

KM+BM
BIG MEDIA

PRESENT

SCANNING HISTORY

USING MODERN TECHNOLOGY TO REVEAL SECRETS OF THE PAST

A 6 x 60' DOCUSERIES

CREATED BY MAX SERIO AND MARTIN KASE

PRODUCED BY **PICASSO** film FOR KM/BIG MEDIA

WELCOME TO SCANNING HISTORY

Scanning History takes us across the 6 latest archeological discoveries, each episode showcasing how different cutting edge advances in archaeological research are opening compelling windows to our past.

An archeological revolution has been taking place over the last 15 years – and technology is at its heart. Archeologists once excavated ancient ruins with little more than oral texts, haphazard plans, and aerial photographs to guide them. Thanks to the development of drones, lidar, radar, 3D technology this series explores how technological innovation is pushing the boundaries of archaeology and rapidly developing our understanding of what once was, casting new light on ancient civilizations.

From a submerged archipelago an ancient mesolithic community emerges from the past, the use of LiDAR revolutionizing our understanding of Mediterranean archeology. From there to ancient Jerash in Jordan, a town once engulfed in flames; we use CT scanning, and advanced 3D-modelling to unwrap documents previously lost to history and reveal how languages evolved and humans told stories 1,300 years ago.

Scientific advances bring us even further, geo-chronologists can now date seed particles from when light last hit them some 45,000 years ago, computerized tomography and atom smashing originally conceived for molecular physics, has meant archaeologists can identify objects wrapped deep in the bandages of the mummies. This series explores incredible new advances, visualizing extraordinary archaeological finds using compelling CGI and VFX.

As British Museum archaeologist Neal Spencer explains “it is difficult to imagine archaeology today without technology, it has quite simply changed the way we look”.

SERIES OVERVIEW

In this six part close-ended documentary series each episode will look at a recent, notable archaeological achievement brought about by recent advances in technology. We dig into how that technology was deployed in the field and which scientific advances have been harnessed by archaeologists to push the boundaries of our understanding. This jumping off point allows us to approach classic archeology from a new angle, just as it has given those practising in the field new and exciting windows into our past.

The series will not be hosted, instead each episode will stand alone, relying on the expert contributions (5-6 per episode) of the archeologists and scientists that undertook the original ground-breaking work. These will be shot in relevant locations either on site at the location of the discovery or at the important scientific and academic institutions that supported and processed the fieldwork. We intend to rely on the contributors on location for as much narration as possible, only introducing a narrative voiceover to serve to transition us from one sequence to the next.

Each episode opens with a brief and compelling sequence that immediately establishes what was discovered, where and as importantly what technological or scientific innovation made this possible.

We move on to examine the site itself through expert interviews shot on location, bringing the audience into the story and grounding the science in the real world. Here we will see our central contributors engaging directly with the technology, using CGI overlays to create a visual and simple representation of these complex machines.

Due to the special importance we're placing on the use of the high-tech equipment on-location we intend to be 'in the field' for the majority of the action capturing all the details in 4K on Canon C100 Mark III cameras with Xeen lenses. These will be operated with gimbal stabilisers bringing the audience into each site, capturing the details of the dig up close while drones will provide the aerial photography giving a sense of scale. Experts will be shot POV down the lens to bring an authentic directness to their contributions.

A 6 x 60' **DOCUSERIES**

CONTRIBUTOR TREATMENT

A 6 x 60' **DOCUSERIES**

In order to engage the audience with the subject matter and bring the past to life we will use two different styles of interviews.

1. **Immersive Style:** We will follow our experts on site, immersing the viewer at the location of the fieldwork. Our experts will not present to camera but will be shot 'over the shoulder' either when they are driving their cars to the labs, introducing the technology or working on the site. This will bring a detached immediacy, creating a sense of movement to the 'experts at work' and deliver pace to the final edit.



2. **Talking heads:** Will be employed sparingly and wherever possible and contributions will be overlaid with images, CGI and VFX relevant to their contributions.



