

## SESSION 7

### TECHNOLOGY

*Coordinated by Ana Cristina Araújo and Éva David*

This session focuses on one of the most important aspects of Mesolithic societies: their knowledge and their ways of converting raw materials into objects. Technology is a form of cultural expression that reveals different traditions, peoples, landscapes, and modes of production and operation, contributing to the knowledge of economic, social and symbolic aspects of humanity. Stone, bone, antler and shell, among other materials that have survived time and erosion, have been processed and used by groups for food, shelter, warmth and comfort, adornment, clothing, and so on. In this session we would like to bring emphasis on the enormous richness and diversity of technological solutions implemented by Mesolithic groups across time and space. We will explore the potential of new instrumentation (e.g. XRF, FTIR, 3D digital microscopy), approaches (e.g. artificial intelligence) and other analytical infrastructures and statistical tools for the study of Mesolithic technologies. Particular attention will be paid to current advances in the study of: (i) manufacturing processes; (ii) raw material procurement and circulation; (iii) function and use of objects; (iv) recognition of fashions and styles; and (v) role of experimentation. We would like to approach these subjects in a relational way, drawing on variables of past human behaviour that triggered differences in technical choices over various chronological sequences and/or geographic contexts.

S7

## TECH LUMIÈRE – PROCESSING PAST STORIES THROUGH TECHNOLOGY

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Tech Lumière – Processing past stories through technology The term “Tech Noir” is a genre of fiction which presents technology “as a destructive and dystopian force that threatens every aspect of our reality”. Playing with opposed terms, we propose that archaeologists dealing with studies of technologies are in the “Tech Lumière” genre of scientific storytelling, in which technology is presented as a decisive and instrumental force in shedding light on cultural expressions of the past. In this paper we will use data from lithic studies of assemblages from mountain and coastal sites from Early Mesolithic Norway to detect differences in strategies when it comes to raw material selection, technological processes, learning situations and demography. An important aim is to demonstrate the potential in assessing the entire lithic material, and not only a few selected categories. Above all, we want to focus on the stories and individuals found behind the modes of production and traces discovered on the sites. Keywords: lithic analysis, technological organization, skill transmission, coastal and mountain sites

## MESOLITHIC TECHNOLOGY AND KNOWLEDGE TRANSFER: THE DIFFUSION OF THE HANDLE CORE PRESSURE CONCEPT

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In this presentation I will discuss the Mesolithic Handle Core Pressure Concept (HCPC), focusing on its technology, chronology, and knowledge transmission. The HCPC, is a lithic technology that was used to produce small blades from single-fronted cores, and requires social learning for its diffusion and maintenance. Statistical analysis of attributes on cores and blades from Northern Europe reveals morphological similarities across the region, but also highlights regional technological differences, particularly related to core preparation, which correspond to two separate chronologies east and west of the Baltic Sea. Cores from Scandinavia show continuity with an earlier pressure-based blade technology from the Early Mesolithic. These findings suggest the diffusion of the HCPC through both vertical and horizontal social learning. The research underscores the role of mobility, material availability, tradition, and social interactions in the complex transmission of knowledge during the Mesolithic, offering insights into the long-term processes that shaped communication and learning in past societies.

## LITHIC TECHNOLOGY ON THE WESTERN-ESTONIAN ARCHIPELAGO

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This presentation is about my PhD project that studies the lithic technology on the Western-Estonian archipelago. In this thesis lithic assemblages from Saaremaa, Hiiumaa and Ruhnu islands are analyzed. Sites date from the Mesolithic 7th millenium BC to Early Metal Age 1st millenium BC. The study uses the chaîne opératoire approach to analzing stone tool technology. The project consists of three articles: first one concentrates on the lithic technology of the first settlers on the islands, second article looks at lithic technology the Comb Ware Culture Complex (CWC) period and the last article studies lithic technology of Early Metal Age Estonia which mostly concentrates on Saaremaa island which is located west of Estonian mainland. The main aims of the research are to describe the lithic technology starting from pioneer colonist to see how these people adapted to the local island environment, raw material availability and to see possible migration patterns based of their stone tools and raw material usage. Secondly, it looks for changes in technology among the CWC settlement sites and looks for technological remnants of original colonists in CWC assemblages. Lastly I look at how the introduction of metal affected the use and development of stone tools.

