



Επιστημονικό Σωματείο,  
Έτος Ίδρυσης 1982, έδρα:  
Κάνιγγος 27, 106 82 Αθήνα  
(Ένωση Ελλήνων Χημικών)  
<http://archaeometry.org.gr>

**ΛΟΙΚΗΤΙΚΟ  
ΣΥΜΒΟΥΛΙΟ:**

Γ. Φακορέλλης (πρόεδρος),  
Ι. Μπασιάκος (αντιπρόεδρος),  
Ε. Φιλίππáκη (γενική  
γραμματέας),  
Α. Οικονόμου (ταμίας),  
Μ. Παπαγεωργίου (ειδική  
γραμματέας),  
Μ. Καπαρού (μέλος),  
Ε. Κουλουμπή (μέλος)

**Πληροφορίες:**

Γ. Φακορέλλης (σύνταξη,  
επιλογή ύλης)  
**E-mail:** [yfacorel@uniwa.gr](mailto:yfacorel@uniwa.gr)

Scientific Association, Year  
of Establishment 1982,  
Headquarters: Kaniggos 27,  
106 82 Athens (Association  
of Greek Chemists)  
<http://archaeometry.org.gr>

**BOARD:**

Y. Facorellis (president),  
I. Bassiakos (vice-president),  
E. Philippaki (general  
secretary),  
A. Oikonomou (treasurer),  
M. Papageorgiou (special  
secretary),  
M. Kaparou (member),  
E. Kouloumbi (member)

**Information:**

Y. Facorellis (editor)  
**E-mail:** [yfacorel@uniwa.gr](mailto:yfacorel@uniwa.gr)

# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

**- Ιανουάριος 2021 -**

**ΚΑΛΗ ΧΡΟΝΙΑ 2021**

**Time is the most valuable thing a man can spend.**  
*(Theophrastus)*

## Newsletter of the Hellenic Society of Archaeometry

**HAPPY NEW YEAR 2021**

**- January 2021 -**

**Nr. 238**

## ΠΙΝΑΚΑΣ ΠΕΡΙΕΧΟΜΕΝΩΝ – TABLE OF CONTENTS

### ΣΥΝΕΔΡΙΑ – CONFERENCES/WORKSHOPS

- International e-conference “Ancient Greek, Roman and Byzantine engraved gems in the eastern Mediterranean and Black Sea area”, May 13-14, 2021 ..... **page 4**
- EGU 2021 session: Geochronological tools for environmental reconstructions . **page 5**
- 43<sup>rd</sup> International Symposium on Archaeometry, Lisbon, 16<sup>th</sup> – 20<sup>th</sup> May 2022 . **page 6**
- Call for papers: Soundscapes and Taskscapes in Antiquity, Kiel, 8-11 September 2021 ..... **page 8**
- 2<sup>nd</sup> International Conference on Global Issues on Environment and Culture ..... **page 9**

### ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ – JOB VACANCIES/FELLOWSHIPS

- RESEARCH POSITIONS AT THE LABORATORY OF ARCHAEOLOGY - UNIVERSITY OF THE PELOPONNNESE KALAMATA, GREECE ..... **page 10**
- Job Announcement for Contract Position in the U.S. Department of State's Cultural Heritage Center in Washington, DC ..... **page 11**
- Job vacancy at the Cyprus Institute ..... **page 14**

### ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

- ΠΡΟΣΚΛΗΣΗ ΕΚΔΗΛΩΣΗΣ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΓΙΑ ΜΕΤΑΠΤΥΧΙΑΚΟΥΣ ΦΟΙΤΗΤΕΣ ΠΜΣ «ΣΥΝΤΗΡΗΣΗ ΤΗΣ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ» - ΑΚΑΔΗΜΑΪΚΟ ΕΤΟΣ 2020-2021 .... **page 15**

### INTERNET SITES

- The Human Face of Mesopotamian Mathematics ..... **page 18**
- Radiocarbon Dating for Conservators Video ..... **page 19**

### ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

- The Restoration of the Nativity Church in Bethlehem ..... **page 21**
- Invisible Connections: An Archaeometallurgical Analysis of the Bronze Age Metalwork from the Egyptian Museum of the University of Leipzig ..... **page 24**
- The Foreign Relations of the “Hyksos” - A Neutron Activation Study of Middle Bronze Age Pottery from the Eastern Mediterranean ..... **page 26**
- Tash, village préhistorique de Macédoine orientale I. Fouilles de Jean Deshayes (1961-1975), volume 3 ..... **page 27**
- New publication "Enkomi (Cyprus): Using pXRF spectroscopy to identify

LBA copper alloys" ..... **page 32**

### **ΕΙΔΗΣΕΙΣ - NEWS RELEASE**

Revealed: Isaac Newton's attempts to unlock secret code of pyramids ..... **page 33**

Egypt's Great Pyramid: 'Staggering' quarry discovery disputes leading construction theory, by Callum Boare ..... **page 35**

Philistines had a taste for far-flung foods, fossilized tooth plaque reveals, by Andrew Curry ..... **page 37**

Top Ten Most Spectacular Greek Archaeological Discoveries of 2020, by Patricia Claus ..... **page 40**

Archaeological Trove Spanning Millennia Emerges From Construction Work in Ancient Jaffa ..... **page 45**

Uncovering secrets hidden beneath the sands of the Arabian Peninsula, by Tareq Al-Thaqafi ..... **page 49**

Early humans may have survived the harsh winters by hibernating, by Robin McKie ..... **page 52**

Mummified baboons shine new light on the lost land of Punt ..... **page 54**

Evidence of Oldest Gynaecological Treatment on Record, Performed in Ancient Egypt 4,000 Years Ago ..... **page 56**

The last speakers of ancient Sparta ..... **page 58**

Great Pyramid: Lost Egyptian artefact found in Aberdeen cigar box ..... **page 62**

Ancient Egyptian hoard of counterfeit 'dirty money' unearthed, by Tom Metcalfe ..... **page 64**

Biggest circular tomb in the ancient world to open in Rome, by Julia Buckley .. **page 67**

Ancient snack stall uncovered in Pompeii, revealing bright frescoes and traces of 2,000-year-old street food ..... **page 70**

Evidence For A Massive Paleo-Tsunami At Ancient Tel Dor, Israel ..... **page 72**

Banking, Trade & Commerce In Ancient Phoenicia, by Michael Arnold ..... **page 74**

Ivory: Elephant decline revealed by shipwreck cargo, by Victoria Gill ..... **page 78**

## **ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**

### **INTERNATIONAL E-CONFERENCE** **“ANCIENT GREEK, ROMAN AND** **BYZANTINE ENGRAVED GEMS IN THE** **EASTERN MEDITERRANEAN AND BLACK** **SEA AREA”, MAY 13-14, 2021**

We are organizing an international e-conference entitled “Ancient Greek, Roman and Byzantine engraved gems in the eastern Mediterranean and Black Sea area” that will take place on May 13-14, 2021 on Zoom.us.

The first circular of this e-conference as well as its poster are attached to this mail. We warmly invite contributions by scholars and graduate students from a variety of disciplines of ancient studies related to these objects. The video conference is free of charge.

We would be delighted, if you could consider contributing to our e-conference and contact us with the required information below before January 1, 2021. Our e-mail addresses are: [terracottas@deu.edu.tr](mailto:terracottas@deu.edu.tr) or [gul1988kaynakci@gmail.com](mailto:gul1988kaynakci@gmail.com)

We would like to ask you:

- a- Would you like to become a member of our scientific committee?
- b- Whom else would you like to suggest for our scientific committee?
- c- What would you recommend about the e-conference’s topics and contents? We would be thankful for experiencing any of your suggestions, critics, additions, corrections and opinions.

We kindly request that you alert any persons within your research community who would be interested in participating at this e-conference, either by forwarding our e-mail through Facebook or other similar social media, or by printing this circular or poster and displaying it in your institution. We hope that you will be able to join us on Zoom, and look forward to seeing you in May 2021!

---

## **EGU 2021 SESSION: GEOCHRONOLOGICAL TOOLS FOR ENVIRONMENTAL RECONSTRUCTIONS**

Calling all geochronologists and geochronology users! Do you have some shiny new geochronology science to share? Did you use geochronological tools to answer questions about Quaternary climate or environment? Then we cordially invite you to submit an abstract to the 2021 vEGU session CL5.1.4 titled "Geochronological Tools for Environmental Reconstructions." Check out the session summary below and submit your abstracts before 13 January 2021!

<https://meetingorganizer.copernicus.org/EGU21/session/40784>

Session CL5.1.4 <https://meetingorganizer.copernicus.org/EGU21/session/40784>:

The Quaternary Period (last 2.6 million years) is characterized by frequent and abrupt climate swings that were accompanied by rapid environmental change.

Studying these changes requires accurate and precise dating methods that can be effectively applied to environmental archives. A range of different methods or a combination of various dating techniques can be used, depending on the archive, time range, and research question. Varve counting and dendrochronology allow for the construction of high-resolution chronologies, whereas radiometric methods (radiocarbon, cosmogenic in-situ, U-Th) and luminescence dating provide independent anchors for chronologies that span over longer timescales. We particularly welcome contributions that aim to (1) reduce, quantify and express dating uncertainties in any dating method, including high-resolution radiocarbon approaches; (2) use established geochronological methods to answer new questions; (3) use new methods to address longstanding issues, or; (4) combine different chronometric techniques for improved results, including the analysis of chronological datasets with novel methods, e.g. Bayesian age-depth modeling. Applications may aim to understand long-term landscape evolution, quantify rates of geomorphological processes, or provide chronologies for records of climate change.

\*\*\*\*\*

Dr. Irka Hajdas  
ETH Zurich

\*\*\*\*\*

---

## **43<sup>RD</sup> INTERNATIONAL SYMPOSIUM ON ARCHAEOLOGY, LISBON, 16<sup>TH</sup>-20<sup>TH</sup> MAY 2022**

Dear colleagues,

All of us love attending conferences. Attending a conference was never about just listening to talks - it was about meeting people, networking, making friends, learning new things, and understanding different cultures.

Conference organizers caught in the current health crisis should make rational decisions about their conferences.

The COVID-19 pandemic that so deeply affects our lives and countries is not expected to end soon, and its consequences will be felt for a long time. In particular, satisfactory conditions for international scientific conferences to take place will certainly not be fulfilled in the next months.

**We have made the decision to further postpone the ISA 2020.**

We are thus forced to postpone the 43rd Symposium on Archaeology of May 2020 and to settle a new date, in order to create an experience that is safe and rewarding for all involved.

After much deliberation and conversation, the following actions have been decided by Local Organizing Committee together with the International Standing Committee:  
- Due to the currently uncertain lifetime of the current COVID-19 crisis, the **Lisbon 43rd ISA** will be postponed for 2 years from its original date, and is rescheduled for **May 16-20, 2022** – again in **Lisbon**, and in the same venues (and with the same Local Organizing Committee). The Congress program, which had already been finalized, will remain the same for 2022 (assuming the willingness of currently enlisted speakers to participate and upon confirmation of authors). The congress web site will remain live until the 2022 congress and updated accordingly.

This was no easy decision but was a necessary one, and the only appropriate option, given the enormous material and immaterial compromise already assumed by the local organization. We sincerely apologize for any inconvenience this will cause for you. We trust that you understand that we made this decision in the best interests of all ISA community. We wish to assure you that your agreements, registration and participation is unchanged valid for the new dates. We look very much forward to welcome you in Lisbon 2022.

### ***Symposium Program***

Loyal to the initial scientific program, the 43rd Symposium on Archaeology to be held in 2022 will be built under the same sessions. Some changes will be indeed introduced since nothing remains the same after the enormous test, we are all being submitted. For

the time being, we are still working on a stimulating scientific program, that will develop around the previously selected works.

Nevertheless, we are aware that some of the previously sent works might be out of date. **So, all previously submitted contributions will not be processed without notice to the ISA 2020-2022 program.** An opportunity for updating your contributions will be announced in due time. We will keep your pre-registration in our files so that we may send you further information in due time. If you do not agree, please let us know (by a simple e-mail to [isa2020@isa2020-lisboa.pt](mailto:isa2020@isa2020-lisboa.pt) and we will delete your full record). Still, we hope to see you all in Lisbon in 2022, for celebrating the continuation of this regular series of ISA Symposiums.

**Response required:** If yours was one of the fabulous abstracts originally accepted for the 2020 conference, please let us know whether you will or won't still be joining us in 2022. You can submit your 'yes' / 'no' or 'maybe' response by **30 June 2021** (soon a link will be available in the ISA 2020-22 website).

### ***Cancellation Procedure and Refund policy***

Registrations completed before congress postponement, will remain valid for the 2022, ISA, if desired. Detailed information on refunding of already paid registrations will follow soon.

Registration is temporarily suspended and will reopen during **2021** (date to be announced).

Best wishes to you all at this truly astonishing and challenging time. Resilience-based approaches and research have never been more critical.

Best wishes to you all at this truly astonishing and challenging time. Resilience-based approaches and research have never been more critical.

Above all, **stay safe, healthy and updated.**

M. Isabel Dias

\*\*\*\*\*  
If you have any questions, please do not hesitate to reach out to the organizers at [isa2020@isa2020-lisboa.pt](mailto:isa2020@isa2020-lisboa.pt) and check for updates at ISA 2020 website.

\*\*\*\*\*

---

## **CALL FOR PAPERS: SOUNDSCAPES AND TASKSCAPES IN ANTIQUITY, KIEL, 8-11 SEPTEMBER 2021**

We kindly invite you to submit abstracts for the session 095 titled "Arts in work: about the interaction of soundscapes and taskscapes in Antiquity", organised in the framework of the EAA (European Association of Archaeologists) annual meeting. It will be held in Kiel (Germany), 8-11 September 2021 on-site, hybrid or on-line depending on the situation.

**Deadline to submit abstracts: 11 February 2021.**

Organisers: Angela Bellia (Italy) - Institute of Heritage Science at the Italian National Research Council; Meritxell Ferrer Martin (Spain) - Universitat Pompeu Fabra; Agnes Garcia-Ventura (Spain) - Universitat Autònoma de Barcelona; Mireia López- Bertran (Spain) - Universitat de València

Session presentation: Working and music/sounds are two topics of research that have been almost unexplored together so far in studies of material culture, especially due their ephemeral nature. On the one hand, when dealing with music, working environments are not usually considered. On the other hand, when dealing with work and production the focus is often on administrative and economic aspects, as well on the so-called chaîne opératoire, but not on soundscapes.

In this session we aim to fill this gap discussing several aspects of the interaction between working and music/sounds through a fresh look of material culture that shed light on the potentialities of objects and architectures as creators of a wide array of sounds that participated in the creation of taskscapes in working environments.

Notice that we use indiscriminately and intentionally music and sounds as synonyms as we also aim at discussing the definition of their boundaries. In doing so, we aim to include in the debates on soundscapes issues as diverse as work songs, traditionally considered "music", but also the crackle of fire or the pounding of mortars, to name two examples, traditionally considered "sounds" (or even "noise").

How do we define these conceptual borders in working environments? Why? Are they useful for our analysis or they hide more than what they show? To discuss all these issues we encourage contributions by scholars dealing with any period and geography as well as various perspectives: history of religion, archaeomusicology, archaeoacoustics, sound archaeology, ecoarchaeology, classics, anthropology, and art history. Interdisciplinary and multidisciplinary research will be welcome, especially research on archeoacoustics based on contemporary analysis like Soundshed Analysis GISTool among others.

Theme: Assembling Archaeological Theory and the Archaeological Sciences.

Submissions can only be done online. See <https://tinyurl.com/y6rx2y22>



## **2<sup>ND</sup> INTERNATIONAL CONFERENCE ON GLOBAL ISSUES ON ENVIRONMENT AND CULTURE\***

Details to be announced\*

**Time:** September 2021

**Place:** Mycenae or Delphi

For more information and to find out about our measures related to COVID, go to: (<http://huaxiahellas.com/conference-2021/>) or contact us at: [shap@henu.edu.cn](mailto:shap@henu.edu.cn)

The 2<sup>nd</sup> International Conference is a follow-up after the success of the 1st Sino-Hellenic International conference in Kaifeng, Henan University in 2019 (<http://huaxiahellas.com/1st-internationalsino-hellenic-conference/>). The theme of Global Issues of Environment & Culture encompasses a broad field concerning the interaction of human development over millennia with the environmental factor. The non-linear trend of evolution of ancient cultures is decisively affected by climatic change, seismic and volcanic destructions, terrestrial but astronomical impacts too, pandemics and more. At the same time natural sciences applied to material culture and delving into the stratigraphic record reveal and document buried antiquities, past destructions and past daily life. Literature sources and scientific tools are used to study ancient societies, their rise and decline, trade and diffusion of ideas, arts & culture. Modern humanity's task is to preserve the memories of the past.

***Accepting proposals on topics including but not limited to:***

- *Enviro-cultural reports from ancient literature sources*
- *Enviro-cultural issues in ancient societies*
- *Cultural management, innovation technologies & sustainability*
- *Climate change & ancient cultures*
- *Disaster archaeology*
- *Silk Road: operational sequences of artefacts & diffusion of ideas*
- *Geoarchaeological issues*
- *Sacred landscapes & religious aspects*
- *Archaeological sciences - archaeometry*
- *3D Reconstructions*
- *Remote sensing applications*
- *Predictive modelling of archaeological sites*
- *Archaeological parks*
- *Geoarchaeological Parks*
- *Skyscape Impact on Cultural Development*
- *Miscellaneous*

*This event is organised by Henan University and the University of the Aegean*

---

**ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –**  
**JOB VACANCIES/FELLOWSHIPS**

**RESEARCH POSITIONS AT THE**  
**LABORATORY OF ARCHAEOLOGY -**  
**UNIVERSITY OF THE PELLOPONNESE**  
**KALAMATA, GREECE**

The research programme RESEARCH EXCELLENCE in Cultural Heritage / ESPA Partnership Agreement (2014-2020) implemented by the Laboratory of Archaeology, University of the Peloponnese, Kalamata, Greece, announces the following research positions for the coming years 2021-2023:

- 2 post-doctorals in archaeology and digital applications, respectively (2,200 euro total/month)
- 2 laboratory technicians in archaeology and digital applications, respectively (2,500 euro total/month)
- 8 PhD candidates, in the above fields (1,500 euro total/month). The funding period can be up to 30 months.

All research positions will be focused on the analysis and documentation of Archaeological and Cultural Heritage materials and sites, using state of the art technological infrastructure located at the Laboratory of Archaeology. More specifically, in the direction of archaeology, research can be conducted applying Electron Microscopy (SEM, TEM), X-ray techniques (XRF, XRD) and Raman spectroscopy. In the direction of digital archaeology, available infrastructure including GIS, 3D laser scanner, 3D printers, LIDAR and UAVs etc.

Additionally, the programme will provide 24 short term grants, of 6 months duration each, allowing full access to all equipment and additionally funded with the amount of 2,500 euro per grant, following a continuous submission and evaluation scheme.

