EUROLITHOS European Ornamental Stone Resources

Eurolithos case study

Magura Calanului - Heritage assessment of historical quarry

Thematic focus:	**Value assessment of large quarry areas**
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GeoERA RAW MATERIALS

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Description of case study

« The stone hopes to be nothing but the stone.
But collaborating, he joins other stones and becomes a temple. »
Antoine de Saint Exupéry

The historical use of the dimensioned stone for constructions (walls of military enclosures, civil or religious buildings, access roads, places of worship) has often been determined by practical requirements (as good workability, durability, distance from the source area, the required quantity) and only secondary to aesthetic - ornamental ones. In such cases, the source-area of the stone associated with historical monuments defining even national identity, has itself heritage value, deserving the scientific recognition of its importance for the world culture and civilization.

The proposed case study refers to the ensemble of fortresses and fortifications from Sureanu-Orastie Mountains erected by the Dacians during the Ist century BC and destroyed by the Romans at the beginning of the 2nd century AD. The monumental structures of the Sarmizegetusa Regia, the capital of the Dacian Kingdom (226 anthropogenic terraces, inhabited probably by more than 5000 people) and other 5 fortresses overlap a schistous or a hard limestony geological substratum, non-suitable to be used as ashlar (dimension) stone.

At present, it is admitted that all these fortresses were almost exclusively built with limestone that originates from Măgura Călanului quarry (30-50 km away). However, while the above-mentioned fortresses have been inscribed on the World Heritage List 20 years ago, the Măgura Călanului historical quarry *has never been systematically studied, nor the geosite protected or valued*. It was only exploited during the building of the Dacian fortresses and it is well preserved, being probably one of the most spectacular ancient monuments of its kind outside the Greek-Roman world.

Keywords: geosite, limestone, heritage, historical site, UNESCO monuments

Methods applied

To analyse the potentiality of the geosite from Magura Calanului to be a representative case-study in WP5 task of Eurolithos project, there were applied the main recommended actions:

- data collection from open access sources and specific bibliography (scientific, technical, administrative, juridical) records and documents;
- in-situ evidences, researches and analyse of the present situation (including ”the absence” of records or data for preservation or valorization programs for this geosite;
- identifying of similar European or non-European case-studies which can be used as applicable best practice;
- administrative / legislative national procedures or regulations (geosite, cultural heritage, preservation in the proximity of historical sites, as balance for deforestation of some surfaces by the owners of land);
- identifying the potential local consortia, involving the local representatives from different area.

Case study results

Presentation

Măgura Călanului Hill, located north of Călan city, it is archeologically recorded until now through traces/settlements of the Early Bronze Age (Coțofeni culture, 3500-2500 BC, on the southern slope of the hill and on the territory of Sântămăria de Piatră village) and La Tène from the Iron Age (Dacian culture – the limestone quarry at the top of the hill and on the northern slope).

An extraordinary geosite with complex heritage value, the limestone quarry from Măgura Călanului, initiated with great probability during the reign of Burebista, functioned for several generations, until the Roman conquest, at the beginning of the 2nd century AD. Although the stone quarry from Măgura Călanului was probably known by the locals from ancient times, the first mentions of the ancient exploitation are from the beginning of the 19th century, in connection with the stone from the Dacian fortresses, having as context the discovery, by the authorities, of the ruins of Sarmizegetusa Regia, the capital of the Dacian Kingdom, and other nearby fortresses.

The first remarks will inevitably be related to the huge amount of shaped stone used in these fortresses. The stone itself proved, at the most superficial analysis, that it came from somewhere other than the area where the fortresses were built. The source from which the limestone from these fortresses was mined is correctly identified as early as 1805, and the first observations made by professional geologists will be made at the beginning of the XXth century

In the second half of the 21st century, field informative research made by archaeologists, sometimes accompanied by geologists, has been supplemented by mineralogical-petrographic analyzes who proved that the source of limestone blocks for the Dacian fortresses from the Orăștie Mountains is undoubted the area of carbonate deposits of Volchynian age from Măgura hill.

Although registered in the National Archaeological Repertory under the name of the Archaeological Site of Călan – Măgura Călanului (RAN 87433.03 code) with archaeological evidence belonging to the Coțofeni and Dacian cultures and although the ancient stone quarry is the best preserved in Romania and intrinsic correlated with monuments that are part of the UNESCO List, it has not been declared a historical monument so far and has not benefited from preservation or valorization.

In this context, geoconservation requirements have been identified and first step was conducted, officially asking the law enforcement authorities to take the necessary measures or this important geosite to be included in the list of Romanian historical monuments. Meantime, following independent geo-archaeological investigations, a more detailed geological research is carrying out in the Magura Calanului limestone quarry by Geological Institute of Romania.

