ROCKY LANDSCAPES

at the intersection of people and rocks

ORIENT-INSTITUT ISTANBUL

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ABSTRACTS

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SESSION 1: STATIGRAPHIC UNDERSTANDING OF THE LANDSCAPE THROUGH THE STUDY OF ROCK-CUT STRUCTURES AND STONES QUARRIES

Connecting Traditions: Assessing the Effects of Spatial Connectivity on Motif Diversity in Sardinian Domus de Janas *Rock-cut Tombs*

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Prehistoric Sardinia is known for its elaborate Late Neolithic and Chalcolithic (c. 4400-3400 BC) rock-cut chambered tombs, known locally as *domus de janas*. This name, meaning "houses of the fairies", is drawn from the fact that many are embellished with architectural and abstract art, creating the illusion of architecture in miniature. Of the c. 3600 tombs distributed across the island, around 490 feature carved or painted motifs, including representations of roofs, ornamented doorways and false doors, bucrania (bull's head/horns), and geometric designs. The *domus de janas* are therefore prime candidates for studies of typological similarity, the role of art in funerary architecture, and social identities.

However, decoration is very variable across the island, and is more common in regions with greater numbers of tombs and where there is greater potential for interaction, mobility, and interconnectivity. Moreover, other archaeological evidence suggests that the same regions were prominent in prehistoric networks (e.g. trade and exchange) – environments which would have promoted social heterogeneity and increased awareness of difference in this period. Arguably, communities may have expressed this through the tombs' variable decorative schemes.

To assess the effects of connectivity on motif diversity, this study applies a computational framework combining spatial and statistical approaches statistical, geospatial, and computational approaches to understand the funerary landscape of pre-Nuragic Sardinia. By comparing the similarity and diversity of motifs amongst tombs with geographical traits, the authors explore to what extent connectivity influenced the embellishment of tombs, and in particular, if higher connectivity values positively correlate with greater diversity in motif schemes. They also reflect on the cultural reasons behind patterns, and the implications for our understandings of monuments and landscapes in this period.

Chamant : an Iron Age Rotary Quern Quarry in Central Paris Basin

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An exceptionally well-preserved Gallic rotary quern quarry was uncovered in the centre of the Paris basin, 45 km north of Paris. A large rescue archaeology excavation took place in 2023 at Chamant (Oise, France) over more than 2,5 acres. This new site provides a rare opportunity to study the organisation of the rotary quern's artisanship, industry that is still little-known for the Iron Age period. Particular attention is paid to the techniques used to extract the blocks of a distinctive facies from the base of the Upper Lutetian ceriths limestone (Eocene), used for the rotary querns. Uncovering the extraction floors on large areas allows the study of the network of diaclases and stratification joints in the bedding planes, as well as the detailed observation of tool marks. The aim is also to describe the production chain, from extraction to the most achieved stage, based on some 600 blanks and failed specimens.

The excavation reveals extraction techniques such as quarry progress strategies, blocks management and backfilling methods. The quarrying process is known as "block quarrying". 607 lifting holes have been documented within the excavation field. Artisans appear to have taken advantage of the rock's natural fractures and joints. The limestone bedding planes allowed extraction sequences organised according to the succession of strata, progressing at different levels. The thickness of some beds seems to be especially well-fitted with the standard modules: the top and bottom of the blanks show natural stratification surfaces. The fine digging of the extraction floors revealed sub-circular piles of cutting chips and white rammed dust indicating working areas within the quarry and waste management.

The excavation of the site of Chamant provides rare evidence of the exploitation of a specific limestone bed, a Lutetian fossiliferous facies, by Iron age artisans.

Cimmerians, Sibyls, Soldiers, and Stonecutters. The Porosity of the Tuffaceous Landscape Between Cumae and Naples

Dan **Diffendale** - Scuola Superiore Meridionale (Italy)

The northern coast of the Bay of Naples is modeled in no small part by Neapolitan Yellow Tuff (NYT), the product of a 15 ka eruption of the Campi Flegrei. The porosity of this rock contributes to the degree of porosity of the landscape it largely composes, crisscrossed by quarries and galleries; this in turn contributes to a certain "porosity"

of architecture, people, and culture, as observed by Walter Benjamin in his essay on Naples. NYT is also a very temporal rock, in the sense that it can be created rapidly by an eruption, or eroded within a human lifespan.

This contribution focuses on the acropolis of ancient Cumae, just west of Naples, which over the course of the last 2700 years, if not longer, has been subject to human intervention in the bedrock to make space for living, dying, attacking, defending, worshipping, traveling, storing, and extracting of stone. The frequency and scope of these interventions is certainly due to the particular affordances of the NYT that composes the southeastern half of the acropolis; the other half, a lava dome overlain by less coherent pyroclastic materials, betrays far less evidence of human-rock interaction.

A digital photogrammetric study of toolmarks in galleries cut into the acropolis of Cumae brings to the fore the chronological superposition of interventions of various epochs, which can then be projected across the surrounding landscape where numerous other galleries and quarries are known. Cumae serves as a case study for reading the other cities that demarcate the NYT deposit such as Pozzuoli and Naples, whose uninterrupted urban continuity makes interpreting evidence of ancient excavation and extraction challenging, but which serve in turn to keep Cumae situated in the contemporary present.

Rock-Cut Funerary Architecture in South Etruria. An Overview of The Etruscan Society During the Hellenistic Period

Vincent **Jolivet** - UMR 8546 AOrOc (France)

In Etruria, funerary rock-cut architecture developed mainly in the Viterbo region, a tufa landscape shaped by the eruptions of the volcanoes of the Volsinii complex, during two distinct historical periods, the Archaic and Hellenistic ones, separated by a hiatus of nearly two centuries. The region was then part of the territory of Tarquinia. While during the Archaic period, tombs were limited to imitating the exterior of a house, during the Hellenistic period, the facades of the most complex monuments were inspired by various models: an aristocratic domus (tomba grande at Castel d'Asso), a temple (tomba doriche at Norchia), a Macedonian palace (tomba Lattanzi at Norchia) and a royal tomb (tomba Torlonia at Cerveteri). Because of their considerable complexity and size, often far greater than that of the monuments in Asia Minor to which they are often compared, some of them clearly required the intervention of architects and specialised workers. Given the visibility of these monuments in the contemporary landscape, the choice of one of these different models is deeply revealing of the values and ideals, more or less traditional, that each family intended to confer on its tomb, cut in the rock in front of the city. In this respect, the recontextualisation of these monuments, which are often studied separately, within the necropolis to which they belong, allows a direct approach to the different classes of the Etruscan society, and highlights the power of its elites. At

the same time, they also provide a better understanding of the beliefs and funerary rites that took place there, centered, for the most important families, on the practice of the funerary banquet. Where known, the items found in the hypogeums also document the strict division of genres practised in Etruria during the early Hellenistic period.

Rock-cut Graves and Funerary Monuments in Roman Edessa: a Funerary Relief Group from Şanliurfa (South-Eastern Turkey)

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Ergün **Lafli** - Dokuz Eylül Üniversitesi (Türkiye)

In this brief paper we focus on stratigraphic understanding of rocky landscape of Roman Edessa through examining suburban necropolis sites of this large city. We also concentrate on a single funerary monument, parts of which are today being exhibited in the Archaeological Museum of Şanlıurfa. This is a group of ca. 20 limestone bas-reliefs which are figuring Eros and other chtonic deities and it is already known through the book of Judah B. Segal, entitled "Roman Edessa: the blessed city" in the 1970 who dated them roughly to the "Roman period".

Since 2010 the Municipality of Şanlıurfa drives a project at the necropolis of Kızılkoyun in Tılfındır and Haleplibahçe where 389 buildings were collapsed in order to check archaeological remains in the area. Some unknown and so far non-excavated 64 rock-cut graves as well as bones were found in this area's cleaning. Some inscriptions were reported in Anatolia Antiqua. Two statues and a limestone sarchophagus are the most important in situ finds. These baseless statues are found in the left and right side of the grave's entrance. They are 1,85 m, thus bigger than life size and they reflect character of Late Roman soldiers as they are armed and have an eastern clothes. Both of them were made of local limestone and stylistically they belong to the same local workshop. Both of them along with the sarcophagus were transported to the Museum of Şanlıurfa. In one of the rock-cut grave with three klinai a 6 m² mosaic floor was found that has geometric patterns and good quality.