More information about the grants will be available since early January at [www.laboratoryarchaeology.gr](http://www.laboratoryarchaeology.gr).

For expression of interest and possible queries please write at [zacharias@uop.gr](mailto:zacharias@uop.gr).

---

## **JOB ANNOUNCEMENT FOR CONTRACT POSITION IN THE U.S. DEPARTMENT OF STATE'S CULTURAL HERITAGE CENTER IN WASHINGTON, DC**

Apply here: <https://tinyurl.com/yasffcqe>

Senior Analyst 31 - Tatitlek Technologies, Inc.  
Tracking Code 4807-205

### **Job Description**

The Senior Analyst functions as an expert in research and analysis related to the cultural heritage of geographic regions outside the continental United States, such as the Middle East, North Africa, East Asia, or Central and South America. The incumbent carries out primary research and assists in the production of analyses that form the basis for entering into and implementing binding cultural property agreements with foreign governments. The incumbent also supports the functions of the President's Cultural Property Advisory Committee, and establishes and maintains liaison with officials and experts in pertinent governmental and non-governmental organizations.

### **PERSONNEL REQUIREMENTS:**

Expertise and professional networks in the cultural heritage of one or more of the following regions: East Asia, the Pacific Islands, the Middle East, or North Africa  
Subject matter expertise in cultural property, especially religious or sacred art and architecture  
Ability to conduct research and analysis in a foreign affairs or foreign assistance setting  
Strong organizational skills and multi-tasking abilities  
Strong critical and creative thinking and analytical skills  
Strong written and oral communication skills  
Facility with data sources on: 1) cultural property laws and regulations; 2) measures taken to protect and preserve cultural heritage; 3) incidences of looting and illicit export; 4) international patterns of trade for cultural property, art, and antiquities; and 5) the state of research, exhibition, and conservation of archaeological or ethnological resources  
Facility with standard software, including the complete Microsoft Office Suite (Word, Excel, Access, PowerPoint, SharePoint), and an ability to learn and work with other software such as database applications  
Ability to work independently, with minimal supervision, in a high volume, fast-paced work environment  
Ability to build and maintain productive professional relationships with associates in the Department and interagency  
Ability to travel to and perform services in an area that has been determined by the Department to be a hazardous duty area  
Ability to obtain and maintain a security clearance at the Secret level  
Willingness to obtain training as needed

### **DUTIES AND RESPONSIBILITIES:**

Under the technical supervision of FTE senior analysts, conducts research and analysis of information related to cultural heritage in an assigned geographic area outside the continental United States.

Monitors political, social, economic, and other developments affecting cultural heritage in the various geographic areas.

Develops sources of information regarding international cultural property laws and regulations; measures taken to protect and preserve cultural heritage; incidences of looting and illicit export; international trade patterns; and the state of research, exhibition, and conservation of archaeological or ethnological resources.

Analyzes a broad profile of current information relevant to cultural heritage that is available from a wide variety of sources to discern matters of inherent importance to U.S. foreign policy interests.

Monitors the implementation of agreements in geographic areas and develops appropriate analytical data about implementation, including with respect to the role of transnational organized crime in cultural property looting and trafficking.

Is the lead analyst for managing the complete analytic, bureaucratic and diplomatic process for: a.) renewal of cultural property agreements with countries in one of the six geographic regions defined by the State Department, b.) the development of new agreements in the same region, and c.) development of follow-on action plans for any completed agreement. To these ends, consults with posts on cultural heritage issues within their host countries, traveling there as needed.

Assists senior analysts with comprehensive written and oral assessments of broad, complex, and sensitive issues related to cultural heritage overseas.

Presents results of research and analysis to the President's Cultural Property Advisory Committee and to senior leaders in the Bureau and Department as the Senior Subject Matter expert in this area of expertise. Advises U.S. Government, Department, and ECA policymakers and their staffs on matters pertaining to the protection or preservation of cultural property and heritage overseas.

Drafts reports of the findings and recommendations of the President's Cultural Property Advisory Committee for review by the supervisor and committee chair.

Assists with the drafting of decision-making documents that advance U.S. foreign policy in cultural heritage protection and preservation.

Participates in meetings, workshops, and seminars regarding policy issues of special interest to the cultural heritage community, which may include domestic and/or international travel.

#### **SPECIAL KNOWLEDGE REQUIREMENTS:**

At minimum, a Master's degree in art history, archaeology, anthropology, historic preservation, law, criminal justice, or related field; or a Bachelor's degree in the aforementioned fields or in business administration (with a project management concentration), combined with a minimum of three years of project management experience.

**Additional Qualifying Factors:**

A satisfactory background screening, negative drug test, positive references and proof of identity and legal authorization to work in the United States and for TTC are required.

The Tatitlek Corporation gives hiring, promotion, training and retention preference to Tatitlek shareholders, shareholder descendants and shareholder spouses who meet the minimum qualifications for the job.

As an equal opportunity employer, The Tatitlek Corporation recognizes that our strength lies in our people. Discrimination and all unlawful harassment, including sexual harassment, in employment is not tolerated. We encourage success based on our individual merits and abilities without regard to race, color, religion, national origin, gender, sexual orientation, gender identify, age, disability, marital status, citizenship status, military status, protected veteran status or employment.

**Job Location**

Washington, District of Columbia, United States Position Type Full-Time/Regular

---

## **JOB VACANCY AT THE CYPRUS INSTITUTE**

Dear All,

The Cyprus Institute has a vacancy for an Assistant Professor / Research Scientist in Archaeological Materials, with specialisation ideally in archaeometallurgy, or in archaeological ceramics. More details can be found here:

<https://jobboard.cyi.ac.cy/?q=1857904371>

Please note that the **closing date for this position is 31 January 2021**, not 3 January as currently stated on the CyI Jobboard. (I hope to get this corrected once our offices reopen in early 2021.) Also, we are asking for contact details for 3 references, not 5 as currently stated.

Best wishes for 2021, and apologies for the administrative errors in the advert,

Thilo

\*\*\*\*\*

Dr.-Ing. habil. Thilo Rehren FSA  
A.G. Leventis Professor in Archaeological Sciences  
The Cyprus Institute  
Nicosia, Cyprus

<https://www.cyi.ac.cy/>

[Th.Rehren@cyi.ac.cy](mailto:Th.Rehren@cyi.ac.cy)

<https://cyi.academia.edu/ThiloRehren>

\*\*\*\*\*



## **ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS**

### **ΠΡΟΣΚΛΗΣΗ ΕΚΔΗΛΩΣΗΣ** **ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΓΙΑ ΜΕΤΑΠΤΥΧΙΑΚΟΥΣ** **ΦΟΙΤΗΤΕΣ ΠΜΣ «ΣΥΝΤΗΡΗΣΗ ΤΗΣ** **ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ» -** **ΑΚΑΔΗΜΑΪΚΟ ΕΤΟΣ 2020-2021**

Το Τμήμα Συντήρησης Αρχαιοτήτων και Έργων Τέχνης (ΣΑΕΤ) του Πανεπιστημίου Δυτικής Αττικής, έχοντας υπόψη:

1. Τις διατάξεις της Απόφασης Αρ. Τ. Β' Αρ. 2368/ΦΕΚ 12.07.2017
2. Τις διατάξεις της Απόφασης Αρ. 7487 για την Επανίδρυση του ΠΜΣ «Συντήρηση της Πολιτιστικής Κληρονομιάς» (Τ. Β' Αρ. 3484/ΦΕΚ 12.08.2018)
3. Τις διατάξεις του ν. 4485/2017 (ΦΕΚ Α'114)
4. Τον Εσωτερικό Κανονισμό του Π.Μ.Σ. (Προσάρτημα του αποσπάσματος πρακτικού με αριθμ. 2/18-04-2018 της Συνέλευσης του Τμήματος ΣΑΕΤ) που εξειδικεύει το θεσμικό πλαίσιο για τις μεταπτυχιακές σπουδές σύμφωνα με τον Ν.3685/2008 (Α' 148) και όπως έχει τροποποιηθεί με τους Ν.4009/2011, Ν.4485/2017 και Ν. 4521/2018 που ισχύουν και συμπληρώνουν τον ισχύοντα κανονισμό λειτουργίας Π.Μ.Σ. του Π.Δ.Α.. βάσει των άρθρων 30-37 & 43,45, 48 ,των διατάξεων του Ν.4485/2017
5. Την απόφαση της Συνέλευσης 20/9-12-2020 του Τμήματος Συντήρησης Αρχαιοτήτων και Έργων Τέχνης
6. Την απόφαση της Συνέλευσης 21/16-12-2020 του Τμήματος Συντήρησης Αρχαιοτήτων και Έργων Τέχνης

Προσκαλεί για εκδήλωση ενδιαφέροντος για την πλήρωση είκοσι (20) κενών θέσεων Μεταπτυχιακών Φοιτητών για το ΠΜΣ «Συντήρηση της Πολιτιστικής Κληρονομιάς» με έναρξη στο εαρινό εξάμηνο του Ακαδημαϊκού Έτους 2020-21.

#### **Γενικά**

- Στο ΠΜΣ γίνονται δεκτοί πτυχιούχοι Τμημάτων Συντήρησης Πολιτιστικών Αγαθών, Πανεπιστημιακού και Τεχνολογικού Τομέα της ημεδαπής ή ομοταγών αναγνωρισμένων ιδρυμάτων της αλλοδαπής (Τ. Β' Αρ. 3484/ΦΕΚ 12.08.2018, Άρθρο 4). Προβλέπεται να γίνονται δεκτοί αλλοδαποί φοιτητές εφόσον γνωρίζουν επαρκώς την ελληνική γλώσσα (κάτοχοι πιστοποιητικού B2 επιπέδου) βάσει της υπουργικής απόφασης Φ152/Β61504/30-5-2001 (659 Β').
- Η εισαγωγή των Μεταπτυχιακών Φοιτητών και η έναρξη των μαθημάτων θα γίνει το εαρινό εξάμηνο του Ακαδημαϊκού έτους 2020-2021. Το ΠΜΣ θα πραγματοποιηθεί στην ελληνική γλώσσα και οδηγεί στη λήψη Μεταπτυχιακού Διπλώματος Ειδίκευσης (ΜΔΕ) χρονικής διάρκειας κατ' ελάχιστον τριών (3) ακαδημαϊκών εξαμήνων.
- Τα δύο (2) πρώτα εξάμηνα σπουδών, αντιστοιχούν σε διδασκαλία μαθημάτων, ενώ το τρίτο εξάμηνο, αντιστοιχεί στην εκπόνηση Μεταπτυχιακής Διπλωματικής

Εργασίας. Ο ανώτατος επιτρεπόμενος χρόνος σπουδών ορίζεται στα τέσσερα (4) 'ενεργά' εξάμηνα.

- Κάθε φοιτητής υποχρεούται να παρακολουθήσει επιτυχώς όλα τα μαθήματα και να εκπονήσει τη μεταπτυχιακή διπλωματική εργασία του μέχρι το τέλος του 4ου εξαμήνου (σύνολο: 90 πιστωτικές μονάδες ECTS).
- Τα μαθήματα διεξάγονται κυρίως στις εγκαταστάσεις του Πανεπιστημίου Δυτικής Αττικής. Η διεξαγωγή των μαθημάτων στο νέο κύκλο του ΠΜΣ θα γίνει βάσει των υγειονομικών οδηγιών και των υπουργικών αποφάσεων για τον τρόπο λειτουργίας των ΑΕΙ λόγω της πανδημίας του Covid-19. Το ύψος των διδάκτρων ανέρχεται σε **2800 €** ανά φοιτητή και καταβάλλονται σε τρεις (3) δόσεις ως εξής: 1η δόση: 1000 € με την εγγραφή στην αρχή του 1ου εξαμήνου, 2η δόση: 900 € στην αρχή του 2ου εξαμήνου και 3η δόση: 900 € στην αρχή του 3ου εξαμήνου.
- Από το τέλος φοίτησης απαλλάσσεται το 30% των εισαγομένων φοιτητών, οι οποίοι δύναται κατόπιν αιτήματός τους να υπαχθούν βάσει οικονομικών κριτηρίων στις διατάξεις του άρθρου 35, παρ. 2 του ν. 4485/2017, όπως καθορίζονται με την Απόφαση Αρ. 131757/Ζ1 (Τ. Β' Αρ. 3387/ΦΕΚ 10.08.2018

Για περισσότερες πληροφορίες οι ενδιαφερόμενοι μπορούν να ενημερώνονται από την ιστοσελίδα του ΠΜΣ [www.master-conservation.uniwa.gr](http://www.master-conservation.uniwa.gr), ή επικοινωνώντας με τη γραμματεία στο E-mail: [gram-master-conservation@uniwa.gr](mailto:gram-master-conservation@uniwa.gr).

#### Υποβολή εκδήλωσης ενδιαφέροντος

Οι ενδιαφερόμενοι καλούνται να υποβάλουν εκδήλωση ενδιαφέροντος με μορφή Αίτησης Υποψηφιότητας που παρέχεται ηλεκτρονικά στη διεύθυνση <https://www.master-conservation.uniwa.gr/copy-of-prosklisi-metaptyxiakoi>, την οποία θα υποβάλουν συμπληρωμένη:

(α) ηλεκτρονικά, στη διεύθυνση [gram-master-conservation@uniwa.gr](mailto:gram-master-conservation@uniwa.gr),

και

(β) σε φυσική μορφή εντός φακέλου (Φάκελος 1) στη διεύθυνση: Γραμματεία Τμήματος ΣΑΕΤ, ΠΜΣ «Συντήρηση της Πολιτιστικής Κληρονομιάς» Τμήμα Συντήρησης Αρχαιοτήτων και Έργων Τέχνης, ΤΕΙ Αθήνας, Αγίου Σπυρίδωνος, 12243 Αιγάλεω, Αθήνα με καταληκτική ημερομηνία υποβολής **20/01/2021** (σφραγίδα ταχυδρομείου, σε περίπτωση ταχυδρομικής αποστολής). Ο φάκελος πρέπει να περιλαμβάνει όλα τα ζητούμενα δικαιολογητικά (βλ. κατωτέρω) και να αναγράφει ευκρινώς στο εξωτερικό του: «Πρόσκληση ΠΜΣ-ΣΑΕΤ 21/16-12-2020».

**Φάκελος 1:** Εντός του φακέλου 1 θα πρέπει οι υποψήφιοι να συμπεριλάβουν *Κείμενο Προθέσεων Φοίτησης* (έως 2 σελίδες), στο οποίο θα εξηγούν τους λόγους για τους οποίους επιθυμούν να παρακολουθήσουν το συγκεκριμένο ΠΜΣ και θα αναφέρονται στα γενικά και ειδικά ενδιαφέροντά τους και τη μέχρι τώρα επαφή τους με τα επιστημονικά αντικείμενα του προγράμματος.

Ο **φάκελος 1** θα περιλαμβάνει σε έντυπη μορφή τα παρακάτω δικαιολογητικά:

1. Συμπληρωμένη Αίτηση Υποψηφιότητας
2. Βιογραφικό σημείωμα
3. Φωτοαντίγραφο αστυνομικής ταυτότητας
4. Κείμενο Προθέσεων Φοίτησης (έως 2 σελίδες)
5. Επικυρωμένο αντίγραφο Πτυχίου i. Πτυχιούχοι ημεδαπής: Αντίγραφο πτυχίου Ελληνικού ΑΕΙ.



ii. Πτυχιούχοι αλλοδαπής: Αντίγραφο πτυχίου ομοταγών ΑΕΙ της αλλοδαπής (με επίσημη μετάφραση στα Ελληνικά) και βεβαίωση αναγνώρισης ισοτιμίας ή και αντιστοιχίας πτυχίου από το ΔΟΑΤΑΠ.

iii. Για όσους έχουν ολοκληρώσει τον κύκλο σπουδών τους και εκκρεμεί η απονομή πτυχίου μπορούν να προσκομίσουν ανάλογη βεβαίωση της οικείας Γραμματείας τους

6. Βεβαίωση αναλυτικής βαθμολογίας προπτυχιακών σπουδών

7. Επικυρωμένα αντίγραφα πιστοποιητικών καλής γνώσης (B2) αγγλικών με επίσημη μετάφραση στα Ελληνικά

8. Δύο (2) πρόσφατες συστατικές επιστολές

9. Βεβαίωση συναφούς επαγγελματικής προϋπηρεσίας

10. Πιθανή ερευνητική ή/και συγγραφική επιστημονική δραστηριότητα<sup>1</sup>

11. Αντίγραφα άλλων πιθανών πτυχίων ή/και αναγνωρισμένων μεταπτυχιακών τίτλων σπουδών με επίσημη μετάφραση στα Ελληνικά, αν αφορούν τίτλους σπουδών της αλλοδαπής.

12. Άρρενες υποψήφιοι: επικυρωμένη βεβαίωση εκπλήρωσης/απαλλαγής/αναβολής των στρατιωτικών υποχρεώσεών τους

13. Αλλοδαποί υποψήφιοι: οφείλουν να γνωρίζουν επαρκώς την ελληνική (κάτοχοι πιστοποιητικού B2 επιπέδου), βάσει της υπουργικής απόφασης Φ152/Β6/1504/30-5-2001(659 Β').

<sup>1</sup> Τεκμηριώνεται από συμμετοχή σε χρηματοδοτούμενα Ερευνητικά Προγράμματα ή/και ανακοινώσεις σε επιστημονικά συνέδρια και δημοσιεύσεις σε επιστημονικά περιοδικά.

Φάκελοι που δεν θα περιέχουν τα δικαιολογητικά 5-8 δεν θα αξιολογούνται.

### Επιλογή υποψηφίων

Η επιλογή των υποψηφίων θα γίνει βάσει αξιολογικών κριτηρίων σύμφωνα με το παρακάτω σχήμα:

| ΚΩΔΙΚΟΣ | ΠΕΡΙΓΡΑΦΗ   | ΒΑΡΥΤΗΤΑ |
|---------|---|----------|
| K1      | Βαθμός πτυχίου  | 30%      |
| K2      | Επίπεδο γνώσης αγγλικής γλώσσας   | 10%      |
| K3      | Πιθανή συγγραφική ή/και ερευνητική δραστηριότητα του υποψηφίου  | 15%      |
| K4      | Επαγγελματική εμπειρία του υποψηφίου ή τεκμηριωμένη ενασχόλησή του με τα αντικείμενα του προγράμματος | 15%      |
| K5      | Συνέντευξη  | 30%      |

---

## ***INTERNET SITES***

# **THE HUMAN FACE OF MESOPOTAMIAN MATHEMATICS**

Thin End of the Wedge episode 11 is now available: <http://www.wedgepod.org/episode-list/>.

Carlos Gonçalves: The human face of Mesopotamian maths

Carlos introduces us to the social setting of Mesopotamian maths. What form did maths take? Who used it and what for? Are Mesopotamian practices related to what we know from other ancient cultures, or from the modern world? Carlos explains how our understanding of Mesopotamian maths has changed over the years.

