobotanical remains. Most of the excavation was carried out left of N. Vlassa's trench, where the stratigraphy shows a detailed sequence, some 1 m thick, attributed to the Chalcolithic Toarte Pastilate (Bodrogkeresztúr) aspect (*Maxim Z., 1999*, 127), beneath the Coțofeni occupation and above the Petreşti one (fig. 3). The lowest "Early Toarte Pastilate" levels yielded one man-made structure delimited by an alignment of very small post-holes. Furthermore a clay kiln, rebuilt at least three times, was brought to light within the Middle Toarte Pastilate series (fig. 4). Excavated materials included an abundance of pottery sherds, stone tools, faunal and charred plant remains. Needless to say, the pottery was the most numerous artefact category.

Four radiocarbon dates were obtained from this latter part of the sequence from samples collected during the 2003 (GrN-29014) and 2004 seasons (GrN-29100, GrN-29101 and GrN-29102) (table 1 and fig. 5). Although it is difficult to understand why the radiocarbon results are stratigraphically upside-down, they show that this local aspect of the Transylvanian Chalcolithic flourished between the last three centuries of the fifth and the first two centuries of the fourth millennium Cal BP (at 2 sigmas). Of particular importance are dates GrN-29101, from charcoal, and GrN-29102, from a fragment of a *Bos primigenius* tibia, collected from the same level 2a3 in which the clay kiln was discovered. These dates are some 350 years younger than the most recent assay available for the Petreşti Culture at least from the results obtained from Daia Româna, the only Transylvanian site so far radiocarbon-dated (*Mantu M., 2000*, 100).

Several gold beads, some 2 mm in diameter, and a few rectangular gold plaquettes were collected from this level. This should indicate that the kiln was most probably linked with the moulding of gold items as also shown by the preliminary results of the soil thin section analyses of a thick ash sample from the lower part of the 2b levels (*G. Boschian*, pers. comm. 2006).

Furthermore the accurate water-sieving of the Toarte Pastilate layer led to the recovery of other material culture and ornamental finds among which are one small copper perforator and two beads made from stone and shell as well as a great quantity of micromammal remains, including rodents, fish and bird bones, land snails, charred hazelnut shells and *Cornus mas* fruits, at least three species of *Triticum* caryopses and a great amount of charcoal fragments (*R. Nisbet*, pers. comm. 2006).

2. The chipped stone assemblage

The chipped stone assemblage is represented by obsidian, flint and radiolarite artefacts of exogenous provenance. The typological description of the implements (table 2) follows the list proposed by G. Laplace (*Laplace G., 1964*). Most of the artefacts (250) come from the Chalcolithic Toarte Pastilate levels, subdivided by G. Lazarovici into three main subsequent (development) periods (Early, Middle and Late: fig. 3). A few were collected from the levels above and below: 6 from the mixed Coţofeni/*Toarte Pastilate,* 20 from the Petreşti Culture layers, and 5 are of uncertain provenance, most probably from the *Toarte Pastilate* levels. Altogether the assemblage consists of 281 artefacts (table 2).

2.1. The Toarte Pastilate assemblage

The Toarte Pastilate chipped stone assemblage is represented by 256 artefacts, among which are 12 implements (4.69%), 2 cores (0.78%), 71 unretouched artefacts (27.73%), 1 splintered piece (0.39%) and 170 shatters (66.40%) (table 2). Most of the artefacts are from obsidian (170: 66.40%) and Volhynian flint (66: 25.79%), while brown flint (9: 3.52%), grey radiolarite (6: 2.34%), grey flint (1: 0.39%) and Úrkút Transdanubian radiolarite (1: 0.39%) are much less represented. Furthermore 3 artefacts (1.17%) are "burnt". If we take into consideration the weight of the different raw materials employed for chipping artefacts, obsidian predominates (48 gr.: 45.28%) over Volhynian flint (30 gr.: 28.30%), Transdanubian radiolarite (16 gr.: 15.10%) and the other flint and radiolarite types (12 gr.: 11.32%) (fig. 6). This is mainly due to the occurrence of a great number of obsidian (and Volhynian flint) shatters.

Sixteen obsidian artefacts have been identified as from the Carpathian 1 source (Cejkov and / or Kašov in eastern Slovakia: *Williams O., Nandris J., 1977*, fig. 2; *Bigazzi G., et al.*, 1990, fig. 1) by XRF at Toulouse (F) (fig. 7) and University of Calabria (I) laboratories.

2.1.1. Implements

The implements are represented by 2 End Scrapers (0.78% of the total assemblage), 4 Truncations (1.56%), 4 Trapezoidal Geometrics (1.56%) and 2 Retouched Blades (0.78%).

Both the End Scrapers are obtained from Volhynian flint. 1 is long (fig. 8, n. 1) on a blade and 1 short on a flake (fig. 8, n. 2). The front of the first was used for scraping wood and its left side for cutting wood, while the front of the second for scraping hard.

The Truncations are obtained from obsidian microbladelets: 1 proximal specimen is slightly oblique, with an abrupt, direct retouch (fig. 9, n. 4) and 1 is distal (fig. 9, n. 5).

The Trapezes are all from obsidian bladelets. 3 are of isosceles type with two oblique, slightly concave truncations (fig. 9, nn. 6-8) and 1 rectangular, with one of the two truncations which is convex, obtained with a bifacial retouch (fig. 8, n. 5). The right side of this latter tool was used for cutting medium hard material.

The Retouched Bladelets are represented by two fragments with simple, marginal unilateral retouch of obsidian and Volhynian flint respectively.

2.1.2. Cores

Only one prismatic specimen from grey radiolarite with microflakelet detachments and a Core trimming flakelet with microbladelet detachments of Carpathian 1 obsidian (fig. 9, n. 2). Another prismatic core with microbladelet detachments is of “uncertain” provenance (fig. 9, n. 1).

2.1.3. Unretouched artefacts

Apart from the above-mentioned tools, 1 unretouched Volhynian flint blade (fig. 8, n. 4) and 1 Carpathian 1 obsidian bladelet (fig. 8, n. 3) show traces of cutting soft and cutting medium respectively.

2.1.4. Splintered Pieces

Only one specimen of Volhynian flint with hard hammering detachments on both surfaces at the proximal end (fig. 9, n. 14).

2.1.5. Shatters

Are very numerous (170): 122 from obsidian, 38 from Volhynian flint and 10 from other flint, mainly of brown colour, 3 of which are burnt. Their presence indicates without any doubt that the implements were manufactured and subsequently retouched at the entrance (inside?) the cave.

2.2. The Petreşti Culture assemblage

Given the small surface excavated during the 2003-2004 seasons, it is represented by only 20 artefacts from layer 3. Amongst these are 2 implements, 2 unretouched pieces and 14 shatters. The commonest raw material employed for chipping tools is Carpathian 1 obsidian (10 pieces), followed by Volhynian flint (7 pieces) and flint from other sources (3 pieces).

The implements are 1 short End Scraper of Volhynian flint with converging sides and a lateral complementary retouch, whose front shows traces of scraping hard, and both sides cutting hard (fig. 8, n. 7) and 1 isosceles Trapeze with slightly convex, direct truncations, on a bladelet of Carpathian 1 obsidian (fig. 9, n. 9).