The human activity of digging rock outcrops produced different features in the landscape of Roman Edessa which also enabled to produce some sculptural material. So far nobody, however has given any attempt to reconstruct these monuments and relate them to the rock-cut tombs of Roman Edessa. As such tombs are many in number in Edessa and were also used as stone quarries, especially in the area of Yakubiye, this paper will overlook all these recent finds from Şanlıurfa and their structures and functions in a preliminary manner. We also will present this funerary group and attempt to relate this group to the new finds.

Quarries, Settlements and Infrastructures in Valpolicella in the Roman Age. Integrated Approaches to Reconstruct the Exploitation and Management of Stone Resources

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Valpolicella is a hilly area located north-west of the city of Verona (Italy), on the left bank of the river Adige. In this region there are outcrops of excellent quality limestones which have been extracted and used by man from the protohistoric age until today, with no solution of continuity.

In Roman times, these stone materials were mainly used in Valpolicella and the nearby city of Verona, but were also traded on a regional and extra-regional scale. Despite this intense exploitation, the identification of Roman quarrying sites in Valpolicella is problematic, as the continuity of the extraction activity over the centuries has resulted in a palimpsest of quarries, most of which cannot be dated.

In an attempt to identify Valpolicella quarries exploited in Roman times, integrated research approaches were applied. First, a census of the known extraction sites was carried out, flanked by the study of the few documents available about the historical exploitation of Valpolicella limestones.

Subsequently, surveys were conducted in the region to verify the literary data and to correctly geolocate the quarries. In this occasion detailed surveys of the sites and of the traces of quarrying activity preserved within them were carried out. In addition, from each quarry stone samples were taken and compared with stone samples collected from the Roman buildings of Verona, as part of a broader research project on the use of stone in the Roman cities of Veneto region.

At the same time, archaeological findings in Valpolicella (settlements, buildings, infrastructures, necropolis, sporadic artefacts) were mapped in order to reconstruct how the territory was inhabited and structured in Roman times.

Finally, the data obtained were incorporated into a GIS, which was used to analyse the relationship between quarries, settlements and infrastructures. In this way, it was possible to get new information on the exploitation and management of Valpolicella's stone resources in Roman times, which will be the topic of this presentation.

In the Rocky Landscape of Death: Colossae Necropolis

Barış **Yener** - Pamukkale Üniversitesi (Türkiye)

Colossae stands as an extraordinary archaeological site - a remarkably preserved, and largely unexplored ancient city nestled in inner western Turkey, adjacent to several significant archaeological sites. Positioned at the crossroads of vital communication routes, particularly along the Meander, Colossae has played a pivotal role in significant cultural exchanges throughout history. Enduring the dominion of various powers, including Lydian, Persian, Hellenistic, Roman, and Byzantine, its rich historical tapestry unfolds. Recent archaeological survey unveiled the expansive Kolossai Necropolis, stretching across the travertine rocky areas north and northeast of the Acropolis, and the Aksu Valley to the northwest. Remarkably, the entire necropolis is situated on travertine rocky terrain, the region's foundational building stone. The typological analysis of Colossae's tombs provides a lens to understand the influence of political and potentially cultural shifts. It introduces a topographical factor into this typology, where in the choice of tomb location at the local level informs us about the social dynamics accompanying the construction of funerary structures and the desired level of ostentation by the designers. The status of the tomb and its integration into an important necropolis contribute to a nuanced representation of the tomb owner's significance within the community. The unique aspect of the Necropolis area being confined to travertine rocky grounds, housing various tomb types like chamber tombs, khamosoria, tumuli, rock-cut tombs etc. reflects the dissolution of both the chronological and socio-economic structure of Colossae in the context of its relationship with the rock. This study aims to delve into the travertine, the primary building stone of the region's ancient structures, and unravel the intricate interaction between the necropolis and the city, shedding light on the profound relationship between Colossae and its rocky landscape.

Technai *and* Metakinesis*: Latomie Craft Activities and Mobility Indicators. Case Studies from Italy and Greece*

Dimitris **Roubis** - ISPC-CNR; DICEM-UNIBAS (Italy)

The discovery of quarry areas along the watercourses that characterise the Bradano river valley in the hinterland of Metaponto (Basilicata, Southern Italy) as well as the discovery of quarrying activities located along the Acheron river (Epirus, Greece), serve as case studies to address issues related to the processes of quarry exploitation and the supply of stone elements in sites facing the Ionian Sea between the Late Classical and Hellenistic period. The contribution addresses the nodal role of riverine landscapes and systems of interconnecting routes between quarry places of supplying structural stone elements and final destination settlements.

The Re-Use of Matera's Rupestrian Churches and Rock-Cut Settlements as Quarries for Building Materials

Francesca **Sogliani** - Università degli Studi della Basilicata (Italy)

One of the most critical issues in assigning dates and chronologies to post-antique rock-cut complexes, be they places of worship, monastic settlements, residential or productive environments, consists in the practices of re-use and re-functionalisation that have affected most, if not almost all, of these peculiar forms of human habitation.

This is particularly relevant in contexts in which, as in the case of Matera and the ravine in front of it, written documentation is completely absent for the early medieval and medieval phases, appearing only from the post-medieval period onwards, and the characteristics of the rock in place have encouraged the numerous transformations and frequent reuse of excavated environments, leading to changes in volumes and functions according to epochs and needs. One of the most evident effects of these practices is the use of the floors and walls of the rupestrian complexes as quarries for the extraction of calcarenite blocks, functional for the procurement of building materials, a phenomenon that is particularly accentuated in conjunction with the expansion of religious and civil construction in the urban centre proper in the late medieval period, starting in the 13th century, and that will continue in the following centuries.

Even before the further transformations that affected the original layout of these settlements, with the opening of passageways between one room and another, the excavation of cisterns or silos for storing foodstuffs, the extension of places of worship and monastic spaces, the setting up of productive activities such as apiaries or dovecotes, the use of rock banks as quarries has particularly altered the volumetric perception of rupestrian churches, obviously cancelling their function and sometimes considerably increasing their height. An attempt will therefore be made to document the phenomenon through “negative” stratigraphic analysis, to investigate the times and methods of these practices and to assess their impact on the economic and productive dimension of post-antique societies in the context considered.

SESSION 2: STONE ECOLOGY AND MULTI-SPECIES INTERACTIONS IN CARVED LANDSCAPES

Negotiating Spaces, Memories, and Identities in the Egyptian Eastern Desert

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The desert to the east of the Nile Valley has had a long use-life since Prehistory, which have resulted in a multi-layered network whose nodes consist of mines and quarries together with their processing sites, connecting roads and waystations, rock shelters carved with petroglyphs,

inscriptions and graffiti. All these nodes are the embodiment of individual and collective perceptions and understandings of the desert environment through time.

The study of the rocky landscape of the Egyptian Eastern Desert cannot disregard the recognition of the temporal dimension of landscape as theorised by the anthropologist Tim Ingold: "for both the archaeologist and the native dweller, the landscape tells - or rather is - a story. It enfolds the lives and times of predecessors who, over the generations, have moved around in it and played their part in its formation".

Similarly, research on the ancient Egyptian desertscape must detach itself from a merely positivist approach, in which the landscape is understood as a material object. The use, re-use, and abuse of the Egyptian Eastern Desert by various peoples over time expresses not only the control over mineral resources but also a search for continuity, the attempt to elaborate one or several group identities. In this sense, the appropriation (and apprehension) of landscape coincides with an active process of socialisation.

This paper will focus on the long-term processes of place-making in some selected Eastern Desert quarrying and mining sites (e.g. Wadi Hammamat and Wadi el-Hudi), understood as the social practices of defining and locating places, constructing shared meanings and cultural memories, mechanisms in which the negotiation between places and people comes into play.

Different Times, Different Purposes: the Artificial Cavities of the Perpétairi (Drôme, France)

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Jules **Kemper** - UMR 5204 EDYTEM (France)

Laurine **Viel** - Cité de la Préhistoire grand site de France, UMR 7269 LAMPEA (France)

The Perpétairi site (Mollans-sur-Ouvèze, Drôme), in the south of France, is known for its late Neolithic funerary hypogeum. It belongs to the group of hypogea found on the administrative border of the Drôme and Vaucluse departments. These hypogea are isolated and do not appear in necropolises. In the 1960s at the Perpétairi, 21 other artificial spaces and 3 rock shelters were discovered, which were also described as hypogea. These cavities are carved out of two hillocks, Perpétairi and Vouronnade, composed of Helvetian molasse (Miocene sedimentary rock). This rock is easy to carve out and is known locally as safre. As part of a new research project on this site, a thematic survey was carried out in 2023 to verify the location and datation of these structures. The data from this survey, combined with cartographic, geomorphological, and technical analysis, has enabled us to distinguish different periods during which the cavities were carved out. In fact, since the end of Prehistory, the two hills have undergone a vast range of agricultural alterations, with the construction of various terraces. By looking at these developments and their relationship with the artificial caves, it is possible to trace the evolution of the landscape of these hills as well as the possible functions of these different underground spaces.

