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Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Δεκέμβριος 2025 -

Appearances are a glimpse of the unseen.
(Anaxagoras)

Newsletter of the Hellenic Society of Archaeometry

- December 2025 -

Nr. 297

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

ISA 2026 - TURIN - ITALY - NEW SUBMISSION DEADLINE

Dear All,

Given the number of requests for an extension of the deadline, we decided to give some additional time to ensure that all interested people could send their abstracts.

The new deadline is **December 15th**. Please take advantage of this additional time and send us your contributions!

We would like to remind you that the abstract format is available on the website at the submission page, and that it should be saved as SessionNumber_TypeOfPresentation_SurnameOfPresenter.docx (e.g.: S2_Oral_Smith.docx or S4_Poster_Brown.docx).

Please note that the abstract submission is managed through a Google form, which can be only filled **once**. If you wish to receive a copy of the submitted information, please tick the "send me a copy of my response" box, at the bottom of the form.

For any problem or information, please feel free to contact us.

We are looking forward to reading your works!

All the best,

The ISA 2026 Organising Committee

32ND EAA ANNUAL MEETING, 26 - 29 **AUGUST 2026, ATHENS, GREECE**

The City of Athens looks forward to welcoming the 32nd Annual Meeting of the European Association of Archaeologists in 2026. The Annual Meeting will be hosted by the Department of History and Archaeology, at the School of Philosophy of the National and Kapodistrian University of Athens, the oldest and largest university in Greece, in which the discipline of archaeology is taught since 1837.

The Greek capital is renowned as a destination for archaeological research, while the city's unique mix of historic advantages creates an unforgettable experience.

The city's contemporary life combines the classical and cutting-edge delights, from ancient stone theatres to outdoor cinemas and rooftop bars with views of the Parthenon. Wander through four millennia of history at 80+ world-famous sites, including two UNESCO marvels where visitors get up close with the ancient past. Discover the urban and the seaside on the 50 km coastline of the Athens Riviera with 18 blue flag beaches and 11 marinas.

Athens has a privileged geographical location at the crossroads of three continents. Its award-winning Athens International Airport offers easy access to the city, as well as direct connections to all major European cities.

Athens has a fresh take on Mediterranean cuisine and a gastronomic scene embracing the flavours of Greece's mountainous terrain, rolling vineyards, and the deep blue sea. Let taste be your guide to stunning natural landscapes and the famous islands that are only a short journey from the city centre.

Visionary thinking is in the city's cultural DNA. Athens builds upon its proud intellectual legacy and forward-thinking heritage to create a safe, sustainable, and socially responsible destination.

Now more than ever, Athens is a centre of learning. From Plato's Academy to the research ecosystem of today, academic inquiry is part of the urban fabric of Athens that offers opportunities for advancements in classical and cultural studies, life sciences tourism, and many other disciplines. The city is a hub of knowledge and innovation that is leading impactful conversations across the Mediterranean.

The City of Athens is working to protect the Athenian cultural heritage through a transformative strategy for every neighbourhood, meeting venue, and cultural institution in Athens.

The City of Athens supports EAA's mission to promote the development of archaeological research and the exchange of archaeological information; enhance the management and interpretation of the European archaeological heritage; encourage the application of proper ethical and scientific standards for archaeological work as well as advance the interests of professional archaeologists in Europe.

By connecting international delegates with the local community of archaeologists, both will highly benefit by the knowledge transfer, networking, and professional development opportunities that the EAA Annual Meeting in Athens has to offer.

We look forward to welcoming you!

Athens local organising team and This is Athens – Convention & Visitors Bureau

Please visit the site:

https://www.e-a-a.org/EAA/EAA/Events/Future_Annual_Meetings/EAA_2026.aspx

IRUG16 CONFERENCE & WORKSHOP, 6-9 OCTOBER 2026, WINTERTHUR, DE, USA, CALL FOR PAPERS

We're excited to share that the Infrared and Raman Users Group (IRUG) and the Scientific Research and Analysis Lab at Winterthur Museum, Garden & Library are now accepting submissions for the 16th International Conference on infrared and Raman spectroscopies in cultural heritage taking place on October 6–9, 2026 at Winterthur Museum, Garden & Library!

We welcome contributions on all aspects of IR and Raman spectroscopic techniques applied to cultural heritage materials, including:

- Novel analytical methods and instrumentation
- Database development and reference collections
- Case studies in the application of IR or Raman in cultural heritage
- Case studies in teaching IR or Raman techniques in cultural heritage and conservation

Submit your paper or poster abstract via [here](#) before January 31st 2026.

Authors presenting original, previously unpublished research will be considered for publication in a special issue of the Journal of the American Institute for Conservation.

Don't hesitate to reach out if you have any questions: irug16@winterthur.org

Rosie Grayburn
Head of Scientific Research and Analysis Lab
Winterthur Museum, Garden & Library
Winterthur
United States

**SMT37 – 37TH CONFERENCE ON SURFACE
MODIFICATION TECHNOLOGIES, 22-24
APRIL, 2026, CAMPUS UCHARLEROI -
CENTRE UNIVERSITAIRE ZÉNOBE
GRAMME, BELGIUM**

More information

[Continue on the related website](#)

[Register](#)

Organized by

Dr. Tirumalai S SUDARSHAN (MatMod Inc), Dr Francesco DELLORO (Mines Paris-PSL), Prof. Véronique VITRY (UMONS)

[Send an e-mail](#)

The 37th International Congress on Surface Modification Technologies (SMT37) aims to cover progress on all aspects of surface modification technologies. The conference will address industrial materials (metals, alloys polymers, ceramics, composites, ...) and advanced materials and processes, from the macroscopic to the microscopic standpoint.

Producers, users and researchers, engineers and scientists that have an interest in Surface Modification will be brought together for this event, in order to facilitate and encourage, the exchange of knowledge, experience and ideas among the community of people that use, improve, develop, research and assess surface modification processes.

Please visit the site: <https://web.umons.ac.be/en/agenda-events/smt37/>

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

TAU ARCHAEOLOGICAL
SCHOLARSHIPS

Dear colleagues,

A limited number of scholarships are available for advanced PhD students interested in a short internship at TAU in archaeometallurgy. The internship includes hands-on chemical and isotopic analysis of metallurgical artifacts from unique collections, with the potential to lead a study from analysis through publication (various topics/periods; collaboration with the student's PhD supervisor is encouraged).

In addition, a small number of scholarships are available for participation in this year's Timna Valley excavations (Dec 28–Jan 9).

If interested, please contact me directly for further details.

Best regards,

Erez

Erez Ben-Yosef, Professor

The J. M. Alkow Department of Archaeology and ANE Cultures

Tel Aviv University, Tel Aviv, 6997801 Israel

Head, [Timna Valley Archaeological Expedition](#)

[Israel Young Academy](#) member, 2022-2026

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[Webpage](#) | [Academia-edu](#) | [In the Media](#)

"We cannot solve our problems with the same thinking we used when we created them."
(A. Einstein)

CAARI-HFF GRADUATE FELLOWSHIP

The Cyprus American Archaeological Research Institute (CAARI) is pleased to announce a new fellowship!

The fellowship offers one grant of £2000 (c. US\$2600) to a graduate student of any nationality, with a preference given to scholars from Egypt, Cyprus, Lebanon, and Syria, enrolled in a graduate program in any nation.

The funding is to be used to fund a period of research time in residence at CAARI and to help defray costs of travel. The purpose of the time at CAARI must be to conduct research on a project relevant to the maritime archaeology or maritime heritage of Cyprus. Residence at CAARI is required.

The deadline for applications is 12 January 2026.

<https://honorfrostfoundation.org/2025/11/24/caari-hff-graduate-fellowship/>.

Contact CAARI Fellowships Committee Chair (Kate Grossman, kmgrossman@ncsu.edu) or CAARI directly (admin@caari.com.cy) with any questions.

PHD OPPORTUNITY AT THE MARY ROSE TRUST - BRIDGING PAST AND PRESENT: CORRELATIVE MULTIMODAL MATERIALS ANALYSIS OF THE MARY ROSE HULL

Applications are invited for a fully-funded three year PhD to commence in April 2026.

The PhD will be based at the University of Portsmouth and carried out in collaboration with the University of Southampton. The supervisory team at Portsmouth (Dr Charles Wood, Dr Tarek Teba and Dr Jovana Radulovic) will work alongside academic collaborators at Southampton, drawing on their strengths in maritime archaeology, geomatics and digital heritage data to ensure the project benefits from the wider interdisciplinary context of the partnership. External supervision will be provided by Eleanor Schofield at the Mary Rose Museum.

Successful applicants will receive a bursary to cover tuition fees for three years and a stipend in line with the UKRI rate (£20,780 for 2025/26). Bursary recipients will also receive £1,500 p.a. for project costs/consumables.

Costs for student visa and immigration health surcharge are not covered by this bursary. For further guidance and advice visit our international and EU students ['Visa FAQs' page](#).

This funded PhD is **only open to new students** who do not hold a previous doctoral level qualification.

The work on this project could involve:

Apply advanced multimodal imaging (micro-CT, XRF, spectroscopy and EM) to one of the world's most iconic archaeological artefacts - the hull of the *Mary Rose*
Integrate structural, chemical and historical datasets to reveal how a 16th-century warship has changed over five centuries of burial, recovery and conservation
Work directly with the Mary Rose Museum's conservation scientists, gaining rare access to physical samples, historical records and long-term environmental monitoring data
Generate evidence that directly shapes conservation decisions for the Mary Rose Trust and establishes transferable methods for protecting other heritage collections

Project description

The *Mary Rose* hull has undergone extensive conservation following centuries of submersion and subsequent exposure in a controlled museum environment. A range of techniques (micro-CT, XRF, XANES and physical monitoring of movement and moisture content) have been used at different stages, but these datasets have largely been analysed separately. A key challenge now is to correlate structural, chemical and environmental information across scales and over time, to better understand ongoing risks and optimise conservation strategies.

This project will address that challenge by combining new microscopy and imaging experiments with the integration of existing datasets. You will acquire and analyse micro-CT, XRF and complementary spectroscopic and electron microscopy data on selected regions of the hull or associated material and will develop workflows for registering and visualising multimodal datasets in a common spatial framework. By comparing these integrated datasets with historical measurements, the project will provide new insight into degradation mechanisms, the effects of past treatments, and the current stability of the hull.

You will receive training in advanced X-ray imaging, electron microscopy and data analysis, and will work closely with both the University of Portsmouth's Future Technology Centre and the Mary Rose's conservation team. The methodologies developed will be directly relevant to other maritime and wooden heritage collections, providing broader impact within heritage science.

General admissions criteria

You'll need a good first degree from an internationally recognised university (minimum upper second class or equivalent, depending on your chosen course) or a Master's degree in an appropriate subject. In exceptional cases, we may consider equivalent professional experience and/or qualifications. English language proficiency at a minimum of IELTS band 6.5 with no component score below 6.0.

Specific candidate requirements

We welcome applications from candidates with a background in one or more of: physics, materials science, mechanical or civil engineering, conservation science, heritage science, chemistry or a closely related discipline.

Experience in at least one of the following will be advantageous:

X-ray imaging (e.g. micro-CT), electron microscopy, or related microscopy/characterisation techniques.

Analytical spectroscopy (e.g. XRF, XANES, FTIR) or materials characterisation.

Scientific computing, image analysis or data visualisation (e.g. Python, MATLAB, or similar tools).

An interest in heritage science and working at the interface between experimental measurement, data integration and real-world conservation problems is essential. Prior experience with heritage materials is desirable but not essential; full training will be provided

How to Apply

We'd encourage you to contact Dr Charles Wood (charles.wood@port.ac.uk) to discuss your interest before you apply, quoting the project code **SEM50780126**.