2.3. Other tools

Apart from the above-mentioned pieces, the assemblage includes 5 specimens of “uncertain” provenance that are listed at the end of table 2.

Among these are 1 obsidian, prismatic bladelet core (fig. 9, n. 1), 1 proximal fragment of a hafted blade with cut hard traces (fig. 8, n. 6) and 1 probable proximal straight borer on a thick flakelet (fig. 9, n. 3).

3. Discussion

According to the results obtained from the analysis of the chipped stone artefacts and other evidences, the activities practised at the cave during the Toarte Pastilate period were many and varied. There is a strong evidence for stone tool manufacturing, including cores and shatter.

The obsidian had been carried to the cave in nodules that were reduced to cores and subsequently chipped into tools as the high number of shatters indicates. All the raw materials employed for the manufacture of the stone tools come from a great distance. No local resources have been used although there are such sources in Transylvania (*Comşa E., 1976*, 244; *Luca S.A. et al., 2004*, 66). As mentioned above, the obsidian is always of Carpathian 1 type (Cejkov and/or Kašov in eastern Slovakia), a source of very transparent and sometimes variegated material located some 300 kms north-north-west of the cave. This type of obsidian is well known for its long-distance distribution (*Williams Thorpe O. et al., 1984*, fig. 9) that reached Western Macedonia during the Late Neolithic period (*Kilikoglou V. et al., 1996*, 347). Extensive research on obsidian has shown that no sources are found in Romania (*Nandris J., 1975*) despite previous claims of the existence of such sources in the country (*Biró K., 2006*, 271; *Kasztovszki Z., Biró K., 2006*, 303).

The Volhynian flint comes from north-west Ukraine, some 400 kms north-east of the site (*Zaliznyak L., 2005*, fig. 6), while the Úrkút Transdanubian radiolarite is from the Bakoni Mountains near Veszprem in

Hungary, some 500 km to the west of the Cheile Turzii (*Biró K., Dobosi V., 1991*, 53). The chipped stone artefacts from *Peştera Ungurească* mirror findings elsewhere. They demonstrate long-distance procurement networks from western Hungary, the western Carpathians and north-western Ukraine towards central Transylvania at least from the late fifth millennium Cal BC (*Constantinescu B. et al., 2002*, 377).

The kiln that was uncovered is evidence for the smelting of gold in the cave, as are the gold beads and plaquettes that were found through water sieving. Smelting native gold would have required temperatures of at least 1063°. This procedure would involve a great quantity of wood as fuel and consequent residuals in the form of charcoals and thick ash levels (*R. Nisbet*, pers. comm. 2006). Evidence for such an early activity is poorly documented and so far unknown in the region from any cave settings.

Concerning the chipped stone tools, the presence of trapezes is notable in that such pieces are considered to be common for the Early Neolithic sites, although in Romania they are known also from later Neolithic cultural aspects (*Păunescu A., 1970*; *Comşa E., 1971*). A comparison of the implements does indicate that early (isosceles) types, such as those associated with the Criş, as well as the Starčevo (*Karmanski S., 2005*, plate CLXXVIII) and Körös Cultures (*Starnini E., 1993*, 81), are different in form from those from Peştera Ungurească, where they most probably made their first appearance during the Petreşti period and continued to be in use throughout the entire *Toarte Pastilate* occupation. Interestingly, the only trapeze that showed microwear traces from use had not functioned as an armature, but rather as part of a cutting tool (fig. 8, n. 5).

Of particular interest is also the occurrence of obsidian Truncations on a microbladelet (fig. 9, n. 5) and a microflakelet (fig. 9, n. 6), which do not find parallels from any other Chalcolithic site in Transylvania.

The microwear analysis shows that a variety of tasks were carried out at the cave, suggesting that it had been occupied for a rather long time as also indicated by the radiocarbon results (table 1). Such an occupation would involve also the smelting activities mentioned above which were conducted during a specific period of the Toarte Pastilate occupation of the site. The typological study demonstrates that the most common lithic implement was the End Scraper, a tool that dominated Neolithic Balkan sites at least from the Vinča Culture onwards (*Radovanović I. et al., 1984*), although different varieties of this tool are quite common throughout the whole period comprised between the Early Neolithic and the beginning of the Chalcolithic in Romania (*Comşa E., 1971*). Broadly speaking the End Scraper is a type that is also common for the Petreşti Culture in general (*Paul I., 1992*, 38) although no specimens with convergent sides, such as that of fig. 8, n. 7, have ever been found so far from any of the sites of this culture.

The faunal remains indicate that different environments were exploited for the meat diet of the inhabitants of the cave during the Chalcolithic period, who practised both hunting and the rearing of large game supplemented by fishing, fowling and the collection of freshwater turtles. This evidence in the consequence of the complex geography of the area in which the cave opens, that is represented by a variety of environmental and microclimatic zones among which are middle-altitude karstic pastures that open just above steep, somewhat forested cliffs of the gorge crossed by a narrow stream, and the terraces formed by the Ariesul River. The occurrence of large-sized fish vertebrae suggests that they had been acquired, most likely, from fishing in this later water course that flows some 2.5 km east of the cave of which the Hăşdatelor is an affluent that joints the Mureş River some 30 km to the east-south-east as the crow flies.

Charred remains are also plentiful. As mentioned above, the analyses so far indicate the presence of *Cornus mas* (fruits), hazelnut shells as well as different varieties of domesticated wheat, suggesting that both the seasonal gathering of plant foods and agriculture integrated the diet of those living in the cave.

4. Conclusion

The excavations at Peştera Ungurească have helped shed light on a unique archaeological area, the Cheile Turzii gorge, that has so far received little detailed attention although it has been known for many years. The activities that had taken place at the cave during the Chalcolithic were many and varied. They attest, along with the radiocarbon dates, a fairly long occupation. Of especial interest is the kiln that had been used to smelt gold, resulting also in some finds of gold beads and plaquettes.

The analysis of the chipped stone assemblage from the *Toarte Pastilate* levels excavated in 2003 and 2004 has shown that the cave was part of a complex network system for the procurement of the raw materials for the manufacture of obsidian, flint and radiolarite tools that covered a radius of some 500 km. It demonstrates that during this period raw materials with excellent technological qualities were required by the local inhabitants for their daily necessities, a phenomenon already known from other neighbouring areas already during the Neolithic (*Kaczanowska M., Kozłowski J., K., 1994*).

Furthermore the identification of the provenance of the obsidian artefacts has shown that they were traded exclusively from the sources of Cejkov and or Kašov in the Tokaj Mountains of eastern Slovakia. This variety of obsidian is characterised by lumps of transparent, sometimes almost colourless or striped material, which were collected from the surface or excavated from the loess sediments of the availability area. The presence of a great quantity of shatters, typical residuals of the local manufacture of the retouched instruments, which were collected thanks to the small grid water-sieving of the excavated sediments, indicates that the production of the chipped stone implements took place within the excavated area, even at the entrance of the cave. These activities had so far never been recorded from any other Chalcolithic site of Carpathian Transylvania. They show that an accurate sieving is absolutely necessary for the collection of material culture and archaeozoological remains in order to favour the achievement of a reasonable understanding of the activities practised within a complex archaeological site whose geographical location is unique.