## FIRST ASSESSMENT OF THE EARLY MESOLITHIC LITHIC ASSEMBLAGE FROM CONTRADA PACE (TOLENTINO, CENTRAL-ADRIATIC ITALY)

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The Mesolithic in Italy is characterised by an uneven distribution of archaeological evidence, with higher concentrations of sites between the south-eastern Alps and the northern Apennines. In the central-southern regions, the number of identified sites is significantly lower and it almost exclusively consists of caves and shelters, explored over limited areas.

The open-air site of Contrada Pace, discovered in 2019 on a terrace of the Chienti Valley (Tolentino, Marche), stands out for its excellent preservation. Here, extensive excavations uncovered a seasonal settlement with various structures, including combustion features, escargotières, and tree stumps. In light of all these features, Contrada Pace can be seen as a kind of settlement so far unknown in the Italian Mesolithic. This work aims to discuss the first results of the techno-economic and typological studies of the lithic industry from US10, which was already analysed from a zooarchaeological, malacological and carpological perspective. US 10 is one of the most relevant archaeological features, consisting of a large and rich scatter of lithic artefacts and bone remains associated to a wide escargotière composed of tens of hundreds of land-snail shells of *Helix cf. pomatella*.

The lithic assemblage from US 10 is mostly realised on local cherts and can be assigned to the Sauveterrian tradition, representing the first evidence of an Early Mesolithic occupation in the Marche region. The numerous refittings that were realised provide valuable insights into the reduction sequences and production objectives, contributing to outline the technical traditions and socio-economic behaviour of local Early Holocene hunter-gatherers groups.

## EXPLORING THE MESOLITHIC OF THE CANTABRIAN LITTORAL (NORTHERN IBERIA): A PRELIMINARY APPROACH TO THE LITHIC INDUSTRY OF EL TORAL III ROCK SHELTER

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The Mesolithic of the Cantabrian area in northern Iberia has drawn scientific interest since the early 20th century, mainly focusing on "Asturian" sites but also other Mesolithic contexts. Among them, El Toral III (Asturias, northern Spain) is currently under study. A 2009 rescue excavation identified several stratigraphic units with archaeological remains, including shell midden deposits. Radiocarbon dating places the occupation levels within two Mesolithic phases, with continued use of the site into the Neolithic, Copper Age and Bronze Age. This study examines the lithic technology and typology of the Mesolithic units at El Toral III, focusing on raw material provenance, production systems, and the manufacture of retouched tools and microliths. The objective is to reconstruct lithic chaînes opératoires to better understand resource management, exchange networks, and mobility patterns throughout the site's occupation. The findings will help position El Toral III within the broader framework of Mesolithic hunter-gatherer-fisher communities along the Atlantic coast during the Holocene. Additionally, they will enable comparisons with other local and regional Mesolithic sites, offering new insights into the adaptive strategies and cultural dynamics of these prehistoric populations.

## CHANGES, RUPTURES AND TRANSITIONS: REFLECTIONS FROM THE MESOLITHIC OF THE EBRO VALLEY

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Technology is a conservative social practice that usually shows a progressive evolution. However, occasionally, the archaeological record presents radical transformations that break with the previous industrial tradition and replace it. In both cases, technological change occurs, but the mechanisms and factors that catalyse it necessarily respond to very different socio-historical realities. A good example of this is the Mesolithic of the Ebro Valley, which presents three very different transitional scenarios over time: 1) a progressive genesis of the Sauveterrian industries and their link with the industrial traditions of the final Late Glacial; 2) the particular development of the Mesolithic of notches and denticulates and its break with the technology of the northern Pyrenees; and 3) - the rapid adoption of the technology of the Late Mesolithic. Based on these examples, we want to reflect on how we analyse changes, ruptures and transitions in the archaeological record and their interpretative implications.



## **ACTIVITIES AND RESOURCE MANAGEMENT IN EARLY MESOLITHIC HIGHLAND HUNTING SHELTERS. TECHNOLOGICAL DATA FROM MONDEVAL DE SORA - VF1 AND PRÀ COMUN, PASSO GIAU - PC1 (BELLUNO DOLOMITES)**