Limestone Quarrying at Sagalassos (SW-Anatolia), Usual Extraction Trench-based Technology, Lever-based Extraction from Naturally Rock Fractures, or Both?

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Quarrying activities at Sagalassos were located in and immediately around the built city center, in the *necropolei*, although a few more quarries were identified at some 5 km distance. Technological quarry surveys performed in 2021 and 2022 allowed to identify 66 extraction points, of which 61% delivered a few blocks only, and 23% were specifically opened for carving of sarcophagi or *chamosoria*. Nevertheless, 18 on a total of 28 sampled buildings (64%) of the city center had their stones extracted locally, as shown by archaeometry. About three quarters of the quarry sites (grouping several extraction points) showed a stepwise extraction and 81% made use of narrow vertical extraction trenches, while in 44% of the cases the use of a lever for breaking stone

blocks from naturally fractured rock formations, likely seemed to have been common practice. This last hypothesis was encouraged by the observation of a high degree of natural fracturing of the limestone rock formations, such as in the *necropolei* and in the mountainous area north-west of the city, where also four regular quarries with stepwise extraction and extraction trenches were identified. That economical advantage was effectively gained from working in heavily fractured rock formations was demonstrated through the analysis of a quarry for the production of sarcophagi in the southern necropolis. Apart from the four regular quarries in the mountainous area, traces of a wide sloping extraction trench at a height no longer accessible today, shows that much more limestone was extracted from that area than just the blocks leaving traces in regular quarries. The survey and reconstruction of a possible transport route between this area and the city center and the finding of several enormous unfinished architectural elements abandoned along this road also suggest much more lever-quarrying activities than the few regular quarries identified.

Ancient Quarries and Rock Structures in Limestone Formations in the Upper Tigris Basin and Tur-Abdin: Structural and Distributional Characteristics

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This study explores an expansive plateau between the Tigris River's northern and southern banks, spanning from the outer edges of the Eastern Taurus Mountains to the Turkey-Syria border. The region's geomorphological features depict a gradual descent from north to south, characterized by diverse domed mountains and plateaus that defy simplicity, ultimately converging with the Mesopotamian plains to the south.

Within this geographical context, sedimentary formations, particularly limestone marked by Jurassic-type folds, indicate a historical backdrop of primarily marine and intermittently lacustrine conditions during the Tertiary and Early Eocene periods, enriching the region's geological narrative.

The focus then shifts to the Southeastern Anatolia Karst Region, where karstic landscapes in carbonate rocks manifest as horizontal or nearly horizontal monoclinal structures. Karst topographies take shape in rocks that readily dissolve, including limestone, gypsum, dolomite, and rock salt. The optimal formation sites for karst topographies are the crevices and cracks within limestone. Along the Upper Tigris Basin and Tur-Abdin (Mardin- Midyat Threshold), karstic formations intricately integrate into the fabric of crevices, cracks, and fault systems, offering valuable insights into the geological complexities of the area.

The narrative further unfolds to elucidate ancient rock structures stratigraphic and distributional intricacies within limestone formations. These structures, encompassing quarries, castles, rock tombs, cellars, workshops, and rock dwellings, reflect the material

culture that has been pivotal in shaping the region's landscapes. Limestone, a crucial geological resource, emerges as a significant contributor to archaeology and geology, shedding light on the dynamic interplay between human societies and the geological wealth of the terrain.

Quarries in Cappadocia

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Quarries are an important factor determining both the landscape diversity of the territory and the development of underground spaces. Cappadocia, a historical region located in central Anatolia 250 km southeast of Ankara, is no exception in this regard.

Traces of the extraction of stone blocks from rock architectural monuments in Cappadocia are recorded in the works of R. Osterhout, R. Bixio, V. Kalas, Y. Dolotov. The archaic technology of extracting stone blocks in underground tunnels using wedges, which has survived to this day, is described in detail in the work of F. Ozturk.

This paper analyzes in detail traces of the extraction of stone blocks during the development of underground spaces using the example of cave complexes for various purposes in Cappadocia. Our observations allow us to assert that the technology described by Ozturk is used, as a rule, in the creation of dovecotes, storage facilities, post-Byzantine estates, underground quarries, and some of the water tunnels.

At the same time, traces of the extraction of stone blocks are recorded in underground and rock shelters, sometimes called “underground cities,” as an exception, and only in that part of these objects that belong to the last period of their existence. Several such cases are analyzed in detail. We also do not observe traces of tools typical for extracting stone blocks in unfinished parts of churches.

The observations made by the authors suggest that technologies for the development of underground spaces with the separation of stone blocks appear everywhere in Cappadocia in a relatively late period. According to the authors, this is due to changes in construction technologies and the peculiarities of using tuff stone blocks in construction.

Exploitation of the Volcanic Rocks from the Euganean Magmatic District in the Roman Towns of the Veneto Region (Northern Italy). A Stippled Quarry Landscape

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Jacopo **Bonetto** - Università degli Studi di Padova (Italy)
Chiara **Girotto** - Università degli Studi di Padova (Italy)
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In recent years, the interest in stone exploitation and quarrying has grown in archaeological studies. Current research employs multidisciplinary approaches, combining spatial mapping and detailed surveys of extraction traces with petro mineralogical and geochemical analyses of stone types, to outline a complete reconstruction of quarry sites and material behavior of the carved lithotypes used for the manufacturing of artifacts or for constructive purposes.

In the wake of a research project promoted by the Department of Cultural Heritage and the Department of Geosciences of the University of Padua, investigating the forms of use of stone resources in the main Roman town of the ancient *Venetia* (nowadays corresponding to Northeastern Italy), we discuss the results we are obtaining on the quarrying dynamics of the stone resources of the Euganean Hills Magmatic District, worldwide known for its renowned trachyte, but actually constituted of a series of independent volcanoes with differentiated eruptive activities ranging from rhyolitic to basaltic from the Lower Oligocene.

Through a meticulous analytical protocol, coupling archaeometric techniques (OM, XRF, XRPD) and multivariate statistical analysis, we precisely mapped quarry sites of stone materials. This revealed significant geochemical and petro mineralogical variations within the Euganean volcanic outcrop, closely tie d to magma's geochemical features and eruptive dynamics. In this way, we were able to track several quarry sites, subject to differentiated patterns of exploitation by the towns of the region, primarily relying on the geographical positioning and organization of the network infrastructure for stone transport. The detailed mapping of volcanic outcrops in the Euganean district also revealed the extraction of lesser known volcanic lithotypes like rhyolites, and trachytic latitic breccias, mainly employed as pozzolanic additives for mortars and concretes. Through this combined archaeological archaeometric approach, our final aim is the reconstruction of the stippled "quarry landscape" of the Euganean Magmatic District and the distribution patterns of the stone materials in the Roman towns of the ancient *Venetia*.

The Formation of Isaurian Building Industry: Coastal Quarryscapes of Dana Island and Kesiktaş

Günder **Varinlioğlu** - Mimar Sinan Üniversitesi (Türkiye)

The fame of the construction workers originating from Isauria (Rough Cilicia) is a well-known phenomenon in Late Antique architectural history. In the late fifth and sixth centuries, Isaurian architects, masons, quarrymen, and ordinary laborers were involved in construction projects across the Eastern Mediterranean. In Isauria, where variations of limestone bedrock are ubiquitous, builders had easy access to ordinary building materials. In this context, two coastal quarryscapes are unique cases illustrating the development of the quarrying industry and trade in ordinary stones. The first example is Dana Island where settlement and quarries co-existed. Quarrying may have started in the Early Roman period, while its transformation into an industrial and commercial endeavor is a Late Antique phenomenon. As large-scale quarrying subsided at the end of antiquity, the infrastructure such as coastal ramps, warehouses, and stockpile areas fell out of use. Decrepit buildings were pillaged, their sites were excavated, and quarries were cut through the coastline that had long served the quarry industry. The second and smaller case is Kesiktaş which functioned exclusively as a quarry of industrial proportions but did not have a permanent settlement. Unlike Dana, the chronology of quarrying at Kesiktaş cannot yet be dated. The stones extracted from Dana and Kesiktaş are lower quality stones that are lighter than their more dense 'true limestone' counterparts, which may have made them easier to quarry, move, lift, transport, and use in construction. Despite chronological unknowns, the stone industry and trade in ordinary building materials seem to have been essential in the economy and crafts of Isauria. This paper is based on the archaeological evidence gathered via multiple campaigns of mapping, photogrammetry, airborne LiDAR, and documentation at these two sites. It discusses the complex taskspaces where the protagonists were the quarrymen, quarry owners, stonecutters, metal workers, stone traders, and other supporting laborers.