When you are ready to apply, you can apply at the link below. Please note that email applications are not accepted.

Please visit the site: <https://www.findaphd.com/phds/project/bridging-past-and-present-correlative-multimodal-materials-analysis-of-the-mary-rose-hull/?p191967>

ASCSA ARCHAEOLOGICAL RESEARCH **FUNDING OPPORTUNITIES**

AIA Anna C. and Oliver C. Colburn Fellowship

For Ph.D. candidates or recent Ph.D.s (within the last 5 years) to support studies undertaken at the American School of Classical Studies at Athens, Greece for no more than a year. Must be citizens or permanent residents of the United States or Canada, and must be current AIA members at the Graduate or Professional level. Stipends available up to \$9,000. Application deadline: December 15, 2025.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/postdoctoral-and-senior-scholars#Colburn>>.

Harry Bikakis Fellowship

For graduate students at U.S. or Canadian institutions, or Greek graduate students world wide, whose research subject is ancient Greek law and need to work at ASCSA libraries; or Greek graduate students working on excavations conducted by or affiliated with the ASCSA. Stipend of \$1,875. School fees are waived either for the duration of the field project or for the period of the academic year during which the fellow is carrying out research at the ASCSA. Application deadline: March 15, 2026.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/graduate-and-postdoctoral#Bikakis>>.

Jacob Hirsch Fellowship

For U.S. or Israeli citizens. Applicants must either be Ph.D. candidates writing their dissertations in archaeology, or early-career scholars (Ph.D. earned within the last five years) completing a project that requires a lengthy residence in Greece. Applicants can propose to use any of the School's research facilities, as long as their research topic has an archaeological component. Stipend of \$11,500 plus room and board in Loring Hall, and waiver of School fees. Meals, Monday through Friday, are provided at Loring Hall. The fellow is expected to be engaged full-time in the supported research from early September 2026 to late May 2027. Application deadline: February 15, 2026.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/graduate-and-postdoctoral#Hirsch>>.

Joan and Eugene Vanderpool Fellowship

At the Athenian Agora For Ph.D. holders and graduate students working on any aspect of the Athenian Agora from antiquity to the present. Open to all nationalities. The fellowship includes a stipend of \$5,000 and a waiver of up to two months of membership fees for residency in Athens while working on the proposed project. Application deadline: March 15, 2026.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/graduate-and-postdoctoral#Vanderpool>>.

Kress Publications Fellowships

For Ph.D. holders working on a publication assignment from Corinth, the Athenian Agora, Lerna, or any affiliated project of the ASCSA. Preference is given to researchers assigned the primary publication of material from ASCSA-sponsored or affiliated excavations. Open to all nationalities, including staff of the Ministry of Culture. Stipends are for a minimum of three months (up to \$10,000) to a maximum of nine months (up to \$30,000) to be used between May 1, 2026 and March 31, 2027. Application deadline: January 15, 2026.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/postdoctoral-and-senior-scholars#KressPublications>>.

Voislav Saney Fellowship

For citizens of the Republic of North Macedonia. Archaeologists who are either graduate students or Ph.D. holders wishing to use the ASCSA facilities. Fellowship covers room and board at the ASCSA (or equivalent if Loring Hall is unavailable), and School fees, for up to two weeks. Application deadline: Rolling.

For more information, <https://www.ascsa.edu.gr/fellowships-and-grants/graduate-and-postdoctoral#Saney_Fellowship>click here <<https://www.ascsa.edu.gr/fellowships-and-grants/postdoctoral-and-senior-scholars#Saney>>.

William and Suzanne Murray Research Fellowship

For graduate students working on a research project that requires residency in Greece. Open to students enrolled in North American universities. The project may relate to dissertation research or an independent project (e.g., research on an article or research as a member of an excavation team). The fellowship includes a stipend of \$4,000 for one fellowship or \$2,000 if two smaller projects are funded in the year, and a waiver of up to two months of membership fees for the duration of residency in Greece while working on the proposed project. The stipend may be used for travel, lodging, equipment, summer expenses, or other project-related needs. The award is to be used between July 1, 2026 and June 30, 2027. (Summer projects may begin in June, but funds will not be disbursed until July 1.) Application deadline: January 15, 2026.

For more information, click here <<https://www.ascsa.edu.gr/fellowships-and-grants/graduate-and-postdoctoral#Murray>>.

2026 SUMMER EXCAVATION PROGRAMS

Funding available for programs.

Agora Excavation Summer Volunteer Program Program allows students to excavate in the Athenian Agora, in the heart of modern Athens. The excavation season is eight weeks each summer (early June to early August), five days a week. Apply by December 8, 2025 <<https://www.ascsa.edu.gr/programs/summer-excavation-programs/agora-summer-volunteer-program>>.

Archaeological Conservation Summer Internships The Excavations Conservation Laboratory offers Internships giving students an opportunity to treat freshly excavated archaeological finds and to participate in an active on-site conservation laboratory.

Apply by December 15, 2025 <<https://www.ascsa.edu.gr/programs/summer-excavation-programs/agora-archaeological-conservation-summer-internships>>.

Corinth Excavation Participation

The Corinth Excavations of the American School are looking for advanced graduate students to serve as supervisors during the spring 2026 field season. Apply by January 15, 2026 <<https://www.ascsa.edu.gr/programs/summer-excavation-programs/excavation-supervisors-ancient-corinth>>.

2026-2027 ARCHAEOLOGICAL SCIENCE FELLOWSHIPS January 15, 2026 deadline Fellowships available for study at the Malcolm H. Wiener Laboratory for Archaeological Science. Full year and partial-year fellowships.

Click here to learn more <<https://www.ascsa.edu.gr/research/wiener-laboratory/fellowships-and-research-associate-appointments>>.

The American School of Classical Studies at Athens does not discriminate on the basis of age, color, disability, gender identity or expression, genetic information, national or ethnic origin, pregnancy, race, religion, sex, or sexual orientation when considering admission to any form of membership or application for employment.

***** (

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ASSISTANT SCIENTIST POSITION AT THE VAN GOGH MUSEUM IN AMSTERDAM

(Part-time or full-time minimum 4 days – scale 10)

The Van Gogh Museum inspires a diverse audience with the life and work of Vincent van Gogh and his time'. All our colleagues contribute to this mission with their own expertise. Together we are making great strides and we are open to what is happening around us. We like to be at the forefront and work closely with others. We focus on our immediate environment as well as on the international world.

With the support of ASML - Van Gogh Museum Partners in Science , the museum implements innovative research techniques for studying and preserving paintings by Van Gogh and his contemporaries.

As of 1 January 2026, the Science team of the Van Gogh Museum is looking for an assistant scientist (1 year, part-time or full-time) to support an interdisciplinary research team consisting of restorers, scientists, art historians and researchers from partner institutions.

Tasks and responsibilities

You will examine artworks from the collection and analyze sample material using advanced analysis techniques: X-ray Fluorescence, Reflectance Spectroscopy, Infrared Spectroscopy and other relevant research techniques.

You record the findings of the technical investigation in reports. You contribute to the dissemination of research results in publications and presentations.

You are jointly responsible for equipment maintenance, setting up and compliance with relevant work and safety protocols and (science) data management.

You will actively contribute to conferences, workshops and educational activities and help organize them.

Job requirements

PhD in Natural Sciences or Engineering (Heritage Studies, Chemistry, Physics, Optics, Computational Physics or related disciplines)

Experience in XRF mapping techniques of cultural heritage objects (as well as other techniques such as RIS, 3D mapping, OCT)

Experience with sample preparation and analysis (Optical Microscopy, Scanning

Electron Microscopy, FTIR and Raman Spectroscopy)

Certificate of Technical Assistant Radiation Expert

Experience with computational programming

Strong motivation to work in a multidisciplinary museum environment

Knowledge of paint and artist materials with a focus on the 19th century

Excellent verbal and written communication skills in English and Dutch (or willingness to learn Dutch).

Who are you?

You are someone with a curious eye and a passion for art and cultural heritage. You enjoy working in a team and you are interested in using modern technologies to study and better understand works of art. You have excellent experimental, analytical and problem-solving skills. You work independently, you are proactive and used to meeting deadlines, you know how to keep a good overview and set priorities.

Where will you work?

In the heart of Amsterdam, you will find yourself in a dynamic and collegial working environment. The Museum Collective Labor Agreement applies. This position falls into scale 10. The full-time salary (36 hours) is between €4,131 and €5,516 gross per month, depending on education and experience. In addition, we offer 8% holiday pay, 3.4% end-of-year bonus, a good pension scheme, a laptop and iPhone, a museum card and a healthcare allowance of €150 per year.

Will you join us?

Do you recognize yourself in the above profile and have you read this vacancy with enthusiasm? Then we are very curious about your reaction! You can apply via the [apply](#) button. We kindly ask you to attach your motivation letter and CV (in PDF format). Don't wait too long to apply. The vacancy closes as soon as a sufficient number of suitable candidates have been found.

For questions about the vacancy, please contact:

Ruth Hoppe (Head of Collection Management & Restoration) via R.Hoppe@vangoghmuseum.nl, tel. +31 6 31015271

Ana Martins (Scientist) via A.Martins@vangoghmuseum.nl, tel. +31 6 50182370

Diversity and inclusion

We are an organization for everyone, in which we embrace the greatest variety of people. We see diversity as essential for creativity, relevance and innovation. Every day, we work on our mission to inspire diverse audiences and bring new meaning and value to people's lives. We don't care what name you bear, where you come from, what you look like or what you believe. We are here for you, and you are welcome to apply!

Ana Martins

Scientist
Van Gogh Museum
Amsterdam
Netherlands

CALL FOR APPLICATIONS – POSTDOCTORAL POSITION IN GEOARCHAEOLOGY (TEL MOZA EXCAVATION PROJECT)

Prof. Oded Lipschits and Dr. Shua Kisilevitz, on behalf of the Tel Moza Expedition, in collaboration with Prof. Dr. Anselm Hagedorn (Osnabrück University) and Dr. Florian Oepping (Tel Aviv University), invite applications for a two-year postdoctoral position (with the possibility of extension for a third year), based at the Institute of Archaeology, Tel Aviv University.

The project is part of the Research Cooperation Lower Saxony – Israel of the project "Bringing an Ancient Temple to Life – With Texts, Archaeology, and 3D Reconstruction", supported by Volkswagen Stiftung and Niedersächsisches Ministerium für Wissenschaft und Kultur.

The successful candidate will conduct a geoarchaeological study of the Iron Age temple at Tel Moza, focusing on reconstructing the temple's life history—from its construction and phases of use to its eventual abandonment.

The research will involve producing and analyzing micromorphological thin sections from stratigraphic contexts representing these phases, and, as appropriate to the candidate's expertise and research design, applying complementary analytical techniques such as FTIR spectroscopy, XRD, and SEM-EDS.

The postdoctoral fellow will work in close collaboration with research units at Tel Aviv University and with partner institutions in Israel and abroad.

Requirements

Ph.D. in geoarchaeology, soil science, or a related field.
Demonstrated expertise in geoarchaeological research and micromorphological analysis.
Record of relevant publications and prior research experience.
Strong collaborative and communication skills.

Position Details

Duration: Two years, with the possibility of extension for a third year.
Location: Institute of Archaeology, Tel Aviv University.
Expected start date: Between January and June 2026.
Application deadline: December 15, 2025.

Application Materials

Please submit the following as a single PDF:

Cover letter describing your research interests and suitability for the position.

Curriculum Vitae (including a list of publications).
Names and contact information of two academic referees.

