

Ice age EUROPE

NETWORK OF HERITAGE SITES

Magazine

ISSUE 4 APRIL 2020



Specialized and innovative Neanderthals

New research at Fumane Cave unravels advanced technology – page 8

A legacy for the future

Documenting Altamira's collections – page 14

Scladina Cave

Discover one of Wallonia's famous Neanderthal sites – page 18

Approaching environmental and social sustainability

Two case studies of museums in transition – pages 22–25



INTRODUCTION

Welcome to the fourth edition of the Ice Age Europe magazine!

The purpose of our publication is to present you highlights of the many activities taking place at the different Ice Age sites across Europe. Our network members are engaged in a broad spectrum of topics, which is reflected in every single issue of our magazine. These are research and conservation, documentation and digitisation, museum management and exhibitions as well as education, communication and tourism. Last but not least all Ice Age Europe network members tackle different aspects of sustainable development. We have created a new magazine section to also showcase these examples.

It has become a nice tradition that the first article of each magazine issue is written by a guest author. This time it's Trine Kellberg Nielsen from the Moesgaard Museum in Denmark, reporting on a joint exhibition project with the Neanderthal Museum, Germany.

As we are believing in the power and potentials of networks, among many other activities Ice Age Europe will again be an official partner of the European Archaeology Days taking place from June 19th to 21st and most likely in the virtual space, and we will also host our own Ice Age Europe Day on September 20th 2020.

If you would like to get in touch with any question or enquiry, please contact Katrin Hieke at our network office via office@ice-age-europe.eu or via our social media channels on Twitter, Facebook and Instagram.

This and all previous issues of our magazine are available for free on our website www.ice-age-europe.eu/learn-and-discover/magazine.html.

We hope you enjoy reading!

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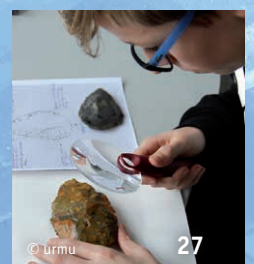
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Marc Steinmetz, © Archäopark Vogelherd

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Detail of Ekain's Great Panel, © Ekainberri

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Ice age EUROPE

NETWORK OF HERITAGE SITES



■ Europe's coastline today ■ Ice Age coastline □ Maximum ice coverage

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SPAIN

- 1 NATIONAL MUSEUM AND RESEARCH CENTER OF ALTAMIRA - Santillana del Mar
- 2 NATIONAL CENTER FOR RESEARCH ON HUMAN EVOLUTION (CENIEH) - Burgos
- 3 CAVES OF SANTIMAMIÑE AND BIZKAIA MUSEUM OF ARCHAEOLOGY - Bilbao
- 4 EKAINBERRI - THE REPLICA OF THE EKAIN CAVE - Zestoa

FRANCE

- 5 PREHISTORY MUSEUM OF SOLUTRE - Solutré-Pouilly

BELGIUM

- 6 SCLADINA CAVE ARCHAEOLOGICAL CENTRE - Sclayn/Andenne
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GERMANY

- 8 NEANDERTHAL MUSEUM - Mettmann
- 9 MUSEUM OF PREHISTORY - Blaubeuren
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BRINGING NEANDERTHALS TO DENMARK: AN EXHIBITION COLLABORATION BETWEEN MOESGAARD MUSEUM AND NEANDERTHAL MUSEUM

Author: Trine Kellberg Nielsen, Moesgaard Museum, Højbjerg, Denmark

Although there is no secure archaeological evidence to suggest that Neanderthals ventured into the area we now refer to as Denmark, Neanderthals will – at last – make it to the Danish city of Aarhus in 2020, by means of a large special exhibition at the Moesgaard Museum. This exhibition is made in close collaboration with the renowned Neanderthal Museum in Mettmann, Germany, famously situated close to the Feldhofer Cave, the type locality of the Neanderthal human. This collaboration is a fundamental bridge ensuring that the exhibition is internationally rooted, and draws on the wide and highly relevant Ice Age Europe Network of which the Neanderthal Museum is the lead partner.

story of how Neanderthals to a large degree were expertly adapted to climate change, and it will offer visitors close encounters with their daily life, such as hunting, social interaction and cultural behaviors. The exhibition will continue the journey of the Neanderthals during the Weichselian period and will take us East to the fateful meetings with humans, including Neanderthals, *Homo sapiens* and Denisovans, thus offering reflections on what these genetic and cultural encounters meant for the survival of the diverse human groups, as well as what it means for us today. The exhibition will end with the spread of the early *Homo sapiens* and reflect on what happens after the Neanderthals and Denisovans disappear.



The Moesgaard Museum is situated in the coastal forest landscape south of Aarhus and is designed by Henning Larsen Architects A/S, © Moesgaard Museum, Iga Kuriata

In 2015, the museum inaugurated a new 16,000 square meter exhibition building with 4,000 square meters of permanent exhibition space for archaeology and social anthropology and a 900 square meter special exhibitions gallery. The special gallery opened with the exhibition “The First Emperor – China’s Terracotta Army” featuring the terracotta warriors from the Qin and Han Dynasties. The exhibition “Heroes of the Colosseum” in 2016 involved loans of many remarkable objects from Italian museums, including the Colosseum, Pompeii, Naples and Bologna. The 2018 special exhibition “On the steppes of Genghis Khan – Mongolia’s nomads” featured exhibits on loan from the National Museum of Mongolia and the Institute of History and Archaeology in

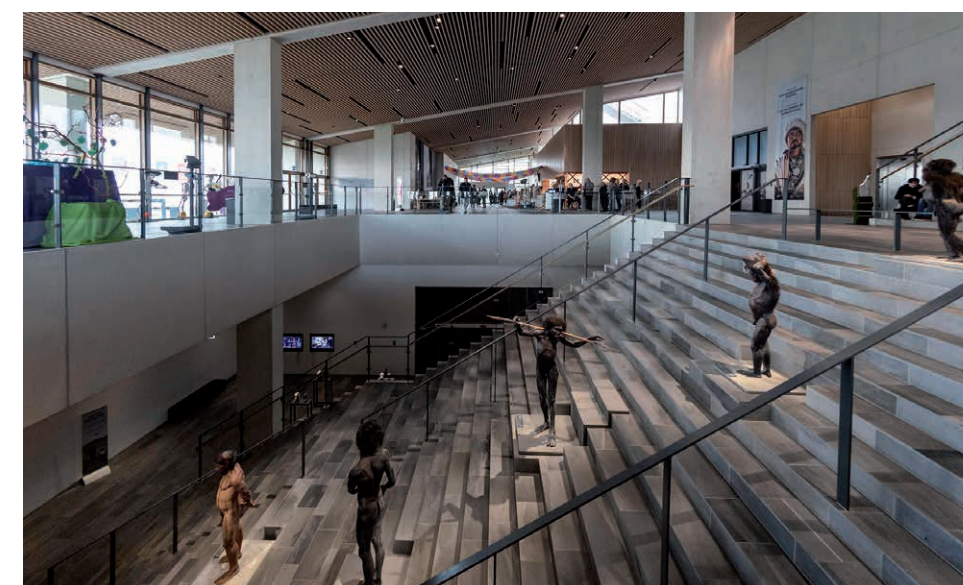
“This collaboration is a fundamental bridge ensuring that the exhibition is internationally rooted.”



Central staircase at the Moesgaard Museum showcases a variety of hominin reconstructions made by Élisabeth Daynès, Kennis & Kennis (middle), and Oskar Nilson, © Moesgaard Museum, Rógvi N. Johansen



View of a section of the permanent exhibition, © Moesgaard Museum, Simon Christensen



Entrance hall and central staircase leading to the permanent exhibitions at the Moesgaard Museum, © Moesgaard Museum, Rógvi N. Johansen

The special exhibition is planned to open between autumn 2020 and spring 2021 under the title “Neanderthals – in the land of the mammoth hunters” and is supported by Augustinus Fonden, Aage og Johanne Louis-Hansens Fond, Spar Nord Fonden, Knud Højgaard’s Fond and KrogagerFonden. The title hints at the timeframe of the exhibition, which will focus on the Neanderthals in the time after the transition from the warm Eemian Interglacial during the onset of the cold Weichselian Glaciation, the ice age which ultimately led to the extinction of the Neanderthals. Although the fate of the Neanderthals is a sad one, the exhibition will focus on the living Neanderthals and tell the

About the Moesgaard Museum

Moesgaard is a self-governing, partly state-funded cultural history museum located in Denmark’s second-largest city, Aarhus. Since 1970, the museum has been based at Moesgaard Manor, together with the Department of Prehistoric and Medieval Archaeology and the Department of Social Anthropology of Aarhus University. Moesgaard Museum has ambitious aspirations in its exhibitions and the museum has its own in-house exhibition office with architects, a scenographer, IT designers and archaeologists. Our special exhibitions are financed by ticket sales and grants from private foundations. The museum is granted with National Indemnity.