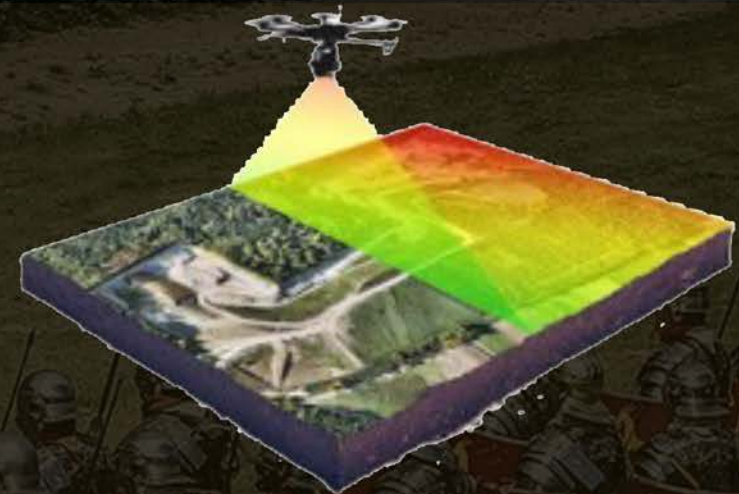
researcher at OGS Emanuele Lodolo



*Prof. David Emil Reich,
Harvard University,
genetics of old civilisations*

CGI & VISUAL EFFECTS

We will reconstruct each archaeological site step by step using environment mapping and virtual reality, we will use VFX to illustrate the schematics, scientific explanations and maps. This will all be supported by cutting edge CGI that is the hallmark of some of our most recent productions creating a uniform visual motif for the series.



Lidar Scanning using aerial photography

RECREATIONS

In order to bring the past to life and to create a more visceral connection to archaeology we will use recreations sparingly but effectively as a series of flashbacks tell the story on the ground, using accurate depictions of life at the time to deliver a contemporary representation of the site.

The overall the effect will be one that introduces the audience to a piece of technology that seems futuristic, but is the jumping off point for our journey to the past. Experts shot on location will lead the way back, aided by CGI/VFX and reconstruction to present what can be complex or antiquated subjects in a new, engaging, informative and always entertaining style.



Roman Army training re-enactment

EPISODE 1: CAESAR IN SPAIN



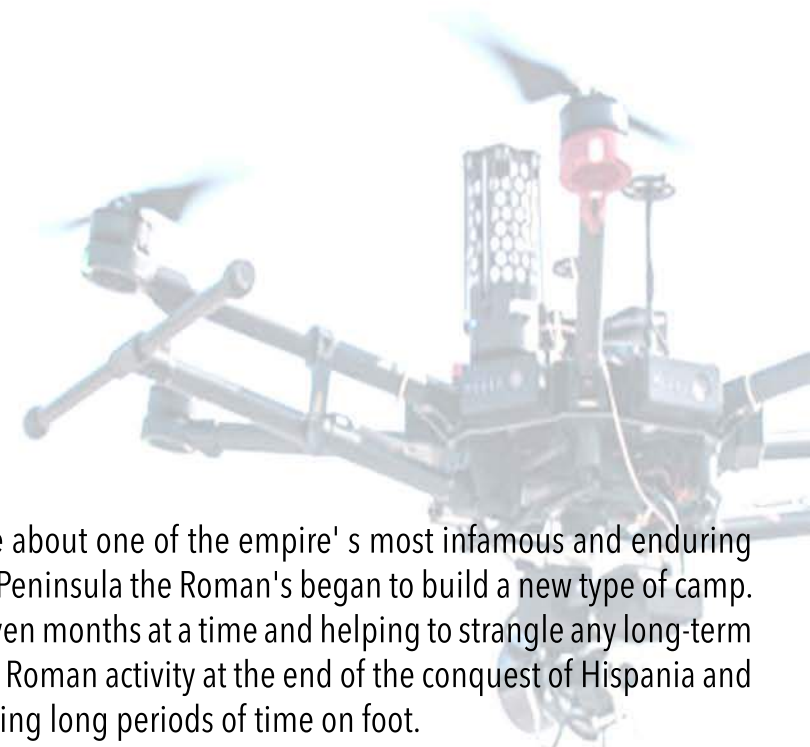
LASER SCANNING UNCOVERS THE MILITARY GENIUS OF JULIUS CAESAR IN HIS CONQUEST OF THE IBERIAN PENINSULA IN THE 1ST CENTURY BC.

Where: Spain - Iberian Peninsula
When: 2020
Discovery : 66 New Roman Army sites
Technology: 3D Scanning Technology

The discovery of 66 new Roman Army sites in Spain thanks to new 3D scanning technology, reveals more about one of the empire's most infamous and enduring conflicts than ever before. By the 1st Century BC and the end of the 200-year battle to conquer the Iberian Peninsula the Roman's began to build a new type of camp. These strategically aided movement to remote locations, helping soldiers stay in these areas for weeks or even months at a time and helping to strangle any long-term resistance to their rule. But it wasn't until more recently that we've been able to reveal the true intensity of Roman activity at the end of the conquest of Hispania and that's all down to the newfound ability to inspect and analyse vast areas of open landscape without spending long periods of time on foot.