Thin End of the Wedge is working to produce translations into Middle Eastern languages. If you'd like to support that effort, please join the TEW Patron family at <http://Patreon.com/WedgePod>.

---

## RADIOCARBON DATING FOR CONSERVATORS VIDEO

The third session of Practical Science for Conservators, [Radiocarbon Dating for Conservators](#), with special lecturer Dr. Greg Hodgins, Dept. of Physics, University of Arizona, Dir. [Accelerator Mass Spectrometry Laboratory](#), is now available on [YouTube](#).

Please send any follow-up radiocarbon dating questions or comments to Luke at [AddingtonFurniture@gmail.com](mailto:AddingtonFurniture@gmail.com).

**For our UK and European colleagues, don't forget the European Remix.**

Jennifer González Corujo will be hosting the **European Remix** of the event which will take place on **Sunday, December 13<sup>th</sup> at 8:00pm BST** (11:00am PST / 2:00pm EST). Email Jenny at <[jenny\\_corujo79@hotmail.com](mailto:jenny_corujo79@hotmail.com)> for more info. We will be there for any questions/discussion.

Thank you & see you for our next lecture on January 29!

[Luke Addington](#), [Nina Roth-Wells](#), [Craig Deller](#), [Tiarna Doherty](#), and [Chris Stavroudis](#)  
Topics:

[07:26](#) The origin of Carbon-14 & the cosmic ray background

[11:00](#) Transmutation of Nitrogen-14 to Carbon-14

[13:40](#) Radioactive decay of C-14

[14:42](#) Applications of C-14

[15:23](#) Isotopes of Carbon & C-14 half life

[18:40](#) Radiocarbon measurement & decay counting (C-14 to N-14 +  $\beta$  particle)

[20:48](#) Accelerator Mass Spectrometry (AMS)

[22:35](#) Sample Preparation 1: Cleaning

[30:18](#) Sample Preparation 2&3: Combustion and Graphitization

[33:24](#) AMS instrumentation explanation

[40:35](#) Calibration of radiocarbon measurements

[41:50](#) 1st Q&A session

Dr. Hodgins starts the second half of the lecture

[48:34](#) Photosynthesis, wood, and special tree ring glasses

[51:22](#) Tree rings as archives of annual atmospheric C-14 content

[53:28](#) Calibration curve from tree ring measurements

[54:00](#) Dendrochronology's link to C-14 dating & calibration of radiocarbon measurements

[58:30](#) Calibration plots

[1:03:50](#) Radiocarbon dating the last 600 years

[1:08:00](#) Radiocarbon in the post-nuclear age & the bomb-spike

[1:12:30](#) Contaminants

[1:15:45](#) Dating fine art

[1:18:40](#) 2nd Q&A session

\*\*\*\*\*

Luke Addington

Furniture & Wooden Artifacts Conservator  
Addington Furniture, LLC  
AddingtonFurniture.com

\*\*\*\*\*

**Please visit the site:**

[https://www.youtube.com/watch?v=DJHws\\_OD7MY&feature=youtu.be](https://www.youtube.com/watch?v=DJHws_OD7MY&feature=youtu.be)



## ***ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS***

# **THE RESTORATION OF THE NATIVITY CHURCH IN BETHLEHEM**

Edited By Claudio Alessandri Hardback, 460  
\$144.00  
eBook, \$47.16  
ISBN 9781138488991

This book is a summary of the main restoration works carried out at the Church of the Nativity in Bethlehem that commenced in September 2013. Work on roof wooden structures, wall and floor mosaics, internal plasters, wooden architraves and painted columns of the naves, external wall surfaces and Narthex is all presented in a sequence of reports that accompany the reader up to the final interventions through accurate descriptions of historical and archaeological features, initial state of conservation and appropriate techniques of conservation and restoration.

Topics are treated with the methodological and linguistic rigor specific to each disciplinary sector involved even if, in the interest of making reading and comprehension easier, it was sometimes preferred to present only significant case studies, which are nevertheless representative of groups of wider and more complex problems. Through the reading of this work, the reader can simply fulfil his desire for knowledge and obtain answers to certain curiosities about the past history of the Church. At the same time, useful guidelines in dealing with conservation and restoration interventions at historic-architectural sites of similar complexity can be found.

The book is, therefore, addressed to a generic reader, interested in the history and conservation of one of the most representative examples of our heritage, but also, in light of its technical and scientific value, to university students, technicians, restorers, architects, structural engineers, archaeologists and historians.

### **Table of Contents**

#### 1 Introduction

Presidential Committee for the Restoration of the Church of the Nativity and C. Alessandri

#### 2 The restoration site

Piacenti S.p.A., C.D.G. – Community Development Group and C. Alessandri

##### 2.1 Team configuration

##### 2.2 Preliminary on-site tests

##### 2.3 Organization of the work site

##### 2.4 Supply of materials and facilities

#### 3 Roof and windows

##### 3.1 Historical analysis

G. A. Fichera

3.2 Morphologic and structural characteristics of the roof C. Alessandri, N. Macchioni, M. Mannucci, M. Martinelli and B. Pizzo

3.3 The scaffolding

C. Alessandri and M. Martinelli

3.4 State of conservation of the wooden structures N . Macchioni, M. Mannucci , M. Martinelli and B. Pizzo

3.5 Wooden species and dating of the wooden structural components M . Bernabei, J . Bontadi, N. Macchioni and M. Mannucci

3.6 Interventions on trusses, purlins and boards C. Alessandri, V. Mallardo, M. Martinelli and B. Pizzo

3.7 Archaeological analysis

G. A. Fichera

3.8 Vulnerability analysis and seismic reinforcement C. Alessandri, V. Mallardo and M. Martinelli

3.9 Old and new roof covering

C. Alessandri and M. Martinelli

3.10 Windows

S . Palanti

3.11 Maintenance

C. Alessandri, N. Macchioni, M. Martinelli and B. Pizzo

4 Mosaics

4.1 Historical analysis

M . Bacci

4.2 Materials and techniques

S . Sarmati, N. Santopuoli and E. Concina

4.3 Mosaics materials analysis

M . Verità, L. Lazzarini and P. Santopadre

4.4 The photogrammetric survey of the mosaics 216 G. Caratelli and C. Giorgi

4.5 State of conservation

S . Sarmati, N. Santopuoli and E. Concina

4.6 Interventions

S . Sarmati, N. Santopuoli and E. Concina

4.7 Floor mosaics – archaeological excavations G.A. Fichera

5 Plasters

S. Sarmati and N. Santo Puoli

5.1 Material composition

5.2 State of conservation

5.3 Interventions

6 Paintings on columns

6.1 The figurative cycle

M . Bacci

6.2 State of conservation

S . Sarmati

6.3 Interventions

S . Sarmati

7 Exterior wall surfaces

- 7.1 Materials and their state of conservation S . Sarmati and G. A. Fichera
- 7.2 Intervention techniques on stones and mortar joints S . Sarmati

## 8 Wooden architraves

C. Alessandri, N. Macchioni, M. Mannucci, M. Martinelli and B. Pizzo

- 8.1 Internal geometry, material and technical characteristics
- 8.2 External decorations
- 8.3 State of conservation and past interventions
- 8.4 The new interventions
- 8.5 The problem of the corners
- 8.6 Maintenance

## 9 The narthex

9.1 Archaeological analysis and preliminary structural survey C. Alessandri, G. A. Fichera and M. Martinelli

9.2 On-site material survey

C. Alessandri and M. Martinelli

### IQM

9.3 Interventions of restoration inside the narthex C. Alessandri and M. Martinelli

9.4 Interventions of structural consolidation C. Alessandri and M. Martinelli

9.5 Numerical simulations and on-site tests C. Alessandri and M. Martinelli

9.6 The Armenian door

M . Bacci and S. Sarmati

9.7 Maintenance

C. Alessandri and M. Martinelli

## 10 Monitoring

C. Alessandri, N. Macchioni, M. Martinelli and B. Pizzo

10.1 Narthex

10.2 Church façade

10.3 Walls of the nave

10.4 Orthodox wall (south wall)

10.5 Corners

10.6 Columns

10.7 Wooden architraves

10.8 Roof wooden structures

10.9 Fire and micro-climate detection system

\*\*\*\*\*  
.Claudio Alessandri graduated in Architecture at the University of Florence, Italy in 1976. In 1983 he was appointed Assistant Professor in Mechanics of Solids & Structures at the same University. In 1991 he became Associate Professor and two years later he moved to the University of Ferrara where in 2011 he became Full Professor and later Head of the Architecture Department from 2003 to 2005 [...]  
\*\*\*\*\*

**Please visit the site: <https://www.routledge.com/The-Restoration-of-the-Nativity-Church-in-Bethlehem/Alessandri/p/book/9781138488991>**

---

# **INVISIBLE CONNECTIONS: AN ARCHAEOLOGICAL ANALYSIS OF THE BRONZE AGE METALWORK FROM THE EGYPTIAN MUSEUM OF THE UNIVERSITY OF LEIPZIG**

Author: Martin Odler and Jiří Kmošek. Paperback; 205x290mm; 200 pages;  
176 figures, 15 tables (colour throughout). 692 2020 Archaeopress Egyptology 31.  
Available both in printed and e-versions. Printed ISBN 9781789697407. Epublication  
ISBN 9781789697414.

The Egyptian Museum of the University of Leipzig has the largest university collection of ancient Egyptian artefacts in Germany. It includes important objects from the excavations of the most prolific excavator among the museum's curators, Georg Steindorff, at the sites of Abusir, Aniba, and Giza, complemented by objects from Abydos, Thebes, and Kerma. The catalogue represents the results of an interdisciplinary project by Egyptologist and archaeologist Martin Odler, archaeometallurgist Jiří Kmošek and other participating researchers. A selection of 86 artefacts was analysed using a range of archaeometallurgical methods (X-ray fluorescence; metallography; neutron activation analysis; lead isotope analysis), providing a diachronic sample of Bronze Age Egyptian copper alloy metalwork from Dynasty 1 to Dynasty 19.

Besides currently popular focus on the ore provenance, the selection of the applied methods aimed also at the description of practical physical properties of the objects. The question of differences between full-size functional artefacts and models is addressed, as is the problem of 'imports' and their ethnic interpretation. The analyses brought many unexpected results to light, the most surprising being a bowl (ÄMUL 2162) made of arsenical copper high in nickel, which has parallels in Chalcolithic and Early Bronze Age Anatolia, and was featured in an article in the Journal of Archaeological Science in 2018. The corpus presented here involves the largest analysed metalwork assemblage from the Nubian C-Group and the Egyptian New Kingdom, and it addresses the issue of the use of local Nubian ore sources versus the sources of copper from Cyprus and elsewhere.

\*\*\*\*\*  
Martin Odler defended his PhD thesis 'The social context of copper in ancient Egypt down to the end of Middle Kingdom' in 2020. In 2016, he published the monograph 'Old Kingdom Copper Tools and Model Tools', the first of its kind in Egyptology, with Archaeopress.[...]

Jiří Kmošek is an archaeometallurgist, a PhD candidate at the Institute for Natural Sciences and Technology in the Arts, Academy of Fine Arts Vienna. He has analysed not only ancient Egyptian material but also Bronze Age metalwork from the Czech Republic.

\*\*\*\*\*

**Please visit the site:**



<http://www.archaeopress.com/ArchaeopressShop/Public/displayProductDetail.asp?id={9BC6335C-BD54-48DB-AA6F-5CF3DADC51C3}> [Go there for price range and ToC]

---

# **THE FOREIGN RELATIONS OF THE “HYKSOS” - A NEUTRON ACTIVATION STUDY OF MIDDLE BRONZE AGE POTTERY FROM THE EASTERN MEDITERRANEAN**

by Patrick E. McGovern with a contribution by Tine Bagh

BAR International Series S888. Oxford: Archaeopress Paperback:260pp. Includes new 2020 preface with links to additional, updated material. 1 colour plate, 17 black and white plates, 29 figures, 46 tables ISBN 10:1841710881

ISBN:9781841710884

BAR number:S888

£57.00

[To receive 20% discount on all BAR Publishing titles, please quote the following code at checkout: BARmember] .

The 2020 printed and ePDF edition has an updated Afterword by PE McGovern with new data and interpretations, a petrographic Addendum and critique by geologist C Wnuk, and the 86 pottery figure plates of the Tell el-Dab`a NAA corpus, available here for the first time (go to <https://rb.gy/cnmwzl>).

This volume constitutes the largest, most focused chemical study of ancient pottery ever undertaken for the Old World. It demonstrates that the enigmatic “Hyksos” of Egyptian history and legend most likely immigrated into the Nile Delta from the Gaza region of southern Palestine. Their higher socio-economic status at their new-found capital of Avaris, from which they ruled Egypt for more than a century (ca. 1650-1550 B.C.), is evidenced by the massive importation of goods from their Gaza homeland, including resinated wine, and by the wholesale transplantation of burial, religious, technological, and culinary traditions as reflected in foreign pottery types. Less intense contacts with Middle Egypt, Syria, Lebanon, Crete, and Cyprus are also documented in this investigation.

Recommended Sales Price: £57 / €70.5 / US\$94 | ISBN: 9781841710884 |

Language: English | 260 pages, Includes new 2020 preface with links to additional, updated material. 1 colour plate, 17 black and white plates, 29 figures, 46 tables

Please visit the site: <https://www.barpublishing.com/the-foreign-relations-of-the-hyksos.html>

---

## **TASH, VILLAGE PRÉHISTORIQUE DE MACÉDOINE ORIENTALE I. FOUILLES DE JEAN DESHAYES (1961-1975), VOLUME 3**

BMCR 2020.12.15

René Treuil, Dikili. Bulletin de Correspondance Hellénique, Supplément 61. Athènes: École française d'Athènes, 2019. 199 p.  
ISBN 9782869583108 €45,00.

Review by Michael Fotiadis, University of Ioannina. [mfotiadi@cc.uoi.gr](mailto:mfotiadi@cc.uoi.gr)

The École française d'Athènes (ÉfA) first set spade at Dikili Tash in 1920–1922. Four decades later, in 1961, the ÉfA returned to the mound of Dikili and, under the direction of Jean Deshayes, until 1975 exposed 300 m<sup>2</sup> of Neolithic and Bronze Age deposits. A Greek team led by Dimitrios Theocharis excavated another 340 m<sup>2</sup> in the 1960s. Neither team reached the bottom of the anthropogenic accumulation, but with 640 m<sup>2</sup> of excavated deposits, by 1980 Dikili Tash was among the most extensively explored prehistoric settlements in north Greece.

Sponsored by the ÉfA, field research and specialized studies by Franco-Hellenic teams have continued into the 2010s with important results. Since the 1990s the ÉfA has also been publishing book-length reports on Deshayes's excavations at Dikili. On the centenary of the first excavation, in 2020 the work of the ÉfA at the site was awarded the Grand Prix for archaeology of the Institut de France.[1]

The volume under review is devoted to the Bronze Age pottery and to the figurines, clay models and miniature pots from all phases of Dikili explored by Deshayes. It also includes a concise, highly informative chapter on the history of research in Dikili Tash (co-authored by René Treuil and Dimitra Malamidou).

Chapter 1, by Malamidou, is a detailed study of the Bronze Age pottery from Deshayes's 1961–1975 trenches, focused primarily on pot shapes and decoration.[2] The bulk of the material belongs to Early Bronze Age (EBA), divided into two main phases, the second of which, EBA 2, is further divided into three sub-phases. What of absolute chronology? The author indicates a range for the EBA at Dikili between 3300/3100 and 2700/2350 BC, and that is as good an estimate as any.[3] The lack of precise chronology is compensated for by the existence of records that assign each excavation unit to a specific phase or sub-phase on stratigraphic grounds. Thanks to those records, Malamidou was able to trace the development of pottery shapes and decorative motives and arrangements from EBA 1 to EBA 2c. The relevant evidence indicates continuity from the beginning to the end of the period. Still, EBA 2 pottery exhibits more complex decorative patterns (incised, impressed, excised, in relief) executed with much greater care for regularity than before and often extending to a greater portion of the pot's surface. The evidence also shows the use of new devices, such as rollers, for impressing patterns on pot surfaces.

All these features had disappeared by the time Late Bronze Age (LBA) deposits began accumulating at Dikili, at least in the areas excavated by Deshayes. The LBA accumulation began about the middle of the second millennium BC or soon after, as indicated by several <sup>14</sup>C dates.[4] A temporal hiatus, greater than five hundred years, intervened therefore between EBA 2 and the LBA, but that does not necessarily imply that Dikili was deserted during that period. Be that as it may, the LBA deposits form a thin (20–30 cm) mantle over the top of the Dikili mound and are, as expected, disturbed by later activities and surface processes. Their pottery content is small yet by no means uninformative. Bowls of various sizes and profiles predominate. A concentration of sherds from large vessels and utensils is associated with the ruins of an elongated apsidal building. The author plausibly suggests that the building could have served as storage of foodstuffs intended for consumption beyond the individual household. Decoration is noticeably simpler and more limited in patterns than in EBA 2.

Novel is the use of a graphite solution applied to a pot's exterior, thereby giving the pot a metallic shine. Another novelty is the application of relief bands with fingertip impressions. The use of a white or colored paste that fills incised and impressed patterns, first encountered in EBA 2, is a feature the LBA pottery as well.

Typological analyses are not the cutting edge of today's pottery studies. But let us be realistic for a moment. When working with material excavated and recorded 45–60 years ago, with the standards that were current in the 1960s and 1970s, typological analysis may be the one kind of study one can still hope to conduct with a reasonable degree of rigor. Consider: quantification of the changing frequency of pot types through time would be desirable, but in the case of Dikili the result could not be relied upon: an unknown amount of potsherds was discarded long before reaching the analyst's bench. For another example, examination of wear marks and, even, of organic residues from the interior of the pots would strengthen (or weaken) the claims about their presumed uses; but that presupposes that the material had been cleaned by gentle means. However, no information about cleaning procedures at the site is available. Notwithstanding such limitations, Malamidou's typological study is to my mind highly useful, on a par with the study of the EBA pottery from Sitagroi,[5] but encompassing a longer period (the Dikili LBA material as well), it provides a carefully documented guide to the development of Bronze Age pottery in northeast Greece. Especially valuable for future researchers will be the hundreds of illustrations of pot profiles and patterns of decoration accompanying the text.

In Chapter 2 Christina Marangou presents the 243 clay figurines, models and miniature pots from all phases of Dikili explored by Deshayes. The chapter's essential part is the catalog of those objects, divided into four parts: anthropomorphic figurines, zoomorphic figurines, models of household furnishings (from ovens to stools) and miniature pots. Most objects are illustrated. Each part of the catalog is further divided according to the Dikili periodization established in the 1970s: Middle Neolithic, Late Neolithic, EBA and LBA. Within each of these chronological divisions, objects are further subdivided into classes according to morphological criteria ("naturalistic" anthropomorphic figurines, for example, are treated separately from "schematic", or plank-like, ones) and, in the case of models of household furnishings, according to the kind of object the model arguably depicts. The overwhelming majority of all objects are dated on stratigraphic grounds to the Late Neolithic. Most of the anthropomorphic figurines depict females.