History of the geosite and quarrying

The stone quarry from Măgura Călanului, initiated with great probability during the reign of Burebista, functioned for several generations, until the Roman conquest, at the beginning of the the 2nd century AD. The ruins of the fortresses from the Șureanu Mountains were known to the

locals for centuries, and the treasure hunters ravaged them from an early age. Only the discovery of large treasures near the fortress from Grădiștii Hill at the turn of the 18th and 19th centuries alerted the authorities and led to investigations in the area. There were official excavation campaigns followed in 1803-1804 at Grădiștea Muncelului, in order to find gold, action which attracted the attention of several scholars of the time. From this moment on, the news of the existence of strange ancient cities in the mountains will attract a number of scientists, which throughout the nineteenth century and until the First World War will climb on the difficult mountain paths to get to see with their own eyes and explore the ruins.

Mine Supervisor Bernhard Aigler, in charge of conducting the excavations organized by the Austrian tax authorities at Grădiștea Muncelului, writes in August 1803 in one of the first reports that the walls of the fortress there are made of stone blocks of sand with a large grain (Jakó, 1968, p. 440).

In 1805, in another tax report, Bögözi admires the skill of the stonemasons who made those stone blocks and the fact that they were provided with grooves for joining (photo), and notice that they are made of fine-grained limestone. It indicates as a source of the stone used at Grădiște the Totier area, located one day away, identifiable as the village of Totia north of the Măgura Călanului hill.

Téglás Gábor, who visited the Grădiștea in 1884, clearly states in his writings that the limestone blocks come from Sântămăria de Piatră and from this moment the identification of the area of origin is no longer questioned. At the beginning of the 20th century, Finály Gábor quoted the Hungarian geologist Antal Koch, which indicates as a source for the blocks from the Dacian fortresses Piatra Roșie and Grădiștea Muncelului the (oolithic an fossiliferous) limestones around the baths from Călan and Măgura Călanului.

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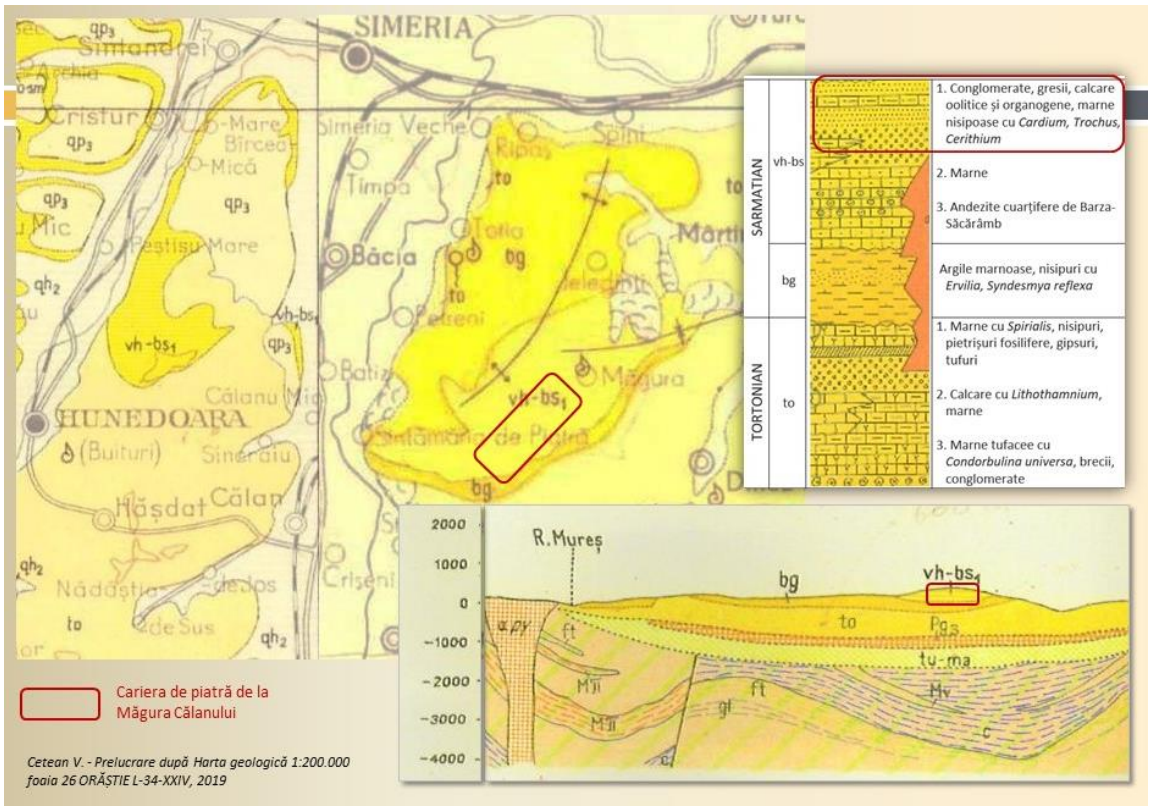
Mapping and field observations at Măgura Călanului hill were made also by the team of the independent projects PETRODAC and THE STONE QUARRIES OF THE DACIANS, throughout the period 2011-2018, followed by some laboratory analysis, presentations and informative papers (http://arheovest.com/simpozion/arheovest5/36.pdf).