Given the inaccuracy of the studies so far conducted in the *Cheile Turzii* gorge and its surroundings, it is at present impossible to ascertain whether the cave was part of a system which included open-air large settlements and sites with other (more specific?) characteristics and their eventual complementary role within the regional settlement pattern. Nevertheless it is important to point out that the cave was repeatedly settled during several periods of the Holocene, from the middle Atlantic onwards. This indicates the importance played by a cave site of fairly uneasy access even during such periods and the complexity of the Chalcolithic settlement system in the environmentally variegated territory surrounding Petreşti de Jos.

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Table 1: Peştera Ungurească: radiocarbon and calibrated dates at 1 and 2 sigmas from the Toarte Pastilate levels

Signature	Material	Lab. Number	Date BP	Date BC (1 sigma)	Date BC (2 sigmas)	Layer
CT2	Charcoal	GrN-29100	5100+/-40	3950-3820 (68.2%)	3980-3790 (95.4%)	2B
CT4	*Bos primigenius* tibia	GrN-29102	5120+/-40	3970-3820 (68.2%)	4010-3800 (95.4%)	2A3
CT3	Charcoal	GrN-29101	5260+/-40	4190-4010 (68.2%)	4230-3980 (95.4%)	2A3
CT1	*Fraxinus*, *Quercus*, Pomoideae	GrN-29014	5350+/-40	4260-4080 (68.2%)	4320-4050 (95.4%)	2A

Table 2: Peştera Ungurească: typological description according to Laplace, G., (*1964*) and other characteristics of the chipped stone implements from the 2003-2004 excavations. The dimensions are indicated as follows: eee = hypermicroflakelets, ee = microflakelets, e = flakelets, E = flakes, lll = hypermicrobladelets, ll = microbladelets, l = bladelets, L = blades. eee and lll <1.25 cm, ee and ll between 1.25 and 2.50 cm, e and l between 2.50 and 5.00 cm, E and L between 5.00 and 10.00 cm

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Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method-analysis n.	Wear Traces	Figure
Toarte Pastilate							
1.1/E1	Volhynian flint	L1 [Smd sen]	(16)x13x3	mesial fragment			
1.1/E1	obsidian	shatter					
1.1/E1	brown flint	shatter					
1.1/E1	dark brown flint	shatter					
1.1/F6	Carpathian 1 obsidian	Gm6 [Apd+Apd]	23x13x2	complete	XRF-ctpu14		9, n. 7
1.1/F6	Carpathian 1 obsidian	fl	(34)x14x5	distal fragment	XRF-ctpu7	cut medium	8, n. 3
1.2/E6	obsidian	T2 dist [Apd]	10x10x2	complete			9, n. 5
1.2/E6	Volhynian flint	fl	(18)x10x2	proximal fragment			
1.2/E6	Volhynian flint	fl	(15)x11x3	distal fragment			
1.2/E6	obsidian	fll	(15)x5x1	proximal fragment			
1.2/E6	obsidian	fll	(7)x14x2	mesial fragment			
1.2/E6	Volhynian flint	fll	(9)x8x1	mesial fragment, corticated			
1.2/E6	obsidian	shatter					
1.2/E6	obsidian	shatter					
1.2/F5	Volhynian flint	G1	(27)x17x6	distal fragment		cut wood - scrape wood	8, n. 1
1.2/F5	grey radiolarite	prismatic microflakelet core	15x23x16	complete			
1.2/F5	Carpathian 1 obsidian	core trimming flakelet	11x21x7	complete	XRF-CT11		9, n. 2
1.2/F5	brown flint	eee	10x8x2	complete			
1.2/F5	obsidian	shatter					
1.2/F5	obsidian	shatter					
1.2/F5	brown flint	shatter					
1.2/F5	light grey radiolarite	shatter					
1.2/F6	obsidian	fll	(8)x7x1	mesial fragment			
1.2/F6	Carpathian 1 obsidian	ee	27x15x7	complete, corticated	XRF-CT8		
1.2/F6	obsidian	ee	14x11x5	complete			
1.2/F6	Carpathian 1 obsidian	e	28x30x6	complete, corticated	XRF-CT9		
1.2/F6	obsidian	shatter					

PESTERA UNGUREASCA

Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method-analysis n.	Wear Traces	Figure
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	obsidian	shatter					
1.2/F6	brown flint	shatter					
1.2/F6	brown flint	shatter					
1.2/F6	brown flint	shatter					
1a2/F5	obsidian	ll	13x6x2	complete			
1a2/F5	obsidian	fll	8x10x1	mesial fragment			
1a2/F5	obsidian	ee	16x12x2	complete, corticated			
1a2/F5	Carpathian 1 obsidian	fee	(10)x12x1	proximal fragment	XRF-CT5		
1a2/F5	Volhynian flint	eee	9x12x2	complete			
1a2/F5	Volhynian flint	eee	9x8x2	complete			
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	obsidian	shatter					
1a2/F5	Volhynian flint	shatter					
1a2/F5	Volhynian flint	shatter					
1a2/F6	obsidian	L1 [Smd sen dist]	(9)x6x1	distal fragment			
1a2/F6	Volhynian flint	fl	(18)x12x2	proximal fragment, corticated			
1a2/F6	Volhynian flint	fll	(8)x7x2	mesial fragment			
1a2/F6	Carpathian 1 obsidian	fll	(12)x10x2	mesial fragment	XRF-CT10		
1a2/F6	Volhynian flint	ee	17x18x2	complete			
1a2/F6	obsidian	ee	14x8x3	complete, corticated			
1a2/F6	obsidian	ee	23x15x4	complete			
1a2/F6	Carpathian 1 obsidian	fee	(13)x(13)x3	proximal fragment	XRF-CT12		
1a2/F6	obsidian	fee	(10)x11x3	proximal fragment			
1a2/F6	obsidian	fee	(11)x11x3	distal fragment			
1a2/F6	Volhynian flint	fee	10x7x2	proximal fragment			
1a2/F6	Volhynian flint	fee	(10)x8x1	distal fragment			
1a2/F6	obsidian	eee	7x7x4	complete			
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					

PESTERA UNGUREASCA

Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method- analysis n.	Wear Traces	Figure
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	obsidian	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	Volhynian flint	shatter					
1a2/F6	brown flint	shatter					
1a2/F6	brown flint	shatter					
1b2/F5	grey radiolarite	fl	(30)x16x4	mesial fragment			
1b2/F5	Carpathian 1 obsidian	fll	(20)x7x2	proximal fragment	XRF-CT6		9, n. 10
1b2/F5	grey radiolarite	ee	13x19x5	complete			
1b2/F5	Carpathian 1 obsidian	fee	(13)x12x3	mesial fragment, corticated	XRF-CT7		
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	obsidian	shatter					
1b2/F5	burnt flint	shatter					
1b2/F5	Volhynian flint	shatter					