Applications and inquiries:

deanh@tauex.tau.ac.il; mozaexcavations@gmail.com; efratsheffi@mail.tau.ac.il

(Email subject line suggestion: Postdoctoral Application – Geoarchaeology, Tel Moza – [Your Name])

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

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Please direct any questions to the SAS VP for Member Communications, Braden Cordivari (sasmembercomms@gmail.com).

Thank you very much!

All the best,

Braden Cordivari
SAS VP for Member Communications

Braden W. Cordivari (he/him)
Doctoral Program in the Ancient World
Institute for the Study of the Ancient World, New York University

INTERNET SITES

PHOTOS OF THE UNOBSTRUCTED ANCIENT PARTHENON IN ATHENS, BY PETROS GIANNAKOURIS

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This is a photo gallery curated by AP photo editors.

Please visit the site: <https://apnews.com/photo-gallery/greece-parthenon-acropolis-restoration-photos-dcfff46c24a3990e6bb960d895868254>

NEES EKΔΟΣΕΙΣ – NEW PUBLICATIONS

MANURED OR NOT MANURED? NEW BASELINES FOR RE-INTERPRETING CEREAL C AND N STABLE ISOTOPE DATA FROM NEOLITHIC SITES IN THE NW

MEDITERRANEAN,

**BY FERRAN ANTOLÍN, GUILLEM
SALVADOR-BAIGES, CLAUDIA GERLING,
RAÛL SOTERAS, HÉCTOR MARTÍNEZ-
GRAU, ALBERT PRATDESABA, MARIA
OCAÑA, IMMA OLLICH, MONTSERRAT DE
ROCAFIGUERA, MADALINA JAGGI,
STEFANO M. BERNASCONI**

Journal of Archaeological Science: Reports, Volume 68, 2025, 105470
ISSN 2352-409X,
<https://doi.org/10.1016/j.jasrep.2025.105470>

Abstract

The NW Mediterranean region saw the arrival of agriculture around 5800 cal. BCE. The paucity of weeds in the Neolithic archaeobotanical record in the area makes it difficult to characterise agricultural practices. Stable carbon and nitrogen isotope analyses of archaeobotanical remains provide an opportunity to discuss the availability of water and nutrients during cereal growth. This type of approach has been attempted for this region in recent publications. However, there is a lack of sufficient local modern baselines to confirm the archaeological interpretations. In order to improve this situation, experimentally grown crops from the Archaeological Museum of l'Esquerda (Roda de Ter, Barcelona) have been analysed. The museum has a long-term experimental project in which different crops have been grown under different conditions. Winter and spring sowing in a 3-year rotation without fertiliser, and occasionally manured fields have been tested with different crops such as einkorn, emmer, spelt, faba beans, barley and rye. Modern samples of spring and autumn sown rye and emmer, and autumn sown einkorn and spelt, both from chaff and grain, were analysed for stable carbon and nitrogen isotopes. Based on the results, we agree with previous work that modern crops from unmanured fields give $\delta^{15}\text{N}$ values below 2 ‰, while fields under crop rotation without manure show negative values up to -4‰. For the NW Mediterranean region, $\delta^{15}\text{N}$ values around 3–8 ‰ combined with $\Delta^{13}\text{C}$ values around 16–18 ‰ in the archaeobotanical record should be interpreted as indicative of moderate manuring.

Keywords: Experimental archaeology; Iberian Peninsula; Crop rotation; Emmer; Einkorn; Rye

Please visit the site:

<https://www.sciencedirect.com/science/article/pii/S2352409X25005036>

POMPEIAN PIGMENTS. A GLIMPSE INTO
ANCIENT ROMAN COLOURING
MATERIALS,
BY CELESTINO GRIFA, CHIARA
GERMINARIO, SABRINA PAGANO, ANDREA
LEPORE, ALBERTO DE BONIS, MARIANO
MERCURIO, VINCENZO MORRA, GABRIEL
ZUCHTRIEGEL, SOPHIE HAY, DOMENICO
ESPOSITO, VALERIA AMORETTI

Journal of Archaeological Science, Volume 177, 2025, 106201,
ISSN 0305-4403,
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Abstract

Pigments played a vital technological role by enabling the development of advanced artistic techniques, preserving cultural heritage through durable materials like frescoes and facilitating innovations in early chemistry, such as the creation of synthetic colouring compounds. This paper examines pigments found in some exceptional Pompeian contexts spanning the 3rd century BCE to the 79 CE eruption, covering almost the entire palette of an ancient painter made of natural and synthetic, inorganic and organic pigments. Their composition has been revealed thanks to a non-invasive analytical approach designed to preserve these invaluable archaeological resources, illuminating that the artists skillfully mixed the colouring materials to achieve an uncountable range of colour tones. Quantifying any individual colouring compound enables a review of recipes as reported by ancient sources and modern scientific literature and opens new scenarios in the artistic process that likely started in the pigmentarium. In the analysis of the mixtures, the role of Egyptian blue and red lead in the variation of shades, which are almost ubiquitous as additional components in paint mixtures, is worth noting. Ultimately, one of the samples uncovered the earliest known use of a light green compound containing baryte and alunite, providing the first definitive evidence of barium sulphate being utilized in the Mediterranean during ancient times.

Please visit the site:

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**TRADITION AND INNOVATION IN TEXTILE
PRODUCTION IN THE ANCIENT
MEDITERRANEAN WORLD AND BEYOND,
BY CHRISTINA MARGARITI, STELLA
SPANTIDAKI, ALINA IANCU (EDS.)**

Proceedings of the VIIIth International Symposium on Textiles and Dyes in the Ancient Mediterranean World (Athens, Greece 19 - 21 October 2022)

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**DETECTION OF TWO ANOMALIES BEHIND
THE EASTERN FACE OF THE MENKAURE
PYRAMID USING A COMBINATION OF NON-
DESTRUCTIVE TESTING TECHNIQUES,
BY KHALID HELAL, POLINA PUGACHEVA,
HUSSIEN ALLAM, MOHAMED FATH-ELBAB,
MOHAMED SHOLQAMY, OLGA POPOVYCH,
SIMON SCHMID, BENEDIKT MAIER, AMR
GALAL, ALEJANDRO RAMIREZ, JOHANNES
RUPFLE, KHALID TAIE, MENNA ALI,
CLARIMMA SESSA, THOMAS
SCHUMACHER, ZAHY HAWASS, MEHDI
TAYOUBI, CHRISTIAN U. GROSSE, HANY
HELAL, MOHAMED ELKARMOTY**

[NDT & E International](#)

[Volume 155](#), October 2025, 103331

Open access

<https://doi.org/10.1016/j.ndteint.2025.103331>

Abstract

The Menkaure Pyramid is the smallest of the three main pyramids on the Giza Plateau. Recently, the possibility of a second entrance to the Pyramid has been hypothesized by Van den Hoven [1], based on similarities between the polished granite blocks covering the Eastern face and the blocks around the main entrance on the Northern face. To test this hypothesis, measurement campaigns using three non-destructive techniques, Electrical Resistivity Tomography (ERT), Ground Penetrating Radar (GPR), and Ultrasonic Testing (UST), were carried out on the Eastern face of Menkaure Pyramid. ERT data was obtained from measurements of four long parallel profiles using stainless steel mesh electrodes and inverted using a three-dimensional inversion algorithm. These ERT results guided the more focused grid measurements of a dual-frequency GPR instrument (200/600 MHz antenna) and a 16-channel UST array device. Image Fusion (IF) was utilized to merge the reconstructed ERT, GPR, and UST images, allowing for precise correlation of the detected features from each technique.

The images revealed two anomalies directly behind the polished granite blocks, which would indicate the presence of air-filled voids. This interpretation was supported by a series of numerical simulations that considered various possible scenarios under real-world conditions.

Keywords:

ScanPyramids, Menkaure pyramid, Non-destructive testing (NDT), Electrical resistivity tomography (ERT), Ground penetrating radar (GPR), Ultrasonic testing (UST), Image fusion (IF)

Please visit the site:

<https://www.sciencedirect.com/science/article/pii/S096386952500012X> [Go there for downloadable article]

ΕΙΔΗΣΕΙΣ - NEWS RELEASE

A HEADLESS MYSTERY - ARCHAEOLOGISTS FIND EVIDENCE THAT A WAVE OF MASS BRUTALITY ACCOMPANIED THE COLLAPSE OF THE FIRST PAN-EUROPEAN CULTURE, BY ANDREW CURRY

In 2017, archaeologists digging in the middle of a Slovak wheat field uncovered four headless skeletons. The burials, in a ditch dug on the edge of a settlement more than 7000 years ago, belonged to one of Europe's first farming communities. Burying people in or near settlements wasn't unusual at the time—but burying them without heads was.

Year after year, the researchers have returned to find more and more headless skeletons on the outskirts of Vráble, a small village 100 kilometers east of Bratislava. "Everywhere we started to dig, we found bones. Everywhere we were sitting or standing, there were bones," says Katharina Fuchs, a biological anthropologist at Kiel University who has excavated in Vráble every summer since 2021. In the summer of 2022, she and colleagues from Kiel and the Slovak Academy of Sciences's Institute of Archaeology recovered the skeletal remains of 34 people, piled on top of each other two or three deep in a space about the size of a parking spot. With the exception of one child, none of them had heads.

Each year the team expects to reach the mass grave's edge. Instead, it finds more bodies. "Every time we think we have a clue, the site shows differently," Fuchs says. "It's not stopping. We now have a skeleton layer 45 meters long."

Vráble's headless bodies are more than a ghoulish curiosity. They could help answer a decades-old question: What happened to central Europe's first farmers?

Known as the Linear Pottery culture (or LBK, after their German name, Linearbandkeramik), these early agriculturalists were direct descendants of the people who began to domesticate plants and animals in the hills of Anatolia around 9000 B.C.E. By 5500 B.C.E., they had reached today's Hungary. Then they spread westward, farther into Europe. The LBK farmers flourished for more than 400 years, eventually occupying a 1500-kilometer belt of fertile land stretching as far west as the Paris Basin.

Then something went terribly wrong. Vráble and other mass graves across Europe attest to a wave of brutality around 5000 B.C.E., about the same time as hundreds of LBK settlements across the continent abruptly vanished. In the aftermath, parts of the continent remained empty for centuries. Other settlements transitioned peacefully into something else, with people living in the same place and continuing to farm, but building houses and decorating their ceramics in a different way. "The LBK were the first farmers, the first large pan-European culture, and the first time we see these repeated

finds of violence,” says Christian Meyer, an independent osteoarchaeologist who has studied human remains from multiple LBK mass graves.

The finds at Vráble and other LBK sites challenge a long-held notion that prehistory was more or less peaceful, with isolated cases of interpersonal violence but no large-scale conflicts or wars. It may also shed light on one of prehistory’s great vanishing acts. “It’s one of the most interesting questions in history,” Fuchs says. “What led to the disappearance of an entire culture?”

A few hundred meters away from a small river, the Vráble site has been productive farmland since the dawn of agriculture in the Neolithic period. Like people all across the LBK, farmers here favored land covered by a type of loose, stone-free soil called loess. Burnt grains in the soil show that at Vráble, they grew early forms of wheat called emmer and einkorn. Piles of cattle, pig, sheep, and goat bones found at the site show meat was on the menu, too.

The bountiful harvest fueled a centurieslong demographic boom. Wherever these pioneers appear, within a few generations “every valley seems to fill up,” says Martin Furholt, an archaeologist at Kiel who leads the work at Vráble.

Europe’s first farmers

About 7500 years ago, farmers who traced their ancestry to Anatolia began spreading across Europe, clearing forests and founding small settlements. Known as the Linear Pottery culture (LBK), they were stunningly successful: In the space of just a few centuries, they expanded across a 1500-kilometer belt of fertile, easily tilled land.