From 2019, the geological research continues by Geological Institute of Romania, as work phase in RoQ-STONE project, with budget founds.

Geological and geomorphological framework

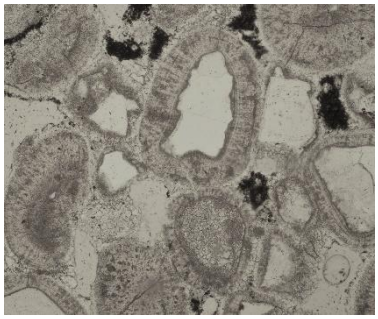
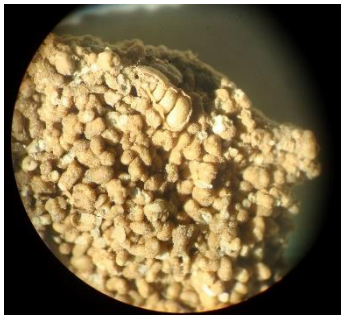
The area between the Mureș river corridor to the north, the Sebeș Mountains (Șureanu / Orăștie) to the east, Poiana Ruscă to the west and the Hațeg verge to the south is part of the Strei basin. This northern part of the Hațeg-Strei basin it was once a bay of the Transylvanian Basin.



Sarmatian deposits in the region can reach 500 meters and in Măgura hill, include: conglomerates, sandstones, oolitic, clastic and organogenic limestones, arenaceous marls and sandy sandstones. The geological layers were the main source of stone for the Dacian fortresses in the Șureanu Mountains are located in the upper part of the hill. There are represented by quasi-horizontal levels of oolitic, fossiliferous and clastic limestones, with many subdivisions/varieties. Their genesis is based on a turbulent environment in this edge of the Hațeg sedimentation basin.

Morphologically, the Măgura hill is part of the Piedmont unit situated to the south of the Orăștie corridor. It stands out as a relatively isolated ridge in the surrounding relief features, extended on a WSW-ESE direction. The highest elevation is on the Măgura peak, with it's 592.7 m above sea level, compared to the elevation of 220-223 m of the river Strei, which limits the hill to the west.

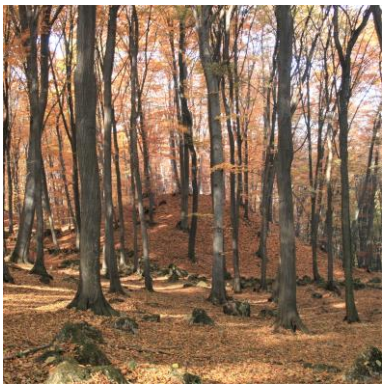
Towards south, the slope of the hill is very steep, being almost completely without any tall vegetation (Photo). In the upper part of this exposed slope are recognized trenches marks showing the exposure of the rock within the underlayers and the edges of the layers, declining very slightly to the north. From the central edge to the north, the slope is completely covered with deciduous trees. Numerous glens are slicing the hill into compartments, easily observable from the air or from the northern access direction. The western and southern valleys are tributary directly to the Strei river, and those in the northwestern part are tributary to the Mureș river, through the Turdaș and Sicheș valleys.

DEPR. BRAD
Brad
Zlatna
DEPR. ZLATNA
ALBA IULIA
Teiuș
Geoagiu
Sebeș
Cugir
Mărgura Călanului
Simeria
Călan
DEVA
Orăștie
Miercurea Sibiului
Săliște
Hațeg
M-ȚII ȘUREANU
M-ȚII CINDREL
M-ȚII METALIFERI
M-ȚII POIANA RUSCĂI
HUNEDOARA
Petroșani
Lupeni
Uricani
Vulcan
Vf. Parângu
M-ȚII PARÂNG
M-ȚII RETEZAT
M-ȚII TARCULUI
GODEANU
Vf. Gugu
Vf. Tarcu
Vf. Grohot
Vf. Fericeli
Vf. Drocea
Vf. Cindrel
Vf. Șteflești
Vf. Ursu
Vf. Straja
Vf. Pelegea
Vf. Mic
Vf. Padeșu
Vf. Ruscă
Ojelu Roșu
Vf. Iul Pătru
Petrila
Lonea
Câmpul Mare