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Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method-analysis n.	Wear Traces	Figure
1b2/F6	Volhynian flint	fl	(42)x19x6	mesial fragment, corticated		cut soft	8, n. 4
1b2/F6	Transdanubian radiolarite-Urkut Eplény type	e	35x30x15	complete, corticated			
2a/E6	Volhynian flint	ll	16x5x2	complete			
2a/E6	Carpathian 1 obsidian	feee	(9)x19x2	mesial fragment, corticated	XRF-ctpu2		
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	obsidian	shatter					
2a/E6	Volhynian flint	shatter					
2a/E6	Volhynian flint	shatter					
2a/E6	Volhynian flint	shatter					
2a/E6	Volhynian flint	shatter					
2a/F6	grey radiolarite	l	35x9x4	complete			9, n. 12
2a/F6	Carpathian 1 obsidian	e	32x36x8	complete, corticated	XRF-ctpu9		
2a/F6	obsidian	shatter					
2a/F6	obsidian	shatter					
2a/F6	obsidian	shatter					
2a/F6	Volhynian flint	shatter					
2a/F6	Volhynian flint	shatter					
2a1/F6	obsidian	fll	(10)x9x3	proximal fragment			
2a1/F6	Carpathian 1 obsidian	e	21x24x8	complete, corticated	XRF-ctpu13		
2a1/F6	Carpathian 1 obsidian	fe	(24)x17x4	proximal fragment	XRF-ctpu4		
2a1/F6	obsidian	shatter					
2a1/F6	obsidian	shatter					
2a2/F5	grey flint	fll	8x7x2	mesial fragment			
2a2/F5	obsidian	fee	(12)x14x3	proximal fragment			
2a2/F5	Volhynian flint	fee	(12)x18x3	mesial fragment, corticated			
2a2/F5	obsidian	shatter					
2a2/F5	obsidian	shatter					
2a2/F5	obsidian	shatter					
2a2/F5	Volhynian flint	shatter					
2a2/F5	Volhynian flint	shatter					
2a3/F6	obsidian	T3 [Apd prox]	(10)x9x2	proximal fragment			9, n. 4
2a3/F6	Carpathian 1 obsidian	e	24x30x7	complete, corticated	XRF-ctpu10		
2a3/F6	Carpathian 1 obsidian	fe	(26)x26x6	proximal fragment, corticated	XRF-ctpu11		
2a3/F6	obsidian	ee	13x13x5	complete			
2a3/F6	obsidian	shatter					
2a3/F6	obsidian	shatter					
2a3/F6	obsidian	shatter					
2a3/F6	obsidian	shatter					
2a3/F6	Volhynian flint	shatter					
2b/E6	Carpathian 1 obsidian	Gm6 [Apd+Apd]	20x10x2	complete	XRF-CT1		9, n. 6
2b/E6	obsidian	fll	(10)x7x2	distal fragment			
2b/E6	Volhynian flint	ee	16x13x3	complete, corticated			
2b/E6	obsidian	eee	10x8x4	complete			

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Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method-analysis n.	Wear Traces	Figure
2b / E6	obsidian	shatter					
2b / E6	Volhynian flint	shatter					
2b / F5	obsidian	shatter					
2b / F6	Volhynian flint	ee	14x27x4	complete			
2b / F6	Volhynian flint	fee	(12)x13x2	mesial fragment			
2b / F6	Volhynian flint	eee	11x9x1	complete			
2b / F6	obsidian	shatter					
2b / F6	obsidian	shatter					
2b / F6	obsidian	shatter					
2b / F6	obsidian	shatter					
2b / F6	obsidian	shatter					
2b1 / E6	Volhynian flint	eee	9x10x2	complete			
2b1 / E6	obsidian	shatter					
2b1 / E6	obsidian	shatter					
2b1 / E6	obsidian	shatter					
2b1 / E6	Volhynian flint	shatter					
2b1 / E6	Volhynian flint	shatter					
2b1 / F5-F6	Carpathian 1 obsidian	Gm6 [Apd+Apd]	15x12x4	complete	XRF-ctpu8		9, n. 8
2b1 / F6	Volhynian flint	T3 [Apd dist]	(10)x8x2	distal fragment			
2b1 / F6	obsidian	fee	(8)x8x2	distal fragment			
2b1 / F6	obsidian	fee	(6)x8x2	proximal fragment			
2b1 / F6	obsidian	fee	(12)x13x4	mesial fragment			
2b1 / F6	Volhynian flint	fee	(10)x24x3	proximal fragment			
2b1 / F6	light grey radiolarite	fee	(7)x11x1	mesial fragment			
2b1 / F6	obsidian	eee	10x10x5	complete			
2b1 / F6	obsidian	shatter					
2b1 / F6	obsidian	shatter					
2b1 / F6	obsidian	shatter					
2b1 / F6	Volhynian flint	shatter					
2b1 / F6	Volhynian flint	shatter					
2b1 / F6	burnt flint	shatter					
2b2 / F5	obsidian	fee	(10)x14x2	mesial fragment			
2b2 / F5	Carpathian 1 obsidian	fee	(9)x17x2	mesial fragment	XRF-CT3		
2b2 / F5	Volhynian / Prut flint	shatter					
2b2 / F6	Volhynian flint	G3 dist	36x31x9	complete		scrape hard	8, n. 2
2b2 / F6	obsidian	fll	(12)x7x2	proximal fragment			
2b2 / F6	Volhynian flint	fll	(15)x10x3	mesial fragment			
2b2 / F6	Volhynian flint	fll	(13)x6x2	proximal fragment			
2b2 / F6	obsidian	eee	7x8x1	complete			
2b2 / F6	Volhynian flint	eee	9x10x1	complete, corticated			
2b2 / F6	Volhynian flint	feee	(7)x6x1	proximal fragment			
2b2 / F6	obsidian	shatter					
2b2 / F6	Volhynian flint	shatter					
2b2 / F6	Volhynian flint	shatter					
2b4 / F6	obsidian	T3 [Apd dist]	11x11x3	complete			9, n. 5
2b4 / F6	obsidian	Gm7 [Apd+Apb conv]	15x15x2	complete		cut medium	8, n. 5
2b4 / E6	Volhynian flint	E1 splintered piece	(33)x19x7	proximal fragment			9, n. 14
2b4 / F6	Volhynian flint	lll	11x4x1	complete			
2b4 / F6	Volhynian flint	feee	(7)x8x2	proximal fragment			
2b4 / F6	obsidian	shatter					
2b4 / F6	obsidian	shatter					
2b4 / F6	Volhynian flint	shatter					
2b4 / F6	Volhynian flint	shatter					
2b4 / F6	Volhynian flint	shatter					
2b4 / F6	Volhynian flint	shatter					
2b4 / F6	Volhynian flint	shatter					
2b4 / F6	burnt flint	shatter					