Assembling and publishing a diverse corpus of objects such as that treated by Marangou is an arduous task, all the more so since the objects are often of minute dimensions and virtually all are preserved as fragments. Overcoming these difficulties, the author offers many useful observations. She describes, for instance, the techniques of figurine manufacture: the larger ones among the figurines were built around a core of clay (or, occasionally, a core from materials that did not survive the firing), limbs and heads were formed separately, then joined to the body, last the surface was smoothed and polished.

She further indicates that the ‘naturalistic’ human figurines, in contrast with the animal figurines, were as rule decorated, usually with incised patterns, rarely with painted ones. One cannot tell, however, what the decorations represent; clothing, tattoos, and ornaments are all possibilities, while in some cases they appear simply to call attention to body features. Small perforations here and there (e.g., in the arms, the shoulders, the ears) probably indicate places where appendages from non-ceramic materials were tacked onto the figure. Marangou also notes that, while the animal figurines pertain in general to domestic species (especially bovines, but no pigs), the sample also includes bears and at least one monster or fictive creature (a bovine with a head at each end of the body).

Noticing that the paws of the animal figurines are flat, she infers that those figurines could stand on their feet if placed on level ground. By contrast, the human figurines cannot be balanced on level ground without being propped; perhaps, then, they were meant to be portable rather than to stand in one place. Reclining figures, a type of which many examples are present, could be held in the palm, while figures in a sitting posture (none of them being attached to a chair) could perhaps have rested on one or another of the furniture models.

These are keen observations and thoughtful suggestions, even though the realities they point to cannot always be verified.

Marangou devotes 25 pages to describing the models of household furnishings. Owing to the fragmentary state of the relevant material, identifications are often tentative, as the author admits. For example, about a dozen fragments demonstrably belong to models of ovens; many of them bear engraved patterns on their exposed surfaces, but only one is reasonably well preserved, though still missing its upper part.

Chapter 2 concludes with the consideration of c. 50 miniature pots (defined by Marangou as items up to nine centimeters in largest dimension). Some of these miniatures are crudely made; perhaps they were the products of novices (including children) trying their hands on the plasticity of clay. Many others, however, appear to be works of accomplished potters, capable of reproducing at a radically reduced scale actual pots and their details—pot profile, wall thickness, handles and surface finish, including decorations. The purposes of those ‘exact replicas in miniature’ escape us, but we are grateful to Marangou for bringing the matter to the discipline’s attention.

Marangou dwells at length on the contexts of the objects she treats, and does so in hopes of finding clues about the uses of those objects.

I turned with great anticipation to the relevant parts in Chapter 2, yet I found the result somewhat disappointing. By ‘context’ the author means two things: first, the numbered

square of the Dikili excavation grid (that is, archaeological coordinates) and, second, artifacts such as stone tools, potsherds, pieces of jewelry, sling bullets, animal bones and the like that were found along (i.e., in the same or nearby excavation units) with the objects treated. Now, having at your disposal the archaeological coordinates is surely useful if you plan to work further with the Dikili materials, but it is unavailing for a broader readership. As for the second meaning of ‘context’ sensu Marangou, a crucial clarification is needed: are the contexts she reconstructs primary (de facto refuse, i.e., items abandoned where they had been used, e.g., on house floors) or are they secondary contexts (accumulations of waste from areas of unknown extent and formed over unknown periods of time)? In the latter case, the associations of artifacts described are entirely fortuitous and reveal nothing about the uses of figurines and household furnishings.

Information pertaining to the nature of the Dikili contexts is erratic, as the author acknowledges, yet by no means wholly unavailable. It is left, however, to the reader to glean that information from the most relevant publication.[6]

In sum, the volume reviewed is a publication of primary data from an excavated site with a long prehistoric sequence. Yet the significance of the publication clearly exceeds its contribution to our knowledge of the site. It also rests with the detailed treatment of scores of objects, common throughout Greece and the Balkans—classes of objects that have rarely received proper attention in the past. I therefore anticipate that the volume will serve as a point de repère for prehistorians working in a very broad area.

\*\*\*\*\*

## Notes

[1] Dikili Tash actualités.

[2] A technological study of the Bronze Age material has been published by L. Courtois as chapter 1 in *Dikili Tash, village préhistorique de Macédoine orientale I. Fouilles de Jean Deshayes (1961-1975)*, vol. 2, 2004.

[3] The EBA 14C dates published in *Dikili Tash, village préhistorique de Macédoine orientale I. Fouilles de Jean Deshayes (1961-1975)*, vol. 1, 1992, 33, were deemed by Treuil “unusable.” Four more dates for the site’s EBA 1 were published in Z. Tsirtsoni (ed.), *The Human Face of Radiocarbon: Reassessing Chronology in Prehistoric Greece and Bulgaria, 5000–3000 Cal BC* (Lyon 2016), 53, but again three of them proved widely aberrant; the fourth date (Lyon-6012) would, however, support Malamidou’s estimate for the beginning of the EBA at Dikili.

Malamidou does not mention the recently published dates, for they became available after she submitted her manuscript.

[4] Source for the 14C dates: see Tsirtsoni in footnote 3 above.

[5] C. Renfrew, M. Gimbutas and E.S. Elster (eds), *Excavations at Sitagroi, a Prehistoric Village in Northeast Greece*, vol. 1 (Los Angeles 1986), 429–86.

[6] Chapter 3 (by Treuil) in vol. 1 of the Dikili series (see above, footnote 3)

\*\*\*\*\*

Please visit the site: <https://bmc.brynmawr.edu/2020/2020.12.15/>

---

## **NEW PUBLICATION "ENKOMI (CYPRUS): USING PXRF SPECTROSCOPY TO IDENTIFY LBA COPPER ALLOYS"**

Dear colleagues,

A new paper entitled "*Enkomi (Cyprus): Using pXRF spectroscopy to identify LBA copper alloys*" spearheaded by Andreas Charalambous and co-authored with George Papasavvas and myself has just been published in the *Journal of Archaeological Science: Reports*. It discusses the results of chemical analysis of 206 copper-base artefacts coming from Porphyrios Dikaios' excavations at the Late Bronze Age settlement of Enkomi and dated to the 16th-11th centuries BC. The analysis was undertaken within the framework of the project entitled "Enkomi: a site at the forefront of technological innovation in metallurgy and artistic excellence in metalwork", funded by the [University of Cyprus](#) and coordinated by George Papasavvas. The link below offers a 50 days' free access - you can read online or download directly.

<https://authors.elsevier.com/c/1cIDm,rVDBVSuM>

Sincerely

Lina Kassianidou

\*\*\*\*\*

**Professor Vasiliki (Lina) Kassianidou**

Archaeological Research Unit, Department of History and Archaeology  
UNIVERSITY OF CYPRUS

P.O. Box 20537. CY-1678 Nicosia, CYPRUS

tel. [+357 22 893564](tel:+35722893564), FAX. [+357 22 22895489](tel:+3572222895489)

Personal web page: <http://www.ucy.ac.cy/~arkasian.aspx>

Academia.edu web site: <https://ucy.academia.edu/VASILIKIKASSIANIDOU>

\*\*\*\*\*

---



## ***EΙΔΗΣΕΙΣ - NEWS RELEASE***

# **REVEALED: ISAAC NEWTON'S ATTEMPTS TO UNLOCK SECRET CODE OF PYRAMIDS**

Unpublished notes show he believed ancient structures held key to the apocalypse Harriet Sherwood

He is the mathematician who laid the foundations of classical physics, formulated the laws of motion and the law of gravity, and remains the epitome of the age of reason.

But Isaac Newton's secret obsessions with alchemy and obscure branches of theology, which only came to light 200 years after his death, reveal another side to the man who helped shape the modern world.

Now unpublished notes showing Newton's attempts to unlock codes hidden in the Bible and determine the timing of the apocalypse are now being sold by Sotheby's. Three pages of scribbles on the Egyptian pyramids, which Newton believed held the key to profound secrets, are expected to fetch hundreds of thousands of pounds when online bidding closes on Tuesday.

In a variation on "the dog ate my homework", the notes are scorched from a fire apparently caused by Newton's hound, Diamond, jumping onto a table and tipping over a candle.

"These are really fascinating papers because in them you can see Newton trying to work out the secrets of the pyramids," Gabriel Heaton, Sotheby's manuscript specialist, told the Observer. "It's a wonderful confluence of bringing together Newton and these great objects from classical antiquity which have fascinated people for thousands of years. The papers take you remarkably quickly straight to the heart of a number of the deepest questions Newton was investigating."

Newton studied the pyramids in the 1680s, during a period of self-imposed scholarly exile at Woolsthorpe Manor in Lincolnshire, away from his base at Cambridge University, following criticism of his work by his rival Robert Hooke of the Royal Society.

Newton was trying to uncover the unit of measurement used by those constructing the pyramids. He thought it was likely that the ancient Egyptians had been able to measure the Earth and that, by unlocking the cubit of the Great Pyramid, he too would be able to measure the circumference of the Earth.

He hoped that would lead him to other ancient measures, allowing him to uncover the architecture and dimensions of the Temple of Solomon – the setting of the apocalypse – and interpret the Bible's hidden meanings.

"He was trying to find proof for his theory of gravitation, but in addition the ancient Egyptians were thought to have held the secrets of alchemy that have since been lost,"

said Heaton. “Today, these seem disparate areas of study – but they didn’t seem that way to Newton in the 17th century.”

Newton kept his obsession with alchemy and his heterodox religious beliefs – a rejection of the doctrine of the Trinity – to himself.

This was not because he feared his faith might discredit his scientific work, or vice versa, but because his unorthodox views would cost him his career.

Although his reputation rested on his mathematical and scientific discoveries, to Newton these were secondary to his “greater” studies in alchemy and theology. A cache of manuscripts on these subjects surfaced at Sotheby’s in 1936; some of them were bought by the economist and Newton devotee John Maynard Keynes, who described his hero as “the last of the magicians”.

Heaton said: “The idea of science being an alternative to religion is a modern set of thoughts. Newton would not have believed that his scientific work could undermine religious belief. He was not trying to disprove Christianity – this is a man who spent a long time trying to establish the likely time period for the biblical apocalypse. That’s why he was so interested in the pyramids.”

Newton’s *Philosophiae Naturalis Principia Mathematica*, published in 1687, cemented his status as a scientific superstar. The culmination of decades of work and thought, the magnum opus outlined his theories of calculus and gravitation and the laws of motion, providing a new understanding of the universe.

A few years later Newton had a serious breakdown but recovered to be elected as an MP and appointed as Master of the Mint. He also became president of the Royal Society. After his death in 1727, he was given a state funeral and buried with full honours in Westminster Abbey.

He was a “prickly individual, always up for a feud”, said Heaton. Others have described him as secretive, neurotic, spiteful, vindictive, ruthless, arrogant, obsessive and paranoid. “He liked to think of himself as the new messiah, come to save the world,” according to Professor Patricia Fara, a science historian at Cambridge University.

But Newton’s genius is undisputed. “To everything he studied, everything he touched – religion, physics, mathematics, alchemy, chemistry – he brought incredible depth and complexity and originality,” said Heaton.

The papers are likely to be bought by a private collector, although institutional libraries may also put in bids. “There is a huge amount of interest in scientific books and manuscripts – it’s the biggest growth area I’ve seen in the past 10 or 15 years,” said Heaton. “We have complex attitudes towards many historical figures, but the great heroes of science still stand as tall as they ever did.”

**Please visit the site: <https://www.theguardian.com/science/2020/dec/06/revealed-isaac-newtons-attempts-to-unlock-secret-code-of-pyramids> [Go there for pict]**

---

## **EGYPT'S GREAT PYRAMID: 'STAGGERING' QUARRY DISCOVERY DISPUTES LEADING CONSTRUCTION THEORY, BY CALLUM BOARE**

EGYPT'S Great Pyramid of Giza was built using different techniques to what had been conventionally thought, a structural engineer claimed after discovering the "staggering" effort it would have required.

The ancient monument is believed to have been built more than 4,500 years ago for the Fourth Dynasty leader Pharaoh Khufu, yet questions still remain over its construction. One of the Seven Wonders of the Ancient World, it is the only one still largely intact and is estimated to weigh approximately six million tonnes from its 2.3 million limestone blocks. Numerous theories exist about how the Great Pyramid was built, but most archaeologists believe each stone block was cut and transported from a nearby quarry and positioned into place using a large external ramp.

But this is nearly impossible, according to structural engineer Peter James, who has spent the last 14 years working on preserving the historic buildings and temples of Egypt with his company Cintec.

He claimed in his book 'Saving the Pyramids: Twenty First Century Engineering and Egypt's Ancient Monuments,' that "the theory is based on the assumption that the pyramids contain several million large blocks".

Mr James believes experts have overestimated this number. And he explained why, adding: "Having located a suitable source of stone, the top covering of sand and debris would need to be removed to reveal the selected stone.

"Next it is necessary to locate, mark out and cut 2.3 million blocks and dress them to fit each course, then to transport them on paved roadways to the pyramid or the start of the external ramp.

"It has been calculated that this method of construction would need to have been undertaken every six minutes during a ten-hour day for 25 years to complete the construction of the pyramid.

"This also leads to the question of how many men were needed to build the pyramids.

"Surely, this method would need the 20,000 - 30,000 mentioned in many of the articles published today."

But the Egyptologist believes these numbers are "staggering" adding it would be "difficult to imagine how all these labourers would be able to work on such a confined site".

He stated: “The process of quarrying would not be able to supply the number and quality of stones using this method, even if they were available within the time frame.

“The stones would have to be cut from the quarry face, therefore access would be the limiting factor, not the number of workers.

“The quarrymen would get in each other’s way. A face would have to be worked and totally removed before the next face was exposed.”

Instead, the Newport-based author believes the outside of the Great Pyramid differs from the inside.

He claims “internal ramps would be constructed to provide working access” rather than using the external ramp theory to place each large stone block.

Therefore “this infill would comprise of much smaller and more easily managed stones” to speed up the building process leaving large parts of the Great Pyramid empty or “filled with a material that is a different density to the outside”.

Mr James has spent his career strengthening and restoring historically significant structures all around the world, from Windsor Castle to the White House.

In ‘Saving the Pyramids,’ he puts forward a unique perspective to the structural engineering of ancient Egypt, giving his opinion on common theories surrounding the pyramids – along with new and innovative projections on their construction.

\*\*\*\*\*  
The book, published by University of Wales Press, is available for purchase in bookstores throughout the UK, as well as online at:  
<https://www.amazon.co.uk/dp/178683250X/?tag=dailexpr-21>.

\*\*\*\*\*  
Please visit the site: <https://www.express.co.uk/news/world/1367273/egypt-great-pyramid-giza-quarry-discovery-construction-pharaoh-khufu-archaeology-spt>

---

## **PHILISTINES HAD A TASTE FOR FAR- FLUNG FOODS, FOSSILIZED TOOTH PLAQUE REVEALS, BY ANDREW CURRY**

A study of individuals buried more than 3,000 years ago in what is now Israel shows Asian foods like soy and turmeric were surprisingly on the menu.

Researchers have long agreed that the New Testament tale of the Three Wise Men reflects a thriving long-distance trade that brought exotic oils and resins from the Arabian Sea and points further east into the Mediterranean region in Roman times. But a surprising new discovery is revealing that ancient residents of what is today Israel were enjoying south Asian fruits and spices as early as 3,500 years ago.

A recent analysis of fossilized dental plaque from more than a dozen skeletons dating from the Middle Bronze to early Iron Age (ca. 1500-1100 B.C.) turned up evidence for bananas, turmeric, and soybeans—all crops that grew in far-off south Asia at the time.

The finds, published today in the Proceedings of the National Academy of Sciences, add to artistic and archaeological evidence showing that ancient Mediterranean civilizations were importing everything from chickens to black pepper and vanilla from as far away as India and Indonesia.

“We once thought people got their food locally and imported precious stones from far away,” says co-author Philipp Stockhammer, an archaeologist at Ludwig Maximilian University of Munich. “But even in the Bronze Age they’re a lot like us, importing their food from all over.”

### **An unexpectedly rich source of evidence**

Dental calculus is the hardened plaque that accumulates on teeth.

Until recently, it was considered junk to be scraped from archaeological samples and thrown away. But recent discoveries have shown it’s actually a rich source of information that traps everything from ancient DNA to bacteria and proteins.

“If you would stop brushing your teeth, in 2,000 years I could tell what you were eating,” Stockhammer says.

To find out what people in the Levant were eating in ancient times, an international team analyzed plaque from the mouths of 16 skeletons.

Some remains were excavated at Megiddo, an ancient city-state better known by its Biblical name, Armageddon. Megiddo thrived in the Bronze Age, a fact reflected in the elite burials sampled for the research, but it didn’t have the vast wealth and imperial reach of its larger neighbors. “It was rich and well-connected,” Stockhammer says, “but not a major player—nothing compared to Egypt, or Mesopotamia.”

While dental calculus from upper-class graves at Megiddo showed that people there were eating lots of grains, including wheat and millet, and fruits like dates, they were also

eating delicacies from much farther afield. Samples from several people yielded evidence that they were eating soybeans and the bright-orange spice turmeric—both crops native to South and East Asia that archaeologists didn't think were familiar on the tables of people in the ancient Mediterranean region.

“Even from this small number of samples, we’re seeing the appearance of something you wouldn’t expect in that place at that time,” says University of Copenhagen ancient protein expert Matthew Collins, who was not involved in the study.

The researchers also scraped calculus from the teeth of people buried around 1100 B.C. at a nearby settlement site called Tell Erani, which archaeologists have connected to the people known as Philistines in the Bible. The simpler burials at Tell Erani reflect a place with less wealth, and the authors wondered if it would have fewer exotic imports too. Their results turned up traces of sesame, which was also present in samples from Megiddo.

While sesame oil, paste, and seeds are all common ingredients in Levantine cuisine today, the plant is native to South Asia.

Archaeologists had found sesame seeds in the tomb of Egyptian pharaoh Tutankhamun, buried around 1400 B.C., but many researchers doubted that sesame was common in the local diet until much later.

The most surprising dental discovery, however, came from a man in his 50s buried at Tell Erani: a protein that triggers ripening in bananas.

“[The Tell Erani burials] are very humble burials, with no evidence of an elite group,” Stockhammer says. “It doesn’t seem like it’s the king having his first banana.”

### **Evidence for the ‘invisible’**

Dental calculus is proving an invaluable tool for identifying foods that are otherwise infrequently or rarely preserved in most archaeological settings, such as spices and oils. While known mainstays of ancient trade routes, “these two classes of foods are nearly invisible in the archaeological record,” says co-author Christina Warinner, a paleogeneticist at Harvard University and the Max Planck Institute for the Study of Human History in Jena, Germany.