Extraction and processing traces

Even if the Dacians knew the exploitation of the stone even before the appearance of the power center in the Orăștiei-Suranu Mountains, the opening and organization of the quarry on Măgura Călanului was most likely done with the help of some Greek specialists, who already had experience in organizing and implementing such a site. The technique of building fortresses is of certain Hellenistic inspiration, and the use of Greek signs on stones argues in the same direction. Over time, the Dacians learned from these craftsmen and the craft took off.
The quarry includes two semi-circular exploitation areas, totalling up to 800 m in length parallel to the edge of the hill and 400 m wide. The difference from previous exploitations was the size and complexity of this quarry, as well as the type of final product: shaped (dimension) stone. It is the first time when the Dacians use huge amounts of finished stone blocks. Chisels were used for fragmentation into smaller pieces.



The same exploitation techniques were used as in the whole Greco-Roman world. The block clearing technique shows training and experience from a specialized staff. The limestone levels were monitored, exploiting the natural cracks, and the linear detachment of the blocks was done with the help of spikes and feathers.
The physical evidences from geosite include:

- traces from extraction stage: chisel traces, holes for detaching blocks, surface straightening directly on strata;
- evidences of primary processing in the quarry area: stone blocks close to the extraction points or along the shortest way to the intermediary storage, stone blocks partially shaped/dimensioned (at least two sides), numerous dumps with stone fragments resulting from primary processing;

- traces of intermediary movement of the blocks by rolling on the steep slope of the hill;
- dumps with stone fragments resulting from secondary processing, before transportation to the fortresses from mountains.

In the north-eastern part of the hill there are several large artificial terraces, where it is possible that the stonemason's neighborhood worked. It is assumed that they lived very close to the quarry, did not travel daily from long distances. There are several sources in the area that support this hypothesis.
Archaeological research has revealed stone tools (hammers, axes and chisels), extremely durable and well sharpened to withstand blunting. In fact, this type of stone mining was conditioned by the stage of development of iron metallurgy, because it requires appropriate tools, with high hardness. These tools were needed both in the quarry and in the stonemasons' workshops or at the installation site. Even if they were not found even in the quarry, it is certain that they were used for stone detachment and processing operations, so the ones used at Măgura Călanului must have been very similar.

Heritage - History of use

The Măgura Călanului limestone quarry is the most important preserved ancient quarry on the Romanian territory. But while the mentioned fortresses are today part of the UNESCO World Heritage, the quarry have never been systematically studied, protected or valued.

The fortresses for which the use of limestone from Magura Calanului has been demonstrated in masonry, roads and sanctuaries are Sarmizegetusa Regia, Costești – Cetățuie, Costești-Blidaru, Piatra Roșe, Fețele Albe și Bănița.

The main categories of constructions for which the limestone from Măgura Călanului was used are: enclosure walls and terrace support walls; defense towers; civil constructions and public buildings; pavements, roads, alleys and stairs; baseboards, drums, pilasters and other temple components; drainage channels, cisterns and other municipal works; decorative pieces.

There is no information about the fate of the quarry after the conquest of Dacia and its transformation into a Roman province, but it can be assumed that the Romans also exploited it, perhaps on a smaller scale, for constructions in Aquae near the current Călan, developed around hot springs in that place. After the abandonment of the province, the urbanism rapidly declined and a millennium of "forgetfulness" followed, a period in which the whole area functioned in rural parameters, without important constructions or investments.

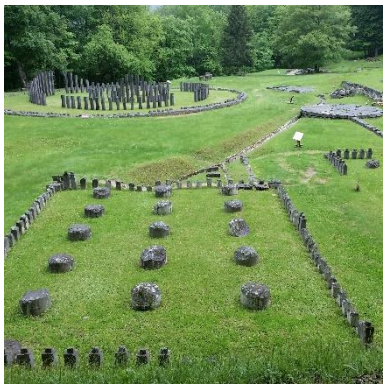
The quarry was covered with vegetation, over the old fronts of exploitation the forest grew, the mounds with remains resulting from the exploitation of the stone were covered with a layer of humus and vegetation and this important resource fell into oblivion. Certainly the quarry stone has been used by the locals in their households. Even today you can see fences built of stone brought from this quarry and some locals have practiced this craft since perhaps ancient times.