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Level/ Square	Raw material	Typology	Dimensions (mm)	State	Analytical method- analysis n.	Wear Traces	Figure
Petresti Culture							
3a/E6	obsidian	shatter					
3a/E6	Volhynian flint	shatter					
3a1/E6	Volhynian flint	fE	(51)x40x14	proximal fragment			9, n. 13
3a1/E6	light grey radiolarite	eee	8x10x2	complete			
3a1/E6	obsidian	shatter					
3a1/E6	obsidian	shatter					
3a1/E6	Volhynian flint	shatter					
3a1/E6	Volhynian flint	shatter					
3a1/E6	Volhynian flint	shatter					
3a1/E6	light grey radiolarite	shatter					
3a2/E6	Volhynian flint	G4/Smm bil	44x42x12	complete		cut hard - scrape hard - cut hard	8, n. 7
3a2/E6	Carpathian 1 obsidian	fl	(31)x10x3	mesial fragment	XRF-ctpu5		9, n. 11
3a2/E6	Carpathian 1 obsidian	fl	13x9x3	mesial fragment	XRF-CT13		
3a2/E6	obsidian	shatter					
3a2/E6	obsidian	shatter					
3a2/E6	Volhynian flint	shatter					
3b2/F6	obsidian	shatter					
3b2/F6	obsidian	shatter					
3b2/F6	dark reddish brown flint	shatter					
3c/E6	Carpathian 1 obsidian	Gm6 [Apd+Apd]	17x12x2	complete	XRF-ctpu6		9, n. 9
Uncertain							
PitA -70 cm/F6	Carpathian 1 obsidian	Bc2 [Apbf sen]	(18)x9x6	distal fragment	XRF-ctpu3b		9, n. 3
PitA -70 cm/F6	Carpathian 1 obsidian	fll	(12)x9x3	distal fragment, corticated	XRF-ctpu3a		
60-70cm/F6	Volhynian flint	L2 [Spa]=gloss sen	(29)x15x5	proximal fragment		cut hard - haft?	8, n. 6
130cm/E6	Carpathian 1 obsidian	fll	(18)x12x4	distal fragment, corticated	XRF-ctpu1		
surface	Carpathian 1 obsidian	prismatic microbladelet core	23x18x16	complete,corticated	XRF-CT2		9, n. 1

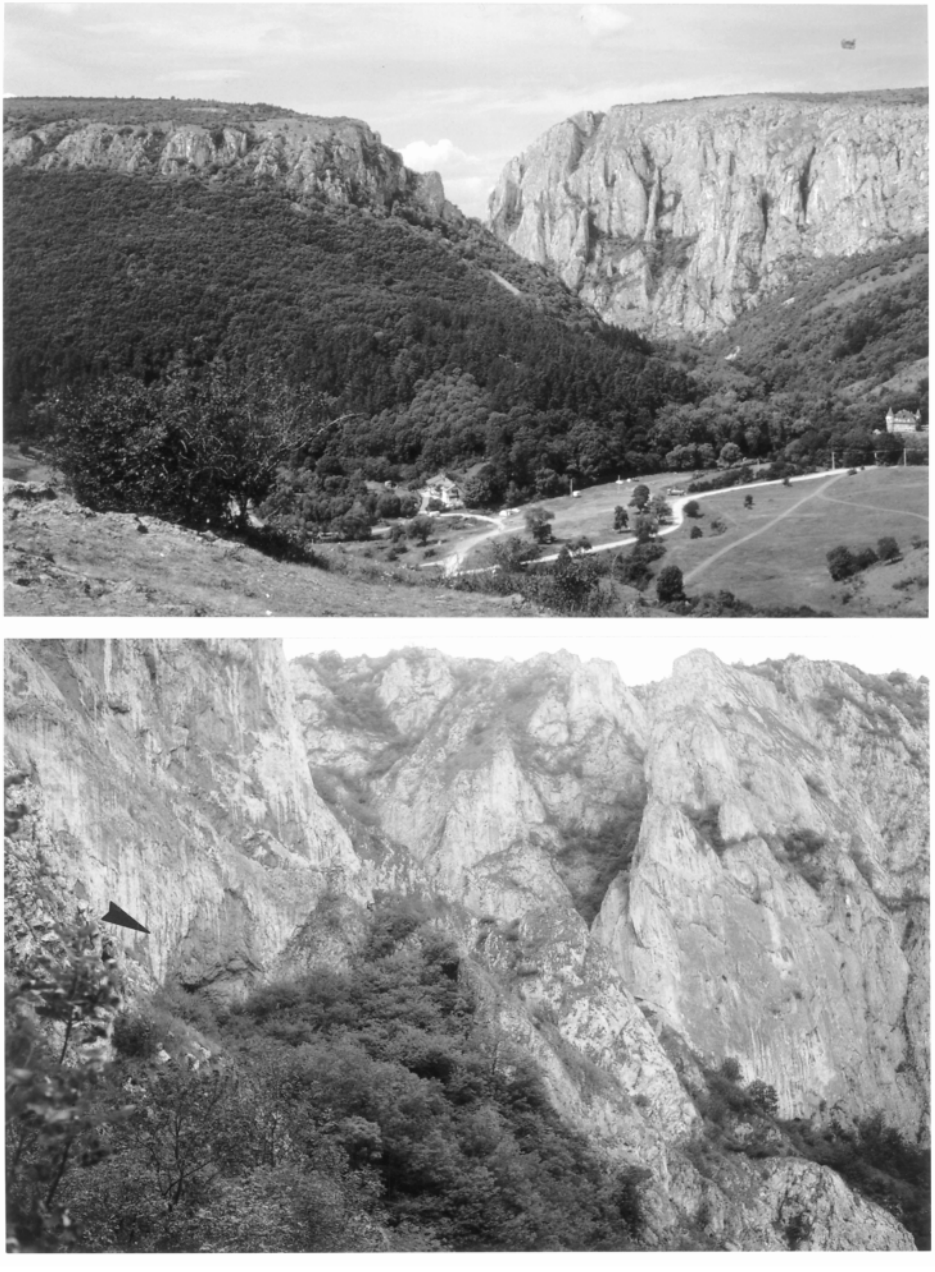

Fig. 1: The entrance of the gorge of Cheile Turzii from the south-east (top) and the opening of Peştera Ungurească at the base of the cliff called Preteler Vulturior (arrow: bottom) (*photographs by P. Biagi*)