Rock to Be Carved: A Theoretical Model for Rock-Cut Space-Making Strategies in Byzantium

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The distinct geographies where medieval inhabitants of the Eastern Mediterranean engaged with rupestrian landscapes make an extensive coverage of what can be broadly defined as Byzantium's cultural sphere. As outcomes of an alternative mode of architectural expression, carved spaces constitute a weighty sum of surviving material evidence from Byzantium, assuming a diverse set of functions and meanings. In my presentation, I will discuss what it means to define or redefine landscapes through rock-cut space-making practices. I argue that nonhuman actants are ever-present in rupestrian

spaces and their making. In particular, two nonhuman entities exercise their agency more manifestly than others: the rock itself through which rock-cut architecture is materialized and the water, especially the bodies of flowing water carving through rocky strata. As products of nonhuman agents as much as human intentionality, coexisting and acting on each other, rock-cut spaces are ideal for examining human-nonhuman interactions. The conscious efforts of people to transform and adapt rupestrian landscapes to whatever use they see fit necessarily rely on entanglements with nonhumans. Along these lines, I suggest three main categories to explain rock-cut space-making strategies in Byzantium and the diverse ways in which people, rocks, and water collaborated in the creation of rupestrian landscapes: carving out spaces from the rock, building spaces on the rock, and using spaces in the rock. Rock-cut architecture is not exclusively human-centric but a clear manifestation of human intervention in nature and collaboration between people and things. I hope the theoretical model presented here contributes to our appreciation of multiple agents in rupestrian landscapes and an understanding of how people worked together with more-than-human agents in rock-cut space-making in Byzantium.

Starting to Carve in Davutlu Bucağı (Mazı köy, Cappadocia). Some Thoughts about Carving a Rock-cut Structure from Ancient to Byzantine periods

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Cappadocia is a well-known region, located in Central Anatolia (Turkiye), covered by a tie mesh of rock-cut structures. Since the beginning of the 20th century, scholars were mostly focused on the rock-cut churches and their painted decorations (Jerphanion 1925-1942) and only one inventory was published on rock-cut tombs (Equini-Schneider et al. 1997).

Around ten years ago, some researchers began to analyse the techniques used to carve these monumental rock-cut structures and the societies behind them (Öztürk 2010; Lamesa 2012). This direction of research is still ongoing and needs to be further explored.

Indeed, when it comes to monumental rock-cut structures, studies have rarely mentioned or even almost systematically overlooked the fundamental question of the choice of location and how the process of carving is started.

This first step of implementation, however, is a fundamental gesture of creation. The choice of the location and techniques used to start carving are explained by several phenomena where human or/and natural agencies are entangled. We propose, therefore, to carry out a survey to delineate the taskscape of rock-cut worksites and revealed the society behind them.

To do so, we will use case studies from one valley: Davutlu Bucağı in Mazı köy. Indeed,

this valley shelters 6 monumental tombs (Hellenistic period) and 6 churches (Byzantine period) which were surveyed between 2009 and 2010 (Lamesa 2016). Crossing methods from ethno-archaeology, traceology (reading tool marks) and archaeology of building, we would like to explore, on the long durée overview, the choices that led communities, patrons or stonecutters to initiate the process of creating a monumental rock-hewn structure and at the end, shad the light of the intertwined of human and natural agencies.

Rock-Cutting a Quarry to Form Cisterns. The Functional Transformation of a Productive Landscape in Pyrgos, Messinian / Outer Mani, Southern Greece

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Arzu **Güler** - Istanbul Technical Üniversitesi (Türkiye)

It is not uncommon in rock-cut archaeology to encounter the transformation of a quarry to a settled area serving different functions when environmental and historical needs are met. Many such cases are already recorded in the wider Mediterranean basin, from Anatolia to northern Africa and southern Europe. The disused quarry provided -almost ready-made- an essential amount of building material, allowing for the foundation of secular or monastic communities.

In the example we are investigating, an ancient quarry expanding in the small village of Pyrgos, in the Mani peninsula in southern Greece, went through a total alteration and hosted anew an unusual function: As part of a wider agro-pastoral area, its core part was transformed into a hydraulic landscape. A cluster of several types of cisterns –vaulted or open, occupied the previously rock-cut fronts and surfaces of the quarry.

Our study provides an overview of this century-long area transformation process using different methods under the supervision of Prof. Sam Turner (University of Newcastle) and a team of experts: Historic Landscape Characterization (HLC) and Retrogressive Analysis and 3D scanning, modeling, and aerial-drone photography. The study shows a historic assessment of the Pyrgos' s landscape representing an operative process with all its units depending on the hydrologic system.

Pyrgos is one of the rare cases in which such historic landscapes are documented with such research tools in the rock-cut archaeology of Greece.

Geography of the Landscape in St Pedro of Rocas (Spain). Heterogeneous Urban Planning, Excavated Structures and Quarries

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Natalia **Figueiras Pimentel** - Universidad Complutense de Madrid (Spain)

In the Iberian Peninsula, numerous anthropic sites linked to the exploitation of stone and the cohabitation between communities and rocky landscapes have been located over the centuries, with a specific nature depending on the period and type of settlement. The Middle Ages is one of those prolific historical moments in terms of the transformation and occupation of the landscape, exploitation and settlements. In parallel, rocky architecture is one of these manifestations that has developed since Late Antiquity and the Early Middle Ages in a unique way, and particularly in the north of the Iberian Peninsula.

One of the examples, which could be considered a paradigm in this sense, is the rupestrian monastic complex of St Pedro of Rocas, in the northwest of the Iberian Peninsula, in present-day Galicia. There are many reasons that, after research in recent years, make us think that we are facing an organized and coherent material reality. In an area of 50 ha and on the west side of Mount Barbeirón, the cave monastery is configured, a space occupied and sacred since Prehistory, during the pre-Roman era and transformed into a monastery in the Christianization phase of this territory.

It is a large granite rocky landscape, with an elevation variation of 300 m in height, where the rock is the primary element, both in the configuration of the landscape and in the construction of the habitat for its anthropic use. Rocks are the matter and at the same time the inhabited space. The final result is an occupied territory, transformed organically, with a particular and heterogeneous result, where self-sufficiency is one of the driving forces of its construction and the structuring of the forms its leitmotiv.

Numerous quarries and rocky crags articulate the landscape, providing the raw material for the built architectures and nearby structures. At the same time, they organize and urbanize the natural environment through paved and delimited communication routes that connect the complex, internally and externally, building significant visual cones. The medieval hermitages are distributed along and up the mountain, around these roads. The rock chapels and chambers for worship and the funerary, living and burial spaces, make up the epicentre of the rupestrian complex. All this using its essential raw material: stone and the transformed rocky landscape.

SESSION 3: LANDSCAPE-SCALE CONCEPTS OF TECHNICAL ENVIRONMENTS AND TASKSCAPE

Ancient Settlements, Quarry Fronts and Georesources: the Multifaceted Roles of the Altesina Mountain (Sicily)

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Giuseppe **Labisi** - Ausonius, Université de Bordeaux-Montaigne (France), Universität Konstanz (Germany)

Mount Altesina is a significant landscape feature in the Sicilian region. Located in the centre of the famous three Sicilian valli, it is the highest mountain in the Erei chain, the source of a river and the centre of a network of ancient trade routes. Due to its unique geographical location and geological composition, this mountain has been a significant landscape feature, strategic settlement, and resource since ancient times. The mountain is composed of a soft sedimentary sequence known as Numidian flysch, which contains polymetallic nodules that may have been used for the extraction of iron and/or manganese. It faces the gypsum-salt Messinian sequence and is situated near an ancient fossilized coral barrier.