In this episode we take a look at how researchers were able to locate 66 entirely new Roman army camps located at the foothills of the Cantabrian mountains which left very subtle traces on the surface undetectable using traditional archaeology. However using aerial photography and satellite images, scientists could create three-dimensional models of the terrain from LiDAR data and then use drones to create detailed maps of the sites. This included resources from the Spanish National Geographic Institute (IGN) allied to geoportals to pinpoint locations for fieldwork to then take place.

This led to the discovery of camps of different sizes and specific purposes which has allowed experts to map how soldiers attacked indigenous groups from different directions and to learn more about the footprint of the Roman military presence in the northern fringe of the River Duero basin -- the León, Palencia, Burgos and Cantabria provinces which were key to victory.

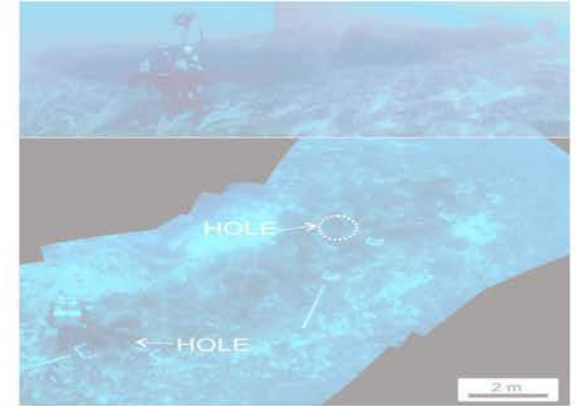


EPISODE 2: ITALY'S ATLANTIS



A MESOLITHIC ISLAND COMMUNITY IS REVEALED BY EXPERIMENTAL GEOPHYSICS, CHANGING THE FACE OF MEDITERANEAN ARCHEOLOGY

Where: Sicily - Island of Pantelleria
When: 2015
Discovery : 12-Metre Long Monolith and submerged towns
Technology: 3D Imaging and Data Analysis



Stretching from the coasts of Sicily to the island of Pantelleria in the warm Mediterranean seas, an ancient underwater archipelago once stood. Now, as a result of advancements in video imaging and data analytics, this episode explores how archaeologists are now able to uncover new insights into the ancient civilisations that once called the submerged islands of the Mediterranean their home.

Thanks to clues collected by geologists from the National Institute of Oceanography and Experimental Geophysics (OGS) of Trieste and the University of Tel Aviv, a team of professional scuba divers reveal a 12-metre long monolith, lying on the seabed of one of the oldest underwater sites recorded so far. A structure which in future, could change the focus of research into the roots of human civilization dating back 10,000 years to the Mesolithic period.

During this time, ancient populations once lived on islands on the North-Western area of the Sicilian Channel, but were forced to leave due to gradually rising sea levels. The discovery of the monolith has enabled the archaeological team at OGS to retrace the history of the underwater site back to a prehistoric era where humans were hunter-gatherers.

By collecting and analyzing data sampled from the site, they reveal how ancient settlers needed advanced technical and engineering skills and the social organisation and meaning to move such a large structure. This leads to the assumption that they had considerable knowledge and ability to exploit natural resources and to cross the sea, completely changing the focus of future Mediterranean study.

"Extensive archaeological evidence of early settlements is still buried in the shallow water areas of our continental shelves. Almost everything we know about prehistoric cultures ensues mainly from studies on dry-land settlements. In order to find the roots of civilization in the Mediterranean area, it is necessary to re-focus research in shallow water areas that are now submerged: this will be the challenge for modern archaeology," adds lead researcher at OGS Emanuele Lodolo.

EPISODE 3: TRACKING THE AMBER ROAD



FOLLOW ONE MAN'S LIFETIME OBSESSION TO UNCOVER THE MOST IMPORTANT TRADE ROUTE OF THE LATE MIDDLE AGES THAT RAN THE LENGTH OF EUROPE

Where: From Sicily to the Baltic Sea
When: 2021
Discovery : The legendary Amber Road
Technology: Aerial LiDAR Scanning, GIS analysis



One of the most used but little known trade routes of the 16th century was the Amber road. It stretched from the Baltic to the Mediterranean Seas cutting straight through the heart of Europe; yet until now we've only been able to find occasional relics of the roads once built out of stone by the Romans. With new scanning and digital mapping technology, we will reveal exact 3D models of the road's hidden tracks and the history behind them.