Perhaps thanks to its rapid expansion, LBK society remained remarkably uniform across an estimated 700,000 square kilometers of Europe, judging from artifacts and, more recently, ancient DNA. Extracted from LBK skeletons, the DNA shows these pioneers were directly descended from early Anatolian farmers, and mostly avoided mingling with local hunter-gatherers they may have encountered as they spread across Europe.

When well-preserved, LBK settlements and cemeteries are easy for modern-day archaeologists to identify. Postholes found by the thousands across Europe suggest these farmers built wooden longhouses with wattle-and-daub walls big enough to house an extended family and their livestock. They typically buried their dead lying on their left sides in a fetal position, and fired pottery decorated with distinctive incised lines.

Archaeologists long believed the LBK era was a sort of early Eden. There are few signs of inequality or competition for resources. People lived on small family farms without social hierarchy or accumulated wealth, using stone axes to clear forests and wood or bone implements to plow fields. The sword wouldn’t be invented for 2000 years. “When you see an agrarian society with no specialized weapons,” Furholt says, “it’s easy to imagine it’s peaceful.”

That idyllic vision began to crumble in the 1980s, when archaeologists in southern Germany excavated a grave containing the skeletons of 34 people, most of them children. The victims’ fractured skulls showed many had been killed with blows to the head. Now

known as the Talheim Death Pit, the grave was radiocarbon dated to 5000 B.C.E., coinciding with the very end of the LBK period.

In the decades since, archaeologists have found many more mass graves across Europe, all dating to roughly the same time. Many, like Talheim, looked at first like the results of small-scale raiding or local conflicts.

But as more burials emerged, those easy explanations faded. If conflict was a regular part of LBK life, the graves should appear throughout the culture's 400-year span instead of only at the very end. And each new LBK massacre site seems to have its own distinct character and particular details that suggest some mysterious constellation of brutal practices, not competition for land or mates. "What we see is different from anything we see before. It's an indication of an end phase, where people turn to rituals and odd beliefs," says Leibniz Center for Archaeology archaeologist Detlef Gronenborn. "Then it breaks out in an orgy of violence. Then it stops, but it's too late."

At a site in southwestern Germany called Kilianstädten, for example, the 26 victims included 10 children under age 6. As at Talheim, many of the skulls had been smashed, but the assailants had systematically shattered their targets' shins, too, either as a form of torture or as a symbolic postmortem maiming. "It was a statement by the perpetrators," says Meyer, who examined the bones. "They did this on purpose."

Another site that Meyer helped excavate in Germany revealed violence reminiscent of the Neolithic version of gangland killings. Eight of the nine people tossed in the mass grave were young men. They had fractures on the backs of their head, invariably on the right-hand side—suggesting they had been forced to kneel for a killing blow from behind. "These people were held prisoner and executed," Meyer says.

At a site in Austria called Asparn-Schletz, archaeologists found the remains of about 200 women, children, and men of all ages in a deep ditch outside a large LBK settlement. At first it looked as though an entire village had been slaughtered at once, presumably wiped out by rivals in an early act of organized warfare. In that scenario, the dead should include many biological relatives. But a study of ancient DNA from Asparn-Schletz published this year showed only two of the people in the ditch were close genetic kin, indicating something far stranger had occurred there.

Perhaps the most bizarre LBK massacre site is a grim spot called Herxheim, now mostly buried beneath an industrial park near Germany's border with France. The sheer scale of the slaughter is stunning. Between 1996 and 2010, archaeologists excavated more than 80,000 pieces of human bone, including the skull caps of more than 500 people, mostly older children and young adults. Cut marks on the bones indicate they were purposefully dismembered, and shards of pottery and animal bones from feasts are interspersed with the remains. "People at Herxheim definitely didn't die normal deaths," says Andrea Zeeb-Lanz, an archaeologist at the Rhineland-Palatinate General Directorate for Cultural Heritage who directs research on the site. "These are special activities, not just villages on the warpath."

Isotopes of strontium, oxygen, and nitrogen from the teeth, which can reveal geographic origin, show the victims weren't local. Zeeb-Lanz is convinced they were brought to the site and killed as part of ceremonies that lasted for weeks and included feasting, digging

the deep ditches, and even firing high-quality pottery destined to be thrown in the pits days later, along with smashed human bone. “It’s not done in a ritual fury,” she says. “It’s a processing which is done with great care.”

At Vráble, archaeologists hope to trace the forces that drove these curious acts of violence. Sending a drone into the clear sky, Kiel archaeologist Nils Müller-Scheeßel points out where ground-penetrating radar surveys found three massive “neighborhoods” occupied simultaneously at Vráble between 5250 and 5050 B.C.E. Each one is 400 meters across and had 15 to 20 longhouses at any given time, each housing an extended family. Together they amounted to a metropolis by LBK standards, with up to 1000 inhabitants. But each neighborhood maintained its own identity. Different concentrations of animal bones suggest the three neighborhoods specialized in raising sheep, pigs, and cattle, respectively. They even featured slightly different pottery styles and tools.

Previous excavations had shown that around 5100 B.C.E., more than 2 centuries after Vráble was founded, a deep, V-shaped ditch was dug around one of the three neighborhoods and reinforced with an earthen berm. A second, inner ditch completed the structure. The effort required would have been immense. “A double ditch 1.3 kilometers long, with the tools they had back then? It’s crazy,” Fuchs says.

Uneasy neighbors

Excavations and ground-penetrating radar have shown that the Vráble settlement had three distinct neighborhoods. Centuries after the settlement was founded, one of the neighborhoods was walled off from the others.

Müller-Scheeßel thinks the village’s size makes the earthworks unlikely to be fortifications against some outside threat. “It’s the largest settlement in the region, so you’d need an army to attack them,” he says.

Instead, the ditch may be a sign that social relationships were splintering inside Vráble itself. The wall had five gates, all facing away from the settlement’s other two neighborhoods. “The entrances cut off other neighborhoods,” Furholt says. “It’s quite a hostile act.” He notes that the three neighborhoods had been distinctive from the start. “We have very individual farms, with strong autonomy, living together as a village,” Furholt says. “You could see how this is a setup that falls apart at some point.”

Grim reapers

Over the past century, archaeologists have excavated hundreds of Linear Pottery culture (LBK) settlements, tracing the rapid expansion and often violent end of these first European farmers. Vráble, one of the largest known settlements, followed the same overall pattern.

Then came the killings and decapitations. The bodies were all thrown in the ditch around one of the gates and along the adjacent ditch. And within a few decades, radiocarbon dating shows, the surrounding settlement emptied out and was never reoccupied. “It lasted another one or two generations at most,” Furholt says. “I can see why all these people without heads wouldn’t be good for a community, and might be a cause for abandonment.”

By late August, the team at Vråble has been in the field for 5 weeks, working under a white party tent that sheltered them from both blazing sunshine and rain that turned the surrounding fields to gluey mud. Standing on the edge of a trench 2 meters deep and about 10 meters long, Müller-Scheeßel gestures at the intermingled bones: “It just doesn’t end.”

So far, the team has identified the headless skeletons of at least 85 men, women, and children. In six seasons of excavation, they’ve found just one head. “Why did they cut off the heads?” Meyer asks. “And what did they do with them?”

The team is now tracing how the massacre unfolded. On one of the excavation’s last days, Fuchs and a team of students crouch among bones they’ve carefully uncovered over the past few weeks, some wearing only socks to avoid damaging the fragile skeletons. They carefully clean soil away from individual bones with brushes and trowels. Exposed for the first time in 7000 years, the remains must be kept moist using spray bottles or they’ll start to crumble. Each individual is placed in a paper bag and stowed in a labeled box. Later, the team will be able to reconstruct the grave digitally, using the hundreds of photos taken during the excavation to locate each body in the pit.

When they found the first headless skeletons, Fuchs and her colleagues weren’t sure whether the bodies had been deliberately decapitated. Neolithic societies sometimes disinterred people and rearranged their bones long after death. Perhaps, they thought, the bodies were allowed to decay after dying naturally, and then the loosened skulls were removed as part of some unknown ritual.

But as more bodies have emerged, it’s become obvious their heads were deliberately removed around the time of death. The skeletons are mostly intact and in anatomical order, down to small bones like fingers and toes—a sign the bodies were not left out for scavengers to pick at, or buried and then moved again after decaying. “They seem to have been covered quite fast,” Furholt says. “This is one mass deposition event, or several in a short period.” And in the Stone Age equivalent of a smoking gun, many of the neck vertebrae bear cut marks. Dozens of people were decapitated using just flint or obsidian knives the length of a finger, in what must have been a messy, strenuous operation.

Biological anthropologist Katharina Fuchs has also unearthed individuals buried nearby with their heads attached. Vråble excavation team

Over the next 3 years, osteologists will examine each bone for clues to how old the people in the pit were when they died, their sex, and any signs of prior trauma or injury. Forensic examination of any cut marks, meanwhile, could indicate whether they were the handiwork of multiple people or a single perpetrator. “Something very special happened here,” Fuchs says. “Understanding how they did it could tell us who did it and why they did it.”

For the researchers, “not having the skull is very difficult,” Fuchs says. To suss out a skeleton’s geographic origin, they need isotopes in teeth. Ancient DNA, which can point to kinship and deeper ancestry, is best preserved in teeth and a bone in the inner ear. And

estimates for bodies' ages at death are often based on the way the skull knits together over time, or whether wisdom teeth have emerged.

Still, analysis of the bones in the field has yielded some impressions. Both men and women were buried in the trench—along with teens—but young children are underrepresented. And so far, the bones of the people buried appear robust, suggesting a highly active lifestyle.

The Vráble burial has other odd features, such as the fist-size river pebbles found scattered among the bones. The site's loess soil is free of rocks, so the pebbles must have been brought from the nearby river and tossed in on purpose. Other artifacts—including a dozen human teeth with holes drilled through them, likely worn as necklaces—and fragments of pottery dot the bottom of the ditch.

All are clues to a mystery yet to be solved. Why did violence break out all across the LBK at the same time, and with such lasting consequences? Since the discovery of the Talheim Death Pit, archaeologists have been searching for a convincing explanation. "Are these strange manipulations a reaction to a crisis," Zeeb-Lanz asks, "or an effort not to let a crisis happen?"

Archaeologists often invoke overpopulation and climate change to explain ancient turmoil. But so far, none of the bones from massacre sites have shown evidence of famine or malnutrition. And even if there was a shift in the region's climate, "I'm hesitant to point to climate change as a single driver," says Rick Schulting, an archaeologist at the University of Oxford. "There are all kind of cases where the climate changes and people do not start killing each other in large numbers."

To him the evidence points to "something of a cultural collapse." From a demographic point of view, the LBK was a stunning success story. What started as a small core group of pioneering farmers spread and expanded across vast territories in just a few centuries, a population boom with few parallels in human history. But perhaps that growth was unsustainable.

"As LBK people multiply, communication becomes more and more difficult, and society breaks apart," Gronenborn says.

Zeeb-Lanz thinks sites like Herxheim were ways to reinforce cultural connections in an increasingly unfamiliar world, perhaps through human sacrifices or some other Stone Age bonding rites. "We're looking at a change in ideology over a generation or two. Social ideas and cohesion aren't working well," Zeeb-Lanz says. "And ritualistic violence is a very strong way to bring cohesion in a community."

Penny Bickle, an archaeologist at the University of York, suggests a culture accustomed to constant expansion might have simply run out of room. Around 5100 B.C.E., the furious pace of the LBK's territorial expansion slows, then stops, as it reaches the edges of the fertile loess zone. "Maybe the society reaches the limits of the landscape where expansion makes sense. Moving on and making new settlements doesn't work as a social system anymore, so they start to look inwards," Bickle says. "There's a shift in how people are relating to each other."