Ulaanbaatar and the Danish National Museum in Copenhagen. “On the way to the catastrophe – Pompeii and Herkulanum”, on display in 2019, shows extraordinary original artefacts from the towns below Mount Vesuvius on loan from, among other institutions, the National Archaeological Museum in Naples and the Archaeological Park of Pompeii and Herkulanum.

Trine Kellberg Nielsen is researcher and project manager at Moesgaard Museum. ■

More information

www.moesgaardmuseum.dk/en/exhibitions/neanderthal



SPECIALIZED AND INNOVATIVE NEANDERTHALS: NEW MULTIDISCIPLINARY STUDY UNRAVELS THE ADVANCED TECHNICAL MANIPULATION OF BACKED STONE TOOLS IN FUMANE CAVE

Fumane Cave, Italy / Author: Nicolò Scialpi

During the Palaeolithic, hominids used lithic technology to make different stone tools for almost every daily activity. These technical skills represent a great ability for adaptation and a deep knowledge of the territory and its raw materials.

The technological repertoire of our cousin species, Homo neanderthalensis, in the production of lithic tools, has always been considered monotonous because of a supposed inability of self-innovation. This set of skills is generally related to the arrival of anatomically modern humans in Europe around 45,000 years ago.

Some types of innovative tools have always been recognised as a proxy of the so-called “modern” behaviour and as an important step in the development of human tool ergonomics: these stone artifacts are backed tools.

The backed items are lithic artifacts with a retouched edge on their thick “back” part organized for the manual handling or hafting; they are widespread within Early Upper Palaeolithic or Middle Stone Age in Africa and they are mainly associated with anatomically modern humans.



Experimental use of manually handled backed items for cutting dry skin, © Delpiano/Zupancich



The hafting of a backed tool with pitch as glue, © Delpiano/Zupancich

In Europe, these artifacts were nonetheless first manufactured by Neanderthal man, especially in certain late Middle Palaeolithic sites spread all over France.

A recent paper published in the Journal of Archaeological Science from the archaeologists of the University of Ferrara shows a specialized use of backed tools by Neanderthal men in the Italian site of Fumane Cave (<https://doi.org/10.1016/j.jas.2019.105011>). The study of a rich corpus of items characterized by discoid technology and recovered from the large assemblage of unit A9, which is dated to at least 47.6 cal ky, has led to the identification of distinctive patterns of anthropogenic modifications.



The lithic knife with a backed tool as a blade, © Delpiano/Zupancich

“The specific elaboration of backed lithic pieces in the assemblage of unit A9 of Fumane Cave suggests a great technical competence and behavioural flexibility of late Neanderthal populations.”

The combination of technological, techno-morphological and use-wear analyses, along with experimental replication and use of backed pieces, has shown that just a few of these tools were hafted, while most of them were intended for manual use.

This pattern in the prehension and use of backed artifacts implies the execution of precision activities that would need a “steady grip” such as the cutting of tendons, the detachment of the meat from bones and the processing of wood or dry skins.

The experimental approach has been fundamental for the identification of these patterns; this method, intended as a scientific and detailed analyses of gestures and techniques and not just as a way to replicate lithic tools, can lead to confirm or deny the hypothesis formulated from archaeological data.

The approach has also proved the profound knowledge of the concept of ergonomics (i.e. the relation that stands between human and artifact) possessed by Neanderthal men, suggesting that this specialized behaviour was an innovative response to disparate needs and activities which didn't strictly require hafting.

In conclusion, the specific elaboration of backed lithic pieces in the assemblage of unit A9 of Fumane Cave suggests a great technical competence and behavioural flexibility of late Neanderthal populations and represents an independent innovation of European Mousterian groups. ■

ABOUT FUMANE CAVE, ITALY

Grotta di Fumane is a cave on the southern edge of the Veneto Pre-Alps, in the North of Italy. It has produced a dated sequence from the Middle to the Upper Palaeolithic. Excavations have been carried out at different times since 1988.

Thousands of flint flakes and cores, bones, teeth, charcoal, worked pebbles, bone hammers prove that Neanderthals made fire, manufactured stone tools, butchered animals and birds, and treated hides and pelts. Painted stone slabs and perforated sea shells testify to some of the first modern man artistic expressions in Europe.

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Laboratory at CENIEH, © Susana Santamaría

THE CENIEH CONSERVATION & RESTORATION LABORATORY FOR ARCHAEOLOGICAL AND PALEONTOLOGICAL CULTURAL HERITAGE

National Center for Research on Human Evolution (CENIEH), Spain /
Author: Pilar Fernández Colón

The National Research Centre on Human Evolution (CENIEH), sited in Burgos, Spain, since 2006, is open to scientific and technological use by the international community. Its research activities are mainly on human evolution during the Late Neogene and Quaternary, and include collaborative projects at excavations and deposits of these periods worldwide. In addition, the CENIEH is responsible for the conservation, management and recording of archaeological and paleontological collections from Pleistocene Sierra de Atapuerca sites (Burgos), designated a UNESCO World Heritage site in 2000. For that

reason, the first laboratory facilities open at the CENIEH were aimed at heritage conservation.

The Conservation & Restoration Laboratory comprises 145 m² with a versatile and open concept, and a permanent staff of graduated conservators-restorers on archaeological and paleontological cultural heritage with extensive experience. It is designed and equipped to fill the needs of the conservation procedures of the cultural heritage that arrives at the lab facilities. At the laboratory, the material is evaluated and conserva-

tion strategies are being developed (preventive conservation, remedial conservation and restoration), focusing on the preservation for present and future generations of the collections stored at the CENIEH, or in others institutions, museums, exhibitions rooms, archaeological sites, etc. Conservation strategies should provide technical solutions through direct or indirect actions in order to avoid, minimize and arrest the potential and current damaging processes which could affect the cultural heritage. Regarding remedial conservation and restoration actions, implementation of treatments will be carried out under the principle of minimal intervention as well as non-interference with any future examination, treatment or analytical techniques. Preventive conservation procedures mainly include risk assessment, development and implementation of guidelines for appropriate environmental conditions for storage and exhibition, and proper measures for handling, packing, transport, and scientific use. The diagnosis of the state of conservation and material characterization of the cultural heritage is carried out through the application of several analytical techniques presents at the CENIEH, including: confocal laser microscopy, Scanning Electron Microscope (SEM), Micro-Computed Tomography (μCT), RAMAN and IR spectroscopy, or X-ray spectrometry.

The laboratory provides its services to internal projects developed at the CENIEH, as well as to external bodies, including both the public and private sector. Since 2006, the CENIEH collaborates with national and international museums and institutions such as El Bardo Museum and the Institute of Archaeology from the University of Algiers 2 (both in Algeria), the Georgian National Museum (Tbilisi, Georgia), the Max Planck for Evolutionary Anthropology (Leipzig, Germany), and the National Museums of Kenya (Nairobi, Kenya). To be emphasized is the contribution for the conservation of Plio-Pleistocene sites like those at Sierra de Atapuerca (Burgos), Ain Hanech (Algeria), and Dmanisi (Georgia). In addition, the lab is responsible of the conservation of the permanent collections and exhibitions at the adjacent Museum of Human Evolution (MEH) in Burgos, that comprises the most significant fossils from Atapuerca: *Homo antecessor* and Sima de los Huesos hominins. ■

ABOUT CENIEH, SPAIN

The CENIEH is a research centre belonging to the national network of Unique Scientific & Technical Infrastructures (ICTS). It is open to scientific and technological use by the international scientific and technological community. Its research activities are mainly on human evolution during the Late Neogene and Quaternary, and include collaborative projects at excavations and deposits of these periods worldwide, in particular from Atapuerca.