But for centuries, or even millennia, any records related to the stone extraction in Magura hill area, as no one knew that there was once the great "construction site" of the Dacian fortresses, the zero point of the huge project initiated by king Burebista in the mountains, no far away.

SARMIZEGETUSA REGIA

Sarmizegetusa Regia - the fascinating capital of the Dacian kingdom until the wars with the Roman Empire, built at over 1000 m altitude in the central area of the Șureanu Mountains, with neighbourhoods built on hundreds of anthropogenic terraces. In the part revealed after the excavation campaigns, we still can see the monumental stone structures used in masonry and the temples built by the Dacians in the 1st century BC and which functioned actively until their destruction by the Romans. The stone masonry were built from two varieties of rocks: pyroxene andesite brought from the Deva area and ooidal (fossiliferous) limestones from the Magura Călanului hill, probably the largest stone quarry outside the Roman Empire.

The mortar-free lifting technique proved to be extremely effective for the mountain relief, with double walls between which was placed *emplecton* (filling) made of fragments of stone and soil and reinforced by wooden tie rods, fixed in trapezoidal grooves (in the shape of a swallow's tail) carved in blocks. They also had huge surface arrangements, retaining walls or water supply system.



The volume of stone used is unknown, but certainly very large, given the number of dimensioned elements currently found in the exposed area of the site, on the adjacent steep slopes or valleys - many of them victims of unfortunate of reconstruction attempts or negligence in preserving this exceptional historical site, part of UNESCO heritage.

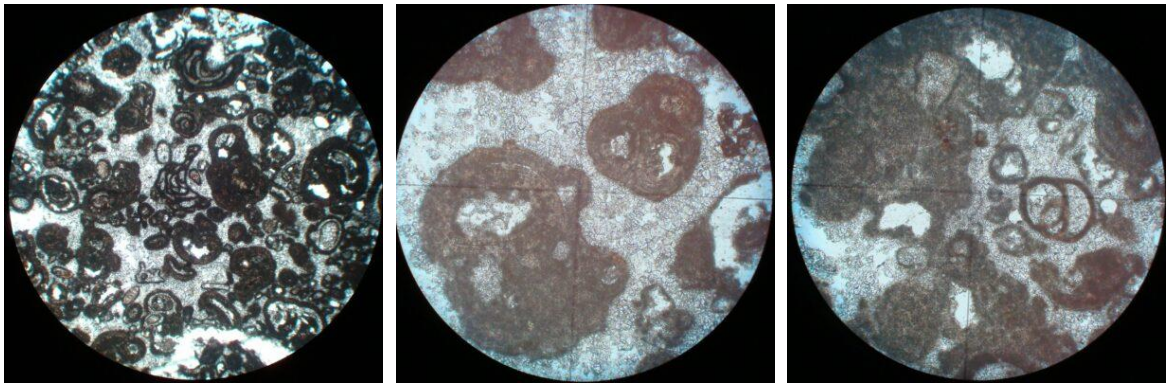
Only an extremely small part of the civilian and military settlement on Grădiștei Hill is currently being researched, partly with access for visits, although the site is still waiting to be (re) discovered and highlighted, to tell the story of the greatness of a kingdom from the border of historical eras.

FETELE ALBE

The Dacian settlement at Feţele Albe (White Faces) was investigated between 1965 and 1972, but the site had already been recorded in writings since the early 19th century. The settlement stretches on 20-30 anthropic terraces located on the middle of the coast of the, near a flat point at about 800 m from the confluence of the Valea Alba River (White Valley) with the Godean Valley.

Somehow appearing as the most "mysterious" fortress in the Șureanu Mountains, the Dacian fortress from Feţele Albe (White Faces) is also the closest to the capital of the Dacian Kingdom. As it is stated archaeologically (although the research is extremely far from being a well-argued reference in published works), this place it would have been one of the most elitist district of Sarmizegetusa Regia. A fabulous air is felt prior to the entrance of the fortress area and the steps are slowly led to the few areas with standing walls.