Whatever its cause, the LBK's end has forced archaeologists to grapple with the fact that human beings have always had the capacity to brutalize others. "It's a basic human thing," Meyer says. "If there are problems, people try to find a scapegoat."

Yet Schulting warns against ignoring the centuries when the LBK was a peaceful, flourishing culture, or the many settlements that transitioned into a different way of life without obvious signs of bloodshed. "Vráble and these other sites show violence is always in the repertoire of human behavior. But that doesn't mean it's inevitable."

A version of this story appeared in Science, Vol 390, Issue 6775.

<https://www.science.org/doi/epdf/10.1126/science.aed9987>

Please visit the site: <https://www.science.org/content/article/headless-bodies-hint-why-europe-s-first-farmers-vanished> [Go there for pix, caps, format]

ANCIENT DNA NARROWS THE TIMELINE **OF CAT DOMESTICATION,** **BY IMMA PERFETTO**

New analysis of 87 ancient and modern cat genomes has concluded that domesticated cats were first introduced from northern Africa to Europe at least 2,000 years ago.

The findings challenge previous studies that suggest cat domestication may have happened much earlier, about 9,500 years ago in the Levant, and spread to Europe with Neolithic farmers about 6,000 years ago. The paper is published in the journal Science.

The domestic cat originated from the African wildcat which is still found today across North Africa and the Near East. But when and where this domestication occurred has long been debated.

“By the time of Thutmose III (around 3500 years ago), *Felis catus* (the domestic cat) lived as a household pet in Ancient Egypt,” Jonathan Losos from Washington University, USA writes in a related perspective article. Losos was not involved in the research.

“This knowledge comes from tomb-wall depictions of cats as family members adorned in collars, earrings, and necklaces; eating from dishes; sitting attentively under the chair of the woman of the house; and even accompanying the family on boating expeditions.

“A handful of archaeological finds of cat bones from Egypt about 6000 years ago, from Israel 2000 years before that, and from Cyprus yet another 2000 years earlier suggest that the process could have begun as much as 10,000 years ago.”

Uncertainty persists because archaeological remains of cats are rare and their skeletons are indistinguishable from wildcats.

The new study analysed 70 genomes recovered from archaeological remains from sites across Europe and Anatolia dating between 9000 BCE and the 19th century. These were compared to 17 higher coverage genomes of modern wildcats from Italy, Bulgaria and North Africa (Morocco and Tunisia).

Their analysis revealed that modern domestic cats in Europe are more closely related to Near Eastern wildcats from northern Africa than to Near Eastern wildcats from the Levant.

“All ancient cats dated to earlier than 200 BCE were identifiable genomically as European wildcats (*F. s. silvestris*), including specimens from Turkey,” explains Losos.

“Ancient cats with Near African wildcat genomes did not appear in either Europe or Turkey until the 2nd century BCE, and all these specimens were more genomically similar to northern African than Levantine *F. s. lybica*.

“The ancient DNA records a quick spread of these domestic cats throughout much of Europe, often in concert with the Roman military, appearing in Britain around 100 CE.”

While the authors of the study suggest their findings indicate domestic cats did not reach Europe until 2,000 years ago, Lasos suggests more DNA sampling is needed to draw stronger conclusions.

“Archaeological evidence from Greece and Italy reveals depictions of these cats as early as 3,700 years ago. This discrepancy may simply be a result of the paucity of genomic data from cats dating to 2,000 to 4,000 years ago,” he writes.

This is complicated by the fact that the study did not include ancient DNA samples from Africa or southwest Asia in the analysis.

“Recovering such data from mummies is notoriously difficult, and other types of feline remains in the archaeological record from this region are not common,” writes Lasos.

“Much more intensive sampling, especially from Egypt, is critically needed to test the robustness of the findings, a sentiment made clear by the authors and one that future work will address.

“Ever sphinxlike, cats give up their secrets grudgingly. Yet more ancient DNA is needed to unravel these mysteries of long ago.”

Please visit the site: <https://connectsci.au/news/news-parent/7400/Ancient-DNA-narrows-the-timeline-of-cat?searchresult=1> [Go there for map]

SUMERIANS AND WATER ECONOMY: NEW EVIDENCE BROUGHT TO LIGHT, BY SAPIENZA'S ARCHAEOLOGICAL MISSION

A proto-cuneiform tablet, discovered in Iraq during the tenth excavation campaign, reveals important information about the writing and economy of the Sumerian civilisation

During the tenth excavation campaign of the Italian Archaeological Mission in the ancient Sumerian city of Nîĝin (Tell Zurghul) in Iraq, directed by Davide Nadali, professor in the Department of Ancient Sciences, a cuneiform tablet dating back to the end of the fourth millennium BC was discovered.

The tablet, read and interpreted by Lorenzo Verderame, professor at the SARAS Department, records the distribution of large quantities of fish, which must have been one of the most common foods in ancient times for a city like Nîĝin, surrounded by an aquatic environment characterised by the presence of both fresh water (rivers and canals) and salt water (the sea).

In addition to recording individual species, the scribe notes five hundred wicker containers used for transporting and storing fish. This detail is particularly interesting because it is confirmed by archaeological evidence, namely the numerous fish bones found in the excavated areas and the discovery of bitumen seals bearing the imprints of the wicker weave and the ropes used to close these containers.

The writing, distributed in two columns on each side of the tablet, is proto-cuneiform. The pictograms are similar to those used in Uruk, where writing first appeared in human history at the end of the 4th millennium BC. The exceptional nature of the discovery is linked to the fact that it is the first evidence of such writing in the Lagash region and, more generally, outside the city of Uruk, and is further proof of the spread of this early form of writing and the administrative system that created it.

Please visit the site: <https://www.uniroma1.it/en/notizia/sumerians-and-water-economy-new-evidence-brought-light-sapienzas-archaeological-mission>

UNEARTHING THE BIRTHPLACE OF THE ALPHABET: ARCHAEOLOGISTS RETURN AFTER 14 YEARS OF SILENCE, BY OĞUZ KAYRA

After more than a decade of silence, the ancient civilization of Ugarit, once one of the most influential trade hubs of the Late Bronze Age, is coming back into focus.

Archaeologists have resumed excavations near Latakia, northwestern Syria, revealing long-buried layers of a city that shaped the cultural and linguistic history of the ancient world.

Located about 12 kilometers north of Latakia, in what is now Ras Shamra, Ugarit was a vibrant coastal city that thrived between 1450 and 1195 BCE. Known for its extensive trade networks that linked Egypt, Anatolia, Cyprus, and Mesopotamia, the city stood as a crossroads of commerce and culture in the ancient Near East. Scholars believe that Ugarit's sudden destruction around 1190 BCE was the result of invasions by the mysterious Sea Peoples, a coalition that reshaped the map of the eastern Mediterranean.

Return of Excavations After 14 Years

Archaeological missions in Syria were largely halted following the outbreak of the civil war in 2011. Now, after a 14-year hiatus, a new joint Italian-Syrian archaeological team has resumed fieldwork near the coastal city. The mission is led by Assoc. Prof. Lorenzo d'Alfonso of the University of Pavia, Italy, a leading expert in Ancient Near Eastern archaeology and art history.

Speaking to local reporters, d'Alfonso confirmed that the team, which includes doctoral students from Türkiye and Italy, is conducting a month-long excavation at Tell Semhane, a previously unexplored mound believed to have connections with the broader Ugaritic Kingdom. "We are excavating Bronze Age layers in Tell Semhane," said d'Alfonso. "No previous archaeological work has been done here, which makes this mission particularly significant."

The work is being carried out in close cooperation with the Latakia Museum and the Syrian Directorate of Antiquities, with future plans to include students from Damascus University.

A New Window into Ugaritic Civilization

According to Muhammad al-Hasan, head of the Latakia Department of Antiquities, this season's findings could provide valuable insights into the political and social structure of the Ugaritic Kingdom. The site, located just five kilometers from Latakia's city center, may have functioned as a satellite settlement linked to Ugarit's wider economic and administrative network.

Hasan emphasized Syria's intention to facilitate the return of international archaeological missions. "We are providing all possible support to foreign teams working in the coastal region," he said. "These collaborations not only revive scientific research but also strengthen cultural ties."

The Legacy of Ugarit: Birthplace of the Alphabet

Beyond its trade importance, Ugarit holds an extraordinary place in human history: it is the birthplace of the world's first alphabetic writing system. Discovered in 1928 among thousands of clay tablets, the Ugaritic script — written in cuneiform but using an alphabet of 30 letters — revolutionized communication and became a model for later Semitic alphabets, including Phoenician and eventually Greek and Latin.

The Ugaritic archives, found in temples and palaces, include texts written in seven languages and four scripts, such as Akkadian, Hittite, and Hurrian. These texts offer a rare glimpse into Bronze Age diplomacy, trade, religion, and daily life — documenting treaties, hymns, myths, and administrative records.

Among the most famous discoveries from Ugarit are the Baal Cycle tablets, mythological poems that describe the storm god Baal's struggle against chaos, providing early parallels to biblical narratives.

Students Bridging Cultures Through Archaeology

Turkish Ph.D. student Adahan Güney, one of the young archaeologists on-site, expressed his excitement about participating in the excavation. "Our goal is to uncover a Bronze Age settlement in its entirety," he said. "In Near Eastern archaeology, most projects focus on temples or palaces. Here, we have the rare opportunity to study a complete settlement context, which could transform our understanding of everyday life in the Bronze Age."

Working in four separate excavation areas, the team has already begun identifying surface artifacts and architectural remains. "We hope that by the end of the month, we will have a clearer picture of how this community functioned within the Ugaritic sphere," Güney added.

A Civilization Rediscovered

The rediscovery of Ugarit is not just an archaeological triumph but also a symbolic act of cultural resilience. Once reduced to ashes by foreign invaders, and more recently silenced by war, the city's rebirth through excavation marks a renewed appreciation for Syria's ancient heritage.

As trowels and brushes once again sift through the soil of Ras Shamra, each unearthed fragment tells a story — of merchants, scribes, and kings who built one of the earliest hubs of literacy and international trade. The new findings promise to shed light on how Ugarit connected civilizations across the Mediterranean and the Near East, reminding the world that even after millennia of silence, history still speaks.

Please visit the site: https://arkeonews.net/unearthing-the-birthplace-of-the-alphabet-archaeologists-return-after-14-years-of-silence/#google_vignette

ANIMAL DUNG AND ENERGY - A VIEW **FROM MESOPOTAMIA,** **BY ALEX JOFFE**

Baby, It's Cold Outside

Humans need heat to keep warm and to cook. This is true whether you're a Windmill Person or on Team Drill Baby Drill. The same was true in the ancient Near East. But in the era before fossil fuels, options were limited. You could burn trees and shrubs or you could burn animal dung.

So where in the ancient Near East did you get animal dung, how did they use it, and what were the rules? This is to say, what were the cultural, political and legal rules which governed its acquisition and use, as fuel or anything else, and how do we discern them? The short answer to this last question is from Mesopotamian texts, where there is a surprisingly small amount of information about animal dung as fuel. This absence, however, suggests quite a bit.

Where Does Animal Dung Come From?

As any pet owner knows, animals create dung. Animal domestication, specifically of sheep/goat, cattle and pigs, occurred between 8,500 and 8,000 BCE as humans manipulated animal reproduction and genetics to create bigger, meatier, and more docile animals. Another result were secondary animal products, meaning milk, hair and wool, the ability to carry and pull loads, and animal dung.