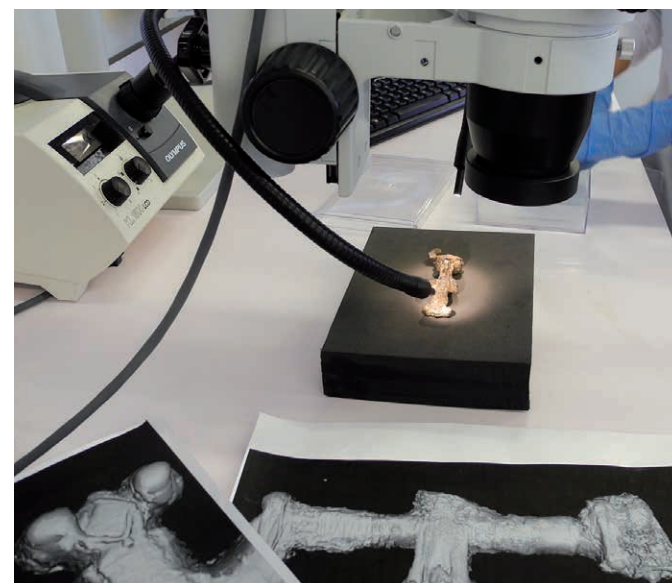
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“At the laboratory, conservation strategies are being developed, focusing on the preservation for present and future generations.”



Conservation training & internships, © CENIEH



Diagnosis procedure, © CENIEH



Preventive conservation: Proper storage & handling, © CENIEH



Direct intervention on cultural heritage: Restoration, © CENIEH



Neanderthal Museum, Mettmann, © Foundation Neanderthal Museum

THE DISAPALE PROJECT

Neanderthal Museum, Germany / Author: Gianpiero Di Maida

In the last decades, social media and digital tools have become an ubiquitous presence in our everyday lives. Science and research are of course no exception in this scenario.

Archaeology, lately one of the most dynamic and lively fields within the humanities, was also stormed by the so-called digital turn, as several publications don't miss to notice (e.g. Petersson/Larsson, 2018). Not only research and fieldwork have been involved in this turn, but the activities of museums, too: "Archaeological museums have adapted to and started to rely more consequentially on digital tools for both managing of col-

lectious use of a 3D scanner within several research projects, and the use of interactive digital media in the exhibitions.

A new project in this field, the DISAPALE project, has been organized and is hosted by the Neanderthal Museum since 2018. DISAPALE is an acronym and stands for Digitale Sammlung Paläolithischer Leitformen (German for Digital Collection of Lithic Typological Forms). The project is financed by the BMBF (Bundesministerium für Bildung und Forschung, Federal Ministry of Education and Research) and the DLR (Deutsches Zentrum für Luft- und Raumfahrt, German Aerospace Center).



The scanner used by the DISAPALE project, © Neanderthal Museum



One of the artefacts ready to be scanned, © Neanderthal Museum

lections and the display of exhibitions. [...] Several archaeological museums around the world have parts of their collections displayed digitally, one of the most famous being the British Museum, showing around 3.5 million objects in their catalogue online, and it is continuously growing" (Petersson/Larsson, 2018, p. 71).

The Neanderthal Museum too has been active in this regard, e.g. with the establishment of the NESPOS database, the active and

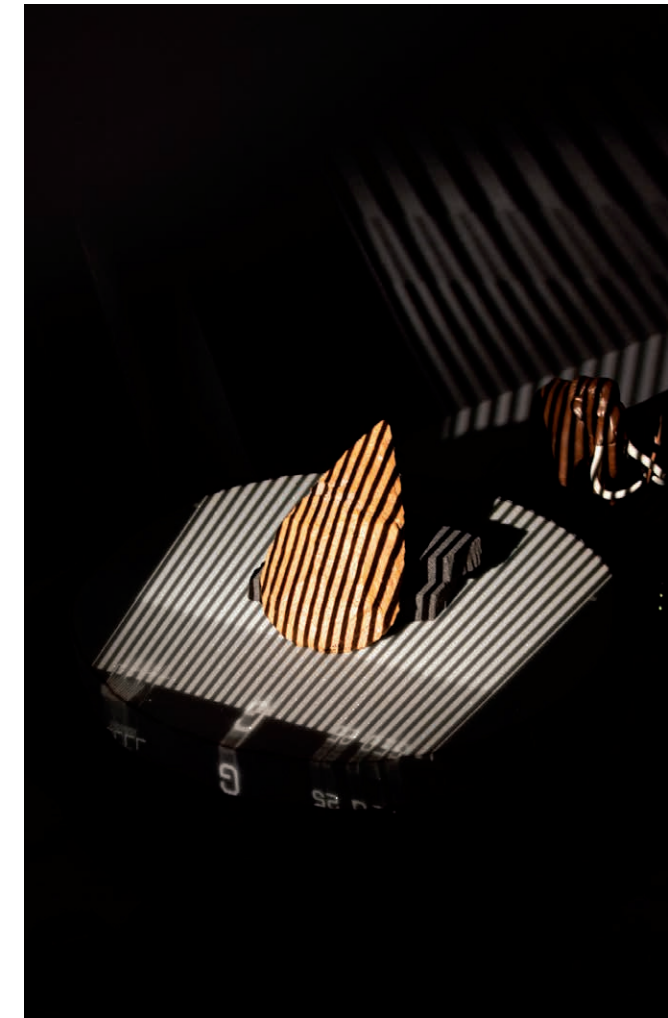
The main task of DISAPALE is to digitize different typological forms known from the literature (in several variants per type, to cover also their diachronic and synchronic variance) and make them available online for amateurs, students of archaeology and professionals alike. The recording process is being carried out using a structured light scanner, but along the way also other tools have been used to compare and test the results and thus produce a dataset about the different methodologies of recording.

In the past year and a half, our team managed to establish a workflow that let us effectively produce a complete digital documentation of the selected artefacts, and we are confident this will represent in itself a powerful tool in the hands of everyone interested in the study of the lithic artifacts of the European Palaeolithic.

Moreover, thanks to the work done so far, several of the challenges that the scientific community will face in the years to come have been experienced directly by our team: the standardization of formats, data portability and exchange, preservation and storage of the collected data, distribution and user experience.

On a more detailed level, DISAPALE also managed to give us a fresh and renewed perspective on long-debated but clearly

“Several of future challenges are being addressed: the standardization of formats, data portability and exchange, preservation and storage of the collected data, distribution and user experience.”



The artefacts during the scanning process, © Neanderthal Museum

We are confident that our project might help in bringing new interest and possibly new insights in solving the issues present in the topic. Finally, the DISAPALE project, with its considerable amount of new raw material that will be offered to the scientific community, will also be of help in the development and application of diverse 3D-based analytic tools (e.g. geometric morphometrics). ■

Reference

Petersson, B. and Larsson, C. (2018). From storing to storytelling – archaeological museums and digitization. In Huvila, I. (ed.). Archaeology and archaeological information in the digital society, pp. 70-105.

ABOUT THE NEANDERTHAL MUSEUM, GERMANY

One of the most popular and most modern museums of Europe is situated on the ground where the most famous German was discovered 150 years ago: the Neanderthal man. This world historic place gives reason for a time travel through the history of mankind – from the very beginning in the African savannah more than 4 million years ago until today.

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Cave ceiling of Altamira caves, © Museum of Altamira

ALTAMIRA DOCUMENTATION OF COLLECTIONS. A LEGACY FOR THE FUTURE

Museum of Altamira, Spain / Author: María de la Cerca González Enríquez

Legacy is the inherited estate, the toil of our ancestors which reaches our lives despite time. The territory we inhabit, the customs and beliefs, what we were and what we are and our creations, the works harboured in museums, are all part of a unique, unrepeatable human reality. The variety of social constructions of these realities has given rise to the cultural diversity that defines us as humans, each of them contributing to our species' legacy.

Museums preserve this legacy by safeguarding and conserving it, researching and disseminating it for the future. After all, behind every human work is an idea dreamt up and transformed in the brain, which inhabits an object, a monument or a tradition, which is inherent to the society that created it and which we recognise today, as our own or others', seizing the past as our own. Altamira Cave is a good example. This monument is

part of a cultural landscape that sheltered communities that expressed their thoughts through cave art and shared ways of life back in the Pleistocene. Today it represents a community's appropriation of its cultural asset.