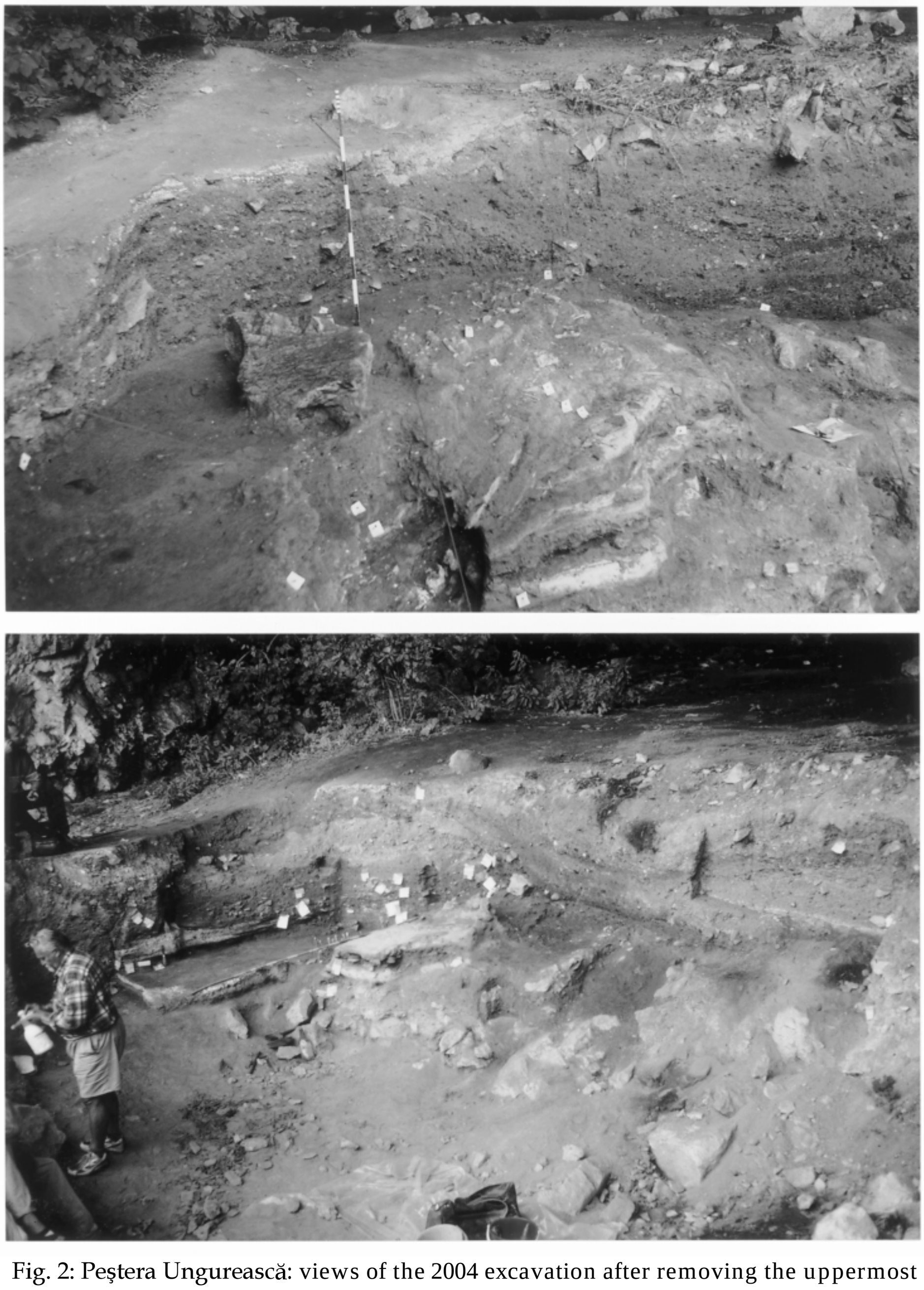

Fig. 2: Peştera Ungurească: views of the 2004 excavation after removing the uppermost levels (top) and after the excavation of the Toarte Pastilate levels (bottom) (*photographs by P. Biagi*)

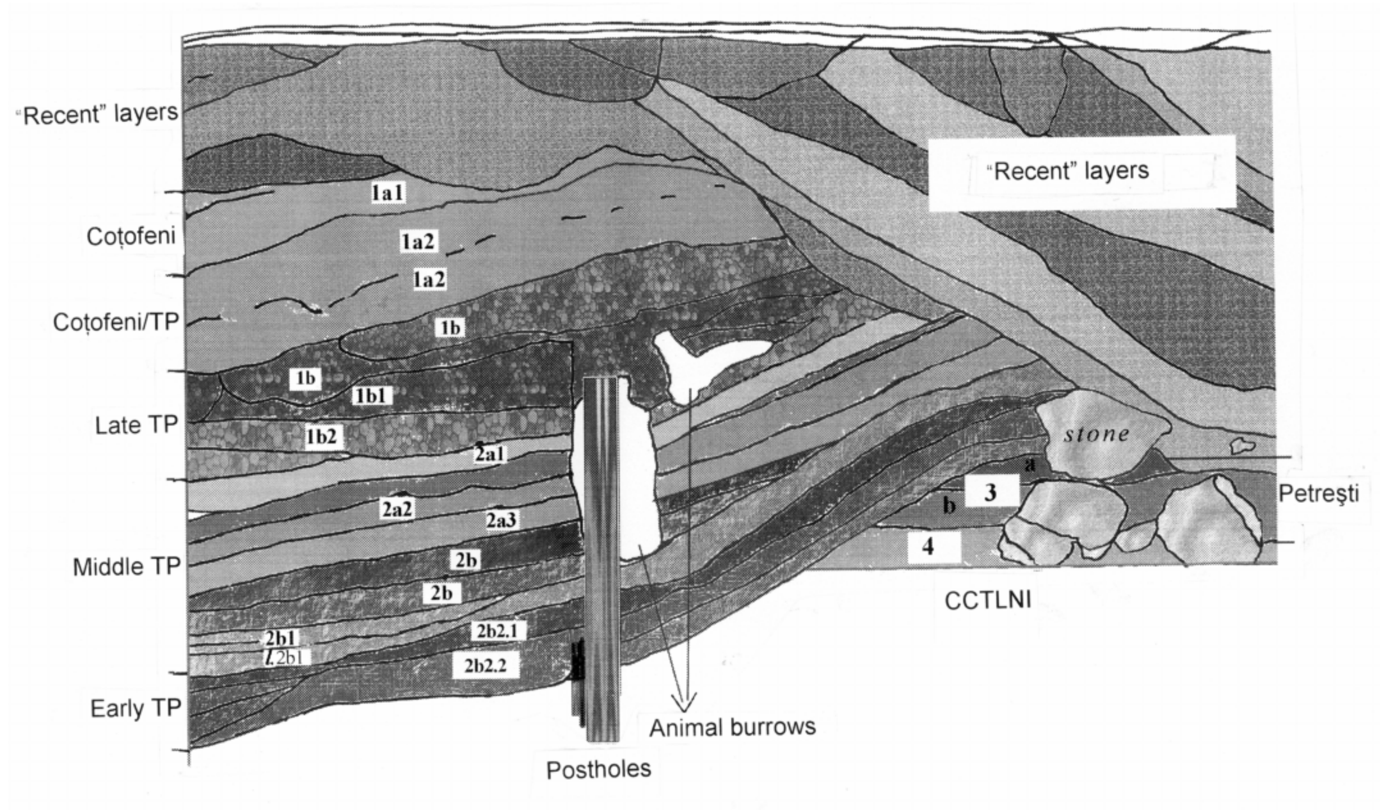

Fig. 3: Peştera Ungurească: schematic representation of the sequence excavated in 2003-2004 (*drawing by G. Lazarovici with variations*)

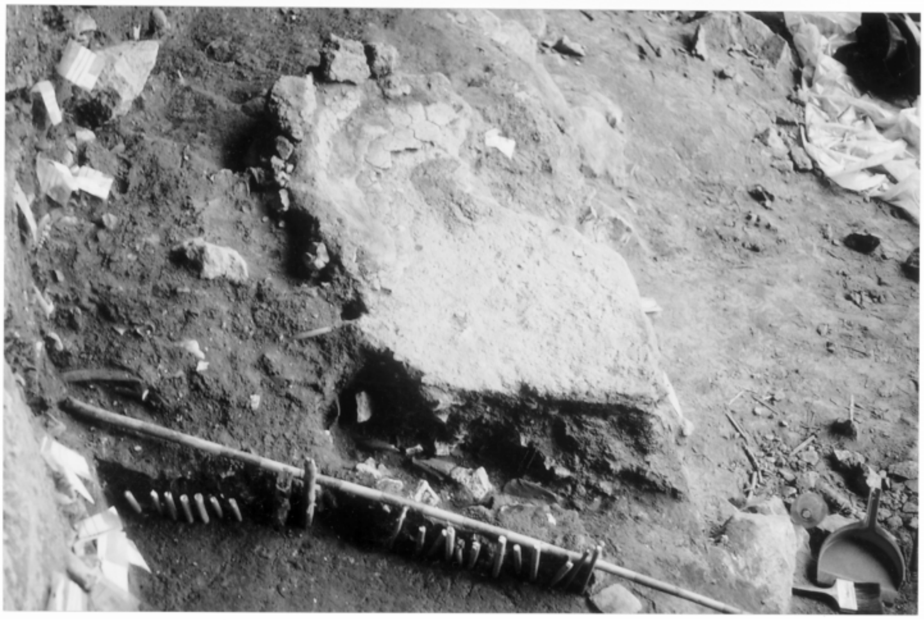

Fig. 4: Peştera Ungurească: view of the Toarte Pastilata sequence excavated in 2004 with the clay kiln – right – and the ash and charcoal lower levels delimited by small „postholes” (top) and the clay kiln (bottom) (*photographs by P. Biagi*)