Animal proteins in meat, milk and blood were critical for human nutrition, which allowed for population growth. Products like skins were the original basis of clothing, but manipulating hair and wool permitted creation of cords, ropes, nets, baskets and bags for storage, transport, fishing and finally woven textiles. Keeping animals also changed the relationship of humans to the landscape; the larger the population, the greater the need for animals and products, meaning larger herds and more grazing lands, and, of course, more dung.

How Do You Use Animal Dung?

The most obvious use of animal dung is fertilizer for crops—ever since the advent of agriculture ca. 10,000 BCE—but it is also used for fuel and as temper for pottery and mortar for construction. So how much dung do animals produce anyway?

Estimates of manure production vary widely and are contingent on factors like breed, size, age, and environmental conditions; data from dry Australia suggest perhaps 500 kg annually per head of cattle, while optimal North American feedlot cattle produce around 2007 kg. Either way, that's a lot of dung. Sheep produce 150 kg and goats about 100 kg.

But transferring these figures to the ancient Near East is difficult. Since livestock production is partially dependent on water, let's arbitrarily adopt a low figure of 50 kg of

dung per sheep annually. This suggests the estimated 320,000 animals associated with the city of Ur during the Ur III period (ca. 2111-2003 BCE) produced approximately 16,000,000 kg of manure annually. Thousands of cattle would also have produced large amounts. Again, that's a lot. Such rough estimates suggest the amount of animal dung available in Mesopotamia was large, but it would have been distributed very unevenly between irrigated and dry farming regions, rural and urban areas, and the spaces in between, and across the agricultural year.

What about dung as fuel? The energy potential of dung is considerable, which is why it is still used in many parts of the world today.

Dried cattle dung produces between 11-18 MJ/kg which compares well to other biomass fuels. Put another way, one kilogram (2.2 pounds) of dry cattle manure equates to about 1300 BTU (British Thermal Units). Dry dung burns evenly and quickly and produces little smoke but lots of volatile organic compounds (be sure to open a window).

But how much do you need? Andean data indicates 15 kg of dry dung is needed for a three hour fire kindled twice a day. This requires a penned herd of 19 cattle or 75 llamas and allows for 40% collection. In contrast, Bedouins in semi-arid areas of Syria and Iraq use an estimated 25-30 kg of wood and shrubs per family per day, resulting in large-scale denudation and soil erosion. Not an especially sustainable practice.

Archaeology shows that animal dung was nearly everywhere in the ancient Near East, which is not surprising considering the close proximity of humans and animals. All sorts of data from archaeobotany, soil geochemistry, micromorphology, biomolecular archaeology, and microarchaeology demonstrate that dung was used on and off-sites in all periods, including as fuel. The proportion of dung to wood as fuel, however, appears to have varied considerably from site to site with access woody vegetation, especially in northern Mesopotamia. Agricultural use of dung has also been documented indirectly, for example by worn sherds in off-site surveys, indicating collection of manure from habitation sites placed in fields.

Dung and Energy

Ethnographic and historical evidence shows how dung is collected and processed into fuel. Manure is collected during the summer, usually by women and/or children, formed into cakes, often with the addition of straw, and allowed to dry. Sheep/goat and gazelle dung presents particular problems given the small size of the pellets. Typically, pellets are collected and compressed into patties or sheets, which is simplified by penning animals. Dung cakes are dried outside in open spaces such as courtyards and then stored inside for later use.

In the Iraqi marshes dung was regarded as property; herders made agreements with farmers to pasture cattle on fields during the winter while claiming certain quantities of dung and milk. Taking dung from another family's cattle could result in feuds. And in a southwestern Iranian village a gifted dung cake might be seen as an act of generosity.

So modern individuals and communities regard dung as a valuable commodity. What about in Mesopotamia? On the one hand there is ample archaeological evidence for use

of dung as fuel. But on the other, written evidence minimal; institutions apparently did not regard dung as a primary resource.

Dung in Mesopotamian texts

Mesopotamian texts were produced by administrators for institutions like palaces, temples, and family corporations. Texts reflect the economic, political, and legal concerns of those institutions, and while they infrequently discuss dung, it is never in terms of energy. That is a telling omission.

The earliest Mesopotamian text references to dung are difficult to understand and terms for dung appear infrequently in the later cuneiform record. The most common terms appear to be kabūtu (animal dung, Sumerian šurim/šurum/n), šabītu (gazelle excrement), putrum (animal droppings, dung, dung cake), and tabāštānu (excrement).

The term kabūtu or animal dung, for example, is used in Neo-Assyrian (ca. 912-612 BCE) divination, magic, and medical texts, such as in this text from the Library of Ashurbanipal:

If a man suffers from sores on the ankle and his heels are swollen, the muscles in his legs are thick, so that he is not able to walk: in order to heal him, you pound gaššu ('gypsum'), sahlû ('cress'), uḫūlu qarnānû ('horned alkali') (and) dung cake, you stir them into a paste in milk using a small copper pot, you smear (the mixture) on a piece of fabric while it is steaming hot, you bandage him with it and you should not remove it for three days.

British Museum K.67

Kabūtu also appears in a Neo-Assyrian treaty between Ashur-nirari V and Mati-‘el of Arrad (BM.134596) as part of a curse formula:

May Sin, the great lord who dwells in Harran, clothe Mati'-ilu, [his so]ns, his magnates, and the people of his land in leprosy as in a cloak; may they have to roam the open country, and may there be no mercy for them. May there be no more dung of oxen, asses, sheep, and horses in his land.

This text implies that lack of dung was a serious agricultural problem for the kingdom but not an energy resource. Conversely, the term kabūtu is absent in the many texts praising rulers who bring prosperity to their lands, for example the Ur III king Gudea, who makes “certain that faultless cattle and goats, grain-fed sheep, fresh bread and hind’s milk are available day and night”.

As for other terms, tabāštānu is found in a bilingual liturgy and an astrological divination. Another uncommon term, piqannu (Sumerian A.GAR.GAR), refers to gazelle droppings and is used in medical texts, especially related to eye diseases. The words šabītu and putrum are used in medical, magical, and divination texts in a ritual to counter bad omens.

Several texts, however, suggest that putrum had an economic role as manure. An Old Babylonian (ca. 1894–1595 BCE) letter requests:

When you see my letter, load 4 shiploads of dung into baskets made of cane and bring (these) away to me... You will have 20 tons of dung patties, 1 shock [bundle of reeds] and 20 talents of wood chips brought to me for the offering of the god Marduk on the 10th of Simanu. It further follows that this will be paid to Marduk.

This sounds like fertilizer. A Neo-Babylonian (626–539 BCE) text from Uruk also discusses a shipment of manure saying “give them dung cakes and plants there for nothing, but sell them here for a profit.”

There are also laconic references to dung in literary texts. The Lament for Sumer and Ur, composed in the late third millennium and known from Old Babylonian period copies, (lines 38-47) cites dung in the context of rural agricultural activities:

That the hoe not attack the fertile fields, that seed not be planted in the ground, That the sound of the song of the one tending the oxen not resound on the plain, That butter and cheese not be made in the cattle pen, that dung not be laid on the ground, That the shepherd not enclose the sacred sheep fold with a fence, That the song of churning not resound in the cattle pen, To decimate the animals of the steppe, to finish off (all) living things, That the four-legged creatures of Sakan not lay dung on the ground

A handful of Sumerian proverbs, which also originate in the third millennium and are primarily known from Old Babylonian period copies, also mention dung, for example “From 3600 oxen is there no dung?” and “You are multiplying oxen (and) you are collecting their dung!” These didactic, conservative, and often playful sayings imply scribes understood the uses of dung were for agriculture rather than for energy.

Finally, dung is mentioned in a negative context in the “Poem of the Righteous Sufferer,” composed in the late second millennium and known from Neo-Assyrian and Neo-Babylonian copies:

From writhing, my joints were dislocated, My limbs were splayed, they were lying awry. I spent the night in my dung like an ox, I wallowed in my excrement like a sheep.

Then as now, being abandoned by the gods and being forced to lie in dung like an animal was a metaphor for human degradation and pollution.

Why aren’t there more references? And what about energy?

Understanding a pattern of absence is problematic. But surveying lexicons, electronic databases, and text corpora nonetheless suggests that terms for dung are conspicuously absent from Mesopotamian economic texts such as ration lists, inventories, contracts, as well as from school texts and legal cases. Nor are references found in Mesopotamian agricultural manuals such as The Farmer’s Instructions which discuss fields, irrigation canals, animals, and implements. In contrast, much later Roman agricultural manuals such as Cato’s De Agricultura have extensive discussions of manuring.

Other texts discuss land tenure and land sales, crops, productivity, payments, and irrigation, but not manuring practices or dung as an agricultural or energy resource. And yet texts also make it clear institutional herds were routinely managed alongside private

herds, and hundreds and thousands of animals were annually delivered to cities for sacrificial purposes alone.

Reconstruction of a Mesopotamian landscape showing areas of agricultural production, animal utilization and potential dung collection. Drawing by Alex Joffe.

Even during the time of the Third Dynasty of Ur (ca. 2112–2004 BCE), when bureaucrats went to extreme length to record everything they could, dung was not a recorded commodity. For example, a central “livestock agency” at Puzriš-Dagan (Tell Drehem) with branch offices recorded many aspects of animal administration; the collection of living, dead, and exotic animals for wool production, meat consumption for gods (meaning cult personnel), the royal household, dependents, workers, the military, and dogs, and for extispicy (divination via animal entrails). But no dung.

The Mesopotamian tradition did not appear to have had a term for dung collector or even street sweeper, but it did have a term for forester, lu-tir. In some periods groups of foresters would collect tens and hundreds of tons of trees, reeds, and grasses for shipment to southern Mesopotamian cities and allocation to state workers. These energy resources were exploited by institutions using recognized categories of worker. Dung was not.

Iraq, a barge carrying fuel on the Tigris at Baghdad, 1932. Library of Congress, Matson Collection, LC-M33- 4606 [P&P].

Finally, animals appear frequently in both Mesopotamian art and non-economic texts as symbols of power, motherhood, and beauty, but dung as fuel or fertilizer is absent. Whatever utility dung and potential economic value had for agriculture or for energy, the commodity was not symbolic of power or wealth. Which was probably for the best.

The place of dung

The collection, storage and use of dung, including whatever energy was produced, was apparently conducted almost completely out of the view of literate institutions. Public institutions were aware of dung as an agricultural resource since it was a component of state prosperity but they do not claim to have controlled the commodity, even through taxation. Private institutions discussed dung as a common, apparently readily available medical material. But dung as an energy resource goes unmentioned.

Dung was apparently part of an informal economy; households could obtain the commodity by following patterns and rules that were of little interest to institutions. This economy functioned well enough to have not even been the subject of court cases. How dung was collected, stored, and used by private institutions like families remains unclear. I’ll trade you this pot for a dung cake? Kids, go out and scour the streets? We don’t know.

As we prepare for another long and lustrous winter, we might ask how the early complex societies like Mesopotamia, Egypt, the Indus Valley, China, and in the Americas addressed thermal energy. They may not have many answers for us, but animals and dung are a common thread in their evolution which deserves closer examination.

Alex Joffe is an archaeologist and historian. He is Director of Strategic Affairs for the Association for the Study of the Middle East and Africa and one third of the podcast This Week in the Ancient Near East. He also founded The Ancient Near East Today.

Further reading:

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UNDERWATER DISCOVERY NEAR ISTANBUL CONFIRMS ARISTOTLE’S ACCOUNT OF 2,300-YEAR-OLD COPPER MINE, BY NISHA ZAHID

Researchers in Istanbul have confirmed the existence of an underwater copper mine near Heybeliada (Greek: Χάλκη, Latinized: Halki) island, providing rare archaeological evidence for a description recorded by Aristotle more than 2,300 years ago. A submerged mining zone in Camlimani Bay aligns closely with the site that the ancient Greek philosopher detailed in his work “De Mirabilibus Auscultationibus” (On Marvelous Things Heard).