Museums are institutions that serve society and evolve with it. Today's society wants quick, concise and global information. To meet this demand, we have gathered the information from our institution and the knowledge from the collections as documentation centres, because it cannot be disseminated without being known, and it cannot be known without research, and it cannot be researched and disseminated without having gathered all the documentation needed. Today, the museum is a cultural mediator between its collections and society because it exercises stewardship of them for society's benefit.

Collections are available online in the Digital Network of Museum Collections of Spain (CER.es) and in the rock art monographic catalogue "Altamira, the First Art".



A museum envisioned thus produces exhaustive, varied documentation. Documentation departments are in charge of organisation and safeguarding this information, as well as for the instruments to retrieve it so it can be disseminated at differing levels of knowledge depending on what the user needs.

The materialisation of this concept in Spanish state-owned museums is the DOMUS system, an IT application which seeks to create a comprehensive policy of museum activities by unifying the museographic and administrative document processes and standardising the terminology. After all, objects are nothing without their history, the documents that stay with them throughout their life cycle.

This system has allowed all the information produced at the museum to be compiled in order to make it accessible. But the most important aspect is that it has facilitated the creation of a network of museums, the Digital Network of Museum Collections of Spain (CER.es), and the creation of joint projects like Museos en Red (Museums in Network), which allow users to get all the information they need at the same time. It has also made it possible to create individual or thematic catalogues in conjunction with other museums. In this sense, the Museum of Altamira is contributing to the dissemination of its legacy via a monographic catalogue of the cave of Altamira, called "Altamira, the First Art", and is contributing to collective catalogues internationally like the Google Art projects and its online exhibition "On Stone and Bone". ■

More information

CER.es (digital access to Spain's museum collections): <http://ceres.mcu.es/pages/SimpleSearch?Museo=MNCIA>

"Altamira, the First Art" (digital access to a specific catalogue of Altamira's rock art): <http://www.culturaydeporte.gob.es/cultura/areas/museos/mc/ceres/catalogos/catalogos-tematicos/altamira/primer-arte.html>

Digital exhibition "On Stone and Bone", produced in cooperation with Google Arts & Culture: <https://artsandculture.google.com/exhibit/de-piedra-y-hueso/AAJiI3eo6sPyJA?hl=es>

Screenshot of the digital exhibition "On Stone and Bone", produced in collaboration with Google Arts & Culture.



“Thanks to the new technologies, the museum can stretch beyond its walls and bring the legacy it stewards to society as a whole.”

ABOUT THE MUSEUM OF ALTAMIRA, SPAIN

The Museum of Altamira is a place devoted to learning about, enjoying and experiencing the life of those who painted and inhabited the cave of Altamira. The museum's most attractive offer is the possibility of learning about humanity's first art, Palaeolithic art. The museum is in charge of a legacy of maximum value, the cave of Altamira, a milestone in universal art history whose discovery meant the discovery of Palaeolithic cave art and one of its most spectacular manifestations. The expertise of the artistic expression of the cave's inhabitants was recognised by UNESCO in 1985 when the site was registered on the World Heritage List.

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Exhibition of the European Heritage label sites, © Krapina Neanderthal Museum

10 YEARS OF KRAPINA NEANDERTHAL MUSEUM

Krapina Neanderthal Museum, Croatia / Author: Lorka Lončar Uvodić

The Hušnjakovo Site in Krapina is the place of the discovery of a large collection of fossil remains of Neanderthals and as such it is one of the most important palaeoanthropological sites not just in Europe, but in the world as well. During geological and paleontological research works from 1899 to 1905, led by Croatian scientist Dragutin Gorjanović-Kramberger, approximately 900 fossil bone remains belonging to Neanderthals of different gender and between two and 27 years of age, about 1,200 stone tools and over 2,400 fossil remains of

different animal species such as warm-blooded rhino, cave bear, bison, etc. were excavated. The Electron Spin Resonance method and analysis of rhinoceros enamel estimated the age of the site at 125,000 years, which is the time of the last great interglacial period, the Riss-Würm interglacial.

The tradition of visiting the Hušnjakovo Site began as early as the beginning of the 20th century, but Krapina became a frequent destination for numerous local and foreign guests



Event celebrating 120 Years of Krapina Neanderthals in 2019, © Krapina Neanderthal Museum

only with the renovation of the site in the 1960s and after the opening of the Museum of Evolution in 1971.

Although the idea of building a new museum was already conceived, due to lack of funding the museum was opened on the first floor of the old building of the former Kneipp Spa. The museum operated there until February 27, 2010, when the story of the Krapina prehistoric man finally got the place it deserved: the new Krapina Neanderthal Museum, which was built in the immediate vicinity of the site itself.

The insights into and acquired knowledge about the life of Krapina palaeolithic hunters and gatherers are presented in the permanent exhibition of the Krapina Neanderthal Museum within a wider context of the long evolution of life on Earth. The museum represents a kind of a time machine, a journey from the formation of the Earth and the first life to the appearance



#IceAgeEuropeNow touring exhibition in front of the museum, © Krapina Neanderthal Museum



Participants of the museum's educational program, © Krapina Neanderthal Museum

of the oldest human ancestors and the beginning of the development of civilization. Each museum item provides information about a specific time and space, at the same time being only a small part of a large puzzle that talks about the evolution of life on Earth. The permanent exhibition features numerous effects and multimedia installations that arouse visitors' senses, leading them on a journey into the distant past.

The attractiveness of the theme of men's origin and development, the modern museological approach and the interactivity and multidisciplinary nature of the permanent exhibition are the reasons why the Krapina Neanderthal Museum has been visited by one million visitors since its opening. In addition to touring the permanent exhibition and the site, large audiences in the last few years have had the opportunity to see numerous temporary exhibitions, participate in events such as book

ABOUT THE KRAPINA NEANDERTHAL MUSEUM, CROATIA

The Krapina Neanderthal Museum is located right next to the Hušnjakovo site, the world's richest excavation site, where the largest number of Neanderthal fossil bones has been found. Besides visiting the permanent exhibition visitors can participate in educational programs, special exhibitions, lectures, concerts, performances and numerous other events.

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promotions, concerts, lectures, etc. For the youngest audience, which makes up about half of the total number of visitors, various educational programmes are organized such as interactive workshops as a part of field trips for school groups and playrooms for preschool children. Due to fruitful collaborations, the museum is a space recognized by the local community as a pleasant venue for active exploration, learning, fun and socializing. Thanks to the enthusiasm of the museum manager and the efforts of a small but diligent team, successful projects have been realized in recent years and connections have been established with other cultural institutions in Croatia and abroad.

For example, the story of the Krapina Neanderthals was narrated at the Cerklno Museum in Slovenia in 2017 as a result of international cooperation, as well as at the Dubrovnik Natural History Museum, where the exhibition, set up last year on the occasion of the 120th anniversary of the discovery of the Krapina Neanderthals, was viewed by over 21,000 visitors. As a proud holder of the European Heritage Label since 2016, the Krapina Neanderthal Museum with the Hušnjakovo Site will continue to stress the importance of preserving natural and cultural heritage and encourage the cultural and economic development of the community in which it operates by organizing various programmes and activities. ■

“The Krapina Neanderthal Museum will continue to stress the importance of preserving natural and cultural heritage and encourage the cultural and economic development of the community.”



Inside Scladina Cave, © Scladina Cave Archaeological Centre

SCLADINA CAVE - ONE OF WALLONIA'S FAMOUS NEANDERTHAL SITES

Scladina Cave Archaeological Centre, Belgium / Author: Grégory Abrams

The Scladina site was first discovered in 1971 by local people, who contacted Marcel Otte (University of Liège) in 1976 after the discovery of lithic artefacts that have been associated with Neanderthals. Thus, for the first time since the end of the 19th century, a new Middle Palaeolithic site was discovered within the context of a cave: a unique chance for researchers to investigate Neanderthal settlements with modern fieldwork methodology.