In recent years, a joint project at the site has aimed to better define the mountain's role in the complex landscapes of the area. The geological environment is used for settling, carving stone for building structures, and exploiting geo-resources such as clays, salts, iron, and manganese. Surveys in the area have revealed evidence of quarry fronts entangled with past rockfall events, suggesting interconnections between the natural transformation of the geological landscape and the human occupation/abandonment phases in the area. Recent studies suggest a possible link between the abandonment of the proto-city during the Roman period and the development of rupestrian settlements at the nearby centres of Nicosia and Sperlinga. Has the transformation of the rocky landscape influenced the resilience process in this scenario? In other words, how have humans interacted with the quarried landscape over the millennia? What were the motivations of human societies to alter their relationship with the resources of Altesina? Could the contrasting history of neighbouring Calascibetta, Enna and Assoro confirm this idea? This paper discusses how a combined geological and archaeological approach would help to trace the metamorphosis of complex mountain landscapes.

"Deep Time" and Recording Temporal Dimensions of Cappadocian Landscape

Sena **Kurçenli Koyunlu** - Carleton University (Canada)

This study is a critique of current heritage recording practices as they are applied to caves and carved stone environments. Considering "deep" or "geological" time as an essential aspect of these types of historic places, I propose a set of general principles for documentation by discussing a specific case study: Cappadocia, Türkiye.

Cappadocia is a cultural landscape - with its rock-carved churches and underground settlements - that reveals an intimate human-nature interaction. Volcanic activity, erosion, and human hands have shaped the landscape over time and given us what we experience today. While these rock-carved structures have been studied by scholars from diverse disciplines, most scholarly interpretation posits "human time" as the historical frame for Cappadocia. While the scholarly literature recognizes the direct impact of "volcanic activities" and "erosion" on the landscape, non-human histories are not taken into account in the narrative-building process. I argue that caves require a philosophical exploration of deep time that can and reveal a chronicle of continuous transformation that take place even before human interventions. It is both human and geological agency that has shaped Cappadocia. Contemporary heritage recording employs techniques and technologies - characterized as rational and standardized - that aim to capture authentic features in order to document and demonstrate the heritage significance. Thus, it aims to capture that moment of a specific asset at a given time and focuses on human time to contextualize and analyze the multi-layered structure of the heritage assets.

Incidence and Evolution of Early Empire's Quarries in the Rural and Urban Landscape of Central Roman Gaul

Philippe **Salé** - Inrap, UMR 7324 Citeres-LAT (France)

In France, quite numerous publications focus on quarries and troglodytes. For the period of Antiquity, studies are mainly concern materials, techniques and craftmen's tools, but also often the largest and most well-known quarries. Since the development of rescue archaeology in the 1980s, many papers refer to stone quarries. Our research has led us to identify 32 limestone extraction sites in central Gaul, especially in the territories of the ancient civitates of Bituriges, Turons and Carnutes peoples. The data's quality is rather heterogeneous, depending on the authors and the conditions of interventions. However, the multiplicity of these examples allows us to show the wide variety of cases, from a single pit to dozens. Their surface area varies from around ten square meters to several thousand. Their location is also diverse ; open fields, along roads or rivers, or near villages or towns. Different forms of production can explain this diversity. Subsequently,

they affect ancient and contemporary landscapes in different ways :

- the smallest can be filled immediately after extraction of the stones ;

- intermediate-sized quarries are often filled over time, sometimes serving as landfills in urban areas ;

- the largest ones can still function in the Middle Ages or they can be reused as burial sites. They still leave their mark on today's landscape.

Springs and Stalactites: Exploring the Rock-Cut Architecture of Geghard (Ayrivank')

Whitney **Kite** - Columbia University (United States of America)

The monastery of Geghard, one of the most-visited sites in the Republic of Armenia, takes its name from a relic of the spear that pierced Christ on the cross, acquired by the monastery in the late medieval period. However, before obtaining the relic, the site was known as Ayrivank', or "Monastery of the Cave". This paper explores this earlier name of the site in conjunction with its architecture. As the only rock-cut monastic complex known from Armenian architecture, its unique form was emphasized in its early name. Yet, the original structure of the monastery, dating back at least to the eighth century, was masonry - the rupestrian architecture only occurred in a later phase. The "cave" referenced in the monastery's name was a natural one, still present at the site, with an ancient holy spring bubbling inside. The decision to build inward, into the very mountain, mark a shift in the conception of the site. Rather than a monastery with a cave, the entire monastery became a cavernous complex, comprising a hidden entrance behind a natural outcrop, stalactite-like muqarnas domes, and select walls of unhewn rock. Yet, the reasons for undergoing such a change remain unexplored. Through the use of pilgrim's accounts, sculptural decoration, and liturgical texts, this paper will investigate the meanings and religious function of Ayrivank' in the thirteenth century.

Man-Made Caves in the Upper Awaš Basin: their Contribution to Understanding the Occupation Dynamics of the Šäwa Region (Ethiopia)

Manon **Routhiau** - UMR 5608 TRACES (France)

In the southern highlands of Ethiopia, the Šäwa region lies at the crossroads of dynamic population changes, where its form, extension and ethno-religious composition evolved on various occasions during the Early and Later Middle Ages and even later on. It is also in this region that a variety of rock-cut remains have been recorded (man-made caves, rock-hewn churches or underground structures). Among them, man-made caves

are the most common. Grouped or isolated around several watercourses, these entities have received little attention from the scientific community. The few researchers of the second half of the 20th century who have studied these remains have often associated them with a process linked to Christianity.

Recent researches carried out as part of a PhD on rupestrian activity and troglodytic cultures in Ethiopia has, however, led us to revise this hypothesis, or rather to supplement it by questioning the multiple uses of the sites. These researches also allow us to renew our knowledge of the distribution and organisation of these sites in relation to their environment, as well as their chronological attribution. In addition, by placing the information gathered from these rock-cut sites in the surrounding archaeological context, we can put forward some hypotheses about the evolution of the occupation of the surrounding area and observe potential societal changes in the communities that occupied the sites. The aim of this paper is to provide an overview of the architectural forms of the man-made caves in this area, and to propose a discussion on the contribution of the study of these remains and their environment to our understanding of societal changes and the dynamics of occupation in this region.

Archaeology and Heritage Communities in a Sardinian Rocky Landscape Managing. Historical Relationships and Stratigraphies Around the Granite of Gallura

Fabio **Pinna** - Università degli Studi di Cagliari (Italy)

Mattia **Sanna Montanelli** - Università degli Studi di Cagliari (Italy)

The subregion of Gallura is perceived as a distinctive territory within Sardinia. The roots of this uniqueness can be traced to cultural elements recognizable even in a distant past and variously manifested over time. However, its distinctiveness also stems from its geographically peripheral position compared to other Sardinian territories, as well as its linguistic projection towards Corsica and the Italian peninsula. In this dynamic, the interaction between plant elements and outcrops of granite rock, with which human communities have engaged over time, has played a significant role, imparting characteristic features to the landscape. This is evident in the adaptation of natural cavities for functions related to life and death and in the extraction of granite as a material defining local construction knowledge. Over the past two decades, actions undertaken by the working group from the University of Cagliari have brought to light various historical variations in the relationships connecting individuals, communities, and this rocky landscape. The connections between people and granite can today serve as a guiding thread for a documented rediscovery and reappropriation by contemporary local communities of a shared historical territorial pathway. This process unfolds in the transformations of the landscape on both small and large scales, tracing back from prehistory through various historical epochs (and the manifestation of different

administrative structures) to the current pervasiveness of the tourism industry. Once again, the interaction between the sea and rock outcrops (consider the identifying features of the 'Costa Smeralda' brand) has become internationally recognizable, yet it also poses a danger to the construction of a solid and sustainable development that does not distort territorial identity. The current task is to investigate, even through participatory protocols inspired by Citizen Science, new possible values of use for the memory of these identity markers. This aims to promote more lasting forms of participatory preservation of these cultural heritages.

The Impact of Geology and Landforms in Current Rock-Cut Tomb Practices in Tana Toraja (Sulawesi, Indonesia)

Guillaume **Robin** - University of Edinburgh (Scotland)

Ron **Adams** - Simon Fraser University (Canada)

The Sa'dan Toraja of Sulawesi (Indonesia) have maintained a rock-cut tomb tradition since the 17th century. The tombs, called *liang pa'* ("cut tombs"), consist of a simple rectangular chamber, and are used by local noble families over generations. Most tombs are grouped together in cemeteries, although isolated tombs are sometimes found. The Toraja country (Tana Toraja), is geographically small (5,260 km^2) but geologically diverse, with two main groups of rock formations: volcanic bedrocks with large erratic boulders on the northwest, and sedimentary formations with high limestone cliffs on the southwest. Rock-cut tombs are found in both groups. To what extent does the local geological diversity, with its various landforms and rock properties, affect the culturally-homogeneous practice of hewing out tombs in Tana Toraja? This paper will examine the impact of geology and landforms on the landscape distribution of tombs (clustered vs scattered), the status of cemeteries (communal or private) and their development over time, and the costs and processes for cutting the tombs.