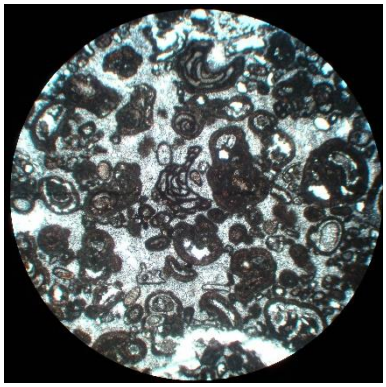
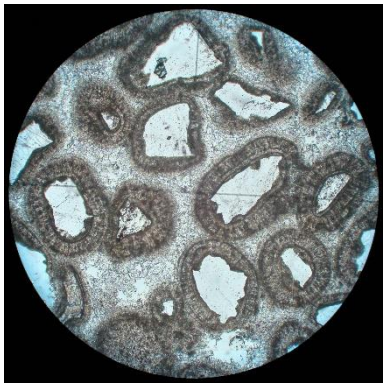
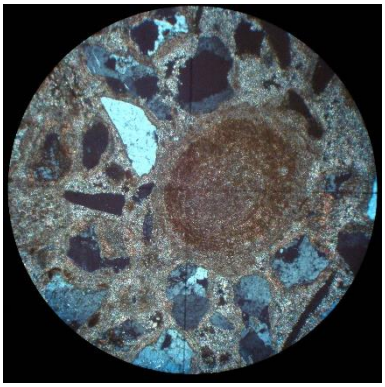
The white to slightly yellowish oolitic-fossiliferous stone of the blocks appears fresh in some parts of the walls, as if it had been intertwined recently by facing; in other places, the visual appearance has been heavily modified, by the formation on the surface of a protective crust, covering with moss or leaching of calcite or iron-containing material.



PIATRA ROȘIE

The Piatra Roșie Dacian fortified acropolis is part of the system of fortifications and settlements in the Orăștiei Mountains grouped around the Dacian capital Sarmizegetusa Regia. It is located on the territory of the Grădiștea Muncelului-Cioclovina Natural Park, on an isolated rocky massif, south-west of the royal fortress (http://arheovest.com/simpozion/arheovest5/36.pdf).
The Dacian fortress Piatra Roșie occupies an isolated peak, difficult to access. The fortifications are located on the upper plateau and on the eastern slope, and numerous artificial terraces, constituting the civil settlement around the fortress, have been arranged both on the hill, in places where the slope allowed (on the eastern and northern slopes) and in the valleys around of it.

Most of the limestone varieties identified at the masonry blocks on Piatra Roșie hill have been confirmed as coming from the historical quarry from Măgura Călanului, although there are still varieties highlighted here and not yet found in the geosite from Magura Calanului. However, research is underway for both perimeters.

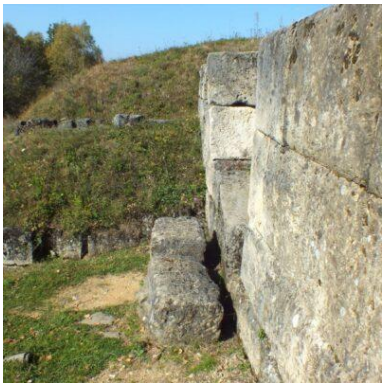




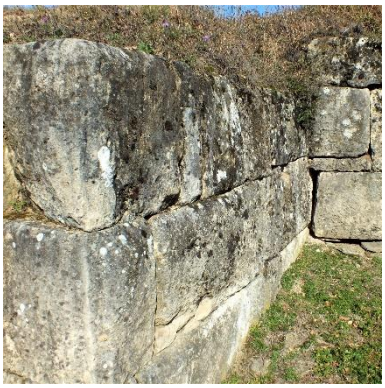
BLIDARU

The main access path climbs gently, but longer, through the deciduous forest. Whatever expectation the tourist has here, the meeting with the main entrance brings to mind cities from other parts of the world or maybe just stories with cities from which the hero's fight with the dragons left behind only the stone foundations of them.

The visual opening is impressive as a structure and strategic defense plan, and the effective size of the fortress (over 6000 sq.) places it on the first position in size. The six watchtowers guard two enclosures, and the trapezoidal shape visible in such a beautiful aerial way makes the opening at the top of this hill wide, beyond the horizon of the forests that currently border it.

Research and some conservation works are recorded in the archaeological evidences, but not in detail on the characterization of the dimension limestone blocks used in masonry, nor is a mineralogical-petrographic study known to detail the stone varieties found, either in or near the exposed areas of the site.