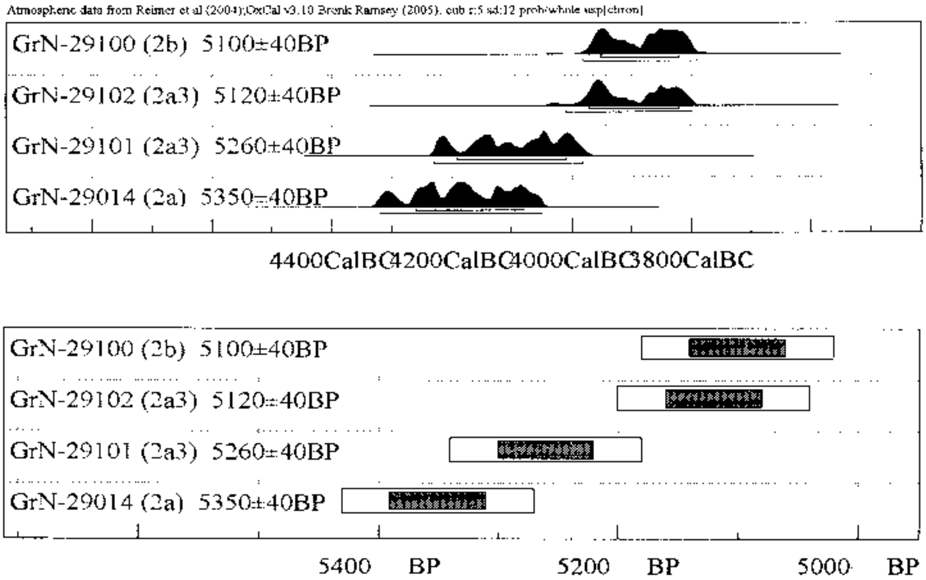

Fig. 5: Peştera Ungurească: radiocarbon dates obtained from the Toarte Pastilate levels (bottom) calibrated according OxCal 3.10 (top)

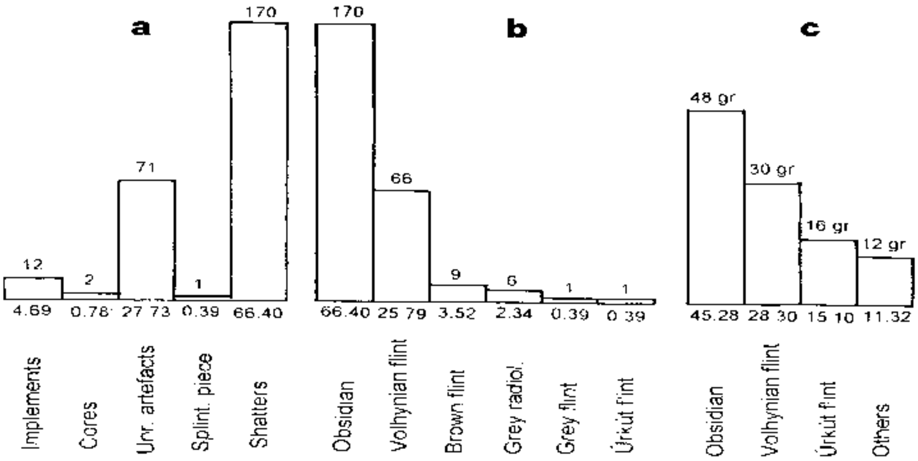

Fig. 6: Peştera Ungurească: block indexes of the Toarte Pastilate chipped stone assemblage: number and percentages of the differnt artefacts (a) and materials employed (b); weight and percentage of the materials employed (c) (*drawing by P. Biagi*)

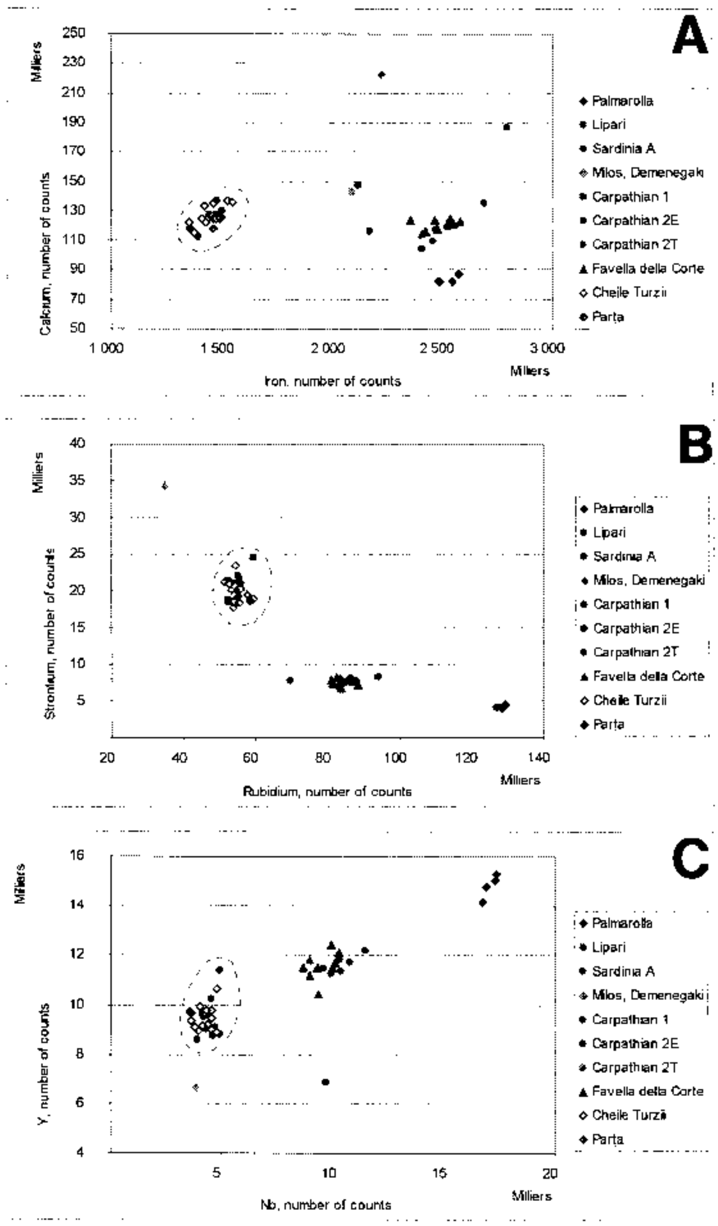

Fig. 7: Peştera Ungurească: diagram iron versus calcium (A), rubidium versus strontium (B) and niobium versus yttrium showing that all the Peştera Ungurească obsidian specimens analysed from Toulouse laboratory are of Carpathian 1 source (*B. Gratuze, pers. comm. 2006*)