The first excavation campaign led by the Department of Prehistory of the University of Liège in 1978 revealed an important sedimentary sequence covering part of the Middle Pleistocene up to the Holocene. The sequence delivered a very abundant palaeontological documentation that allows the study of the evolution of the animal species over a long period of time. Distributed throughout this sequence a dozen of archaeological assemblages has been identified, among which two are numerically important and have been intensively investigated since

the 1980's: the one located in the upper part of the sedimentary sequence (assemblage 1A), already identified by the local people, and the other embedded deeper in the cave infilling (complex 5), discovered by the University of Liège and untouched until then. At present, the excavations are carried out by the non-profit organization Archeologie Andennaise in collaboration with the University of Liège and with support from the City of Andenne, the Service Public de Wallonie and the Fédération Wallonie-Bruxelles.

The assemblage 1A is dated to the Late Middle Palaeolithic, between 44 ky calBP and 42 ky calBP. It constitutes up to now one of the youngest typically Mousterian occupations in North-western Europe. Archaeological evidence shows the exploitation of local and non-local lithic raw material, the use of bones as fuel, the import of a non-local mineral black pigment, and the distribution of the settlement on two separated areas.



Excavation at Scladina Cave, © Scladina Cave Archaeological Centre



Fragment of a juvenile Neanderthal mandible and maxillary discovered 1993, © Scladina Cave Archaeological Centre

The assemblage 5 delivered the richest occupation, at least dating back to the Weichselian Early Glacial. A large diversity of game has been exploited from small prey (hare) to larger animals such as Equidae, Bovidae and Ursidae. Moreover, at least six complete chamois have been brought to the site and were highly exploited. Archaeological and zooarchaeological evidence also indicates a complex behaviour combining the transport of raw material from across the Meuse River, sometimes over a long distance, and the exploitation of local resources to produce stone and bone tools at the cave.

“For the first time since the end of the 19th century, a new Middle Palaeolithic site was discovered within the context of a cave: a unique chance for researchers to investigate Neanderthal settlements with modern fieldwork methodology.”

In 1993, the right fragment of a juvenile Neanderthal mandible was discovered during the field school excavation in the sedimentary complex 4A, dated to the Weichselian Early Glacial. Since then, 19 teeth and bone fragments belonging to the same individual have been unearthed, distributed over a large area. In Belgium, it constitutes the on-field discovery of the most significant set of Neanderthal remains since that found in Spy Cave in 1886. For the first time in Belgium, Neanderthal remains were apprehended in stratigraphic, chronological and paleoenvironmental context. These remains have been extensively studied and published in a detailed monograph in 2014.



Excavation at Scladina Cave, © Scladina Cave Archaeological Centre

In 2017 and 2018, new on-field discoveries and collection reassessments allowed to stratigraphically associate some Upper Palaeolithic stone tools with a bone retoucher made from a horse metapodial within the uppermost half of the T-RO unit. The dates obtained partially overlap with the dating of the latest Middle Palaeolithic settlements and Neanderthal individuals, raising questions about the dynamic of the replacement of Neanderthal populations by anatomically modern humans in Northwestern Europe.

Scladina is being permanently excavated since the mid-1980s. A team is devoted to the project full-time, managing all the different aspects from science to cultural mediation. The presence at the same place of the researchers and the public account for interesting encounters, crossing the border between science and tourism at the archaeological site itself – a successful experience that is highly appreciated especially by school groups. In addition to guided tours, small groups and individuals have access to the Scladina Cave 2.0 experience, a discovery of the cave in augmented reality.

In 2020, the new cultural centre “Phare” will be opened in the city of Andenne, seven kilometres from the cave. There, around 400 square metres will be dedicated to the research and the discoveries made in Scladina Cave with a special focus on the Scladina Child, whose original remains will be presented. ■

ABOUT SCLADINA CAVE ARCHAEOLOGICAL CENTRE, BELGIUM

Scladina Cave is located in the village of Sclayn (City of Andenne, Province of Namur), along the south bank of the Meuse River. Scladina Cave is known for several important archaeological finds, including an approx. eight-year-old Neanderthal child. The cave has been under scientific investigation since 1978, led by the University of Liège and the Scladina Cave Archaeological Centre (SCAC).

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THE WILD LONE VALLEY – THE IMPLEMENTATION OF CURRENT ARCHAEOLOGICAL ANALYSIS IN A SPECIAL EXHIBITION

Archaeopark Vogelherd, Germany / Author: Benjamin Schürch

The Lone Valley is a centre of archaeological research, where several excavation projects were conducted in the last two decades. Best known are the excavations at Vogelherd Cave. Furthermore, the site Fetzersshalden Cave has been excavated in 2013 and 2014 and was addressed as a carnivore den.

In addition to bones of carnivores and bones with carnivore modification, our special exhibition 2020, „The Wild Lone Valley“, shows remarkable artefacts modified by humans from Fetzersshalden and Vogelherd Caves.

Fetzersshalden Cave, dated mainly to the Middle Palaeolithic and the Gravettian, offers a unique opportunity to understand the Gravettian palimpsest in the Lone Valley as well as the palimpsest from the late glacial maximum. As suggested by geoarchaeological observations, the valley and the cave sediments were heavily influenced by solifluction during the last glacial maximum. In consequence, we are lacking an adequate Gravettian record in the whole valley. Fetzersshalden Cave provides important information for understanding the archaeological and geological processes of the last glacial maximum.

In our special exhibition, we present artefacts and additional information of the site and its excavation to support this. As the title “Wild Lone Valley” promises we are focusing on the predators of the site and the valley. We would like to give our visitors an understanding of the dual use of the site and shed light on the interactions between humans and animals. This is

also important with regard to the ivory figurative representation of a mammoth, the heart of our permanent exhibition.

The predators that lived in the caves are cave lion, cave bear, brown bear, cave hyena, wolf, fox, wild cat, wolverine and badgers. For the Vogelherd Cave the cave lion, cave hyena and wolf might have acted as occasional bone collectors and consumers. The smaller carnivores might be the “background noise” of the faunal assemblage. The cave bear bones in Vogelherd Cave are rare in comparison to other cave sites in the Swabian Jura. The Vogelherd Cave was therefore only sparsely used by cave bears as a shelter.



The site Fetzersshalden Cave before the excavation in 2013, © University Tübingen

Discussing not only the site use by the animals but the role of Vogelherd and Fetzersshalden Caves in the settlement system of the Palaeolithic, hunters and gatherers are also the subject of this exhibition.

The famous art from the Vogelherd Cave as a central part of the Archaeopark Vogelherd connects well with the predators of the Fetzersshalden Cave. Both the predators and the prey are present in the ice age art of Vogelherd Cave. In the exhibition we want to focus on the predators. Besides the lion figurines from the Vogelherd, we will present the replica of the famous lion man from the Hohlenstein-Stadel site. This cave is also situated in the Lone Valley, just a stone's throw away from Vogelherd and Fetzersshalden Caves. The lion man is a mixture between a human and a lion and a unique object for the ice age in Europe.

The special exhibition is part of the series “The Vogelherd”, financed by the association Förderverein Eiszeitkunst in the Lonetal e.V., and shows the striking differences between the two mentioned sites in their faunal composition, as well as the difference between high and low-density sites. The exhibition starts in fall 2020.

In addition to the exhibition, we have also planned a series of lectures, which will take up themes from the exhibition and provide the public with the opportunity to get to know the scientists engaged in this research. Topics covered include the exhibition itself, human and animal occupation in the Lone

Valley, the technology of Neanderthals in the Bockstein Cave or the reconstruction of the Palaeolithic landscape using mouse bones. In the park itself we will offer events for kids and special guided tours.

Come along and let yourself be fascinated by the “Wild Lone Valley”! We are looking forward to welcome you! ■

ABOUT THE ARCHAEO-PARK VOGELHERD, GERMANY

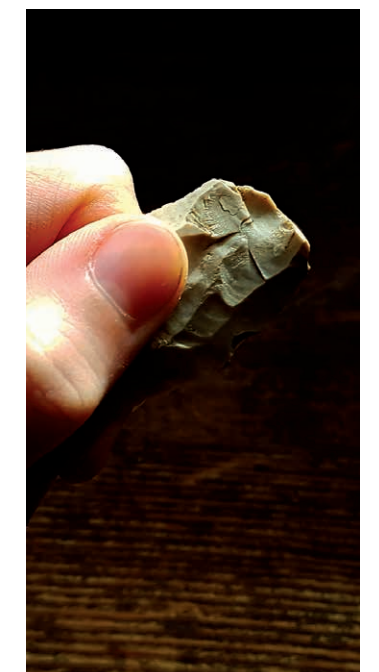
40,000 years ago, in the Upper Palaeolithic, Vogelherd was a place to be. Today the cave is the centre of the Archaeopark, is considered as one of the most important archaeological sites and is part of the UNESCO World Heritage. Our visitors can experience “Stone Age live” and get a fascinating insight into the lives of our ancestors.