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The Early Mesolithic occupation of the Alpine regions is well known, thanks to the hundreds of identified sites. For the populations of the Early Holocene, high-altitude environments represented a significant and non-negligible component of their economic and cultural systems. Among the numerous identified sites, rock shelters located under large boulders that feature multiple occupation phases play a crucial role in territorial mobility within high-mountain environments. Among them, the site of Mondeval de Sora - VF1 (Belluno Dolomites, Northeastern Italy) stands out for the richness of its archaeological findings. In recent years, a new rock shelter with rich Early Mesolithic layers has been discovered at approximately 3 km from it and excavated. This site is known as Prà Comun, Passo Giau - PC1. Currently, data on the economic role of these sites, in particular from a spatio-temporal perspective, are scarce, and their complexity is insufficiently detailed. However, the techno-traceological analysis of a sample of lithic artefacts from these two sites has provided new insight into the economic system that drove the occupation of such sites within the studied micro-regional context. The investigation has explored activities and utilisation needs, enabling a re-evaluation of the adopted technological systems. These preliminary data shed light on a small portion of the economic and organizational mechanisms of Mesolithic communities and help us define the role of these shelters within the seasonal mobility and resource management strategies applied in the Alpine landscape.



## DIFFERENCES IN THE LITHIC PRODUCTION ON QUARTZ IN CENTRAL SUDAN DURING MESOLITHICS

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Quartz emerges as ubiquitous raw material utilized extensively in lithic production across diverse geographic and temporal contexts. Here we focus on central Sudan and demonstrate through lithic collections from two Khartoum Mesolithic (ca. 9000–5000 cal BC) sites the variability in quartz tool production in this region. The compared sites are situated in different ecological niches and differ in the sources and types of quartz available as a raw material. All the studied material comes from excavated and radiocarbon dated contexts. The collection from Sphinx (Jebel Sabaloka), situated ca. 5 km from the Nile, shows predominant use of pebble quartz from the river terraces. In Shaqadud S1-B (Jebel Shaqadud), situated ca. 50 km from the river, quartz which eroded from the surrounding rocks mostly prevails. We will present the geological characteristics and knapping properties of the quartz used in these two collections to contextualize its significance as a raw material, describe the main characteristics of the studied assemblages and compare the findings to discern regional or chronological differences between the studied sites.

## TECHNOLOGICAL CHOICES OF LATE MESOLITHIC COASTAL POPULATIONS: A FUNCTIONAL APPROACH ON THE KNAPPED LITHIC TOOLS IN THE OSLO FJORD REGION, NORWAY

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The paper presents preliminary results of the MSCA postdoctoral project TeCh-Coast - Technological Choices of Coastal populations, that seeks to understand the technological choices of the coastal human groups in the Late Mesolithic (6300-4500 cal BC) in SE-Norway through the application of use-wear analyses of knapped lithic tools. As an intersection of marine and terrestrial biotopes, the coast is a critical ecological space for many human groups in past and present times. In the Scandinavian peninsula, from the end of the last Ice Age, human populations have lived and travelled along the coast, gaining from both biotopes. Technological systems are an important factor in the human/non-human relation. Food acquisition, toolmaking, travelling, or dwelling are some of the activities that have been performed by human groups, each representing specific and socialized technological choices. Knapped lithic tools are among the most common remains on the sites in the Oslo fjord region dated to the Late Mesolithic period. However, no exhaustive functional analyses have so far been performed on these materials. By combining macro and microscopic observations on large samples of materials of several sites, this project intends to reconstruct the functionality of a part of the coastal technological system. The identification of the treatment of marine materials with lithic tools will be a major clue to characterize the specific technological choices of the coastal groups, allowing a cross-regional comparative study of contemporary sites from the Bay of Biscay, as well as facilitate future comparisons with other coastal contexts from the Atlantic Europe.