SESSION 4: CULTURAL SOCIOLOGY AND THE NOTION OF HERITAGE

"Tectonisation" of Cave and Legitimisation of Rock-Cut Architecture in Cappadocia

Fatma Gül **Öztürk Büke** - Çankaya Üniversitesi (Türkiye)

According to Christian Norberg-Schulz, the cave was "the first spatial element", and "the space was liberated from the earth" when "the cave was tectonised". Cave-dwellings are found in any region with rock soft enough for easy carving and strong enough after carving. From southwest America to China, "sculptured architecture", as Spiro Kostof calls it, is plentiful, and its application is "universal". Nevertheless, troglodytic existence has often been regarded with considerable contempt and as Gülsüm Baydar Nalbantoğlu states, " 'negative' dwellings were denied existence in legitimate discourse". In central Turkey, Cappadocia is highlighted as "one of the world's most striking and largest cave-dwelling complexes". The volcanic landscape here contains more surviving Byzantine secular and religious architecture than any other region in Byzantine territory. Despite this, Cappadocia continues to be a road less travelled by architectural historians. The paper argues that architectural historians' prejudices against rock-cut architecture play a role in this and that this prejudice can be traced back to Cappadocia's discovery by Europeans in the 18th century. Paul Lucas introduced the region to the Western world for the first time with an engraving in 1712. The engraving depicts busts of Christian figures atop "built" cones, which Lucas describes as "pyramidal houses". The paper argues that Lucas' stylisation of natural formations as regular geometric cones attempted to tectonise and legitimise rock-cut architecture. The paper further argues that prejudices against rock-cut architecture date back to its creation. Carvers in Cappadocia painted the living rock with red lines to imitate the structure of a "built" masonry wall. They even took on the difficult task of carving deep vertical courtyards and high facades to mimic "built" architecture. Even more striking, portraits of donors in rock-cut churches are occasionally depicted holding "built" architectural models. The paper, therefore, discusses how Cappadocia's rock architecture gained legitimacy in patrons' and carvers' eyes as it became legible by being distinguished from the soil.

Environmental Despoilation in Peri-Industrial Societies

Christopher J. **Lyes** - University of Oxford (England)

> *We now carry away the barriers that were destined for the separation of one nation from another . . .we convey the summits of the mountains to and fro . . . promontories are thrown open to the sea*. (Plin. Nat. 36.1)

These are the remnants of the ancient stone industry. Huge quarries decimated rural landscapes, scarring the environment and alarming even those that benefitted the most. The testament of one of the first large-scale, non-renewable, resource-extraction industries and the struggle that ancient societies had in both justifying their damaging of the environment and living with its impact.

Comprehending the progression and juxtaposition of quarrying activities from small-scale, pre-industrial 'cottage' workings to extensive industrialised activities, both over time and synchronously, is one of the principal objectives of this paper. To explore how the development of an industrialised approach to primary resource extraction impacted on the environment, changed local economies and altered human settlement patterns is another.

The detection and quantification of past environmental damage by industrial activity is a significant way in which historical disciplines can contribute to broader public debates. We shall seek to understand how human activities have shaped Earth's biological and physical systems in antiquity and, viceversa, how the resulting spatial and material reconfigurations of landscapes and experiential fields affected societal developments.

The role of humans in altering Earth's environment and transforming its economies and ecosystems is a central concern of twenty-first-century scientific inquiry; this paper will aim to shed light on our modern challenges by illuminating those of the past.

A Preliminary Framework for Modeling Caria's Rock-Cut Temple Tombs: Structure, Architectonics, and Construction

Yağdır **Çeliker Cenger** - Özyeğin Üniversitesi (Türkiye)

Mine **Özkar** - Istanbul Technical Üniversitesi (Türkiye)

The Carian rock-cut temple tombs in the southwest region of Türkiye are a substantial architectural heritage representing unique construction traditions from antiquity. The tombs have been damaged over time due to environmental effects such as humidity, groundwater, rain, solar radiation, temperature changes, earthquakes, looting, and uncontrolled infrastructure applications. Structural analysis is vital to assess their current

conditions as part of an efficient preservation strategy that is needed to protect this ancient rock-cut heritage against detrimental effects. That most of the 31 temple tombs in Caria are located on the hillside is a challenge for documentation and preservation. As a first step, we offer a methodology to model and analyze the implicit architectonics of the Carian rock-cut tomb typology, looking at structural behavior during its supposed construction, in its finished ideal state, and in its current state. Our proposal is a preliminary computational modeling framework to regenerate the 3D digital model of a rock-cut tomb and represent the construction phases. The procedure consists of both geometrical and structural modeling for the purpose of focusing on the correlation of design and construction decisions of the rock-cut tomb. We present the model and analyses for one representative rock-cut tomb selected and studied according to its level of construction and damage based on historical documentation and drawings in the literature. The geometrical model sets characterize the damaged (current) state of the selected rock-cut tomb, and the assumed undamaged models display the construction process in sequence. The structural models are executed using FEA (finite element analysis) and determine the structural behavior of the tomb during construction and the damaged state under gravity load. The preliminary framework delivers adequate modeling procedures of the rockcut structures considering their geometrical and structural properties. Continuing work aims to produce digital models for all 31 rock-cut temple tombs and to elaborate on varying parameters that define the construction of the tombs.

Sculpting Time: Tracing Centuries of Carrara Marble Quarrying and Its Impact on Cultural and Ecological Landscapes

Claudia **Sciuto** - Università di Pisa (Italy)

Stefano **Genovesi** - Università di Pisa (Italy), Museum of Marble, Carrara (Italy)

Giulia **Picchi** - Soprintendenza Archeologia Belle Arti e Paesaggio per le province di Lucca e Massa Carrara (Italy)

The quarrying basin of the Apuan Alps is situated in the northwestern part of Tuscany, near the town of Carrara, overlooking the Tyrrhenian Sea. Renowned for its extraction and trade of marble, this activity has defined the character of the Apuan mountains for centuries. Quarrying has profoundly modified the morphology of the valleys and slopes, creating new forms of the cultural landscape and related ecological niches. The use of Carrara marble dates back to prehistoric times, with Roman periods marking a shift towards systematic quarrying, leaving enduring traces in the contemporary palimpsest.

Over subsequent centuries, marble quarrying and processing have shaped the morphology of the Apuan mountains, which now appear to us as a tangle of material traces. The Carrara marble basin, with its multi-temporal and multi-species landscape, offers insights from various perspectives, providing an understanding of the region's ecological, social, and economic history. A transdisciplinary and diachronic research

approach is necessary to understand the historical dynamics that led to the formation of the complex taskscape, through palaeoecological, archaeological, epigraphic, historical and anthropological analysis.

This contribution aims to illustrate specific case studies, from the area of Fossacava and the quarries of Gioia, which highlight the complexity involved in studying the Carrara marble quarries. We will focus on showing how research needs to be done at different scales and how data of different granularity can be key elements in understanding the palimpsest. We will focus on challenges associated with unravelling historical-archaeological facets, as well as addressing concerns related to the preservation of both tangible and intangible cultural heritage.

The Vernacular Rupestrian Architecture in Cappadocia

İdil **Üçbaşaran** - Kapadokya Üniversitesi (Türkiye)

Today, Cappadocia is a destination that has been built around its major identity feature, the rock-cut architecture (Üçbaşaran, 2020), thus enabling the development and conservation of a "traditional" (or should we say *traditionalized*) cultural heritage that are the frescoed rock churches, which are the subject of a "conservation + valorization" policy.

Since the 1960's, tourism has been seen as a lever for territorial development in Turkey (Arslan, 2017; Kuruloğlu, 2015) and Cappadocia was the subject of tourist destination planning in 1968, based on its landscape and cultural assets. In the meantime, a policy of population relocation took place, emptying the traditional rock dwellings, considered primitive, to relocate the inhabitants to "modern" houses. Despite a rejection of identity and culture orchestrated by the State, in less than fifty years, these spaces have been reinvested, but this time for economic and touristic purposes, paving the way for practices that fall under the heading of making heritage, but without an institutional framework.