“This allows us to see foods of high economic value that otherwise leave no traces,” like rare sesame and soy oils and exotic fruits like bananas.

In the case of bananas, archaeological evidence is particularly hard to come by: The domesticated fruit is seedless, and its soft flesh decays quickly. That’s why it’s unlikely bunches of bananas were being shipped to Megiddo. Instead, people there might have been importing and eating dried banana chips, which would have survived a long sea voyage with ease.

Among the evidence that researchers can now tease from fossilized tooth plaque, plant proteins—unlike animal DNA, milk proteins, or the sturdier microscopic crystals found in the tough hulls and stalks of grain—break down easily. As a result they are rarely preserved on dental calculus, leaving the misleading impression that milk, meat, and porridge dominated the ancient table. The researchers used a new method to get more

protein out of the calculus, and spent more time than past studies comparing what they found to libraries of plant proteins looking for matches.

The researchers believe that it's very likely more Mediterranean residents were enjoying plant foods such as sesame and bananas, but the proteins weren't trapped in their plaque or didn't survive in the intervening centuries. "We only get the tip of the iceberg," Stockhammer says. "This doesn't mean only one individual was eating bananas, but that there's only one where enough evidence is preserved."

Because it's hard to tell when dental calculus was formed, it's also possible the long-dead Tell Erani banana eater was a trader or seafarer who ate the fruit while traveling in Asia before dying on the shores of the Mediterranean—which would be equally remarkable evidence of long-distance travel in prehistory.

This new evidence adds to a growing realization that the Bronze Age was surprisingly global, with long-distance trade connections stretching from China to the Mediterranean. "It's not surprising anymore," says University of Haifa archaeologist Ayelet Gilboa, director of the Zinman Institute of Archaeology at the University of Haifa, who was not involved in the study. "There's really been a transformation over the last decade of our perceptions of long-distance trade in prehistory."

Five years ago, for example, when Gilboa published research showing that jars found at a site not far from Megiddo contained cinnamon, "people said it was impossible," Gilboa says. "But as we've dug deeper, it turns out the evidence was there all along—but nobody bothered to pay attention."

"We have so much evidence now that beginning in the second millennium B.C., at least, commodities moved over long distances," she adds.

"This shows small-scale societies were operating as part of a vast network."

**Please visit the site: <https://tinyurl.com/yc28jv97> [Go there for pix and for map of imported commodities]**

## **TOP TEN MOST SPECTACULAR GREEK ARCHAEOLOGICAL DISCOVERIES OF 2020, BY PATRICIA CLAU**

Despite the many and varied challenges of the past year as the nation and the world struggled with the pandemic and all its ramifications, 2020 was another banner year for Greece in the realm of archaeology.

Home to some of the most spectacular finds on earth, the country offered up yet more treasures from its brilliant past in digs from the bottom of a well in Athens to artifacts found under the pumice at Akrotiri on the Greek island of Santorini.

While all the nation's archaeological sites were forced to shut down during the two lockdown periods — and suffered tremendous losses of revenue due to global travel restrictions even when they were open — the ancient Greek city of Mycenae experienced yet another shock when a wildfire tore through the site.

However, the damage there was thankfully slight, and important archaeological work was still being carried out at many other sites around the country, with major new discoveries coming to light.

Another significant milestone of 2020 was the new lighting scheme for the Athens Acropolis, with energy-saving LED lighting and new spotlights showing the Parthenon's many features to great effect. A new lift and paved walkways also greatly improved access to the iconic site.

Another historical site of enormous importance to Greece is the shipwreck off the tiny Northern Sporades island of Peristera, offering such a hoard of underwater treasures that it is often called the "Parthenon of Shipwrecks" for its stellar importance to the understanding of Greece's past. This underwater site was opened to scuba divers for the first time ever in the summer of 2020, with those who prefer to stay on land able to visit a nearby museum on the nearby island of Alonnisos, which exhibits artifacts and dioramas of the site.

There were many major discoveries made during 2020 which changed the way archaeologists viewed certain sites and imparted a great deal of information on the way Greeks lived in ancient times. Foremost among these were the following:

### **1. Head of Hermes, discovered under the pavement of Aeolus Street, Athens**

The recent construction work on Aeolus Street in Athens has uncovered some astounding archaeological treasures from ancient Greece, on which the Ministry of Culture has now begun restoration).

The news of the recent discovery of the head of the Greek god Hermes, lying since antiquity at a depth of just 1.3 meters (4 feet 4 inches) under the feet of Athenians as they went about their daily business, was reported around the world. This was perhaps the



most spectacular find of all this year due to its location, with the priceless treasure lying just under the pavement of the busy Athens thoroughfare.

## **2. Ancient aqueduct and artifacts unearthed at Athens port city of Piraeus in July**

Greek archaeologists unearthed an ancient aqueduct and thousands of objects and artifacts dating from Hellenistic and Roman times during the excavations for the expansion of the Athens metro line to Piraeus. Many of the objects were made of wood and were preserved in water at the bottom of a well. The household objects, including wooden furniture, are extremely unusual finds considering the carbon-based material of which they were made.

Some of the artifacts will frame the permanent exhibition that will be set up in the metro station called “Municipal Theater” in Piraeus, which is currently under construction. Foremost among all the treasures found was an exquisite headless statue — which was found at the bottom of an ancient well (pictured above). Archaeologists posit that the destruction of the objects may have occurred during the Roman invasion of the area.

The exhibition will include other ancient artifacts, in addition to the Hermes, along with a model copy of the aqueduct, and an authentic pebble floor from the classical / Hellenistic era which was found during the excavations.

## **3. Minoan Civilization treasures unearthed at Akrotiri, Santorini**

Exquisite pottery was unearthed at Akrotiri, the ancient settlement on the Greek island of Santorini, early in 2020. Most of the discoveries are related to the everyday life of the people who lived on the island before the volcanic explosion which destroyed most of the island — and subsequently, the Minoan civilization on Crete.

A perfectly-preserved shell-shaped vessel demonstrated the high level of artistic achievement in that civilization, in what was perhaps the most endearing find of all, showing that art was made for art’s sake even on the remote island in the days of antiquity.

Among dozens of other new findings, the Ministry of Culture noted that an inscription, consisting of Linear A syllables and an ideogram, was found written in ink on an object which is most likely related to the use of a building, also uncovered in the Akrotiri dig.

## **4. Curse Tablet Found in Athens Well**

Showing another side of Greek history, a curse tablet, showing imprecations against an unfortunate man called Pytheas, was unearthed at the bottom of a well in Athens’ downtown neighborhood of Kerameikos (Ceramicus) by archaeologists from the German Archaeological Institute of Athens.

A total of thirty well-preserved curse tablets dating back to the Classical period (2,500 years ago) were found in an ancient well which was originally discovered back in 2016, when other everyday objects — but not the tablets — were found.

The ancient tablets have curses engraved on them which Athenian citizens would pay to have made against other people, a practice which was relatively common in ancient Greece.

## **5. Eight graves unearthed in Ilia, near Olympia in September**

Four of these rectangular grave sites in Ilia, all lined with rocks, and three extremely large funerary containers, called pithoi, were found at the site, as well as an individual coffin covered by ceramic tiles and a marble grave stele.

Inside one of the pithoi, which were so large that they were often used as coffins themselves, archaeologists discovered an ornately decorated bronze urn, together with its base.

The urn features a floral design on its handles and lion heads fill the space between its handles and its rim. A bronze mirror with a relief was also found in the funerary container.

## **6. New Findings, Remains Discovered At Theopetra Cave**

Theopetra Cave in Thessaly, Central Greece, was formed in the Upper Cretaceous period, 137,000,000 – 65,000,000 years before the present time. The cave that was created in the limestone there has been inhabited since the Middle Paleolithic period, and new findings give new insight into the lives of those early peoples.

According to archaeologists, the cave is likely to be the place of the oldest human construction on earth, as findings indicate that the shelter was inhabited as early as 130,000 years ago.

Neolithic residents of the cave ate wheat and cultivated barley, olives, lentils and wild pear, among others. They ate some meat, mostly from domesticated sheep and goats (which account for 60 percent of the bones found), and also kept cattle, pigs and at least one dog.

About 11 percent of the bones found at the cave belong to deer, wild boars, bears, hares, wildcats and badgers, all of which were hunted. Bones from a bear, for example, astoundingly still bear knife marks.

The community also made its own jewelry, drilling holes into deer-like teeth and shells from the nearby river. The remains of beeswax were also found in the community. The newest findings show that an estimated 43 people lived in Theopetra Cave during the Neolithic era.

## **7. Byzantine-era skull showing signs of complex surgery, Thasos Island**

A proto-Byzantine-era skull which was discovered by anthropologists in the Paliokastro area on Thasos island shows signs of complicated surgery, in one of the more shocking examples of what was discovered this year in all of Greek archaeology.

The skull, which dates from the early Byzantine period — the fourth to the seventh century AD — bears traces of surgery that are “incredibly complex,” according to researcher Anagnostis Agelarakis, Ph.D., who teaches at Adeppli University.

The discovery was made by an Adelphi University research team led by Agelarakis. A total of ten skeletons, of four women and six men, were found and studied. They are likely to be persons of high social status.

“According to their skeletal-anatomical features, both men and women lived physically demanding lives...The very serious trauma cases sustained by both males and females had been treated surgically or orthopedically by a very experienced physician/surgeon with great training in trauma care. We believe it to have been a military physician,” the report says.

## **8. Building from sixth century BC discovered at Epidaurus**

Archaeological excavations conducted in July of 2020 revealed the remains of an even older temple building found at the shrine to Asclepius, the god of medicine, in the vicinity of the Tholos at the ancient site of Epidaurus, outside Athens.

The partially-excavated building, which is dated to about 600 BC, consists of a ground floor with a primitive colonnade and an underground basement chipped out of the rock beneath. The floor is an intact pebble mosaic, which is one of the best-preserved examples of this rare type of flooring to survive from this era.

The find is also considered significant because it predates the impressive Tholos building in the same location, whose own basement served as the chthonic residence of Asclepius, and which replaced the newly-discovered structure after the 4th century B.C.

This shows that the worship of Asclepius at Epidaurus began much earlier than previously thought and had the same chthonic features, while altering what is known about the history of the region in general.

## **9. The Vryokastraki inscriptions and artifacts**

Archaeologists from the Department of Archaeology at the University of Thessaly discovered yet more important artifacts this summer on [Vryokastraki](#), the small rocky islet near the Greek island of Kythnos, once home to a significant city in the early Byzantine period.

Well-preserved ceramics, jewelry, and female figurines were discovered in the sanctuary, leading experts to believe that there was an important cult to a female deity there.

The finds, only recently released in an announcement by the Greek Ministry of Culture, also include many epigraphical remains that detail the history of the island, which was continuously inhabited from the 12th century BC until the 7th century AD.

One of the inscriptions, which are considered “very important” by scholars, describes a pirate named Glafketis who took control of Kythnos in the 4th century BC.

According to the recently discovered artifact, Glafketis had support from the Macedonians, but was eventually forced out of power by the Athenians.

## **10. Eighteen million year-old petrified trees on Lesbos**

Finally, in a find that far predates human history but is nevertheless just as fascinating, fourteen petrified trees were found as a result of excavations for rainwater drainage pipes in an area near Sigri and in the region of Lesbos island's Petrified Forest this year.

The area was declared as a Protected Natural Monument in 1985 but the additional trees that were found this year were extremely old, dating back to 18 million years ago.

The trees were killed by blasts of gas from the volcanic explosions and then covered by ash. Extensive heavy rains then flooded the area, sweeping away both the ash and sections of tree trunks. The giant mudflows blocked valleys, and the tree trunks piled up in successive layers, where they became fossilized.

Professor Nikos Zouros, director of the Petrified Forest of Sigri Museum said of the summer 2020 discovery, "The trunks were in a very good state of preservation – they are impressive logs laid on successive strata, one above the other."

Please visit the site: <https://greece.greekreporter.com/2020/12/20/top-ten-most-spectacular-greek-archaeological-discoveries-of-2020/>

---

## **ARCHAEOLOGICAL TROVE SPANNING MILLENNIA EMERGES FROM CONSTRUCTION WORK IN ANCIENT JAFFA**

A Bronze Age baby buried in a jar, a Greek call to accept death as part of life and an Islamic headache remedy are just some of the recent discoveries in one of the world's oldest port towns

From a baby buried in a jar more than 3,500 years ago to a uniform button lost by a British soldier in the 20th century, Israeli archaeologists scurrying to excavate ancient Jaffa ahead of construction projects have made a trove of new discoveries. The new finds include burials and homes, farms and assorted artifacts dating from prehistory to today. They reveal snapshots of everyday life (and death) in Jaffa, one of the oldest port towns in the world and today part of Tel Aviv.

Salvage digs were conducted over the last decade at five locations in the ancient town. The results were detailed last month by the Israel Antiquities Authority in its journal *Atiqot* (Antiquities).

The digs took place in what used to be the outskirts of the town, below the seaside hill that housed the historical core of ancient Jaffa, and which holds well-explored archaeological ruins that go back to the time of the Egyptian Pharaoh Ramses II and beyond.

This once peripheral area, now covered by residential complexes and a lively flea market, has been rarely investigated. Now the archaeologists realize this scorned area was actually the ancient town's lower city, writes Zvi Greenhut, an archaeologist and editor in chief of *Atiqot*, which celebrated its 100th edition by dedicating an entire volume to the Jaffa excavation.

### **Where Solomon imported cedars**

In antiquity, cities were frequently built on high ground, either a natural hill or an already existing tell, a mound formed by the accumulation of multiple levels of human habitation.

In times of greater prosperity and security, a city would expand into the surrounding lowlands, sometimes contracting again if conditions turned bad, explains Yoav Arbel, the IAA archaeologist who led four of the five digs. Until recently the archaeological world hadn't realized that Jaffa too had experienced such swings in fortune and area. "In fact there were those who told us there was no point to excavate around the mound," Arbel tells *Haaretz*.

We now know that the city experienced at least three periods of major expansion: in Hellenistic times, then a protracted phase spanning the Byzantine, Islamic and Crusader periods, and finally under the Ottomans in the 19th century, Arbel says.

Jaffa's importance as a port in antiquity is alluded to in the Bible, which says that's the harbor through which Solomon imported cedars from Lebanon for the Temple in Jerusalem. It is also said to be the place from which Jonah set sail for his misadventure in a whale's digestive system.

The ancient tell of Jaffa was already fortified in the 20th-19th centuries B.C.E., almost 4,000 years ago, Arbel notes. In these early days, the area to the east of the mound, which would later become the lower city, was not inhabited and was mainly used for burials.

This was dramatically illustrated by the oldest find uncovered in the latest archaeological campaign: the burial of an infant dating to the Middle Bronze Age (18th-17th centuries B.C.E.), who had been interred in a jar. This was a common form of burial for infants in this and earlier times throughout Canaan and the Near East.

These jars were often buried below the floor of the home. Why the infants were interred in storage containers is not clear: some researchers suggest it was a symbolic way of returning the deceased infant to a womb in preparation for rebirth into the afterlife.

Fast forward more than a thousand years, to the fifth century B.C.E., and Jaffa was already starting to prosper as part of the Persian Empire. From this period, the archaeologists uncovered 14 rock-hewn burials, accompanied by lamps, juglets and other funerary offerings.

The burial practices were typical of those found in Phoenician settlements along the coast, giving a clue to the identity of Jaffa's inhabitants at the time, the researchers report.

Jaffa truly boomed in the early Hellenistic period, in the fourth and third centuries B.C.E., when it expanded for the first time into its fertile eastern lowlands, where the archaeologists found remains of scattered dwellings and farms from this era. In one of these farms, they uncovered jar handles from various parts of the Greek world, attesting to a wealthy owner and the international nature of the city, Arbel says.

In the following centuries however, the town declined, and this is reflected in the paltry finds from the Hasmonean and Roman periods.

Jaffa may have suffered from competition from the larger artificial harbor the Romans had built north of it at Caesarea, Arbel theorizes.

In Byzantine times the city boomed again, reaching its greatest pre-modern extent. In the lower city, the archaeologists found dwellings, public buildings and industrial installations including a sixth century C.E. press used to make wine or other alcoholic beverages from the juice of fruits grown in Jaffa's agricultural hinterland.

"The lower city was never densely populated. We are talking about a house here and a house there, maybe with a garden in the middle, not a dense city like we see on the mound, but definitely part of the urban space," Arbel says.

### **The wisdom of Greece**

One of the digs, on the site of the 19th century French Hospital, investigated one of the many cemeteries that served the city through the millennia. From the Byzantine phase of this burial ground, the archaeologists recovered a mosaic inscription that probably adorned the entrance to the necropolis in the fourth or fifth centuries C.E., reports Leah Di Segni, a Hebrew University expert in ancient Greek inscriptions. The text roughly translates to “Be of good courage, all who are buried here. This is it!” – or, in other words: that’s life!

Jaffa’s prosperity continued after the Muslim conquest of the Holy Land, as evidenced by the finds from the Islamic period, which included fragments of an inscribed jug from the ninth or 10th century.

The partially preserved text reads “a dry powder for the treatment of headache,” suggesting the vessel contained a medicine purchased at a local pharmacy, reports Nitzan Amitai Preiss, a Hebrew University researcher in Islamic archaeology.

During the Crusades, Jaffa changed hands multiple times and was heavily fortified by the European invaders, with remains of walls and possibly a moat from the 13th century emerging in the latest digs. But after the city was definitively retaken for the Muslims by the Mamluke sultan Baybars, it was almost completely abandoned and would stay that way for centuries. This was the result of a Mamluke scorched-earth policy of systematically destroying most of the coastal towns in Palestine, to deprive the Crusaders of a potential foothold for a return. The city was only revived in the early Ottoman period, in the 17th century, rebuilt around monasteries: Jaffa’s port became an important entry point for Christian pilgrims to Jerusalem.

Heavily damaged in 1799 by Napoleon’s invasion of the Levant, Jaffa was again rebuilt and expanded by the Ottomans during the subsequent century. The archaeologists digging in the lower city found evidence of warfare, including fragments of several cannonballs. However, they believe these remnants do not date to Napoleon’s siege but to a few decades later, and were probably fired as part of internal Ottoman conflict or the Egyptian-Turkish war of the 1830s.

### **Bending spoons**

The second half of the 19th century saw the start of Jaffa’s great modern expansion. It was in this period that the city became renowned for its fertile citrus groves, where the famous “Jaffa orange” was grown and exported.

This period of renewed prosperity was already well-known from historical sources but remains from this era have also emerged in the recent digs of the lower city. Finds have included ruins of an Ottoman well house, a factory that made olive oil soap and multiple relics of the pipes and channels used to irrigate the orchards, which were mostly covered by urban sprawl starting in British Mandate period.

The archaeologists also found artifacts, such as glass bottles of beverages and perfumes imported from France and Britain, highlighting the town’s increasingly broad commercial networks.