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The excavation of Fetzersshalden Cave in 2014, © University Tübingen



Blade from Fetzersshaldenhöhle, © University Tübingen

“Fetzersshalden Cave, dated mainly to the Middle Palaeolithic and the Gravettian, offers a good opportunity to understand the Gravettian palimpsest in the Lone Valley.”



Rock art in the cave of Santimamiñe, © Arkeologi Museoa

THE ARKEOLOGI MUSEOA: TOWARDS EFFICIENT AND SUSTAINABLE MANAGEMENT

Bizkaia Museum of Archaeology, Spain /
Authors: Laura Garcia Boullosa, Iñaki García Camino

The Arkeologi Museoa is the central repository of archaeological remains from excavations in Bizkaia (Basque Country), and therefore one of its main tasks is to guarantee their conservation for study and enjoyment by future generations. Also, it is important to remember that archaeological heritage is a limited and non-renewable resource, whose care requires maintenance which must be guaranteed over the long-term.

In line with current trends in conservation, the Arkeologi Museoa is prioritising the preventive conservation of its collections, adopting measures such as the stabilisation of environmental parameters (with special attention paid to relative humidity), as well as the compartmentalisation of storage rooms, with a view to creating different environments suited to the needs of each type of material: bone, wood, metal, stone, ceramics, glass, etc.

Another factor to consider when adopting measures relating to environmental control is the energy expenditure required for its maintenance, which affects both economic as well as environmental sustainability. Therefore, being aware that in light of the climate crisis it is necessary to rationalise resources, we are aiming to strengthen passive climate control systems: improving the insulation of the building, and replacing old equipment with more energy efficient systems.

Taking these considerations into account, we are collaborating with engineering and architectural companies, in a project for improving our facilities, which aims to redefine the building's environmental strategy so as to adapt it to current criteria, seeking a balance between the ideal parameters and the resources needed to achieve them.



The Arkeologi Museoa in Bilbao, © Arkeologi Museoa

Thus, our old lighting equipment has been replaced by more efficient LED technology systems, using a colour reproduction index that does not affect the conservation of the collection. In addition to the energy savings made from using this technology, it offers other advantages, as it does not emit ultraviolet (UV) radiation, and its heat output is much lower, not emitting infrared, and thus improving the conservation of materials.

As a tool for measuring the emissions of greenhouse gases generated by the museum's activity, we are utilising the carbon footprint calculation, its purpose being collective awareness. Furthermore, the annual calculation of this footprint allows us to make comparisons, and to check the effectiveness of the improvements that we are introducing, thus encouraging the ongoing application of environmentally responsible measures.

“We are aiming to educate through example, therefore in our activities and exhibitions we try to focus on the reuse of museum resources.”



Storage room at the Arkeologi Museoa in Bilbao, © Arkeologi Museoa



Exhibition at the Arkeologi Museoa in Bilbao, © Arkeologi Museoa

Education: an instrument for boosting sustainable development

In order to achieve sustainability, society has to be committed and aware of the situation that we are causing. And in order to foster this awareness, education is an important tool for achieving sustainable development.

In this regard, at the Arkeologi Museoa, we are aiming to educate and influence various target groups:

- children, via a variety of workshops, highlighting the importance that recycling had in the societies that preceded our own;
- the general public, via temporary exhibitions, whose themes interweave current problems with those of the past, and which have an impact on this issue, such as the exhibition entitled “Climate changes in History”, already discussed in the previous issue of this magazine.

And we are also aiming to educate through example, therefore in our activities and exhibitions we try to focus on the reuse of museum resources, and exchanging them with other museums in the region. ■

ABOUT CAVES OF SANTIMAMIÑE AND BIZKAIA MUSEUM OF ARCHAEOLOGY, BASQUE COUNTRY, SPAIN

The Arkeologi Museoa is in the Old Quarter of Bilbao with about 3,000 m² of exhibition area, research rooms and storages on five floors. It is a centre for heritage research and conservation that offers its visitors an interactive journey through the history of Biscay. The museum oversees the Cave of Santimamiñe which has galleries, rock paintings and carvings. The cave has a new interpretation centre giving visitors the opportunity to discover the cave's art in a sustainable and responsible way.

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Flint flakes, © Préhistorium

WHY AND HOW IS THE PRÉHISTOMUSEUM SEEKING TO BECOME A MUSEUM OF TRANSITION?

Préhistorium, Belgium / Author: Fernand Collin

When our children walk the streets to save our planet – what do we do during this time? Challenged by this question, the Préhistorium is gradually implementing a series of actions to become stakeholders of transition. Moving on from the “museum of duty” (the duty to acquire, conserve, study and disseminate), it strives to become a place of transition: a museum which, with its collections and its knowledge, tries to manage complexity and to connect knowledge and individuals to participate in the search for the future of our planet and therefore of our humanity. In line with the mission of the Préhistorium to allow everybody to experience our humanity through the encounter of prehistory and archaeology, the team is convinced that the museum can (and should) become an active player in sustainable development.

Our western society is gradually suffocated by a single (and simplistic) thought that results from the inexorable tensions caused by our certainties and our doubts, by our scientific beliefs and truths. Prehistory is an extraordinary scientific discipline for experimenting complex thinking. In our educational programmes we are taking care to disclose the system of archaeological facts and the complexity of human behaviour. We are highlighting the diversity of cultural expressions in time and space by using the “Theory of 5M”. Underlying this universal approach to human behaviour is the notion that, at any time and place in a given environment, our actions are determined by metaphysics (Métaphysique), words (Mots), models (Modèles), manner (Manières), and materials (Matières). For example, 40,000 years ago, in nearby Huccorgne, a craftsman produced a biface, consciously or unconsciously, depending on both material and immaterial constraints: The model in terms of reproduced reference, the manner in terms of fashion and memory of the manufacturing process, the available and chosen material, the metaphysics such as myths, religions or taboos and the words, that is the memory, its transmission and expression of intentions and actions.

Our western society progressively suffers from loneliness and individualism artificially aggregated by social media. In contrast, the museum is a real space where the visitor can experience authentic objects from the past and therefore ideal to reweave social ties. Our Center for Conservation, Research and



P as: Préhistorium, Prehistory, Patrimony, People, Participation, Prosperity, Planet, © Préhistorium

Documentation is using the collections to gradually create a heritage community. Each week, curious citizens, amateur archaeologists, students as well as professionals come together to actively take part in the interpretation of finds. This project

gives rise to otherwise improbable human encounters, little by little weaving a real community. A similar dynamic has been driving the Center for Technical Studies and Experimental Research in Prehistory for an even longer time. We are currently witnessing a merging of the various “social cells” of the museum, stimulating connections and collaborations and the emergence of a new “heritage corporate culture”.

Our western society is questioning its dominant economic model and is gradually exploring more sustainable alternatives. In its particular ecosystem, the Préhistorium is also experimenting with a new economic model which puts itself at the service of humans and nature and which relies on intangible (potentially infinite) resources rather than on limited material ones. The challenge here is to deliver and to capture value while integrating social and environmental issues and considering the expectations of its stakeholders, in particular that of its users. In this spirit, the museum is also looking for new ways of internal organization by favouring mechanisms of cooperation and collective intelligence to make the museum “agile” to better adapt to our constantly changing society.

Our western society is now aware of the imminence and the importance of the changes necessary to undertake to save the planet. Paradoxically, the oldest periods in human history can be the most inspiring for our contemporary debates. Thus, prehistory (which is foreign to us because it is distant in time and space) is conducive to debates about our existential questions. Appearances and disappearances, changes and consistencies, inventions, diffusions, migrations and much more are active principles of mankind today and in the past, provoking rewarding philosophical reflections. Our permanent exhibition ends with such a question: »La Préhistoire ne nous offre-t-elle



Creation of a heritage community at the Préhistorium, © Préhistorium

pas des points de vue sur l’humanité... qui nuancent nos à priori sur les « autres » dans le temps et dans l’espace... Elle convoque notre citoyenneté... et nous permet de nous poser la question du bonheur.» ■

ABOUT THE PRÉHISTOMUSEUM, BELGIUM

Located at the cave of Ramioul, an archaeological site in the heart of a forest, the Préhistorium extends over 30 hectares, in the valley of the Meuse, and is one of the largest museums of prehistory in Europe. It forms the link between the numerous archaeological sites which surround this river: from Engis, where the first bones of Neanderthals in the world (1829) were discovered to the splendid caves of Goyet.