On this journey we introduce you to Jan Martinek and his obsession with this important trade route. "As a young boy I was fascinated when I discovered strange gutters in the woods. Nobody was able to tell me what it was. So I started to search on my own". This search continued over 20 years and recently, thanks to the Aerial Laser Scanning and advanced GIS analysis, he has discovered evidence of the whole Amber Road from St. Petersburg to Venice.

We will show you an exact 3D model of the hidden tracks, disproving the original theory that the ancient roads led through the valleys of Central Europe. In complete contradiction, the LiDAR scans show that these roads were set not in low lying valleys but into the ridges of hills, cut into the soil as a hollow track. The rich archaeological findings of pottery, coins and other everyday artefacts in these places are definitive proof of this theory. Roads were of such importance that all of life could be found near or on them; newly discovered burial mounds and relics of ancient market centres all dotted the route adding greatly to our understanding of the time and the interplay between different European cultures.

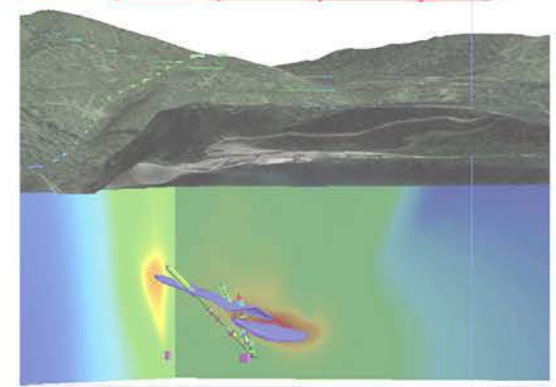
Thanks to the scanning technologies and the interdisciplinary connections of archaeology, history, geography, statistics and science, we can bring a brand-new and exciting angle to this part of history.

EPISODE 4: LOST SILVER MINES OF EUROPE



ADVANCES IN GEOPHYSICAL AND 3D-IMAGING TECHNOLOGY TAKE US DEEP UNDERGROUND VISUALISING THE VAST FORGOTTEN SILVER MINES OF 5TH CENTURY CENTRAL EUROPE.

Where: From Dresden in Germany to Trento, Italy
When: 2020 - 2021
Discovery: Vast underground cathedrals lost to history
Technology: Geophysical, Magnetic and 3D Imaging, Augmented Reality



From Dresden in Germany to the Italian Trento; In this episode, we'll be taken on a journey across Europe to uncover the true scale of Middle Age mining operations, brought to life by detailed 3D scanning technology.

During the Middle Ages from the 5th century AD to the 16th century, Western Europe saw a blooming period for the mining industry. Miners were of great economic and military importance throughout Europe and were welcomed into new societies and granted land in exchange for their prized expertise encouraging ever more ambitious mines and deeper underground shafts.

Most underground mines were covered up and sealed years ago, lost to the naked eye or too dangerous to explore traditionally. Some however have fortunately been exposed by the forces of nature. In 2002, devastating floods swept through the small town of Dippoldiswalde, Germany revealing extensive silver mines left from the Middle Ages. Now, thanks to laser scanning and multi-scanning photogrammetry, we can revisit these marvels of medieval civilisation, gaining new insights from expert archaeological guides, view 3D models of the extensive underground routes and visually explore them using augmented reality.

To go even deeper, we're taken across Germany's border to Buchberg in the Czech highlands. It's at this location where mining once occurred over an unbelievable 14 hectares and archaeologists have been able to explore the entire site purely through geophysical research. By using sensing instruments such as gravimeters, gravitational wave sensors and magnetometers, archaeologists can detect fluctuations in the gravitational and magnetic field of the location even identify the materials being burned at the time and visually recreating the ingenious ventilation mechanisms that allowed these first underground explorers to go deeper than ever before.

EPISODE 5: ANCESTRAL DNA



FROM A SINGLE CAVE, ARCHAEOGENETICS HELPS UNCOVER THE STORY OF PREHISTORIC MAN'S JOURNEY ACROSS EURASIA. CREATING A GENETIC CATALOGUE OF HUMANITY AT THE CROSSROADS OF EUROPE.