## TECHNOLOGY, USE-WEAR AND RESIDUE ANALYSES OF THE SAUVETERRIAN LITHIC ASSEMBLAGE FROM GALGENBÜHEL (SOUTH TYROL, ITALY)

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The Mesolithic rock-shelter site Galgenbühel/Dos de la Forca, located in the Adige Valley (South Tyrol, Northern Italy), was frequented by Sauveterrian groups from the mid-9th to the mid-8th millennium BC cal. Sauveterrian lithic technology is often described as reflecting limited technical investment, especially compared to earlier and later prehistoric periods. Furthermore, due to the preponderant role of the armatures in the Alpine Mesolithic, along with the faunal remains largely dominated by the Ungulates, studies traditionally focused on hunting. However, recent techno-functional studies have revealed a wider range of practices, amongst which evidence for specialised tasks carried out at different sites. This pattern is consistent with a sophisticated settlement strategy, with sites fulfilling different roles within a dynamic subsistence system. Our study focuses on the lithic assemblage from Galgenbühel/Dos de la Forca, a site which is well known for the exploitation of wetland resources, especially fishing, with a specialization in pike fishing during the Boreal. We employed a multi-integrated approach, combining technological analysis with use-wear analysis (both low- and high-power approach) and residue analysis (combining 3D microscopy and FTIR spectroscopy). Our results revealed the occurrence of varied technical behaviours in producing, hafting and using lithic artifacts and suggest the presence of differentiated subsistence activities. These findings contribute to a broader understanding of the adaptive strategies employed by Mesolithic communities in the Alpine region where logistical mobility and site specialization likely played a pivotal role in managing environmental constraints and optimizing resource exploitation.

## LOOKING AT FUNCTION ON GEOMETRIC MICROLITHS: THE CASE OF THE MESOLITHIC SHELLMIDDEN OF CABEÇO DAS AMOREIRAS, PORTUGAL

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Geometric microliths represent one of the most discussed topics in material culture in Portugal, regarding the Late Mesolithic as well as the neolithization process. Specifically, for the Sado Mesolithic shellmiddens they were subject to long studies which interpreted them as chronocultural markers. However, on a functional level, there is little understanding if different typologies and production choices pertain to specific uses of these utensils on the communities that inhabited the Sado river valley, nor for what they were, in fact, used. As such, this paper will present a comparison between a morpho-typological and use-wear analysis on the geometric microliths of Cabeço das Amoreiras, retrieved from the 1950's and 2010's excavations of this site. The analysis demonstrates a standardized usage of these tools, with small apparent variation both on their production, hafting and use. This study improves our understanding on the methodological choices used by the last hunter-gatherers of the Sado river valley pertaining to geometric microliths and demonstrates a more standardized economy and usage than previously considered for these tools.

## **HOW MANY TECHNIQUES TO APPLY A MICROBURIN BLOW? AN EXPERIMENTAL APPROACH FOR EXPLORING THE MICROBURIN BLOW TECHNIQUE VARIABILITY**

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The microburin blow technique is a crucial element in the chaîne opératoire that involves the production of geometrics. In Europe, it sporadically appeared at the end of the Upper Paleolithic, but it reached its maximum diffusion during the Mesolithic. Discussion concerning when this type of fracture transformed from an unintentional breakage into a deliberate method (Krukowski microburin vs ordinary microburin) is still open. Microburins were first identified by Chierici in 1875. Later, several pioneers faced this production waste, but it was only in 1980 that J. Tixier explained in detail the technical process behind this blank segmentation technique. Past works proposed two force application techniques for obtaining a microburin fracture: percussion and pressure. Despite some observations on the efficacy and mode of operation of both these modalities have been published, a detailed analysis for identifying micro-, meso- and macroscopic criteria for differentiating them has never been developed. To answer this question, we propose a first experimental attempt to distinguish different microburin blow techniques by applying several combinations of retouchers (mineral vs organic), force application modes (pressure vs percussion) and types of anvil (mineral vs organic). A low-and high-power approach was carried out to encompass all manufacturing traces and identify a high range of diagnostic criteria. This combined approach applied to the Early Mesolithic assemblage from Mondeval de Sora (BL, Italy) turned out to be a consistent methodology highlighting the existence of a common and normalised technical procedure for applying the microburin blow during the Sauveterrian of the Southern Alpine region.

## THE MATERIAL AND ITS USE : COMBINING PETROGRAPHY AND TECHNOLOGY TO UNDERSTAND HOW A ROCK IS EXPLOITED. THE CASE OF THE MICROQUARTZITE IN THE MESOLITHIC BRITTANY (FRANCE)

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Because of its geology, Brittany stands out for the absence of primary flint deposits. From the end of the Upper Palaeolithic, knappers had to make do with flint pebbles scattered along the offshore bar. In Argoat (inland Brittany), they also used metamorphic or sedimentary fine-grained rocks which presented knapping abilities. This petrographic diversity is first and foremost a challenge for the lithic experts, since the stigmata of knapping are imprinted in an atypical way on some of these rocks ; as for, the debitage products do not fit neatly into the classic categories adapted to flint pieces. However, it is also a tremendous asset as studies into the origin and distribution of the raw materials provide an insight into territorial structures. The first objective of our work is to study the petrography of these rocks in order to determine their geographical origin. By focusing our investigations on one of them, the microquartzite of the Elorn valley in north-west Brittany, we were able to identify several deposits during field walking prospectings. The microquartzite samples collected are used to supply the reference collections in PETRA lithothèque of the CReAAH (UMR 6566, CNRS). This work forms a necessary basis for the development of reliable and well-supported reference systems. Petrographic analysis have identified several facies of microquartzite whose representativeness varies according to the deposits. The second main objective of this program is to compare petrographic and technological analysis in order to verify the hypothesis of possible differential management of these facies during the Mesolithic.