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“The museum strives to become a place of transition: a museum which tries to manage complexity and to connect knowledge and individuals to participate in the search for the future of our planet.”



This face appears foreign and distant, yet by exploring we are allowed to dream, to imagine, to feel. Our past touches us. Inv. 9229, coll. CAHC, © Préhistorium



Detail of showcase of square 30 with Venus from Hohle Fels cave, © urmu

HOW DOES ARCHAEOLOGY WORK? – THE VISITOR’S RESEARCH ROOM

Museum of Prehistory Blaubeuren, Germany / Author: Hannes Wiedmann

Archaeological research resembles a puzzle: individual pieces, which archaeologists receive through excavation and evaluation, are completed to form an overall picture. The eight sections in the Research Room of the Prehistory Museum Blaubeuren invite visitors of all ages to interactively engage in research.

In the middle of the room is a floor-to-ceiling glass showcase that represents one square meter of the Hohle Fels cave. The layer sequence begins at the bottom with the time of the Neanderthals, above that is a sterile layer without any anthropogenic finds. Following upwards there are layers from the time of homo sapiens, from the Aurignacian to the present day. Finds are arranged in the showcase according to the actual layers, including a copy of the Venus from Hohle Fels, the most important find from this square meter. It was found in the lowest Aurignacian layer at a depth of 3.70 meter. The presented copy is broken down into the pieces in which the original was discovered – a little puzzle in itself.

The very basis for archaeological research is the excavation. At the Research Room, an excavation scene from the Hohle Fels shows the careful removal of the sediment – in fine layers, quarter by quarter of a square meter. The uncovered finds are documented in situ. The removed material is then washed in a

fine sieve and sorted. Visitors can search for and discover the finds between the stones.

The manufacturing techniques and shapes of stone tools can be researched using drawings and original tools sitting in chests. The drawing technique may be practiced using a hand axe.

The animal species (reindeer and cave bear) present at the featured site must be identified from a lower jaw and a tooth respectively, and the age of death of young cave bear must be determined using thigh bones. A penis bone is provided for gender determination.

Small mammals have a quick succession of generations and a small radius of action. The composition of the species present at a certain time allows conclusions about the environmental conditions, which in turn is an important basis for climate reconstruction. With a magnifying glass, the teeth and bones of Norway lemming, European water vole and bank vole can be examined and thus the environmental conditions be determined.

Genetic studies have shown that the cave bear *ursus spelaeus* died out some 32,000 years ago. At this time, the cave bear



Research puzzle, © urmu

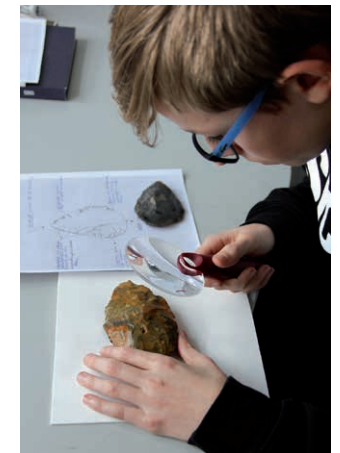
“The interactive Research Room demonstrates that many insights about the life of our ancestors are only possible through the collaboration of different disciplines.”

ursus ingressus immigrated, which however also died out some 3,000 years later. During this period, the brown bear *ursus arctos* lived in our region. Most interesting is that both cave bear species were herbivores, yet the brown bear was initially a pure carnivore and became an omnivore after the cave bears became extinct. The presented molars of the lower jaw of a cave bear allow the visitor to discover that it was not a carnivore.

Bones from human species provide information about where we come from, where we have been during our lives and what we eat. The use of medicine based on penicillin and salicylic acid



Showcase of square 30 from Hohle Fels cave, © urmu



Examination of a hand axe, © urmu

was already evident in the dental calculus of Neanderthals. Examination of the genetic material showed that Neanderthals interbred with homo sapiens and are still, to a small extent, part of our genetic material today. At the Research Room, a milk tooth from Geissenklösterle cave confirms the presence of a homo sapiens child in the site.

Charcoal examinations and pollen analysis form further foundations for the environmental and climate reconstruction of archaeological sites at different times. At this section of the Research Room, pictures show various grass and tree pollen that must be assigned to a warm or cold climate. A climate curve shows the changing climate conditions in the last ice age.

Thin-sections of sediments from Hohle Fels cave show much less burned bones in the Middle Paleolithic layers than in the Upper

ABOUT THE MUSEUM OF PREHISTORY BLAUBEUREN, GERMANY

The cultural roots of Europe’s Upper Palaeolithic lay in the valleys of the rivers Ach, Blau and Lone. The caves at the southern border of the Swabian Alb belong to the most important Palaeolithic sites in the World. Neanderthals and Early Modern humans lived here during the last Ice Age. 40,000 years ago, Early Modern humans not only developed new tool technologies here, but also created animal and human figurines made of mammoth ivory, the earliest known works of art. Other Ice Age art found here includes musical instruments and a large number of Ice Age ornaments that show how sophisticated these people were.

The Prehistory Museum Blaubeuren (URMU) is part of the state museum for archaeology and is situated in the heart of the World Heritage "Caves and Ice Age Art of the Swabian Jura". It presents figurative art and music instruments in the original in the original landscape.

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Paleolithic. This leads to the conclusion that Neanderthals settled in the caves less often than modern humans. The original thin sections can be examined under magnifying glass.

A booklet explains the different dating methods. The radiocarbon method is primarily used for dating finds from our sites. The content of radioactive C14 in suitable materials allows to determine the age of the object. Thermoluminescence, which can be used with quartz-containing materials, is also increasingly used.

In summary, the interactive Research Room demonstrates that many insights about the life of our ancestors are only possible through the collaboration of different disciplines. Many visitors, mainly families, make use of it to experience archaeological research from excavation to the most complicated evaluation methods. It is a place where research and mediation meet. ■



EXPLORING THE EKAIN TERRITORY

Ekainberri – The Replica of the Ekain Cave, Spain / Authors: Ekainberri Team

THE EKAIN TERRITORY TOURS

The Ekain Territory, in the Basque Country, is a cave territory rich in rock art. There are three tours visitors can choose from. The basic route, where Ekain Cave's famous horses and Erlaitz Caves are located, is a flat 4 km tour. The short route is 9.27 km long and goes mainly through the woods up to near Astigarraga Cave. The long route is 15.2 km long and more challenging, where the visitor will walk past the very near

Amalda, Erraila and Danbolizulo Caves. These are circular tours of spectacular beauty to enjoy alone, in a group or family and are perfectly suitable to be made on foot or running, and there is the possibility of hiring guides. For those who are more athletic, there is the option of doing the KOBAZ KOBIA TRAIL route with a guide. ("kobaz kobia" means "from cave to cave" in Basque, the ancient language spoken in this region).



Map of the Ekain Territory, © Ekainberri

7 CAVES, 7 WONDERS

Although in an even larger area more sites can be spotted, seven rock art and prehistoric sites can be found in the Ekain Territory itself:

- 1. Ekain:** The most precious element of the Ekain Territory is located in a strategic place for hunting, in the small valley close to Zestoa, to which it has easy access. Its famous Palaeolithic cave paintings are outstandingly well-preserved. The set of horses is one of the richest and most beautiful examples of Franco-Cantabrian art, "the most perfect group of horses in Quaternary art", according to André Leroy-Gourham. The figures at Ekain also include other animals and signs painted and engraved during the Magdalenian, 14,000-13,000 years ago. The galleries in the cave are named, in Basque, after the figures in them. Discovered in 1969, Ekain was declared a UNESCO World Heritage Site in 2008.
- 2. Astigarraga:** It contains at least 16 pairs of red parallel stripes and a spot that could be a possible horse from 22,000-20,000 years ago. The site was discovered in 1967, the rock art in 2006.
- 3. Danbolizulo:** It was discovered in 1980, the rock art in 2014. The red paintings, especially of female deer, are almost invisible and are at least 18,000 years old, and are thus from the Solutrean.