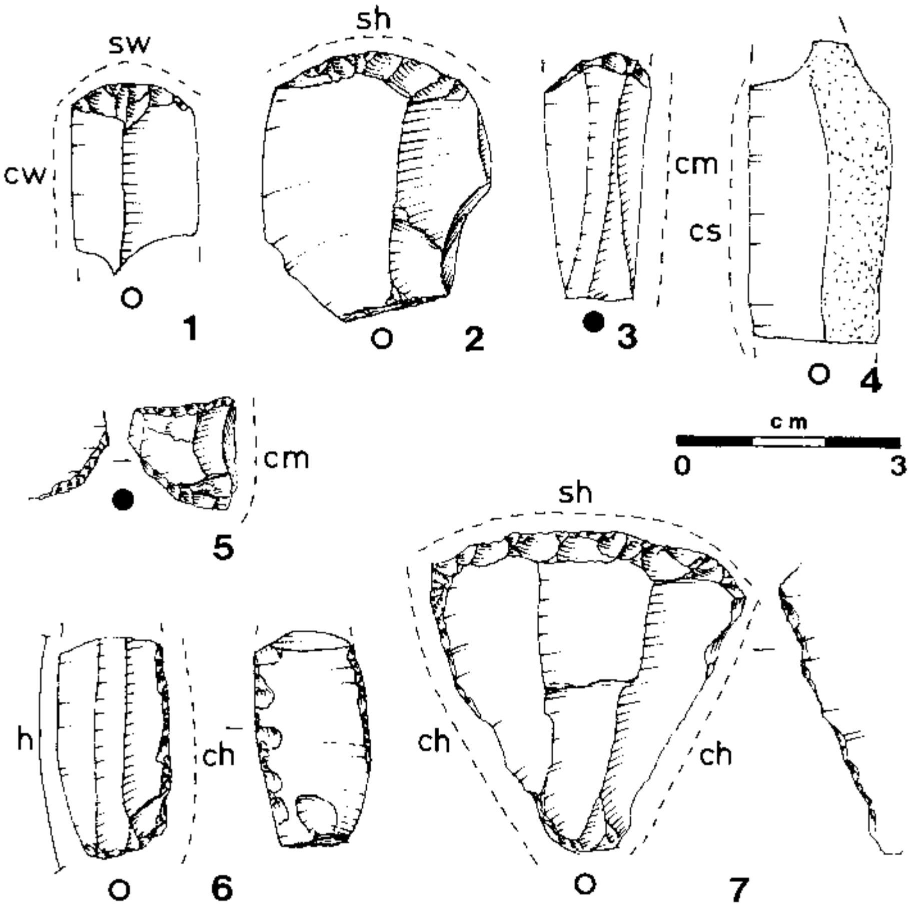

Fig. 8: Peştera Ungurească: chipped stone implements with traces of wear: End Scrapers (1, 2 and 7), Unretouched Blades (3 and 4), Rectangular Trapeze (5), Retouched Blade (6). 3 and 5 are of Carpathian 1 obsidian (dots), the remaining of Volhynian flint (circles). 1-5 from the Toarte Pastilate levels, 6 and 7 from the Petreşti layer. For the details of their provenance see table 2. The abbreviations are: cw = cut wood, ch = cut hard, cm = cut medium, cs = cut soft, sw = scrape wood, sh = scrape hard, h = haft (*drawings by P. Biagi and G. Almerigogna*)

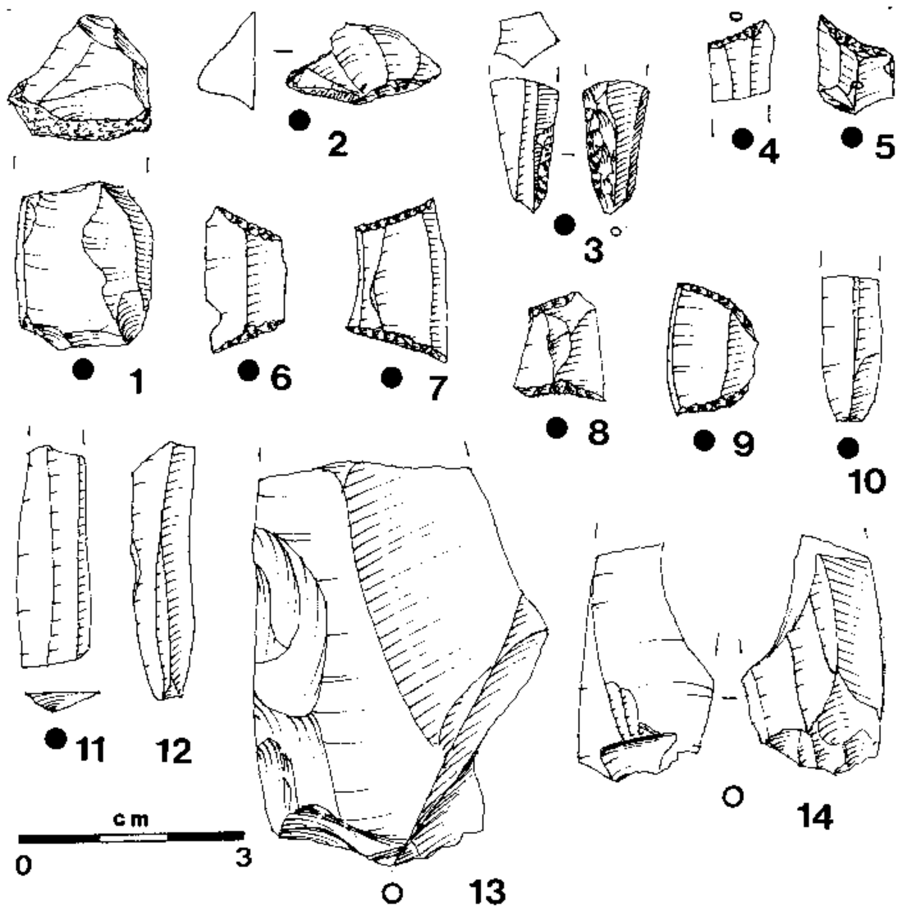

Fig. 9: Peştera Ungurească: chipped stone implements without traces of wear: Core (1), Core trimmimg flakelet (2), Borer (?) (3), Truncations (4 and 5), Isosceles Trapezes (6-9), unretouched bladelets (10-12), Unretouched flake (13), Splintered Piece (14). 1-10 are of Carpathian 1 obsidian (dots), 13 and 14 of Volhynian flint (circles), 12 of grey radiolarite. 2, 4-9, 10, 12 and 14 from the Toarte Pastilate levels, 11 and 13 from the Petreşti layer and 1 and 3 „uncertain". For the details of their provenance see table 2
(*drawings by P. Biagi and G. Almerigogna*)