## THE MOYNAGH POINTS FROM MOYNAGH LOUGH: USING pXRF ANALYSIS TO DETERMINE VARIABILITY WITHIN AN ASSEMBLAGE

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Moynagh Points are Late Mesolithic to Early Neolithic elongated ground stone artefacts that are found only on the island of Ireland. They are made from a variety of fine-grained sedimentary stones that have not previously been identified. This group of just over fifty artefacts is poorly understood with little known about their raw materials, manufacture, morphology or use. Moynagh points are usually found as isolated finds, and rarely in pairs, however ten points were found at Moynagh Lough, which gave them their name. As well as being internally varied, the points from Moynagh Lough are visually distinctive from the rest of the known Irish examples, both in form and in raw material. This study combined geological identification and pXRF analysis to examine the stone used to make the artefacts from Moynagh Lough in order to characterise the internal variation or similarity within the group. The group was then compared to two visually dissimilar artefacts from different regions to establish the likelihood of different raw material sources between regions.



## USE OF BIRCH BARK TAR IN PREHISTORY IN THE EASTERN BALTIC REGION

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Birch bark tar has been discovered at numerous sites across the Eastern Baltic, dating from the Mesolithic period to the early Iron Age. The earliest evidence, from Mesolithic settlement sites in Estonia, dates back to approximately 8600 BC. Birch bark tar is primarily found in the form of traces of tar on composite bone and stone tools, as well as separate lumps, including chewed pieces. A multidisciplinary study of tar collections from Estonia, Latvia, and Lithuania included chemical analyses, microscopic examinations of surface treatment traces, direct radiocarbon dating, 3D scanning, photogrammetry, and computed tomography. These investigations provided new insights into the manufacture and use of composite tools and tar adhesives. Experimental studies, including the reproduction of tar and slotted tools, shed light on Stone Age technologies, enhancing our understanding of the techniques and innovations employed by prehistoric communities in the region. Moreover, our research revealed a unique tar figurine at the Pulli site in Estonia, which may be the oldest known portable figurine from the Eastern Baltic region. This shows that along with the most recognized use as an adhesive for composite, slotted, and hafted tools, as well as for pottery repairs, tar also played a role in artistic production from the earliest period.

## **NEW INSIGHTS INTO THE ROLE OF BONE TOOLS IN THE ACQUISITION OF BARK BY MESOLITHIC COMMUNITIES: THE CASE OF 'BONE DAGGERS' FROM DĄBKİ 9, POLAND, AND BEVEL-ENDED TOOLS FROM PULLI, ESTONIA**

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During the early Holocene, bark was an important raw material in addition to wood. Bark was used in the construction of roofs and floors, and served as an important material in the manufacture of various objects, including containers, rafts and even boats. The bark of certain trees, such as birch, was also distilled to make tar. Unfortunately, little is known about how this raw material was obtained and what kind of tools Mesolithic hunters might have used in this type of activity. Recently, new data on this issue have been provided by the wear analysis of bevelled bone tools from the Early Mesolithic sites of Pulli in Estonia and the so-called "bone daggers" from Dąbki 9 in Poland. The traceological analysis of these artefacts has provided new insights into the methods of obtaining bark and the nature of the collected material. It has shed light on the importance of bone tools in the procurement of plant materials, particularly in the debarking of wood by Mesolithic hunter-gatherers. In addition, the studies reported here included extensive experimental research and classification of use-wear traces identified on experimental tools used in different types of debarking activities, which are also discussed.