Between a repudiated heritage and a reappropriated identity, what is the place of vernacular rock-cut architecture in the landscape of the Cappadocian tourist destination?

Drawing on the notions of heritage and reflexive territoriality (Melé, 2009), the aim of this paper will be to show the new practices of the rock-cut space that generate their staging and encourage the creation of new architectural codes. These practices are revitalizing rocky landscapes and creating new ones, both inside and out. Intimate and hidden spaces become an integral part of the Cappadocian landscape, helping to create the mental landscape of the visitors (and locals) and the tourist imagination. The notion of heritage and *patrimonialization* will be discussed in the light of these practices, which oscillate between reactivation and reinterpretation of the memory of place and rupestrian identity.

Rocky Landscapes in Central Sicily (Italy)

Daniela **Patti** - Università Kore di Enna (Italy)

The rocky habitat is a distinctive element of the Mediterranean landscape. It is more a dwelling culture which has been shared by different civilizations; a global phenomenon, not less than the urban model, which is increasingly seen as an essential component of the process of rural human activity that should be investigated in all of its aspects.

The Northern area of central Sicily is marked by the impressive rocky landscape know from ancient times limited to the castles and the churches.

The use of the rocky units is characterized by stratifications, due to the continuous and prolonged use in time, and the transformations consequent to the changes: funeral, cultic, housing or productive; in it are preserved the traces, the "signs" of the past, the countless transformations imprinted by nature and by man over thousands of years, the signs of settlement structures, cultures, work and daily life, the knowledge of the technological signs and religious convictions of all times.

To avoid the complete disappearance of rock heritage, it is necessary to understand the reason, the techniques, the wealth of elements, reactivating possible real traces and memories for a redesign of rupestrian landscapes.

In recent years the research on the rocky landscape in Southern Italy, conducted according to a multidisciplinary and global approach that also includes the use of advanced documentation techniques (for investigation, monitoring, exploitation), have led to start understanding the complex relationship between the man and the historical, cultural, social significance of rock cut sites. The rock heritage represents the archive of history and identity of a territory and its people who over the millennia have inhabited and transformed it.

According to this perspective and to current issues such as accessibility, usability, environmental and social development, it would also be necessary to eliminate the isolation of several sites, to encourage their inclusion in a present context, to avoid the falling in forgetfulness of the places and the heritage communities living near to the rock sites to this day.

POSTERS SESSION 1

Artificial Cave Dwellings in Odessa

Igor **Grek** - Speleological club "Search", Odessa (Ukraine)
Yevheniia **Pechenehova** - Speleological club "Search", Odessa (Ukraine)
Olha **Krysko** - Speleological club "Search", Odessa (Ukraine)

In this work, the authors consider the emergence and development of “cave” dwellings in Odessa and its surroundings. This is an interesting landscape phenomenon and the subject of numerous legends and historical speculations. The authors consider the theory about the appearance of “cave” dwellings at the end of the 18th century untenable. All explored “cave” dwellings were fenced off in pre-existing sections of underground quarries. Hence, dwellings appearance could emerge only after the quarries in these areas had ceased working.

Cave dwellings were built in the entrance parts of the quarries which were not very deep. The work provides plans and descriptions of several similar objects, and analyzes their design. It is noted that stone walls built from stone blocks or rocks fragmented, with window and door openings, highlight the entrance areas of old quarries. Living quarters were concentrated in the front part of the cave dwellings. The premises were equipped with stoves, the chimneys of which went to the surface. The interior spaces were used as stables for livestock or chicken coops. The inner wall separating the premises from the quarries often has a door or a disguised hole. This indicates that the adjacent quarry areas were also sometimes used.

Quite detailed descriptions of Odessa at the end of the 18th and beginning of the 19th centuries left by some authors do not contain information about the existence of cave dwellings. The first mention of the existence of such objects in Odessa dates back to the middle of the 19th century.

“Cave” dwellings were used as living quarters until the mid-20th century. Currently, many homes are abandoned or destroyed as a result of roof collapses. However, some of them are well preserved and are currently used as utility rooms for adjacent estates.

Değirmendere Region - Rock Caves

Vedat **Akçayöz** - Kars Art Association (Türkiye)

Değirmendere region, which played an active role in Ani Ancient City's inclusion in UNESCO and has not been scientifically examined until today, is 47 km away from the city of Kars. The distance between Değirmendere and Ani is approximately 1,700 m as the crow flies and is at the coordinates of 40º29'8.60"N and 43º33'20.07"E.

On the upper side of the Değirmendere Canyon, where the Arpaçay River, which forms the border of Turkey and Armenia, is located, snow and rain water and water fed by springs descend rapidly from an altitude of 1410 m to 1300 m, forming two waterfalls. In times past, their water fed the mills that gave the region its name (değirmen = mill; dere = valley). There are ruins of mills, settlements and caves in the canyon. Although the Değirmendere region has the same features as the Bostanlar stream in terms of geological structure, the appearance of the fairy chimneys around the caves here becomes more evident and differs in terms of their external appearance.

D.A. Kipshidze (Кипшидзе), describes the soil structure of Ani Plateau and its surroundings as consisting of Lower (generally composed of black hard basalt stones found at the Arpaçay water level), Middle (sand-colored tuff layer) and Upper (hard, relatively thin layer) layers (Д. А. Кипшидзе, 1972: 14-16).

Since the middle tuff layer is soft, Değirmendere caves were mostly excavated in the middle layer. The exit of Değirmendere caves is inclined at approximately 60 degrees. Although the ground is sandy and the natural passageways are closed in places, you can reach the living caves after a dangerous climb.

High-altitude Değirmendere caves consist of one, two or three-storey caves opened side by side. The walls of the caves dug by human hands were decorated with niches, and the living rooms were places where people continued their social lives from birth to death, performed their prayers and buried their corpses over a period of thousands of years.

In this paper, the results of the research conducted in thirteen caves in Değirmendere will be presented.

Landscape of Gypsum Quarries Around Paris (18th and 19th centuries)

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Gypsum plaster has been a fundamental material in construction in Paris and its

surrounding areas since Middle Ages. Then the region is strongly marked by the long term exploitation since it is an abundant local resource. The slopes of the Montmartre, Buttes-Chaumont and Belleville hillsides have been completely transformed by open-cast quarries and underground quarries. From the eighteenth century on, following the geographic description effort of French territory, numerous maps were drawn which would become more and more precise and thematic over time. These documents constitute a first class documentary corpus about territory evolution. According to the observation of these maps, it is possible to make a restitution of landscapes corollary of the exploitation of soil resources of which quarries constitute the most spectacular element.

POSTERS SESSION 2

Are the Location and Situation of Ancient Rock Ruins in Southeast Anatolia Related to Earthquakes?

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Turkey's Southeastern Anatolia Region, as a part of Northern Mesopotamia, is a geography where traces of ancient civilizations and life are found. Engraved landscapes are another notable feature of the Southeastern Anatolia region. These landscapes, characterized by their intricate rock carvings and spaces, provide invaluable insights into the social, cultural, and religious interactions of ancient societies in the area. Among these areas, Ergani Hilar, Adıyaman Pirun (Perre), Silvan Hassuni, Mardin Dara and Hasankeyf are the most notable. Rock-cut spaces in Southeastern Anatolia have played a significant role in shaping the region's history and culture.

Diverse geological formations and structures have contributed to the unique cultural and historical richness of Southeastern Anatolia. Another important feature of the region is that it is located in an active tectonic zone that has caused many devastating earthquakes throughout history. A series of devastating earthquakes occurred on several segments of the East Anatolian Fault Zone (EAFZ) in February 2023, causing an extensive damage and heavy casualties in SE Türkiye and northern Syria. In particular, two catastrophic earthquakes with moment magnitudes (Mw) of 7.8 and 7.6 in Kahramanmaraş, an earthquake of Mw 6.4 in Hatay and numerous small-to-moderate size aftershocks greatly affected a large area in south-central part of Anatolia.

In our GIS-based study on the effects of the earthquake and its geographical distribution, we concluded that these earthquakes had the most devastating effects on the plains and basin floors. This is due to the basin effect. The basin effect refers to the phenomenon

where seismic waves are amplified and prolonged when they pass through sedimentary basins or low-lying areas. The presence of sedimentary basins can lead to the trapping and amplification of seismic energy, resulting in stronger ground motion during earthquakes. The basin effect is particularly important in areas with high population density, as it can significantly increase the ground shaking intensity during an earthquake.