Depiction of bear and cub in Ekain (manganese oxide), © Ekainberri

- 4. Erlaitz:** Here, a set of rock engravings was discovered in 1978, which is between 22,000 and 15,000 years old. There are drawings of horse, deer and aurochs.
- 5. Astuigaña:** While the site itself is known since the 1980s, in 2016 some engravings were discovered, which are about 13,000 to 12,000 years old. The head of a goat and a horse have been identified.
- 6. Amalda:** Discovered in 1979, remains from the Mousterian, between 100,000 and 35,000 years ago, have been found here.
- 7. Erraila:** Two elements similar to altars have been found, including deposits of what could be ritual elements. The place was discovered in 1977.

PLAN YOUR VISIT TO THE EKAIN TERRITORY

Discover Ekain Cave

Visitors can experience a journey with all senses in Ekainberri: Enjoy and discover what the first humans felt inside Ekain Cave 14,000 years ago. Apart from the replica, the visitor can also find a permanent exhibition about rock art in the Basque Country, as well as a library area.

ABOUT EKAINBERRI, BASQUE COUNTRY, SPAIN

Ekain is an exceptional work of cave art from the Palaeolithic period. Artistic creations by Palaeolithic hunter-gatherers have been discovered around the world, and yet the specimens found here on the Cantabrian coast of Europe, known as Franco-Cantabrian cave art, are the most prolific. Ekain is considered the finest example of cave art in the Basque Country. The museum of Ekainberri, located 600 meters from the original cave, presents reproductions of 85% of the art found in Ekain. Ekainberri offers an extraordinary adventure for visitors as they lose consciousness of spatial boundaries and walk through the cave discovering the magnificent paintings and creations.

CONTACT INFORMATION

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Email: info@ekainberri.com
More information at www.ekainberri.eus

All visits are guided tours, so a previous reservation is always recommended. Visitors can choose from the EkainFast guided tour (1 hour), or EkainAdventure (2 hours), including experimental archaeological activities. Ekainberri offers a comprehensive school program and organises the annual Ekainfest Day and KOBAZ KOBIA TRAIL in cooperation with local authorities ([www.kobazkobatrail.com](http://www.kobazkobiatrail.com)).

Zestoa and Lili Jauregia

Zestoa is a village 10 minutes away from the Basque coast, with the mission to facilitate communications and relations in the Middle Ages, and later has maintained an important place for the service sector. A new era began with the discovery of the thermal waters in the mid-18th century, and lignite extraction and the cement industry also had important influence in its history.

30-minutes long storytelling-based tours are offered in Lili Palace (prior booking required). The visitors will experience what the Ekain Territory was like four centuries ago following the history of the medieval Lili lineage.

COMPLETE YOUR VISIT

Zestoa and its countryside neighbourhoods offer a wide variety of eating and sleeping options, in a quiet atmosphere and surrounded by nature. ■

More information

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A SPECIES IN MOTION: A MULTIDISCIPLINARY LAB LOOKING INTO THE DISCOVERY OF HUMAN MIGRATION

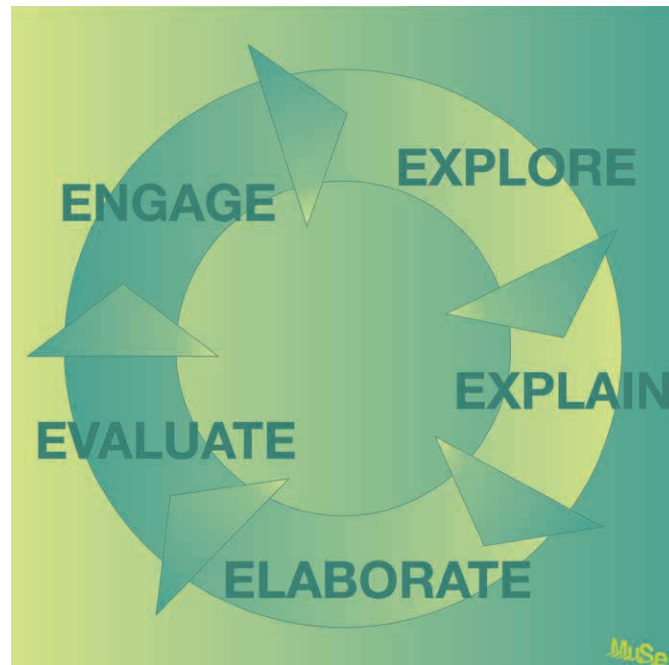
MUSE - Science Museum of Trento, Italy / Authors: Chiara Steffanini, Laura Casari, Nicola Nannini, Elisabetta Flor

Moving is part of the lives of many living beings. However, *Homo sapiens* is the only species that has ever existed that has succeeded in populating the whole planet, from the equator to the poles, except Antarctica. The spread of the species across every continent has taken place through numerous migratory waves that are becoming more precisely defined. The available data on the interaction of anatomically modern humans with other species that already inhabited the territory are increasingly clear and consistent. Such is the case for the Neanderthals in Europe and the Middle East and for the Denisovans across Central Asia.

Modern investigations by genetic scholars have made this possible, conducted both on current populations and on fossil remains of extinct human forms. The genetic heritage of various cohabiting species and their encounters are being used by palaeontology laboratories to attempt to reconstruct the interaction episodes and scenarios that have taken place over the course of millennia.

Going beyond the knowledge of the scientific data per se, these studies are important because they enable museum educators to offer reflections regarding modern events that account for the fact that human migrations exist and have always existed, albeit in very different forms and ways.

This year at the MUSE, Trento's Science Museum, we offered these topics in a science lab that takes students on a journey around the globe, across ancient cultures and faraway populations, to learn about the origins of our species, resting on the conviction that knowledge of our past is the best way to understand our increasingly multi-ethnic and inter-cultural present.



The "5E method" based on the IBSE (Inquiry Based Science Education) educational approach, © MUSE - Science Museum of Trento

In the initial *engage* stage (according to the IBSE - Inquiry Based Science Education-method), the class is given a quiz via the Kahoot multimedia platform (official website <https://kahoot.com/>), which aims at answering the following question: "Can we really be so sure that we can easily identify the origin of a person based on his or her physical appearance?" The answer, which is not so straightforward, will help to dismantle the very concept of race.

In the *explore* stage, the class is divided into five work groups. Each group has to investigate certain scientific arguments on a particular population to give an understanding on how our species spread across the planet.

One group will investigate the transmission mode of mitochondrial DNA, which is transmitted only maternally and, by applying a few basic rules, will solve the mysterious disappearance of an Australian Aboriginal activist.

Another group will look into the gut microbiomes of various indigenous peoples (Maasai, Inuit, Hadzabe, Canadian and Hmong) in order to identify their movement based on their dietary habits.

The third group will analyse the correlation between lactose intolerance and animal domestication by studying the Tuaregs (North Africa), while the fourth group will focus on the domestication of plants through a case study on the Guaraní Indians of South America.



Today's representatives of the *Homo sapiens* species, © MUSE - Science Museum of Trento

The last group will delve into how the adaptation to high altitudes of the Tibetan Sherpas and the Andean Quechuas differed.

Finally, all groups will share their results with the other groups (*explain, elaborate and evaluate* stages).

ABOUT MUSE – SCIENCE MUSEUM OF TRENTO, ITALY

The MUSE (Science Museum) is an auxiliary body of the Autonomous Province of Trento. Its task is to interpret nature, starting from the mountains, using the eyes, tools, and applications of scientific research, taking advantage of the challenges of the contemporary world, stimulating scientific curiosity and the pleasure of knowledge, giving value to science, innovation, and sustainability. MUSE is an associate member of Ice Age Europe and a key partner of the Fumane Caves.

CONTACT INFORMATION

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The lab follows the IBSE (Inquiry Based Science Education) method, recognised as the most effective science education approach. Inquiry-based education engages students and stimulates their critical and logical thinking, enabling them to formulate hypotheses that they can confirm or disprove through the scientific data that they themselves produce. ■

“Inquiry-based education engages students and stimulates their critical and logical thinking, enabling them to formulate hypotheses that they can confirm or disprove through the scientific data that they themselves produce.”

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