## RETRIEVING OSSEOUS BIOGRAPHIES: DEVELOPMENT AND TRANSMISSION OF TECHNOLOGIES IN THE BALTIC SEA REGION C. 9500–3000 BCE

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Osseous production has generally been understudied in relation to lithic technology, partly due to the rarity of preserved bone materials from the Stone Age. However, the eastern Baltic Sea area offers several exceptions. The research project Retrieving Osseous Biographies addresses the knowledge gap about manufacturing processes, traditions, knowledge transmission and social networks related to osseous craft among hunter-fisher-gatherer societies across the Baltic Sea region, c. 9,500-3,000 BCE. The project examines four unique artefact collections from Sweden, Latvia and Estonia, and covers artefact studies, osteological and taphonomic analyses, radiocarbon dating and ZooMS-analysis. While many objects have been typologically attributed to different parts of the Stone Age, a significant portion of these implements remains undated. Bones also provide valuable biodata on animal populations and environmental conditions, offering insights about human choices, trade and exchange of objects and/or raw materials. We further investigate the environments in which these objects were created, used, and discarded through different palaeoecological analysis. Preliminary results suggest that a similar morphology can be observed on different types of tools over long periods of time. However, there are also noticeable differences within the region that are difficult to quantify so far, due to the very different taphonomic histories of the collections.

## **POLISHING AND SHARPENING IN THE MESOLITHIC: EVIDENCE OF PRACTICES IN THE EXTREME WEST OF THE IBERIAN PENINSULA**

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Polishers emerged in the Mesolithic as a new category of tools, related to specific activities complementary to artifact production. As in other locations, the identification of these types of artifacts in Portugal reveals the need to optimize the performance of tools for tasks primarily of an economic nature, also constituting direct evidence of the technological complexity of these populations. The generalization of polishers will result in the development of polishing and abrasion techniques, which characterize the production methods of early Neolithic societies. These objects can take on various morphologies and are associated with different environments, demonstrating intentional productions linked to specific functions and materials. The objective of this paper is to present this contrast, based on collections from sites such as Toledo (Araújo, 2011), Gaspeia (Soares and Silva, 2020), and Barranco Horta do Almada 1 (Rosa, 2017).

## TOOTH-DERIVED TOOLS AND TECHNOLOGICAL TRACES: ISSUES IN IDENTIFICATION

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Beaver mandible tools with working blades fashioned from modified incisors are among the most commonly found bone implements at Mesolithic sites in the forest zone of Eastern Europe, suggesting their significance for the local population. Paradoxically, their specific scope of application remains unclear. While wood would have been an obvious working material, it rarely survives at Stone Age sites, and when it does, the surface condition is seldom adequate for detailed analysis. Moreover, diagnostic traces of incisor use on wooden artefacts are exceptionally rare. Technological traces potentially associated with beaver incisors or other animal teeth have also been identified on elk antler and broad bones surfaces. To investigate and elucidate the role of dental enamel working edges in producing certain types of technological traces, particularly in the context of object decoration, a series of experiments was conducted. The results were subsequently compared with trace samples from the assemblage of the wetland site Zamostje 2 (Upper Volga region, ca. 7th–6th millennium cal BC).

## **EXPLOITING LITTLE FLINT PEBBLES: THE MESOLITHIC LITHIC ASSEMBLAGE OF RIPARO BLANC (MONTE CIRCEO, CENTRAL ITALY)**

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Riparo Blanc is a small rock shelter located along the Tyrrhenian Sea coast of Monte Circeo, in central Italy. It was the first Mesolithic site identified in the Italian peninsula at the end of 1960s. A recent reassessment of the site has revealed Riparo Blanc to be a significant Early Mesolithic burial ground in the Mediterranean area (see Altamura et al.). The Early Mesolithic occupation levels, whose excavation were resumed in 2016-2019 by Università di Roma Sapienza, have yielded a large number of shells, predominantly marine, along with a smaller number of land shells, charcoal remains, and fewer bone fragments from mammals, fish, reptiles, and birds. Notably, the site has also revealed the presence of a substantial collection of *Columbella rustica* shells (see Mussi et al.). Although it was never thoroughly studied, the lithic assemblage from Riparo Blanc was recognized as highly distinctive by Mariella Taschini in the 1960s since the outset of research, and likely related to the specific subsistence activities carried out at the site. It is composed of around 2000 artefacts from old excavations and 300 from new investigations and primarily manufactured on local marine pebbles by using bipolar technique. Furthermore, at least two small fragmented bladelets/flakes made on obsidian were also retrieved from the recent excavations. A new study aims to reconstruct the technical objectives and the reduction sequences applied to the small local marine pebbles, through a techno-economic analysis and an experimental program. The potential for conducting a traceological analysis will also be assessed.