“From the mid 19th century to the end of the Ottoman era there was huge population growth,” Arbel says. “Jaffa grew exponentially and became a cosmopolitan city.”

As often occurs with salvage digs, most of the sites recently uncovered in Jaffa were covered up, after being documented, by the development projects that sparked the excavations. However, besides the artifacts removed by archaeologists, some of the finds are still accessible to the public. Remains of the Crusader walls of the city have been preserved in the former French Hospital, which has been refurbished into a hotel, while the ruins of the Ottoman-era soap factory will be visible as part of an art museum soon to be opened by the Israeli illusionist Uri Geller, Arbel notes.

It may sound surprising that a purported psychic best known for supposedly bending spoons with his mind has taken a role in preserving a key piece of Jaffa’s rich past. But, come to think of it, it’s fair to assume that in this town’s 4,000 years of history, stranger things have happened.

Please visit the site: <https://www.haaretz.com/israel-news/premium-trove-spanning-millennia-emerges-from-construction-in-ancient-jaffa-1.9371748> [Go there for many pix]

---

---



## **UNCOVERING SECRETS HIDDEN BENEATH THE SANDS OF THE ARABIAN PENINSULA, BY TAREQ AL-THAQAFI**

New research shows the historical depth of the region, which was once home to primeval people

MAKKAH: Hidden beneath the sands of the Arabian Peninsula lie secrets dating back thousands of years that tell the story of the people of Arabia.

Ancient stone carvings and other discoveries in the peninsula show a land that once flourished with life and ancient civilizations. Like detectives, historians and archaeologists have found proof that the historical roots of the people of Arabia go back more than 120,000 years.

Dr. Salma Hawsawi, professor of ancient history at King Saud University, said in an interview with Arab News that the geographical location of the Arabian Peninsula, at the center of the ancient world — Asia, Africa, and Europe — provided ancient civilizations with an added advantage to connect East and West.

She explained that from the beginning of the first millennium BC, the southern part of the Arabian Peninsula witnessed the rise of several kingdoms and civilizations, such as Ma'in, Hadramout, Awsan, Qataban, Sheba, and Himyar. Due to their strategic locations, as trade flourished, so did the civilizations that controlled the land and sea trading routes.

The kingdoms of the north and northwest of the Arabian Peninsula such as Dadan, Lihyan, Nabatea, the Palmyrene Empire, Tayma, and Qedar flourished around the same period.

In the eastern region of the peninsula, the kingdoms of Dilmun and Magan, Gerrha and Thaj were active, while in the central region there was the Al-Magar civilization and Qaryat Al-Faw.

Hawsawi pointed out that the Kingdom, which occupies about a third of the Arabian Peninsula, is full of architectural and written proof, from buildings to inscriptions and rock drawings.

She noted that rock drawings can be found in Hail, the ancient fort in Tabuk dating back to 3500 BC, Fadak's palaces and Khaybar's forts, the Marid Castle in Dumat Al-Jandal dating back to the first century AD and ancient cemeteries. She also mentioned statues, some still intact, dolls, bas-relief decorations and pottery. "If the above mentioned items are not enough, we have the Holy Kaaba, which is the oldest place of worship on earth."

She said: "The Kingdom realized the importance of this cultural heritage, so it established the Ministry of Culture in 2018."

She went on to say that the Saudi Arabia and international archaeological missions are still excavating and constantly announcing their findings, the latest of which was a joint discovery by the international and Saudi archaeological missions of human, elephant and predatory animal footprints around a dry lake in Tabuk, in the northwest of the Kingdom, dating back more than 120,000 years.

Archaeological studies have also revealed many archaeological areas within the Arabian Peninsula, for example Dumat Al-Jandal, which was mentioned in ancient biblical sources.

Dr. Marwan Shuaib, professor of Ancient History at King Abdul Aziz University, said: “The ancient Near East region is considered the home of mankind’s first civilizations. Western scholars have been interested in studying it for more than two centuries, since the arrival of the French under Napoleon in Egypt and the Levant (1798-1801 AD). The need to study and explore this important region increased with the discovery of the Rosetta Stone, which made it easy for scientists to decipher hieroglyphics.”

The prevailing view was that the Nile River region and Mesopotamia were the oldest civilizations known to humanity, alongside the Chinese and Indian civilizations.

“Visits from Western travelers to the Arabian Peninsula increased: Swiss traveler Johann Ludwig Burckhardt who discovered Petra in 1812, the capital of the Nabataeans in southern Jordan, and English traveler Charles Doughty who visited the Arabian Peninsula between 1908 and 1909 and discovered the famous Tayma Stone, which contains important information about the stay of the Babylonian king, Nabonidus, in Tayma for 10 years. These discoveries have drawn the attention of scholars to the ancient history of the Arabian Peninsula.”

He said: “King Abdul Aziz led the way for Western scholars to study the archeology of the Arabian Peninsula. The English traveler John Philby, also known as Abdullah Philby later on, was friends with the founding king and was allowed to tour the lands of the Arabian Peninsula, where he visited the ancient village of Faw in 1949 AD, north of Najran. He mentioned in his writings that it is an archaeological area containing many important historical proofs. The Belgian scholar Ryckmans also visited the Arabian Peninsula in 1951-1952 and copied a large number of its inscriptions. Successive exploration campaigns, drillings and excavations later took place in the archaeological areas of the Arabian Peninsula.”

“Archaeological studies have also revealed many archaeological areas within the Arabian Peninsula, for example Dumat Al-Jandal, which was mentioned in ancient biblical sources as the fortress of Dumat Bin Ismail, meaning that it dates back to the 10th century BC.” AlUla, in the northwest of the Kingdom, contains a large number of Dadanitic, Lihyan, and Thamudic inscriptions, in addition to a large number of residences with Nabataean features.

Scholars have found inscriptions and drawings dating back 10,000 years in AlUla and Hail, specifically in Jubbah and Al- Shuwaymis, which indicates that the people of the area developed a writing system earlier than archaeologists believed. He concluded by saying that these findings show the historical depth of the region.

Please visit the site: <https://www.arabnews.com/node/1779861/saudi-arabia> [Go there for pix]

---

---

## **EARLY HUMANS MAY HAVE SURVIVED THE HARSH WINTERS BY HIBERNATING, BY ROBIN MCKIE**

Seasonal damage in bone fossils in Spain suggests Neanderthals and their predecessors followed the same strategy as cave bears

Bears do it. Bats do it. Even European hedgehogs do it. And now it turns out that early human beings may also have been at it. They hibernated, according to fossil experts.

Evidence from bones found at one of the world's most important fossil sites suggests that our hominid predecessors may have dealt with extreme cold hundreds of thousands of years ago by sleeping through the winter.

The scientists argue that lesions and other signs of damage in fossilised bones of early humans are the same as those left in the bones of other animals that hibernate. These suggest that our predecessors coped with the ferocious winters at that time by slowing down their metabolisms and sleeping for months.

The conclusions are based on excavations in a cave called Sima de los Huesos – the pit of bones – at Atapuerca, near Burgos in northern Spain.

Over the past three decades, the fossilised remains of several dozen humans have been scraped from sediments found at the bottom of the vertiginous 50-foot shaft that forms the central part of the pit at Atapuerca. The cave is effectively a mass grave, say researchers who have found thousands of teeth and pieces of bone that appear to have been deliberately dumped there. These fossils date back more than 400,000 years and were probably from early Neanderthals or their predecessors.

The site is one of the planet's most important palaeontological treasure troves and has provided key insights into the way that human evolution progressed in Europe. But now researchers have produced an unexpected twist to this tale.

In a paper published in the journal *L'Anthropologie*, Juan-Luis Arsuaga – who led the team that first excavated at the site – and Antonis Bartsiokas, of Democritus University of Thrace in Greece, argue that the fossils found there show seasonal variations that suggest that bone growth was disrupted for several months of each year.

They suggest these early humans found themselves “in metabolic states that helped them to survive for long periods of time in frigid conditions with limited supplies of food and enough stores of body fat”. They hibernated and this is recorded as disruptions in bone development.

The researchers admit the notion “may sound like science fiction” but point out that many mammals including primates such as bushbabies and lemurs do this. “This suggests that the genetic basis and physiology for such a hypometabolism could be preserved in many mammalian species including humans,” state Arsuaga and Bartsiokas.

The pattern of lesions found in the human bones at the Sima cave are consistent with lesions found in bones of hibernating mammals, including cave bears. “A strategy of hibernation would have been the only solution for them to survive having to spend months in a cave due to the frigid conditions,” the authors state.

They also point to the fact that the remains of a hibernating cave bear (*Ursus deningeri*) have also been found in the Sima pit making it all the more credible to suggest humans were doing the same “to survive the frigid conditions and food scarcity as did the cave bears”.

The authors examine several counter-arguments. Modern Inuit and Sámi people – although living in equally harsh, cold conditions – do not hibernate. So why did the people in the Sima cave?

The answer, say Arsuaga and Bartsiokas, is that fatty fish and reindeer fat provide Inuit and Sami people with food during winter and so preclude the need for them to hibernate. In contrast, the area around the Sima site half a million years ago would not have provided anything like enough food. As they state: “The aridification of Iberia then could not have provided enough fat-rich food for the people of Sima during the harsh winter - making them resort to cave hibernation.”

“It is a very interesting argument and it will certainly stimulate debate,” said forensic anthropologist Patrick Randolph-Quinney of Northumbria University in Newcastle. “However, there are other explanations for the variations seen in the bones found in Sima and these have to be addressed fully before we can come to any realistic conclusions. That has not been done yet, I believe.”

Chris Stringer of the Natural History Museum in London pointed out that large mammals such as bears do not actually hibernate, because their large bodies cannot lower their core temperature enough. Instead they enter a less deep sleep known as torpor. In such a condition, the energy demands of the human-sized brains of the Sima people would have remained very large, creating an additional survival problem for them during torpor.

“Nevertheless, the idea is a fascinating one that could be tested by examining the genomes of the Sima people, Neanderthals and Denisovans for signs of genetic changes linked with the physiology of torpor,” he added.

**Please visit the site: <https://www.theguardian.com/science/2020/dec/20/early-humans-may-have-survived-the-harsh-winters-by-hibernating>**

---

## **MUMMIFIED BABOONS SHINE NEW LIGHT ON THE LOST LAND OF PUNT**

Ancient Punt was a major trading partner of Egyptians for at least 1,100 years. It was an important source of luxury goods, including incense, gold, leopard skins, and living baboons. Located somewhere in the southern Red Sea region in either Africa or Arabia, scholars have debated its geographic location for more than 150 years. A new study tracing the geographic origins of Egyptian mummified baboons finds that they were sourced from an area that includes the modern-day countries of Ethiopia, Eritrea, Djibouti, Somalia, and Yemen, providing new insight into Punt's location. Published in *eLife*, the results also demonstrate the tremendous nautical range of early Egyptian seafarers. A Dartmouth-led team of researchers including primatologists, Egyptologists, geographers, and geochemists, worked together to analyze the isotope composition of baboons discovered in ancient Egyptian temples and tombs, and modern baboons from across eastern Africa and southern Arabia.

"Long-distance seafaring between Egypt and Punt, two sovereign entities, was a major milestone in human history because it drove the evolution of maritime technology. Trade in exotic luxury goods, including baboons, was the engine behind early nautical innovations," explains lead author Nathaniel J. Dominy, the Charles Hansen Professor of Anthropology at Dartmouth College.

"Many scholars view trade between Egypt and Punt as the first long maritime step in a trade network known as the spice route, which would go on to shape geopolitical fortunes for millennia. Other scholars put it more simply, describing the Egypt-Punt relationship as the beginning of economic globalization," he added. "Baboons were central to this commerce, so determining the location of Punt is important.

For over 150 years, Punt has been a geographic mystery. Our analysis is the first to show how mummified baboons can be used to inform this enduring debate."

Ancient Egyptians revered baboons throughout their history, with the earliest evidence dating from 3,000 B.C. Baboons were even deified, entering the pantheon of gods as manifestations of Thoth, a god associated with the moon and wisdom. One species, *Papio hamadryas* (the sacred baboon), was often depicted in wall paintings and other works, as a male, in a seated position with its tail curled to the right of its body. The species was among the types of baboons that were mummified in this very position with the linens carefully wrapped around its limbs and tail. Another species, *Papio anubis* (the olive baboon), was also mummified but it was typically wrapped in one big cocoon in a manner reflecting far less care. Baboons have never however, existed naturally in the Egyptian landscape and were a product of foreign trade in the region.

The baboon is one of seven examples of *Papio hamadryas* depicted in the rigging of Egyptian ships returning to Egypt from Punt. Credit:  
Photograph and figure by Nathaniel J. Dominy.

The study focused on mummified baboons from the New Kingdom period (1550-1069 B.C.) available in the British Museum and specimens from the Ptolemaic period (305-30

B.C.) available in the Petrie Museum of Egyptian Archaeology at University College London. In addition, the authors examined tissues from 155 baboons from 77 locations across eastern Africa and southern Arabia, encompassing every hypothesized location for Punt. The team measured oxygen and strontium isotope compositions and used a method called isotopic mapping to estimate the geographic origins of specimens recovered from the New Kingdom and Ptolemaic sites in Egypt.

Strontium is a chemical element that is found in bedrock, which is specific to a geographic location. As strontium erodes, its composition is absorbed into the soil and water and enters the food web. As animals drink the water and eat the plants, their teeth, and hair and bones, obtain a geographic signature reflecting where they have lived in the past and most recently, respectively.

Baboons must drink water every day and are considered obligate drinkers. Their bodies reflect the oxygen composition of water in the landscape. The enamel of an animal's adult teeth reflect the unique strontium composition of its environment when the teeth formed in early life. In contrast, hair and bone have isotope signatures that reflect the preceding months (hair) or years (bone) of dietary behavior. Similar to strontium, oxygen compositions (specifically, isotopes) of water can also vary by geographic location but the researchers found data from the specimens in this category were inconclusive, and only reflected values specific to Egypt.

The findings demonstrate that the two mummified *P. hamadryas* baboons from the New Kingdom period, EA6738 and EA6736, were born outside of Egypt. They had most likely come from a location in Eritrea, Ethiopia or Somalia, which narrows down the location of Punt.

The data suggest that EA6736, a *P. hamadryas* baboon, must have died shortly, day or months, after arriving in Egypt, as results indicate that its enamel and hair did not have sufficient time to convert to the local oxygen signature of drinking water.

Five species of mummified *P. anubis* from the Ptolemaic period reflected strontium levels that are consistent with an Egyptian origin, which provides tantalizing hints of a captive breeding program for baboons at this time, probably in Memphis, an ancient capital in Lower Egypt, northwest of the Red Sea.

As the researchers explain in the study, their estimated location of Punt is still provisional but the role that baboons played in the Red Sea trade network and their geographic distribution is one that is integral to understanding the historic origins of international maritime commerce.

Please visit the site: <https://phys.org/news/2020-12-mummified-baboons-lost-punt.html> [Go there for pix, caps and map]

## **EVIDENCE OF OLDEST GYNAECOLOGICAL TREATMENT ON RECORD, PERFORMED IN ANCIENT EGYPT 4,000 YEARS AGO**

Scientists from the Universities of Granada and Jaén are studying the physical evidence found in the mummified remains of a woman who suffered severe trauma to the pelvis in 1878–1797 BC, linking them to a medical treatment described in various Egyptian medical papyri of the time

During the Qubbet el-Hawa Project, led by the University of Jaén (UJA) in Aswan (Egypt), in which scientists from the University of Granada (UGR) are participating, researchers have found evidence of the oldest gynaecological treatment on record, performed on a woman who lived in Ancient Egypt some 4,000 years ago and died in 1878–1797 BC.

During the 2017 archaeological dig organised in Qubbet el-Hawa, on the western bank of the River Nile, Andalusian researchers found a vertical shaft dug into the rock in tomb QH34, leading to a burial chamber with ten intact skeletons.

Mummification techniques were not very effective at that time, at least at this site in Upper Egypt. However, the individuals buried there generally belonged to the upper classes of society meaning that they would have been given special care. These particular mummies are very well-preserved and are wrapped in thick layers of linen strips, sometimes bearing remnants of dried soft tissue.

“The mummies had grave goods (usually necklaces of different types); in some cases, their faces were covered with cartonnage masks; and they were preserved inside two rectangular sarcophagi, one inside the other. These featured hieroglyphic inscriptions and were typically badly damaged due to termite infestation,” explains Miguel Botella, forensic anthropologist and Emeritus Professor at the UGR, who conducted the analyses.

### **The last mummy buried**

One of the mummies excavated by the team of anthropologists was perhaps the last to be buried in the chamber. It belonged to a woman of high social class, whose name, Sattjeni, has been preserved in the remains of the outer coffin. That name must have been common among the upper classes of the region, perhaps explaining why she was named Sattjeni A.

Between her bandaged legs, in the lower part of the pelvis and beneath the linen wrappings, the researchers found a ceramic bowl with signs of use, containing charred organic remains. The analysis of the skeletal remains was carried out by a team of anthropologists from the UGR (coordinated by Professor Botella) and it confirmed that the woman had survived a serious fracture in her pelvis, perhaps caused by a fall, which must have caused severe pain.



It is highly likely that, to alleviate these pains, the woman was treated with fumigations, as described in medical papyri of the time describing solutions to gynaecological problems.

“The most interesting feature of the discovery made by the researchers from the University of Jaén is not only the documentation of a palliative gynaecological treatment, something that is quite unique in Egyptian archaeology, but also the fact that this type of treatment by fumigation was described in contemporary medical papyri.

But, until now, there had been no evidence found to prove that such treatment was actually carried out,” explains the UJA’s Dr. Alejandro Jimenez, an expert in Egyptology and director of the Qubbet el-Hawa Project. This work has now been published by one of the most prestigious academic journals in Egyptology, Zeitschrift für Ägyptische Sprache und Altertumskunde.

The project was funded by the Spanish Ministry of Science and Research, Fundación Gaselec, Fundación Palarq, the Calderón Group, and the Spanish Association of Egyptology.

**Please visit the site: <https://www.heritagedaily.com/2020/12/evidence-of-oldest-gynaecological-treatment-on-record-performed-in-ancient-egypt-4000-years-ago/136468>**

---

## **THE LAST SPEAKERS OF ANCIENT SPARTA**

The iconic city-state may have fallen nearly 2,400 years ago, but today, 2,000 people still speak the language of these ancient warriors By Angela Dansby

As you enter the mountainous village of Pera Melana in Greece's southern Peloponnese peninsula, you're likely to hear the roar of scooters zooming down narrow roads and the chirps of birds stealing ripe fruit from trees. But if you approach the village's central cafe, you'll hear a rather unusual sound. It's the buzz of conversations among elders in a 3,000-year-old language called Tsakonika.

The speakers are the linguistic descendants of ancient Sparta, the iconic Greek city-state, and part of a rich cultural heritage and population called Tsakonian.