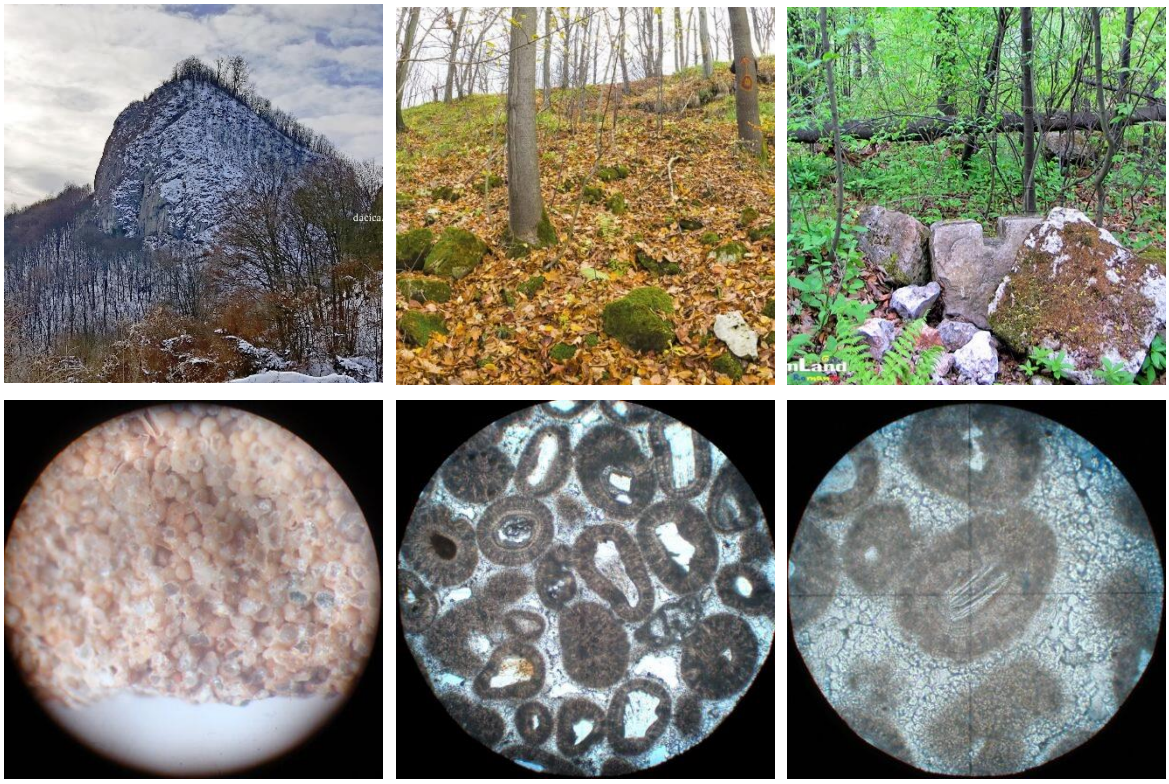
COSTEȘTI – CETĂȚUIE

With the easiest access from Valea Streiului - Orăștie is the Dacian fortress from Costești-Cetățuie. The road on the valley can hardly miss the intersection to the fortress area, but this was also true at the time of its construction, which facilitated not only the lightest supply of construction material (the stone blocks here are the largest of all the fortifications in the Șureanu Mountains), but also the expansion of the fortified area.

The blocks exposed to the sun, rain and snow have taken on grey hues, but under a small crust they reveal the same wonderful world of creatures that lived tens of millions of years ago, of the troubled sea shore that formed oolithes around grains of sand or empty shells. Or maybe just sand gathered on the shores of the former Sarmatian Sea in the Hațeg Basin, strengthened by millions of years of diagenesis and then shaped into blocks by people sitting on guard at the borders of empires. And so, the oolitic, fossiliferous or clastic limestones, found in the historical exploitation fronts from Măgura Călanului or maybe in other places also (still uncertified), have remained as evidence for the constructions of the *murrus dacicus* walls and the residential towers, in this site near Dacian capital Sarmizegetusa Regia.

BĂNIȚA

For an unsuspecting traveller, the exit from the Jiu gorge just north of Petroșani is only an opportunity to admire a still steep landscape, through which the road to Hațeg winds according to engineering rules. Here, the metamorphic formations of the Sebeș-Lotru Geological Series give way, tectonically, to the sedimentary formations of the Hațeg basin. They are transposed into a predominantly hilly morphology, with a plateau or alluvial plain character, but also through formations reminiscent of once impressive mountain ranges. The fortified acropolis from Bănița Hill is such place, known for the Dacian fortress built in its upper part and supported archaeologically by an inhabited area at the foot, unfortunately destroyed by all modern construction works.
Difficult to be reach due to the absence of paths, or, at least properly identified for a UNESCO objective, the area with traces of Dacian fortifications is marked by the presence of walls made of oolitic limestone blocks, fundamentally different in structure and petrographic variety from the limestone that constitutes the geological substrate of the hill.
As in the case of Piatra Roșie fortress, the limestone from the foundation of Bănița hill is not workable, with a reasonable effort, in dimensioned form, fact that determined the craftsmen of time to bring here blocks made of oolithic stone.
The two samples were mineralogically analyzed and typologically confirm the varieties found in the other Dacian fortresses around Sarmizegetusa Regia and in the Măgura Călanului hill, in the area of the historical quarry. However, this informative research needs to be detailed in terms of petrographic varieties at a later stage.