Aristotle wrote that Greek divers collected copper from a mine lying under two fathoms of water, about 3.6 meters (12 feet) below the surface. He said the metal was supplied to major artistic and religious centers in ancient Greece, including the Temple of Apollo at Sicyon (Greek: Σικυών) and monuments at Pheneus associated with Heracles.

His account was unusual because it described a submerged mining operation and claimed that the copper was believed to sharpen the eyesight of those who worked with it.

The island itself was known in antiquity as Halki, Halkitis (Greek Χαλκίτις), and Demonesos (Δημόνησος), with the first two names deriving from halkos (Greek χαλκός), meaning copper, a connection that reflects the distinctive material for which the area was renowned.

Discovery supports centuries-old Greek textual tradition

For generations, scholars debated whether Aristotle’s description reflected first-hand observation or a story shaped by Greek folklore. The question shifted in 2018 when archaeologist Associate Professor Ahmet Bilir of Duzce University conducted a 15-day underwater survey in Camlimani Bay.

His team found copper oxidation on the seabed, ore samples, and extraction traces consistent with organized mining. Dating placed the activity in the Late Classical Period—precisely the era in which Aristotle lived and wrote.

Diver’s copper in the Greek world

Ancient Greek sources referred to the metal extracted from this site as “halkon kolymbeten,” meaning “diver’s copper.” It commanded higher prices than copper from land-based mines and circulated in limited quantities within Greek trade networks. Bilir describes it as a specialty material reserved for high-status artistic workshops and sacred dedications.

In Greek religious thought, the worth of an offering was tied not only to its material value but to the difficulty of obtaining it. Copper taken from the sea carried symbolic weight because it required skill, courage, and repeated dives.

Greek divers worked several meters below the surface with simple breathing devices mentioned by Aristotle, relying on breath control and endurance. That effort made the metal especially suitable for temple gifts and other sacred works.

Possible link to Lysippos and Greek artistic innovation

Historical evidence shows that copper from Halki reached Sicyon, one of the most important artistic centers in ancient Greece. The city's sculpture school trained major Greek artists, including Lysippos, the official sculptor of Alexander the Great.

Lysippos reshaped Greek visual culture with his naturalistic proportions and dynamic poses, and ancient writers recorded that Alexander allowed only him to cast his bronze likeness.

If diver's copper entered the Sicyon workshops, it may have contributed to the production of statues that defined the Greek artistic identity of the Hellenistic period. Researchers say the connection underscores the cultural importance of the copper mined near Halki.

A distinct resource in a Greek-connected economic network

Researchers note that the underwater mine likely played a significant role in the local economy, although it operated independently of typical mining activities in the region. Its limited output and high value kept it in a category recognized across Greek markets.

Aristotle's mention of miners gaining sharper eyesight may reflect Greek medical practice. Greek and later Roman physicians used copper sulfate and related compounds in eye treatments, a detail that may have influenced the philosopher's observation.

A rare confirmation of Greek literary testimony

Experts say the discovery is one of the clearest examples of archaeology confirming a specific detail recorded in ancient Greek literature. The match between Aristotle's description and the physical evidence beneath Camlimani Bay demonstrates the accuracy of Greek textual traditions and highlights the technological sophistication of the classical Greek world.

The discovery closes a gap of more than two millennia, linking a Greek philosopher's account to modern underwater findings and offering new insight into the trade, art, and religious practices of ancient Greece.

Please visit the site: <https://greekreporter.com/2025/11/22/underwater-discovery-istanbul-aristotle-account-copper-mine/> [Go there for pix]

A 2,000-YEAR-OLD FASHION FRAUD: ROMAN TEXTILES IMITATED ROYAL MUREX PURPLE

Ancient textiles from the Judean Desert reveal that many Roman-era “purple” garments were not dyed with costly murex but with a clever blend of madder and woad, exposing a widespread fake-luxury industry 2,000 years ago.

The latest analyses of Roman-era textiles from the Judean Desert have uncovered a remarkably human story: social climbing, strategic imitation, and an ancient version of “luxury for less.” Research led by the Israel Antiquities Authority shows that many garments once thought to be dyed with the prestigious murex purple were, in fact, colored using a clever blend of cheaper plant-based dyes. The findings suggest a widespread market for convincing imitations—an early “Prada for the masses,” as one researcher put it—long before fast fashion and counterfeit brands reshaped the modern economy.

Prestige in a Thread: Why Color Mattered in the Roman World

Clothing in antiquity was never just functional. It was a declaration of identity, wealth, and ambition. Fabric quality mattered, decorative motifs mattered, and above all, color mattered. A single hue could mark the boundary between elites and everyone else.

No color carried more prestige than royal purple. Extracted from murex trunculus and related Mediterranean marine snails, the dye was infamous for its rarity, high cost, and slow multi-stage production process. Its brilliant spectrum—from deep violet to reddish burgundy—was associated with royalty, high-ranking officials, and religious elites.

“Dyeing with murex was an arduous process that took several days and required large quantities of snails,” says Dr. Naama Sukenik, curator of organic materials at the Israel Antiquities Authority and a leading expert on ancient dyes. “Today we can identify the unique molecular signature of murex, allowing us to determine with high confidence whether a textile was truly dyed with the most prestigious dye of the ancient world.”

Close-up view of the 2,000-year-old textile fibers showing the red–blue plant-based dye residues used to imitate expensive murex purple in the Roman period. Credit: Clara Amit and Yuvaly Schwartz, courtesy of the Israel Antiquities Authority; Shahrar Cohen, courtesy of Prof. Zohar Amar, Bar-Ilan University.

The Surprise: Most ‘Purple’ Garments Were Not Purple at All

When dozens of 2,000-year-old textile fragments recovered from Judean Desert caves were tested, expectations were high. The fabrics were decorated in purple-like tones, and some had long been assumed to contain genuine murex dye.

What emerged instead was a clear pattern: the majority of these textiles were not dyed with murex at all.

Laboratory analysis showed that the deep purplish hues came from double dyeing with two plants commonly used in the ancient Near East:

Madder (*Rubia*) — producing a red dye from its roots

Woad (*Isatis tinctoria*) — producing a blue dye often described as the “Near Eastern indigo”

By carefully immersing the cloth in a madder dye bath and then a woad bath (or vice versa), ancient dyers produced a rich, blended hue visually similar to royal purple. The process required skill but no sea snails, no complex chemical extractions, and no days-long preparation.

“Double dyeing achieved a sophisticated imitation that could easily pass for authentic royal purple,” Dr. Sukenik explains. “Madder and woad were widely available, far cheaper, and far easier to work with than murex snails. Their use points to a deliberate strategy—creating prestige at a fraction of the cost.”

An Ancient Marketplace of Imitations

The discovery highlights a phenomenon that feels strikingly modern: fake luxury, tailored for people who wanted to display status without paying elite prices.

These plant-dyed textiles reveal that imitation was not a marginal practice—it was widespread, normalized, and accepted. And it was not a Roman invention. A Babylonian cuneiform tablet from the 7th century BCE already describes a dyeing “recipe” designed to mimic expensive purple.

“Human nature has not changed,” says Dr. Sukenik. “Even in antiquity, people wanted to appear as though they belonged to a higher social class. The use of imitation dyes made that possible.”

Fragment of a 2,000-year-old textile showing a central band dyed in a purple-like shade produced with plant-based double dyeing. Credit: Clara Amit and Yuvaly Schwartz, courtesy of the Israel Antiquities Authority; Shahar Cohen, courtesy of Prof. Zohar Amar, Bar-Ilan University.

Archaeology Meets Social History

The textiles analyzed came from desert caves whose dry microclimate allowed fragile organic materials to survive. Each scrap of cloth helps reconstruct a social ecosystem where appearance, aspiration, and technology intersected.

The findings also reveal something about the ancient dyeing industry in the Land of Israel. Madder and woad were both cultivated regionally and frequently mentioned in Jewish sources. Their importance reflects not only economic pragmatism but also the technical proficiency of dyers who mastered color manipulation long before synthetic dyes were imagined.

A New Publication and Online Event

The research coincides with the launch of *Thread and Color in the Textiles of the Land of Israel*, a new book exploring the region’s textile heritage—from tekhelet (blue) to scarlet and genuine murex purple.

An online event hosted in partnership with Yad Yitzhak Ben-Zvi will take place this Thursday on Zoom, offering the public an opportunity to hear more about the dyes, traditions, and technologies behind these discoveries. Participation is free with prior registration.

Please visit the site: <https://arkeonews.net/a-2000-year-old-fashion-fraud-roman-textiles-imitated-royal-murex-purple/> [Go there for pix]

ANCIENT MASK RELIEFS UNEARTHED AT ROMAN-ERA THEATER IN SOUTHERN TÜRKIYE, BY MUZAFFER CAGLIYANER AND SEYIT KURT

Ongoing excavations in 2,700-year-old ancient settlement in Kastabala, Osmaniye, currently focus on theater area, believed to have been built in 1st century AD during Roman Empire

Five theatrical mask reliefs have been discovered during excavations in the theater area of Kastabala, an ancient city in Osmaniye, southern Türkiye. With the latest finds, the total number of masks discovered this year has risen to 36.

The ongoing excavations in the 2,700-year-old ancient settlement currently focus on the theater area, believed to have been built in the 1st century AD during the Roman Empire. The theater had a seating capacity of approximately 5,000 people.

The excavation team, led by Faris Demir, an archaeologist at Osmaniye Korkut Ata University, recently uncovered five additional mask reliefs, one of which depicts an elderly philosopher.

Speaking to Anadolu, Demir said that similar discoveries had been made in previous years.

“We unearthed masks in Kastabala in previous seasons as well. These depicted tragedy and comedy plays,” he said. “We have also brought to light numerous architectural elements belonging to the stage building. These finds will make it possible to restore the structure.”

Regarding the newly unearthed pieces, Demir highlighted the significance of the philosopher mask relief.

“The most important of the new discoveries is a carving of an elderly thinker,” he said. “This indicates that the theater served not only as a performance venue but also as a cultural center where philosophical and literary discussions were held.”

Demir added that the masks bear traces of both Eastern and Western cultural traditions.

“With this year’s finds, the number of masks discovered has risen to 36,” he said. “By the end of this project, we will be able to restore the stage building and hand it down to future generations.”

Please visit the site: <https://www.aa.com.tr/en/culture/ancient-mask-reliefs-unearthed-at-roman-era-theater-in-southern-turkiye/3748138> [Go there for pix]

ARCHAEOLOGISTS USED FOR 6,000 YEARS AGO? BY RUTH SCHUSTER

Archaeology involves the art of figuring out what ancient people did with objects they clearly prized, but we don't understand. What use the ancient Romans made of hollow metal dodecahedrons, we do not know. The flashy but brittle crystal daggers and arrowheads of prehistoric Spain seem sub-pragmatic for killing.

Now a new paper analyzes the puzzle of ceramic cornets, which look like variations on a theme of ice cream cones. These baffling objects began to appear in the early Chalcolithic in parts of Israel and Jordan around 6,000 years ago, became quite common – if not used in every settlement of the time – and then petered out and disappeared forever more.

Some settlements featured over a thousand, others none. It bears adding that cornets may have more common than we realize because broken bits of their upper part can be confused with bowls. Not the tapered bottoms though.

A great deal of speculation has gone into the use of the cornets. What were they for? One postulation involved an association with dairying; another that they served as V-shaped bowls. The discovery of beeswax inside cornets through residue analysis led to a theory of a possible use in early copper smelting, known for using a lost-wax casting process. Also, the whiff of ritual ran through the theories.