Thomais Kounia, known as the “empress of Tsakonika” for her mastery of the language, tells her friend about the bread she baked that morning, but my Greek translator cannot understand her. Instead, Kounia translates for him in Greek, and he then tells me, like a game of Chinese whispers. I am in awe. These ladies are some of the last fluent speakers of one of the world's oldest living languages.

It is the only continuous legacy of the ancient Spartans and one of the oldest languages in Europe Today, only about 2,000 of the 10,000 Tsakonians, primarily elders, still speak Tsakonika at all, and the language is limited to 13 towns, villages and hamlets located around Pera Melana. While Greek is the region's official language, Tsakonika is often spoken at home and casually in public here. Yet, its future remains uncertain.

“We are losing Tsakonika without authentic teachers,” said Kounia. “I have been trying to preserve it for the last 40 years. It is my duty to do so.”

Tsakonika isn't just important to the identity and culture of Tsakonians, it is the only continuous legacy of the ancient Spartans.

It's also the oldest living language in Greece – predating modern Greek by about 3,100 years – and one of the oldest languages in Europe.

When we go to Sparta, it feels like home

“If we lose our language, we cannot claim to be Tsakonian,” explained Eleni Manou, a Tsakonika teacher and author in the nearby town of Leonidio, the de facto capitol of Tsakonia.

Tsakonika is based on the Doric language spoken by the ancient Spartans and it is the only remaining dialect from the western Doric branch of Hellenic languages. In contrast, Greek descends from the Ionic and Attic dialects on the eastern branch. While each of these use a similar alphabet, Tsakonika has more phonetic symbols and differs in structure and pronunciation. Unsurprisingly, Tsakonika is closer to ancient than modern Greek, but none of these languages are mutually intelligible.

A famous Tsakonika-like phrase was coined by Leonidas I, king of the Spartans, in 480 BC in the Battle of Thermoplae when he led 300 of his men and about 1,000 other Greeks in a fight against up to 500,000 Persians. Given the mismatched forces, the

Persian commander demanded that Leonidas surrender all weapons or die. Leonidas replied in Laconian, “Come and get them!”

Laconian was the Doric dialect spoken in the Spartan state of Laconia, and by the Middle Ages, it became known as Tsakonian or Tsakonika.

“Tsakonika is the main proof of our Spartan connection,” Manou noted.

“And in terms of the heart, we are direct descendants. For me and many other Tsakonians, when we go to Sparta, it feels like home.”

Though Pera Melana and the other villages where Tsakonika is still spoken lie about 55 to 100km north-east of ancient Sparta, their geographical distance from the capital that once ruled them has actually helped preserve the language. After the Visigoths sacked Sparta in 396AD, the city was eventually abandoned and the remaining Spartans fled and settled in these mountainous areas. Over the centuries, Tsakonika was preserved in these isolated farming communities that quietly passed the language down from generation to generation. These communities remained relatively secluded until after the Greek War of Independence (1821-29), which gave rise to mass education and improved infrastructure.

“The building of roads and ports gave people a way out of villages,” Kounia said. “Many residents never returned.”

In the 1950s, the introduction of electricity in all Tsakonian villages and exposure to national broadcast media further connected residents to the outside world. Many also moved to other countries to look for better job opportunities. One of them was Panos Marneris, now a Tsakonika teacher, poet and songwriter who runs the language website Tsakonika.

“Up to 1970, when I left for the United States, Tyros and other villages in the area where I grew up spoke 100% Tsakonika,” he said.

“But each year I returned to visit, more and more people weren’t speaking it and that bothered me. The road from Astros to Leonidio was built in 1958. Twenty years later, people stopped speaking Tsakonika.”

About 5,000 people still spoke Tsakonika in the late 1950s, according to Manou. But this number declined by more than half in subsequent decades as modern Greek became the national language in 1976 and outside teachers came to Tsakonia to teach it. Moreover, Tsakonika was stigmatised as a “peasant language”. As a result, Manou’s father, who was a native speaker,

refused to teach Tsakonika to her because he deemed it unnecessary and shameful. In fact, his generation largely suppressed it with their children – a decision many now regret, as Tsakonika is listed as a “critically endangered” language by Unesco.

Until the 1990s, Tsakonika was still taught alongside Greek in some local schools, but then it became solely optional. Nowadays, there are hardly any schools left in these aging villages because so few children live there.

“Only 12 children live in my village today,” Kounia said. “It’s a big problem without a younger generation to pass along the language.”

While Tsakonika's long-term viability remains in doubt, its past stigma is long gone.

“In the 1960s-70s, there was an attitude change about Tsakonika as something to treasure rather than hide,” Manou said. “In fact, a lot of young Tsakonians were angry with their parents and grandparents for not speaking Tsakonika to them. I was begging my father to speak it to my children, but he refused. Now it's fashionable with the younger generation.”

Today, teachers, philologists and politicians are eagerly trying to revive the language. At a minimum, they are giving Tsakonika the respect it deserves as the language of King Leonidas rather than peasants.

In Leonidio, bilingual signs in Tsakonika and Greek welcome visitors.

One proudly states: “Our language is Tsakonika. Ask people to speak it to you.” Tsakonika is also featured in the town's Tsakonian museum; in the Tsakonian Archives, a heritage club founded in 1954 to preserve written Tsakonika; and at the annual Melitzazz festival each summer.

The latter features Tsakonian music, dance, carpet weaving, stone architecture and a sweet, local variety of eggplant.

“Today it's an embarrassment if you don't speak Tsakonika,” noted Haralambos Lysikatos, the mayor of South Kynouria in Leonidio, who is very proud of his Tsakonian heritage. “It's my dream to have most Tsakonians speak it.”

Historically, Tsakonika was an oral language; per their austere, simple way of life, the Dorians used language only out of necessity and did not write anything down. In fact, the word “laconic” comes from Laconia, whose inhabitants were known for verbal brevity and pithy phrases. So, there are relatively few Tsakonian words – an estimated 8,000 to 10,000, compared to up to five million in modern Greek.

“That's why there is no Tsakonian literature,” said Maxim Kisilier, head of the Department of Byzantine and Modern Greek Studies at Saint Petersburg State University in Russia, who is hailed by Tsakonians as one of its best speakers. “But there are expressions of love.”

“It's quality over quantity with words in Tsakonika,” Kounia joked.

The bigger challenge is preserving the language in writing. Lack of vocabulary isn't a problem as Tsakonika borrows words it doesn't have from Greek and even a handful from French. The bigger challenge is preserving the language in writing.

“Tsakonika has very special phonetics and it is hard to write down typographically,” Kisilier said.

The best effort to date is a three-volume dictionary published by Kounia's uncle in 1986. Now several speakers are looking to update and republish it online. The municipalities of South and North Kynouria and the Tsakonian Archives morally support this initiative but lack the funds to do it.

“What is not written fades away,” noted Tsakonika author Sotiris Steniotis, who has started compiling words for a new Tsakonika dictionary. “In this era of information with the internet, we should not lose a language. Every Tsakonian village should have a Tsakonika centre for its residents and Tsakonika classes should be offered in Sparta and Athens.”

Petris Dimitris, mayor of Prastos, intends to create such a centre in an abandoned tavern in his nearly deserted village. Currently, only the Tsakonian Archives and a few other locations offer in-person Tsakonika classes.

This year, Covid-19 inspired Manou to offer Tsakonika lessons online for the first time, opening up a big opportunity to expand teaching.

She also hopes to start a regional radio show to unite Tsakonika-speaking areas. The digital revolution has even hit the dusty Tsakonian Archives, which aims to back up all of its Tsakonika publications digitally.

“More people must get involved, especially young people – I plead with them to get involved – to preserve this language,” Marneris urged.

In the hearts of Tsakonians, their language will survive, but it will be a difficult battle. Modern, digital dictionaries may save the last words of the ancient Spartans, but only if, as Leonidas would say, Tsakonians “come and get them!

**Please visit the site: <http://www.bbc.com/travel/story/20201215-the-last-speakers-of-ancient-sparta> [Go there for pix, table, and audio]**

---

---

## **GREAT PYRAMID: LOST EGYPTIAN ARTEFACT FOUND IN ABERDEEN CIGAR BOX**

A long-lost Egyptian artefact has been found in a cigar box in Aberdeen - and it is hoped it could shed new light on the Great Pyramid.

The chance discovery was made by a member of staff at the University of Aberdeen during a collection review.

The small fragment of 5,000-year-old wood - which is now in several pieces - is said to be "hugely significant".

The engineer Waynman Dixon originally discovered it among items inside the pyramid's Queens Chamber in 1872.

The piece of cedar - which it is believed may have been used during the pyramid's construction - was donated to the university in 1946 but then could not be located.

Curatorial assistant Abeer Eladany found it while conducting a review of items housed in the university's Asia collection.

Abeer, who is originally from Egypt and spent 10 years working in the Egyptian Museum in Cairo, cross-referenced it with other records.

### **'Hidden in plain sight'**

"Once I looked into the numbers in our Egypt records I instantly knew what it was, and that it had effectively been hidden in plain sight in the wrong collection," she said.

"I'm an archaeologist and have worked on digs in Egypt but I never imagined it would be here in north-east Scotland that I'd find something so important to the heritage of my own country.

"It may be just a small fragment of wood, which is now in several pieces, but it is hugely significant given that it is one of only three items ever to be recovered from inside the Great Pyramid."

### **Museum in row over Great Pyramid stone**

Two other items found by Waynman Dixon - a ball and hook - are now housed in the British Museum, but the wood was missing.

"The university's collections are vast - running to hundreds of thousands of items - so looking for it has been like finding a needle in a haystack," Abeer added.

"I couldn't believe it when I realised what was inside this innocuous-looking cigar tin."

Results have recently been returned and show that the wood can be dated to somewhere in the period 3341-3094 BC.

**'Quite a revelation'**

This is said to support the theory that, whatever their use, the so-called Dixon Relics were original to the construction of the Great Pyramid and not later artefacts left behind by those exploring the chambers. But the dating is also surprising as historical records have dated the pyramid itself to a period about 500 years later.

Neil Curtis, head of museums and special collections at the University of Aberdeen, said: "Finding the missing Dixon Relic was a surprise but the carbon dating has also been quite a revelation. It is even older than we had imagined.

"This may be because the date relates to the age of the wood, maybe from the centre of a long-lived tree. Alternatively, it could be because of the rarity of trees in ancient Egypt, which meant that wood was scarce, treasured and recycled or cared for over many years."

He added: "It will now be for scholars to debate its use and whether it was deliberately deposited, as happened later during the New Kingdom, when pharaohs tried to emphasise continuity with the past by having antiquities buried with them.

"This discovery will certainly reignite interest in the Dixon Relics and how they can shed light on the Great Pyramid."

Please visit the site: <https://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-55315623> [Go there for pix]

---

## **ANCIENT EGYPTIAN HOARD OF COUNTERFEIT 'DIRTY MONEY' UNEARTHED, BY TOM METCALFE**

A shortage of silver caused by the collapse of leading Bronze Age civilizations around the eastern Mediterranean about 1200 B.C. resulted in the original "dirty money" — several hundreds of years before coins had been invented.

The ancient counterfeiting was revealed by archaeologist Tzilla Eshel, then a doctoral student at the University of Haifa, who studied the chemical composition of 35 buried hoards of Bronze Age silver found at archaeological sites around Israel.

In eight of the hoards — dating from the time of the "Late Bronze Age collapse," when the region's most powerful kingdoms suffered often-violent demises — had been deliberately debased, with cheaper alloys of copper substituted for much of the silver and an outer surface that looked like pure silver.

Because the hoards date back to the when the region, then known as Canaan, was ruled by ancient Egypt, the researchers think this deception originated with the Egyptian rulers, possibly to disguise the fact that their supplies of the precious silver widely used as currency were failing.

Canaan had no silver ores of its own, and the precious metal had to be imported. But the silver trade appears to have quickly come to an end when the nearby kingdoms started collapsing between about 1200 and 1150 B.C.

"There was a shortage of silver, probably related to the Late Bronze Age collapse," Eshel told Live Science. "[Counterfeiting] continued after the Egyptians left Canaan, but they were probably the ones who initiated it."

One of the Canaanite silver hoards found at Beth Shean in northern Israel was dated to the 12th century B.C. It contains ingots with a surface of silver around a copper-rich core. (Image credit: Courtesy Beth Shean expedition)

### **Debased silver**

Long before coins were invented, probably in the kingdom of Lydia in western Asia Minor about the seventh century B.C., silver was widely used as a currency throughout the ancient Mediterranean.

Originally, the precious metal was valued by its weight, either of cut scraps of silver and broken jewelry for small amounts or of entire ingots for larger amounts.

Gold, too, was used as a means of exchange, but it was much rarer and more expensive in most regions, whereas silver was less expensive and much more common.



The research by Eshel and her colleagues, to be published in the January 2021 issue of the Journal of Archaeological Science, identified two of the earliest debased silver hoards: one from Beit Shean in northern Israel and another from Megiddo, — a Canaanite city famed for several ancient battles, that gave its name as Armageddon in the Christian bible to a mythical war at the end of the world.

Both hoards dated from the 12th century B.C., Eshel said, when Egypt's New Kingdom had ruled Canaan by right of conquest for about 300 years.

The Beit Shean hoard of silver, which weighs about 5.5 ounces (157 grams), contained ingots of only 40% silver, which had been alloyed with copper and other cheap metals. The ingots had an enriched silver surface but a copper-rich core that may have been achieved by slowly cooling the ingot after it was melted and poured out.

The Megiddo hoard, which weighed 3.4 ounces (98 grams) had an even lower amount of silver — around 20%. But the debasement had been disguised by the addition of the elemental metal arsenic, which gives a silvery shine to copper.

Both methods of silver debasement would have taken a considerable amount of work and knowledge to achieve, Eshel said. "They are both quite sophisticated methods, but it could have been that the arsenic [method] was easier."

Broken silver jewelry, scraps of silver and silver ingots were widely used throughout the eastern Mediterranean as a form of currency many centuries before the invention of coins. (Image credit: Ivgeni Ostrovski/Israel Antiquities Authority )

### **Late Bronze Age collapse**

Eshel suspects that the practice of debasing silver used as currency became accepted and then widespread as the shortage of silver continued in Canaan.

"I think it may have started as a forgery or counterfeiting, and then maybe it became a convention over time," she said. "I don't think you can produce silver-copper-arsenic ores for over 250 years and that no one would notice, because it corrodes [by turning green] over time."

The ancient practice of cutting into silver ingots also appears at around the same time, and it may have been a way to check if the ingots were silver all the way through and not copper at their cores, she said.

Almost three centuries later, as new powers like the Neo-Assyrians, Persians and Greek colonies started to take control of the region, the raw silver used as currency regained its purity, according to the study.

From the mid-10th century B.C., "the silver was pure ... signaling a previously unrecognized large-scale import of silver," the researchers wrote.

The reasons for the Late Bronze Age collapse about 3,200 years ago in the eastern Mediterranean are hotly debated.

Economic disruptions, droughts, volcanic eruptions, earthquakes and piracy have all been blamed for the sudden end of many powerful kingdoms in the region, including the collapse of the Hittite Empire in Anatolia, the end of the ancient Egyptian period of the New Kingdom, and the fall of the Mycenaean culture in Greece.

[Originally published on Live Science]

Please visit the site: <https://www.livescience.com/ancient-egyptian-hoard-counterfeit-dirty-money.html>

---

## **BIGGEST CIRCULAR TOMB IN THE ANCIENT WORLD TO OPEN IN ROME, BY JULIA BUCKLEY**

He was the first Roman emperor, who took over from Julius Caesar and built an empire that would eventually stretch from the UK to Egypt, boasting on his death bed that "I found Rome built of bricks, and left it marble."

But the emperor Augustus didn't exactly get paid in kind when he died in 14CE. His tomb -- a huge, circular mausoleum, which was the largest in the city when it was built -- was abandoned for centuries.

With its roof fallen in and the cypresses planted around it left to grow wild, it has long been a far cry from the carefully preserved Colosseum and Roman Forum.

In fact, for much of the past 80 years, it has been closed to the public, with brief openings in the year 2000 to celebrate the city's Jubilee year, and then again, before being closed in 2007 for archaeological investigations.

It was hoped that it would reopen in 2014, to mark 2,000 years since Augustus died. In the end, though, with conservation work still ongoing, it was opened on the day itself.

But finally, a 13-year restoration has come to an end, and it is due to be opened to the public in March 2021.

### **A full scale renovation**

The restorations, completed in two stages, have cost over €10 million (\$12 million). Stage one, funded partly by the Italian Ministry of Cultural Heritage and Activities, and the Roman authorities, was completed in 2019. It oversaw the restoration of the monument.

Stage two, funded by the Fondazione TIM, the social arm of Telecom Italia, to the tune of €6 million (\$7,300,000), has concentrated on the internal spaces, and setting it up for tours.

Huge structural works to protect the mausoleum have been undertaken, and a spiral staircase that leads to the roof of the monument, has been reconstructed.

The Fondazione TIM has also funded the restoration of the burial space, and the landscaping around the mausoleum.

Even the square outside, the Piazza Augusto Imperatore, is being refurbished. Until now, the mausoleum has been something of a roundabout, with cars parked up all around it. The works are due to finish in December 2021.

### **Grand neighbors**

It's not the first facelift for the archaeological remains in the area. Nearby is the Ara Pacis -- a grand, ceremonial altar built to celebrate Augustus' return from his campaigns in

Gaul and Spain in 13BCE, with intricate sculptures of the imperial family featuring as part of a procession.

In 2006, the old pavilion around it was replaced by a glass and steel structure by architect Richard Meier, which is more of a work of art in itself. The altar is now visible from the river Tiber, with the mausoleum behind it.

Augustus had great plans for his tomb. The emperor -- who was born in 63BCE, and took power in 27BCE -- had work started on it in 28BCE, after his victory over Mark Antony and Cleopatra at the Battle of Actium, back when "Augustus" was merely Octavian -- his name before he became emperor.

### **A gargantuan, marble-sheathed tomb**

Built for him and his family, it is the biggest circular tomb in the ancient world, with a diameter of almost 90 meters and a height of at least 45 meters, from what can be surmised from the remains. Only a third of the original monument has survived.

Its gargantuan size made it almost as big as the nearby Pincian hill, and it was situated by the Tiber so as to be visible from most of the city.

Although today it appears made of brick, originally, those walls were covered in travertine marble, of which only traces remain today.

It is thought to have served as a tomb for more than 100 years, before records were lost. It was next mentioned in the 10th century.

### **From a fortress to an amphitheater**

In the medieval period, a fortress was built on top of the remains, but was destroyed in 1241. Following that, the structure was gradually dismantled, with the marble being removed to use as building materials.

In the 16th century, the owners of a palazzo nearby turned the interior of the tomb into a garden. By the 1780s it was being used as an amphitheater, with bullfighting and jousting on display. In the 19th century it was covered by a glass dome and used for theater shows; by the 20th century it was being used as a concert hall, the Auditorium Augusteo.