Where: Czech Republic, Germany

When: 2020 - 2021

Discovery: Creating a Genetic Catalogue of European Populations

Technology: Molecular DNA Analysis and Genetics



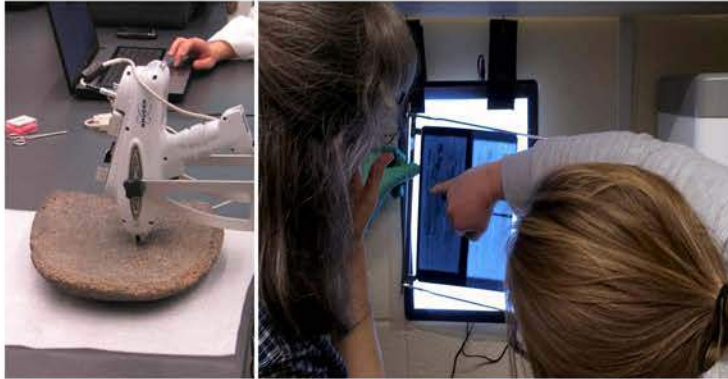
In this episode we'll delve into how DNA analysis of graves in the Czech Republic is helping us answer some of the most pressing questions about who we are and why we live, act and think in the ways we do.

The youngest scientific discipline of the series, Archaeogenetics is the study of ancient DNA using various molecular genetic methods. The newfound ability to read ancient DNA allows us to learn surprising new facts about the lives of our forebears, to study genetic changes that shaped present-day organisms, and to get new insights on fascinating evolutionary questions. For example, how did the Neanderthals evolve, and why were they supplanted by Homo Sapiens?

The Czech Republic is one of the most genetically mapped places in Europe and Dr. Ernee and scientists on the ground have been working with the Max Planck Institute genetically mapping over one hundred graves dating from the Neolithic period through to the end of the Early Bronze Age. This has created a genetic catalogue of humanity across millenia at this crossroads of Europe, allowing us to understand more about the biological life and social behaviour present at the time informing our understanding of how humans spread around the world and what that means for us today.

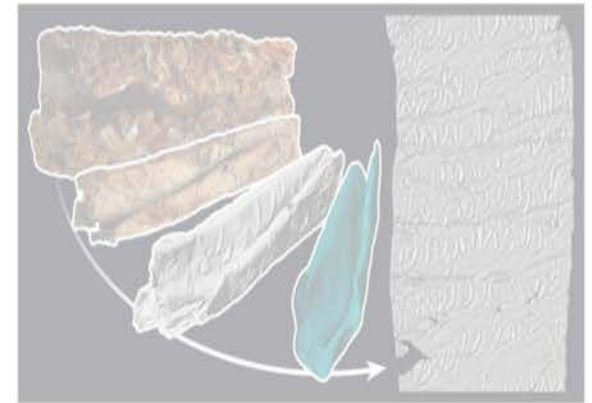
Being such a young and dynamic discipline, we'll also explore what the future holds for the application of archaeogenetics by visiting Harvard University, where Prof. David Emil Reich leads a project focusing on the population genetics of old civilisations including their migration and inter-mixing. Prof. Philipp Wolfgang Stockhammer will show how genomic patterns of mutations can explain population variance around the Mediterranean and Dr. Michal Ernee, will show how focusing on one seemingly inconspicuous location in the Czech Republic can have worldwide implications.

EPISODE 6: SECRET SCROLLS OF JERASH



USING CT SCANNING AND ADVANCED 3D-MODELLING WE UNWRAP DOCUMENTS PREVIOUSLY LOST TO HISTORY AND REVEAL HOW MODERN LANGUAGES EVOLVED THROUGH A SORCERER'S STORY 1,300 YEARS AGO.

Where: Spain - Iberian Peninsula
When: 2014
Discovery : Keys To The Evolution of Ancient Languages
Technology: X-Ray and 3D Modelling



Around 1,300 years ago, a mysterious sorcerer and mage arrived in the town of Jerash in Jordan, seeking help from the locals. Until now we would've never known such a story existed but with the help of X-rays and 3D-modelling, this episode explores how archaeologists are now revealing hidden stories through ancient artefacts, previously considered unreadable.

We do not know why the mage needed help, but thanks to an inscription on a thin silver plate that was rolled up and stored in an amulet, we know that like so many before and after him he wanted answers.

The small amulet was found in 2014 during an excavation of Jerash, which has been inhabited by many different cultures from the Assyrian, Mesopotamians to the Greeks and Romans up until the early Islamic period from the mid-600s CE. But around 749 CE, a devastating earthquake struck the town and it has remained untouched until 2014, when archaeologists excavated the remains of one of these collapsed houses and unearthed a treasure trove of coins, gold jewellery and the small silver scroll.