## QUARTZ SCRAPERS: EVIDENCE OF CURATED TECHNOLOGY AND PERSONAL GEAR IN NORTHERN SWEDEN

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At the excavation of a late Mesolithic site in Borgvattnet (Jämtland parish, northern Sweden), quartz was the dominating raw material. Quartz in Mesolithic Scandinavia is typically considered a wear-and-tear material, meaning that not much effort was invested in crafting formal tools. During the classification of the lithic material from the site, the vast majority of the quartz consisted of unmodified flakes and fragments. However, a small number of formal tools in the form of scrapers were identified. The scrapers consist of modified flakes that have been repeatedly retouched and re-hafted. The scrapers found at the site were worn out, replaced and discarded. This can be interpreted as a form of curated technology, which is unusual in quartz assemblages. Use-wear analysis of the scrapers reveals wear indicating that they were used on wood, skin, and rawhide/meat in a scraping motion. Furthermore, traces of resin and possible hafting traces were also observed. Recent studies have identified similar tools made from other raw materials at several Mesolithic sites in Sweden. This project presents the initial results of an ongoing study aimed at understanding this type of curated scrapers in Northern Sweden. Due to the significant maintenance invested in the scrapers, they can be seen not only as evidence of a curated technology but also as an expression of personal gear in hunter-gatherer communities in late Mesolithic Sweden.



## USING A DOUBLE AWL FROM THE SOMK MESOLITHIC SITE IN SARDINIA

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During the Last Glacial Maximum Sardinia was part of the largest Mediterranean island, the Sardo-Corsican Massif, but split from it when the sea level rose and never had any direct connection with the distant continental landmass. The first firm evidence of human peopling is of Early Holocene age, as recorded at a handful of Mesolithic sites and notably at S'Orku e S'Orku (SOMK), a now collapsed rockshelter on the western coast dated 9,500-7,800 cal BP. Obsidian was available and routinely flaked but, given the endemic fauna of Sardinia, which in the Holocene was depleted of any large mammal species, horn or sizeable bone was not available, but only the small *Prolagus sardus*. At SOMK there is a low-grade metamorphic rock, i.e. naturally occurring metasiltite or metasandstone in the form of lamellae, which may have been used by humans. A fine double awl was produced and the material is currently being defined. Surfaces were observed by digital microscopy (DM) with an Olympus Dsx1000 microscope. While the central body of the tool underwent minimal change, the two extremities show traces of processing, rounding and polishing probably due to the variable intensity of use. They differ in shape, one rounded and one pointed. Traces of ochre are being analysed by Raman microscopy. Experimentation will complete the current study. Naturally pointed metamorphic rocks from the SOMK area, together with small mammal bones, will be experimentally applied to animal and plant materials in order to clarify patterns of use and the types of materials processed.

## **A SLOW BURN: AN ETHNOGRAPHIC REVIEW OF HUNTER-GATHERER FIRE-TRANSPORT METHODS, AND THEIR CONSEQUENCES FOR ARCHAEOLOGICAL FINDINGS AT STAR CARR**

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The presence of fire-carrying strategies within the hunter-gatherer ethnographic record has been used to suggest the possibility of fire-carrying also being used during the Palaeolithic. However, the potential significance of these strategies to Mesolithic studies has been overlooked. A good example is the organic assemblage recovered from Star Carr (North Yorkshire, UK), which includes extensive evidence for charred artefacts and materials potentially linked to fire management, e.g., fungus. However, a systematic consideration of evidence for fire, its character, and the potential technological repertoire surrounding its curation and transport is lacking. This gap can be addressed using the ethnographic record, which may provide insight into possible prehistoric fire-transport methods and support a fuller interpretation of the archaeological evidence. This poster will focus on the results of an ethnographic literature review undertaken using the electronic Human Relations Area Files (eHRAF) ethnographic database, the aim of which was to collect hunter-gatherer fire-carrying techniques. In total, 61 hunter-gatherer/primarily hunter-gatherer groups were identified as possessing strategies for carrying fire. Information collected during this review included: the duration the fire was carried for, the context it was carried in, the carrying method, if it was carried by a particular individual, and what materials were used to carry the fire or if a composite construction was created. The results are used to re-examine charred objects from Star Carr to explore if there are consistencies with fire-carrying, possible strategies that might have been deployed to achieve this, and implications for the lifeways of the people occupying the site.