Only in 1936 did its new life come to an end, when the fascist regime -- which was intent on excavating and preserving the city's heritage, in a bid to align itself with ancient Rome -- demolished the cupola and the modern buildings, to unveil the tomb once more. Restoration work was halted during World War II, and started up again in the 1950s.

The site opens 1 March 2021, and from 22 April visits will include virtual and augmented reality elements.

Tickets for the 50-minute visits -- which are free before 21 April -- must be booked in advance at <mausoleodiaugusto.it>. Elevators will be in use from 22 April -- before that, there is no step-free access.

Please visit the site: <https://www.cnn.com/travel/article/augustus-tomb-rome-opening/index.html> [Go there for pix]

---

---

## **ANCIENT SNACK STALL UNCOVERED IN POMPEII, REVEALING BRIGHT FRESCOES AND TRACES OF 2,000-YEAR-OLD STREET FOOD**

Traces of nearly 2,000-year-old food were found in some of the deep terra cotta jars at the site in Pompeii, Italy.

Rome Archaeologists in Pompeii, the city buried in a volcanic eruption in 79 AD, have made the extraordinary find of a frescoed hot food and drinks shop that served up the ancient equivalent of street food to Roman passersby.

Known as a *termopolium*, Latin for hot drinks counter, the shop was discovered in the archaeological park's Regio V site, which is not yet open to the public, and unveiled on Saturday.

Traces of nearly 2,000-year-old food were found in some of the deep terra cotta jars containing hot food which the shopkeeper lowered into a counter with circular holes.

An undated photo shows the ancient eatery in the Pompeii archaeological park, near Naples.

The front of the counter was decorated with brightly colored frescoes, some depicting animals that were part of the ingredients in the food sold, such as a chicken and two ducks hanging upside down.

"This is an extraordinary find. It's the first time we are excavating an entire *termopolium*," said Massimo Ossana, director of the Pompeii archaeological park.

Archaeologists also found a decorated bronze drinking bowl known as a *patera*, ceramic jars used for cooking stews and soups, wine flasks and amphora.

Pompeii, 23 km (14 miles) southeast of Naples, was home to about 13,000 people when it was buried under ash, pumice pebbles and dust as it endured the force of an eruption equivalent to many atomic bombs.

The stall is now completely excavated, helping to reveal some favorite dishes of citizens of the ancient Roman city.

"Our preliminary analyses show that the figures drawn on the front of the counter, represent, at least in part, the food and drink that were sold there," said Valeria Amoretti, a site anthropologist.

Amoretti said traces of pork, fish, snails and beef had been found in the containers, a discovery she called a "testimony to the great variety of animal products used to prepare dishes."

It is the first time such a stand has been entirely uncovered.

About two-thirds of the 66-hectare (165-acre) ancient town has been uncovered. The ruins were not discovered until the 16th century and organized excavations began about 1750.

A rare documentation of Greco-Roman life, Pompeii is one of Italy's most popular attractions and a UNESCO World Heritage Site.

Please visit the site: <https://www.cnn.com/2020/12/26/europe/pompeii-shop-archaeology-intl/index.html> [Go there for pix]; See also <https://www.bbc.com/news/world-europe-55454717>

---

---

## **EVIDENCE FOR A MASSIVE PALEO-TSUNAMI AT ANCIENT TEL DOR, ISRAEL**

Underwater excavation, borehole drilling, and modelling suggests a massive paleo-tsunami struck near the ancient settlement of Tel Dor between 9,910 to 9,290 years ago, according to a study published in the open-access journal PLOS ONE by Gilad Shtienberg, Richard Norris and Thomas Levy from the Scripps Center for Marine Archaeology, University of California, San Diego, USA, and colleagues from Utah State University and the University of Haifa.

Tsunamis are a relatively common event along the eastern Mediterranean coastline, with historical records and geographic data showing one tsunami occurring per century for the last six thousand years. The record for earlier tsunami events, however, is less defined. In this study, Shtienberg and colleagues describe a large early Holocene tsunami deposit (between 9,910 to 9,290 years ago) in coastal sediments at Tel Dor in northwest Israel, a maritime city-mound occupied from the Middle Bronze II period (2000-1550 BCE) through the Crusader period.

To conduct their analysis, the authors used photogrammetric remote sensing techniques to create a digital model of the Tel Dor site, combined with underwater excavation and terrestrial borehole drilling to a depth of nine meters.

Along the coast of the study area, the authors found an abrupt marine shell and sand layer with an age of constraint 9,910 to 9,290 years ago, in the middle of a large ancient wetland layer spanning from 15,000 to 7,800 years ago. The authors estimate the wave capable of depositing seashells and sand in the middle of what was at the time fresh to brackish wetland must have travelled 1.5 to 3.5 km, with a coastal wave height of 16 to 40 m.

For comparison, previously documented tsunami events in the eastern Mediterranean have travelled inland only around 300 m--suggesting the tsunami at Dor was generated by a far stronger mechanism. Local tsunamis tend to arise due to earthquakes in the Dead Sea Fault system and submarine landslides; the authors note that an earthquake contemporary to the Dor paleo-tsunami (dating to around 10,000 years ago) has already been identified using cave damage in the nearby Carmel ridge, suggesting this specific earthquake could have triggered an underwater landslide causing the massive tsunami at Dor.

This paleo-tsunami would have occurred during the Early to Middle Pre-Pottery Neolithic B cultural period of the region (10,700-9,250 years ago 11,700-10,500 cal BP), and potentially wiped out evidence of previous Natufian (12,500-12,000 years ago) and Pre-Pottery Neolithic coastal villages (previous surveys and excavations show a near absence of low-lying coastal villages in this region). The re-appearance of abundant Late Neolithic archaeological sites (ca. 6,000 BCE) along the coast in the years after the Dor tsunami coincides with the resumption of wetland deposition in the Dor core samples and indicates resettlement followed the event--highlighting residents' resilience in the face of massive disruption.



According to Gilad Shtienberg, a postdoc at the Scripps Center for Marine Archaeology at UC San Diego who is studying the sediment cores, "Our project focuses on reconstructing ancient climate and environmental change over the past 12,000 years along the Israeli coast; and we never dreamed of finding evidence of a prehistoric tsunami in Israel. Scholars know that at the beginning of the Neolithic, around 10,000 years ago, the seashore was 4 kilometers from where it is today. When we cut the cores open in San Diego and started seeing a marine shell layer embedded in the dry Neolithic landscape, we knew we hit the jackpot."

**Please visit the site:**

<https://archaeologynewsnetwork.blogspot.com/2020/12/evidence-for-massive-paleo-tsunami-at.html> [Go there for pix, charts and video]

---

## **BANKING, TRADE & COMMERCE IN** **ANCIENT PHOENICIA,** **BY MICHAEL ARNOLD**

The kingdoms of ancient Phoenicia are remembered for maritime trading networks that made them wildly prosperous. Through banking and commerce, they maintained economic hegemony in the Mediterranean for a millennium.

The turn of the 12th century BC in the Eastern Mediterranean was a turbulent time, to say the least. Because of reasons unknown, numerous tribes of barbarian seafarers were ejected from their homes in the northern Aegean around 1,200. The tribes formed a confederation and came sweeping into Anatolia and the Near East on a bloodthirsty rampage.

Mycenaeans ruling from the island of Crete were first to feel their wrath. The Sea Peoples torched Knossos and sent ancient Greece spiraling into a dark age. Then they landed on the shores of Egypt but were repelled by the forces of Ramses III after a hard-fought war.

Despite being victorious, Egypt's conflict with the Sea Peoples jeopardized its colonies in the Levant and plunged the state into a thousand-year decline.

The Hittite Empire, located in modern-day Turkey, also faced the onslaught of these marauding refugees: it was wiped off the face of the earth entirely. But there was one civilization that survived this calamity: ancient Phoenicia.

And as the whole world seemingly burned around them, ancient Phoenicia's little seaside kingdoms sat unscathed. In fact, amid it all, they were growing rich and founding colonies in such distant lands as Portugal.

They, too, faced the threat of demise from the encroaching Late Bronze Age chaos. But when the Sea Peoples arrived on Levantine shores, the clever Phoenicians paid them off — or at least that's what historians have surmised.

So while their contemporaries were destroyed, the ancient Phoenicians minted new currency, prepared their fleets, and began growing the greatest trade network the Mediterranean had ever seen.

### **A Brief Overview**

The Phoenicians are better known for their exploits at sea than on land. They endeavored to chart the entire Mediterranean basin, and that they did. Afterward, they adapted their seafaring skills to the ocean. And the extent to which they explored it is a matter of debate: at a minimum, they navigated the Atlantic coasts of Europe and West Africa; at most, they made it to the New World.

But before all of this seafaring, the Phoenicians were simply a group of Semitic-speaking city-states on a tiny strip of land in the Levant.

Plato referred to them as “lovers of money.” Not quite as noble as the ancient Greeks on whom he bestowed the epithet “lovers of knowledge” — he may have been biased.

Whether or not the Phoenicians loved money is speculative. But it’s clear that, at the very least, they excelled in making it. Their kingdoms initially grew rich from mining iron and exporting cedar and a purple dye signature of the city Tyre. But their wealth exploded several times over as ancient Phoenician colonies flourished in the west.

The major cities that studded the Mediterranean coast, in order from north to south, were Arvad, Byblos, Beirut, Sidon, and Tyre. And despite sharing religion and culture, they were each independent and self-governing for most of history.

The site of ancient Beirut is the capital of modern-day Lebanon.

Sidon, a biblical city, was a prosperous religious and economic center until it was destroyed by the Philistines. And, most importantly, Tyre was the city from where the early settlers of Carthage originated. In ancient times it was a fortified island just off the mainland that came under siege on a number of occasions. It was the last holdout during Alexander the Great’s conquest of ancient Phoenicia in 332. And for that, the Tyrian citizens paid a grave price.

The Phoenicians’ Ascent To Wealth And Prominence Timber was a staple export of the earliest Canaanite economies. The abundance of cedar trees available in the mountains that hemmed the eastern boundaries of Phoenicia proved to be invaluable to its fledgling kingdoms.

It’s documented that King Solomon’s Temple in Jerusalem was built with cedar imported from ancient Phoenicia. The same cedar that was used to build their world-class sailing vessels, most notably the bireme and trireme.

Another product critical to ancient Phoenician economies was Tyrian purple dye. The entire ancient world came to regard this color as a luxury. And it was later adopted by the Greeks and Romans as a hue of high distinction, often associated with royalty.

The Tyrians produced purple dye from extracts of a sea snail species endemic to the Levantine coasts. Its export throughout the Mediterranean made the early Phoenicians extremely wealthy.

But their height of economic prosperity didn’t come until they launched trade expeditions in the west. This major push to increase wealth in raw materials was a matter of exigency.

By the 10th century BC, imposing Assyrian armies sat just outside of Phoenician lands. Faced with an ultimatum of either forfeiting their sovereignty to the swelling empire or paying a hefty annual tribute to the Assyrian kings, the city-states of Phoenicia chose the latter.

Their natural resources at home in the Levant were limited to iron. So the Phoenicians, but really the Tyrians in particular, set forth to establish mining colonies all over the Mediterranean. And, at least at the beginning, their motivations were less imperial and

more about forming alliances in places with the most lucrative and abundant raw materials.

Nearby in Cyprus, the Phoenicians staked out their claim of the island's famously prolific copper mines. Farther west in Sardinia, they populated small settlements and built alliances with the native Nuragic people. From there they extracted an abundance of mineral resources.

And in southern Spain, at the edge of the ancient Mediterranean World, the Phoenicians established a major colony at the mouth of the Rio Guadalete. The long, snaking river served as a conduit to the vast silver mines in the interior of Tartessos, the ancient name for Andalusia.

These budding trade networks allowed the Phoenicians to maintain their dignity and keep the Assyrians at bay. But, more importantly, it led to their ascent as wealthy kingdoms revered all over the civilized world.

### **Coinage And Banking**

Sophisticated banking didn't quite exist yet in the ancient world. At least not by modern, or even medieval, standards. There were no centralized monetary authorities in the way that there are in almost all nations today. Rather, the treasury of a state fell under the auspices of its ruler. So, naturally, the currency was minted at the will and command of the sovereign.

Cleopatra VII, for example, minted a series of coins in her own honor during a period of exile from Alexandria in the Levantine city of Ashkelon. Currency was used as equal parts propaganda and an assertion of power, as was the case with Cleopatra's Ashkelon mint.

Sovereigns attempted to align themselves with gods or former beloved rulers in the profile images carved on the obverse of coins. The reverse side would usually depict a symbol of the state — most often an elephant in the Punic world, a wolf or eagle in Rome, and a horse, dolphin, or naval vessel in coins coming out of Phoenicia.

The kingdoms of ancient Phoenicia minted new coins on pace with their mining and trade exploits around the Mediterranean. Out of Spain came a steady flow of silver shekels that were often minted with the profile of the Levantine god Melqart during Phoenician times. And in later Carthaginian times they were modified to represent the syncretized version of the same god, Hercules-Melqart.

Coins and, more generally, treasures belonging to the state were usually stored in temples. Such temples existed in all of the principal Phoenician city-kingdoms. But they also sprouted up around the greater Phoenician world, like the famous one dedicated to Melqart in Gades.

The term shekel, originating from the Akkadian Empire, came to represent the first currency of Tyre. The shekel was traditionally made of silver. And with ancient Phoenicia's exploits in Spain, which were later transferred to Carthage, its production of

shekels increased rapidly. They continue to be discovered in archaeological sites all over the Mediterranean and Near East.

### **Trade and Commerce In Ancient Phoenicia**

According to Pliny, the Roman historian, “Phoenicians invented trade.”

The sophistication of the Near East came as a byproduct of ancient Phoenicia’s commercial presence in the west. They traded opulent jewels and masterful ceramics in exchange for raw materials from the mines of native populations.

Along with fine products, the Phoenicians brought with them more sophisticated means of transacting in business. By the 8th century, they’d introduced interest-bearing loans to the Western Mediterranean.

This practice of usury came to them from the ancient Sumerians by way of the Babylonians. And it was later popularized in the Roman Empire and spread across Europe that way.

The Phoenicians never established settlements too far into the hinterlands of their North African colonies. Cities like Carthage and Leptis Magna were critical for their positions along trade routes. But the Sahara Desert was an encumbrance to any further commercial trade networking on the continent.

In Iberia, however, they made significant inroads well beyond their coastal colonies. At Castelo Velho de Safara, an active dig site in southwestern Portugal that accepts volunteer applicants, traces of an ancient Phoenician trade network are evident in many of the material finds.

In the site’s Iron Age context layers, dating back to the 4th century BC, sherds of Greek pottery, Campanian ware, and bits of amphorae are copious. The natives, either Celtiberians or Tartessians, likely developed an appetite for fine eastern ceramics and wines, the likes of which were unavailable in Iberia.

It’s probable that the Phoenicians transported these products from Italy and Greece to Gades. And then from Gades to the settlement at Safara along a network of inland rivers.

The commercial dominance of the Phoenicians weaved together the tapestry of the ancient Mediterranean. The tiny Levantine kingdoms managed to serve as the conduit that united the known world by means of imports and exports.

And in the process, they garnered a long-lasting and well-deserved reputation for financial and economic acumen.

**Please visit the site: <https://www.thecollector.com/trade-in-ancient-phoenicia/> [Go there for map and pix]**

## **IVORY: ELEPHANT DECLINE REVEALED** **BY SHIPWRECK CARGO,** **BY VICTORIA GILL**

Researchers have examined ancient DNA preserved in elephant tusks that were among the cargo of a 487-year-old shipwreck. Their forensic examination of the 100 tusks pinpointed the devastation caused to the elephant population by centuries of ivory trade. On this single ship, researchers found genetic evidence of 17 distinct herds of the threatened animals.

Today, scientists can find only four of those herds surviving in Africa.

The tusks were so well preserved - in cold water off the Namibian coast - that scientists were even able to find out what type of diet the elephants had, which revealed where they had lived and been hunted.

The findings are published in the journal *Current Biology*.

The wreck itself is a Portuguese trading vessel, known as the Bom Jesus, which went missing on its way to India in 1533. It was found by chance in 2008 in a coastal diamond mine, making it the oldest known shipwreck in southern Africa.

The ivory in the cargo hold was just part of a vast haul of precious cargo, including copper ingots and gold and silver coins.

Archaeologists have also found personal effects and navigation equipment amid the remains of the ship.

"There are dinner plates, cutlery and trinket boxes, as well as all the copper ingots, coins and ivory in the cargo," explained Ashley Coutu, an archaeologist from the University of Oxford, who specialises in genetic and chemical analysis of artefacts.

"It is an incredible find, incredibly well preserved," she told BBC News. That preservation meant that the international team of researchers - including experts from from Namibia, the US and the UK - could unpick exactly how many herds of elephants the tusks came from.

The team examined something called mitochondrial DNA. Mitochondria are the power stations of every cell, converting food into fuel. And crucially for this study, the genetic blueprint that makes mitochondria is passed down from mother to offspring.

This makes it a particularly revealing piece of code for elephants.

"Elephants live in female-led family groups, and they tend to stay in the same geographic area throughout their lives," explained Alida de Flamingh from the University of Illinois at Urbana-Champaign, who led the study. "We were able to reconstruct complete mitochondrial genomes from these really old samples."

Those completed pieces of genetic code showed that the tusks on this single trading vessel came from 17 distinct elephant herds. The most up to date genetic information about the elephants surviving in that part of Africa today showed that only four of those could be found.

"That was quite shocking - that loss of diversity," said Dr Coutu.

"Next we'd really like to fill in those gaps in a chronological way.

We can look at where these pinch points are in history and create a timeline of exactly how and when the huge trade in ivory had an impact."

"[What we found] definitely has conservation implications," Dr de Flamingh added: "We know that a loss of genetic diversity is associated with increased extinction risk."

Every tusk is an elephant's life story. What the animals eat creates a fingerprint in the composition of the tusks as they grow - something that scientists can unpick using a technique called isotope analysis.

This essentially breaks down the chemical make-up of every tusk, and it suggested that these were forest elephants - living in mixed forest habitat.

That was a surprise, because by this point in history the Portuguese had established trade with the Kongo Kingdom and communities along the Congo River. So the researchers expected that elephants would be from different regions, especially West and Central Africa.

### **Battling the ivory trade**

The scientists also hope their detailed examination of this ancient ivory could help inform anti-poaching efforts today.

While recent analysis shows elephant poaching has declined slightly, conservationists say the animals are still being poached at unsustainable rates and the trade is a threat to their survival.

When large-scale confiscations of illegal ivory take place, people analyse the DNA to find out where the elephants were killed in Africa.

"Our evidence provides a reference to compare that with, so its origin can be confirmed," said Dr de Flamingh.

"And once you know where the ivory is from you can develop targeted anti-poaching strategies for those locations."

Dr Coutu added: "We're really going to be able to use this historic data to answer modern conservation questions."

**Please visit the site: <https://www.bbc.com/news/science-environment-55340975> [Go there for pix]**