Through the use of CT scanning and advanced 3D-modelling, a team of archaeologists led by professor Rubina Raja at Aarhus University, were able to virtually 'unfold' the silver scroll, revealing a secret 'magical' language. After careful cleaning and restoration, they could clearly see one line of the script embossed on the back but Raja and colleagues want to know more about the little scroll: what was it, and what language was it inscribed in? Answering these questions could reveal the identity, religion, and ethnicity of those who lived in the house.

"It's exciting because this is a fractured part of history: between the late-antique and Arab invasion. Arabic arises in an area where the language was traditionally Greek and Aramaic," says Soren Lund Sorensen, an archeologist at the Free University in Berlin. This new technology will help in our understanding of how different languages evolved and were used by everyday people during this significant cultural shift as well as giving us deeper insights into the mentalities of those living in these ancient and medieval worlds.

Similar archaeological finds exist in museums around the world, recording ancient people's innermost feelings, fears, and dreams. But they are so fragile that no one has been able to unfold and read them.

"It's the first time that it's ever been done for such a complex roll, and we can now use the same technique on other archaeological artefacts," says Raja.

SELECTED EXPERTS



Dr Fonte João
Landscape archaeologist
specialising in remote
sensing and GIS.



Emanuele Lodolo
National Institute
of Oceanography
and Applied Geophysics
- OGS · Division of Geophysics



Mgr. Jan Martínek
researcher,
project manager,
Archaeological Heritage,
Czech Republic



Christiane Hemker
Doctor of Philosophy,
Archaeological Heritage
Department, Saxony



Prof., Dr. Johannes Krause
Head of department
of Archaeogenetics
Max Planck Institute



Rubina Raja,
professor (chair)
of classical archaeology
at Aarhus University

SELECTED PARTNER ORGANISATIONS



National Geographic
Institute,
Spain



National Institute
of Oceanography
and
Experimental
Geophysics,
Italy



Archeology center,
Olomouc, Czech Republic



State Office for Archeology,
Dresden, Germany



Max Planck institute
for the science
of human history,
Jena, Germany



Aarhus University,
Denmark

OTHER NOTABLE STORIES, **READY FOR SEASON 2 / EXCITING DISCOVERIES OF 2020 / 2021**

HUMAN REMAINS NEAR RAMLA, ISRAEL



Fossils representing a previously unknown species of human have been discovered in a sinkhole in central Israel, near the city of Ramla. The fossils include a partial skull and jaw that have been dated to between 140,000 and 120,000 years ago.

A SHRINE TO ROMULUS



A shrine believed to have once been associated with Romulus, the mythical founder of Rome, has reemerged in the Roman Forum. During renovation work on the stairs of the Curia Julia, the ancient Roman Senate house, workers rediscovered the sixth-century B.C. hypogeum, or subterranean tomb, which contains a stone sarcophagus and a small round altar.

SECRETS OF THE VIKING DNA



Invaders, pirates, warriors - the history books taught us that Vikings were brutal predators who travelled by sea from Scandinavia to pillage and raid their way across Europe and beyond. Now cutting-edge DNA sequencing of more than 400 Viking skeletons from archaeological sites scattered across Europe and Greenland will rewrite the history books.

OLDEST MAYA TEMPLE



The oldest and largest ceremonial structure in the Maya world has been hiding in plain sight on a Mexican cattle ranch near the Guatemala border. A high-resolution lidar survey of the site showed that the platform stretches almost a mile long and rises as high as 50 feet. Radiocarbon dating suggests that Maya people constructed the ritual space between 1000 and 800 B.C.

GIANT ICE AGE MAMMOTH BONE STRUCTURE



The giant circular structure has a diameter of 12.5 metres and was built around 25,000 years ago during the peak of the last Ice Age, when communities were mainly mobile hunter-gatherers. This would make the monument one of the oldest known mammoth bone buildings, compared to similar structures that date from 22,000 years ago.

NEWLY DISCOVERED HITTIE INSCRIPTIONS



In southern Turkey, a team of archaeologists made a surprising discovery : a stone stela bearing hieroglyphs in Luwian, a relative of the Hittite language. The inscription has been dated to the eighth century B.C. It records the military achievements of "Great King Hartapu"



FOR ADDITIONAL INFORMATION ON THE SCIENCE AND DISCOVERIES IN THESE EPISODES
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Produced by **PICASSO** Film for **KVMEDIA**
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SCANNING HISTORY