Case study conclusions

An approach to value assessment of the Magura Calanului historical quarry

Hypothesis

- Including of this cultural site in the list of historical monuments or other evidence which can ensure proper preservation and administration;
- Facilitating the starting of meta-disciplinary research for this global heritage stone resource.

Potential stakeholders

- local community + administrative bodies (2 Local councils);
- scientific – cultural responsible units (County Directorate for Culture, 2 Museums);
- 1 Foundation, 1 NGO;
- scientific community and tourists, being in the proximity of an UNESCO International Geopark (Dinosaurs Geopark Tara Hategului - 10-20 km away).

The Eurolithos participants could have a *major contribution* by:

- selection of significant example from their country and spreading their/this experience;
- contributing to the assisting in the developing of a "guideline" drawing regarding the preservation through enhancement of a historical-geological site, linked to national identity objectives.

Dissemination of information

Conference presentation: http://geosociety.ro/wp-content/uploads/2019/07/volum-abstracte_conf-Geoheritage.pdf, Cetean V. - Romanian heritage stone. What to be done for international designating and scientific recognition, 07-Dec-2018

Facebook: https://www.facebook.com/ROheritagestone starting on 03-Mar-2019

Conference presentation: https://meetingorganizer.copernicus.org/EGU2019/EGU2019-4351.pdf, Cetean V., Petan A. - Romanian heritage stone with international historical significance – the ooidal limestone from Măgura Călanului pre-Roman quarry, EGU General Assembly, Apr-2019

Interview to national magazine Formula As: https://www.formula-as.ro/2020/07/20/pietrarii-lui-burebista/ Pietrarii lui Burebista, cercetați de geologi (*Burebista's stonemasons, researched by geologists*) - VALENTINA CETEAN (Dr. eng. Geologist, head of the GeoResources division within the Geological Institute of Romania): "In the ancient limestone quarry from Măgura Călanului, history is coming to life again, after millennial petrifications" (Romanian version), 27-Jul-2020

Website: https://magura-calanului.ro/en/ starting on 15-Apr-2021

Zoom Presentation: 15-Apr-2021 - https://magura-calanului.ro/wp-content/uploads/2021/04/IGR-Invitatie-Prezentare_Magura-Calanului-EN.pdf

Media presentation movie of 2020 research: https://www.youtube.com/watch?v=13mxfVm-cC8 , posted on 20-Apr-2021

Webinar: 14-Jul-2021 - Cariera istorică de calcare de la Măgura Călanului (*Limestone historical quarry form Magura Calanului*| Conferințele DACICA 7/2021, https://www.youtube.com/watch?v=gu2zXa6J7Do

References

Cetean V, Pețan A. (2019) Romanian heritage stone with international historical significance - the ooidal limestone from Magura Calanului pre-Roman quarry. Geophysical Research Abstracts, Vol. 21, EGU2019-4351, EGU General Assembly 2019, https://meetingorganizer.copernicus.org/EGU2019/EGU2019-4351.pdf

Cetean V, Pețan A (2017) Petrographic investigations at the Dacian fortress Piatra Roșie. In: ArheoVest, No. V: In Honorem Doina Benea, Interdisciplinary in Archeology and History, Universitatea de Vest from Timișoara, JATEPress Kiadó, Szeged, ISBN 978-963-315-312-3 (Kötet/Vol. 2), pp 803-826

Glodariu, Ioan. The Civil and military Dacian Arhitecture (century II BC – sec. I AC.), Dacia publishing house, Cluj-Napoca, 1983.

Glodariu, Ioan. Quarries and Stone exploitations in the pre-Roman Dacia, In: Acta Musei Napocensis, XXII-XXIII, 1985-1986, p. 91-100.

Iaroslavschi, Eugen. Technique to Dacians, Cluj-Napoca, 1997.

Mârza I (1995) Les calcaires utilisés à la construction des citadelles daciques des Monts d'Orăştie et les carières antiques, În: Acta Musei Napocensis, 32, 1, 1995, pp. 199-207.

Pețan A. (2018) Sarmizegetusa Regia. 1. Redescoperirea cetății, Centrul de studii al Fundației Dacica, Editura Dacica, ISBN:978-606-8538-00-6 (general) 978-606-8538-01-3 (volum)

https://www.cclbsebes.ro/docs/Sebus_10_2018/04_APetan.pdf

https://ro.m.wikipedia.org/wiki/Fi%C8%99ier:Cetatea_Coste%C8%99ti-Blidaru.jpg