So, the following question comes to mind:Is the situation and location preference of ancient rock landscapes in Southeastern Anatolia related to Earthquakes?

This study aims to open a door to this discussion with the available data.

Where Can a Merovingian Sarcophagi Quarry be Opened to Make It Profitable?

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In Gaul, during the Merovingian period (late 5th-8th century AD), the main quarrying activity was the production of stone sarcophagi. Quarries, whether open-air or underground, varied in size and shape, whether isolated or grouped together, formed quarrying centres whose production was distributed locally, regionally or even supra-regionally. Limestone, sandstone, marble and granite were all used to make sarcophagi, with each rock having its own advantages and disadvantages, which had an impact on the shape of the quarries, the extraction and cutting techniques, and the type of sarcophagi produced.

In 1985, in a brief article, Robert Bedon gave the "recipe" for a good sarcophagus quarry: in short, an accessible, high-quality rock (usually a hillside), and a river to allow easy export of the produce. In reality, the choice of location for a Merovingian quarry depended on numerous interdependent criteria, some of which are still poorly understood: the ancient quarrying heritage, ownership of the land, integration into a communications network (roads and waterways), the rock deposit (accessibility, volume and quality of the stone), local topography (i.e. ease of travel in and around the quarry site) and underground lighting.

Our aim here is to provide an overview of quarrying practices throughout Gaul, focusing on the reciprocal influence of topography, landscape and geology on the opening up, morphology and development of quarries, as well as on quarrying practices.

POSTERS SESSION 3

The Multidimensionality of a Rock-Cut Landscape From Central Italy: Preliminary Insights from the Lularock Project

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The rock-cut architecture represents one of the most tangible outcomes of the interplay between the environmental dimension of the landscape and its anthropo-cultural components: a heritage intricately linked to practical, religious, and economic needs that, spanning centuries, have shaped and continue to shape the identity of the Monti Lucretili landscape. Combining strategies and methods borrowed from various archeological disciplines (such as landscape archaeology, geoarchaeology, digital archaeology, ethnoarchaeology), the LuLAROCK project (Lucretili Rock-cut Archaeological Landscape project) aims to frame the development of the rock-cut landscape in this sector of the Italian Apennines. This paper reports the data obtained from the first extensive archaeological survey campaign, conducted in the hotspots highlighted with the aid of a GIS based predictive model in the southwestern sector of the Monti Lucretili. The rock-cut sites identified in this area, categorized into two different subtypes, are linked to two distinct landscape dimensions, and can be dated to a long chronological horizon that, with a good degree of probability, spans from prehistoric to contemporary times. On one hand, we documented sites utilizing natural caves or rock shelters and occasionally integrating them with drystone walls and perishable materials. These have been interpreted as temporary and seasonal forms of settlement linked to the two most important productive and economic activities of the area: pastoralism and charcoal production. On the other hand, we have sites that, integrating natural caves with excavation work and structures made of masonry and non-perishable material, have been interpreted as stable forms of settlement associated with the sacred landscape of the hermit communities of medieval times. These preliminary insights underscore the diverse and dynamic nature of Monti Lucretili rock-cut landscape, setting the stage for further exploration through the ongoing LuLAROCK project.

Rocks: the Silen Witnesses of Life and Death. Rock Art and Funerary Monuments in Jabal Al Qahar – Al Reeth (Saudi Arabia)

Jafaar **Ben Nasr** - University of Kairouan (Tunisia)

Faisal Hamad **Aljibrin** - Saudi Arabia's Heritage Commission (Kingdom of Southern Arabia)

Faysal **Lemjidi** - Cadi Ayyad University (Morocco)

In this communication we present the preliminary results of an archaeological mission in the Al Reeth Mountains (the southwestern region of Saudi Arabia).

Systematic surveys allowed the inventory of several painted and engraved shelters as well as necropolises which show burials of a varied typology. These remains, of diverse chronology, are witnesses to a long human occupation of this high-altitude sector and to a long-term anthropization of the mountain.

We therefore examine here two aspects of interaction between men and the rocky substrate: shelters, cavities, slabs, and rocks which served as elements or places of simple and collective burial and as supports for the different painted and engraved artistic manifestations, which suggest aspects of daily life and symbolic thought of the human groups who frequented this mountainous area.

From Quarry to Construction Site: Exploring Romanesque Production in the Garonne Region

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Between the late 11th and early 12th centuries, many monumental construction sites were initiated along the course of the Garonne River in southern France, marking the region's entry into the European Romanesque artistic season.

Generally, the emergence of a distinct regional style is influenced by various factors, including local geology, historical and political events. However, in this area such connections had never been studied in detail.

The present study filled this gap analysing the impact of local and regional natural resources on the choice of materials for religious buildings and sculptures. Central to this investigation was an examination of both fluvial commerce and its role in transporting stone materials, and skilled labor from extraction sites to urban construction sites along

the Garonne.

The adopted methodology employed a multidisciplinary approach, integrating diverse research fields. The study focused on the sculptural works attributed to tolosan workshops active between the late 11th and the first quarter of 12th centuries. It involved a detailed stylistic and iconographic examination of the religious buildings and sculptures, with particular emphasis on the historical, social, and economic context of their production. Geological surveys of the region, combined with minero-petrographic and physico-mechanical analyses of stones present in artifacts, facilitated the identification of potential quarrying sites. Subsequent, documentary research cross-referenced historical records to verify the practical accessibility of stone materials by identifying quarries owned by patrons and their operational status.

The comprehensive approach provided a scientifically grounded understanding of the dynamics of Romanesque artistic production in the Garonne region. It elucidated how traditional stylistic and iconographic elements were influenced by natural resource availability and stone material supply strategies. Therefore, this study contributes significantly to the understanding of the interaction among art, geography, and natural resources within the Romanesque cultural context of the Garonne region.

POSTERS SESSION 4

A Cross-section of Rock-cut Buildings. The Survey of Pinnacle Church 33/v in the Area of Göreme

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The report presents the complex of Church 33/V in Göreme. The pinnacle and its buildings provide a cross-section of cave life. Its graphics and descriptive data contribute to knowledge about sacred buildings and residential structures, such as a refectory, food storage premises and stables. Church V shows the architectural influences of the nearby Tokalı Church, one of the most beautiful at the Open Air Museum in Göreme. The rooms carved from the rock are also remarkable.

The documentation is significant in terms of the data collected; indeed, numerous fractures threaten these buildings and their rock facades, which each year risk collapsing due to freezing.

The research is a PRIN (Project of Relevant National Interest) funded by the MIUR. It was carried out on the headland between the Valleys of Göreme and Kılıçlar in Cappadocia, Turkey, world heritage site since 1985.

The landscape of this area belongs to the natural-urban habitat. It did not undergo an

urbanization process built in masonry and preserves examples of settlements, which are useful for understanding the development of rock settlements. The buildings carved into the rock still exist in symbiosis with the extraordinary landscape. Thus, the documentation and representation of the territory at a landscape scale are integral to the research.

The RU conducted the surveys using a 3D phase-shift and with T.O.F scanners technology. The experimental investigation covered an extensive area, from the Göreme Open Air Museum to the promontory bordered by the valleys of Göreme and Kılıçlar.

The research and its documentation contribute to the knowledge and promotion of the area's rich heritage, which is characterized by primary connotations that will be lost with time and permit the classification and typological study of the distinctive features of the buildings and life in caves.

The Quarry Landscape in Apulia. Protection Methodologies and Development Perspectives

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Quarrying areas determined by the identification of a geomorphologically homogeneous material are often marked by a considerable number of quarries that characterize the landscape. This phenomenon appears evident in Apulia, a region of Southern Italy characterized by the presence of calcarenite and limestone deposits that historically determined the opening of numerous quarries. These quarries have marked the landscape with their typical staircase/stepped shape and have profoundly influenced local architecture. The little attention given so far to their development and the rapid building changes of recent decades threaten the preservation and existence of these sites, which are obliterated by new construction or used as dumps.

Current Italian legislative instruments, particularly those of the Puglia region (PPTR), can help protect this landscape through a series of constraints and enhancement operations. This is the case of the landscape that stretches along the Adriatic southern coast of Bari, which is characterized by open-pit and underground quarries. These quarries characterize the architectural, productive and human history of this area. The Superintendence of Bari is currently defining a protected park for these quarries. This action aims at preserving them from future transformations of the landscape and enhancing their knowledge, also from a sustainable tourism perspective. This contribution aims to analyze this protection operation and offer a methodological example applicable to other similar contexts.