The suggestion that they had served as lamps was rejected by skeptics who noted the absence of soot.

But they had served as a sort of lamp, it seems. Based on the first analysis of the objects throughout their "lifetime" - from the stage of production to discard, Sharon Zuhovitzky, Paula Waiman-Barak and Yuval Gadot writing in *Tel Aviv: Journal of the Institute of Archaeology of Tel Aviv University* have seen the light. Cornets were vigil objects, they deduce: beeswax candles with a linen wick nestled inside the ceramic cone that people may have made at home and brought their own personal candle to carry on ceremonial processions of fire.

Cornets are considered indicative of Chalcolithic Israel and Jordan, and have not been found in any other period before or after.

This proposal is based on analyzing 35 complete cornets and 550 broken-off cornet bottoms found in the 1930s in Teleilat Ghassul, a vast Chalcolithic site in Jordan a few kilometers from Jericho. It had been excavated by the Pontifical Biblical Institute, which stored the finds in Jerusalem and kindly gave the Tel Aviv team access to the artifacts for the study.

Map showing some of the sites where cornets were found, including Teleilat Ghassul.
Credit: Sharon Zuhovitzky

The thing about cornets

Occupation of Teleilat Ghassul began in the Late Neolithic, from which times simple mud brick homes and storage pits were identified. By the Chalcolithic, there were villages. Mundane household objects were found such as stone and bone tools, spinning whorls, and also items smacking of ritual such as animal figurines – and cornets. Hundreds were found in the stunning "painted rooms" of the site, leading previous studies to suggest cultic use of both the rooms and the cornets.

Apropos, the surviving frescoes of Chalcolithic Teleilat Ghassul were stunning. They are time-worn and incomplete but seem to show rituals and processions, too. One partially preserved wall shows an 8-pointed star over six feet in diameter that is assumed to represent the sun, or some other celestial body, or something else. There are elaborately robed people facing the star. Another image shows two pairs of feet on footstools, one sandaled. Behind them are more pairs of feet, all of which are suggestive of ritual.

In addition, the collection of cornets at Teleilat Ghassul was one of the largest and most diverse discovered to date, hence the choice of this assemblage to study this phenomenon from the dawn of modern civilization.

The cornets of the Chalcolithic are all open-mouthed conical clay vessels, tapering down to a point. They were finished on the outside with slip (paint made of thin clay mud), but that's where their commonalities end. Most were painted red, some white and some exteriors were finished with "self-slip" made by mixing the cornet's own clay with water, so not adding a new color element.

Some were decorated with stripes and motifs below the rim. Some had no handles, but others had two small pierced handles or four, in two pairs.

The interior was carved out crudely and not finished smoothly like a cup or bowl would have been. That alone rules out their use for food or drink, Zuhovitzky tells Haaretz in conversation – couldn't clean the thing, it would become disgusting.

The team classified the cornets at Teleilat Ghassul into four types, by the shape of their base: long elongated, shorter elongated, short solid and very pointy.

Petrographic analysis shows they were generally made of local clays, of varying textures and colors.

The bottom line is there was no attempt to make a uniform object, which may cast on who made them, and it wasn't master craftsmen. Nor were they found in any uniform fashion.

"That's a thing about cornets – sometimes a huge amount is found and sometimes two or three and sometimes nothing. In Chalcolithic Ashkelon, more than 1,000 cornet bases were found in a single room, which had probably belonged to a public building," Zuhovitzky says. But at other sites, cornets were piled in an area where no buildings were found. The discoveries may have been in ceremonial contexts, but not burials, she adds.

The process of painstaking investigation into their use involved making cornets and actually reconstructing the shapes from scratch using commercial clay. The clay would

be considered coarse in modern terms but was in keeping with Chalcolithic ceramic norms. After trial and error, Zuhovitzky nailed down a series of actions that could effectively produce a cornet in about 10 minutes, using a shaping stick as a utensil.

Like the ancient potters, she smoothed the exterior and applied slip using a piece of fabric, which she deduces was how the ancients did it, based on fiber marks observable by microscopic examination of the slip.

And having made the cornet, decorated it with slip and getting one over the Protojoneses with fancy stripes decorations and motifs, having fired it like other ceramics and once it was ready, filled it – economically, not to the brim! – with beeswax, and having lit the linen wick using the household fire, the family or head of family or whoever would leave the house and join the procession, fire in hand.

Procession of fire

Imagine a twilight procession of fire 6,000 years ago, the people stepping over the rocky land in sandals, each one bearing or swinging a candle.

Cornets with long bodies and no handles could have been held by hand, while the holes in the pierced handles of the others were perfect for string, to hang from the hand. The handles wouldn't have been made for beauty, Zuhovitzky points out, but with two on each side they're convenient for swinging.

What cornets were really used for 6,000 years ago, according to the team's reconstruction. Credit: Sharon Zuhovitzky

This theory connects all the dots: why the cornets are sort of pretty outside or at least finished, but crude inside and contain traces of beeswax; why they vary so much (individual skill, and tastes can be indulged); and it explains the two fundamental types: long-tailed without handles and stubby with handles.

During their experiments, the researchers used cornets filled with beeswax but not to the top, with a linen wick stuck in the middle of the wax, and the candle did not soot up. So that explanation for why cornets couldn't have been lamps is shot out of the water.

As for the beeswax, before the industrialization of apiculture likely it would have been expensive, but we know they used it, she says, not least in the framework of the lost wax metallurgy technique. But the cost could have added to the ceremonial aspect. You don't wheedle the gods with lead but with gold. Also the cornets wouldn't have been filled to the brim and, she adds, some cornets are quite shallow.

It is often suggested that early potters were already specialist craftsmen. Maybe, but the archaeologists postulate that these candles were made by the people at home, and each would bring their own candle to the ceremony, which would explain why each is different.

The clay is all local but some could have come from a riverbed, some from a hillside and so on, resulting in differences in color and texture. Families could have developed

traditions – the Precohenes mining the mountain and the Protolevys grubbing their clay from the streambed.

Usually one thinks of ritual vessels, used to worship or propitiate deities, as being made of fine stuff by experts. They are special, while home kitchenware such as soup bowls could be made of simpler materials and craft. But here, we seem to have ritual vessels made at home, not professionally made, not especially lovely, neither uniform or special – but, maybe, personal. All the communities in the area shared the same basic idea but each could manifest it as they pleased, keeping their swinging or handheld lamp simple, or they could show off.

And when the ceremony was done, Zuhovitzky says, it seems the people didn't take their cornets back home, but broke them and left them behind in a pile, possibly even ritually broken.

"Part of the ceremony may have been to break the cornets and discard them, which may explain why so few were found intact and so many in pieces, not only at Teleilat Ghassul but elsewhere," she says. Like a genizah, a ritual deposit.

The team could even show that they didn't break during excavation or during their thousands of years under the soil – the team could identify blow marks, and the patina of the ages coating not only the exterior but the fractures.

The cornets were apparently used, broken and discarded at the same time, in ceremonies that seem to have been painted on the walls of Teleilat Ghassul, and then from the Late Chalcolithic, they disappear from the archaeological record forever more.

Or perhaps they carried on and their descendants would become the chalices used to hold heated beeswax during burial ceremonies in the Iron Age some 3,000 years ago, says Prof. Gadot.

At Horvat Tevet in the Jezreel Valley in northern Israel, archaeologists found the ruins of an Iron Age "royal estate." The candles found there were also held by hand, and would emit that most precious of human achievements – artificial light – which would be more than just illumination, Gadot points out. A march of people swinging lights against the dark, lights from which wondrous aromas of incense would waft, would be powerfully symbolic and that is the story.

Please visit the site: https://www.haaretz.com/archaeology/2025-11-12/ty-article-magazine/archaeologists-crack-century-old-mystery-what-were-clay-cornets-used-for-6-000-years-ago/0000019a-77d8-d326-a3ff-f7d9a7510000?utm_source=App_Share&utm_medium=iOS_Native [Go there for pix]

OPIUM USE IN ANCIENT EGYPT: ALABASTER VASE RESIDUE POINTS TO WIDESPREAD USE, BY MIKE CUMMINGS

Examination of an ancient alabaster vase in the Yale Peabody Museum's Babylonian Collection has revealed traces of opiates, providing the clearest evidence to date of broad opium use in ancient Egyptian society, according to a new study by the Yale Ancient Pharmacology Program (YAPP).

The finding suggests that similar ancient Egyptian alabaster vessels—all made of calcite mined from the same quarries in Egypt—including several exquisite examples discovered in the tomb of Pharaoh Tutankhamun—could also contain traces of ancient opiates, said Andrew J. Koh, YAPP's principal investigator and the study's lead author.

"Our findings combined with prior research indicate that opium use was more than accidental or sporadic in ancient Egyptian cultures and surrounding lands and was, to some degree, a fixture of daily life," said Koh, a research scientist at the Yale Peabody Museum. "We think it's possible, if not probable, that alabaster jars found in King Tut's tomb contained opium as part of an ancient tradition of opiate use that we are only now beginning to understand."

The study, published in the *Journal of Eastern Mediterranean Archaeology and Heritage Studies*, is coauthored by Agnete W. Lassen, associate curator of the Yale Babylonian Collection, and Alison M. Crandall, YAPP's lab manager.

The alabaster vase is inscribed in four ancient languages—Akkadian, Elamite, Persian, and Egyptian—to Xerxes I, who ruled the Achaemenid Empire from 486 to 465 BCE. Based in Persia, the empire at its height included Egypt as well as Mesopotamia, the Levant, Anatolia, and parts of Eastern Arabia and Central Asia.

A second inscription on the vase written in Demotic script—a simplified form of ancient Egyptian writing—indicates that it has a capacity of about 1,200 milliliters. (It is 22 centimeters tall.) Intact examples of inscribed ancient Egyptian alabaster vessels are exceptionally rare, likely numbering less than 10 in collections worldwide, the researchers noted.

Rare alabaster vessels and their history

The provenances of the intact vessels are generally unknown, the researchers said, but they at least span the reigns of Achaemenid emperors Darius, Xerxes, and Artaxerxes, a period covering 550 to 425 BCE. Yale's vase has been part of the Babylonian Collection since shortly after the assemblage of about 40,000 ancient artifacts was established at the university in 1911.

Based at the Peabody Museum, YAPP harnesses ethnography, science, and technology to better understand how people lived thousands of years ago. Its researchers study the organic residues found on or within ancient vessels, providing insight into ancient

people's diets and lifestyles. The program has developed specific methods for analyzing organic residues—which degrade and decompose over time and are susceptible to contamination—found in artifacts in museum collections or those that have been recently excavated.

"Scholars tend to study and admire ancient vessels for their aesthetic qualities, but our program focuses on how they were used and the organic substances they contained, knowledge that reveals a great deal of information about the daily lives of ancient peoples, including what they ate, the medicines they used, and how they spent their leisure time," Koh said.

Andrew Koh, principal investigator for the Yale Ancient Pharmacology Program, handles an alabaster vase from the Yale Babylonian Collection that contains traces of opiates. Credit: Yale University

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Discovery of opiate residues and implications

For the new study, Koh's interest was initially piqued after observing dark-brown aromatic residues inside the vase. YAPP's analysis of the residues revealed definitive evidence for noscapine, hydrocotarnine, morphine, thebaine, and papaverine—well-known diagnostic biomarkers for opium.

Researchers say the results echo the discovery of opiate residues in a group of Egyptian alabaster vessels and Cypriot base-ring juglets found in an ordinary tomb, likely a merchant family, in Sedment, Egypt, located south of Cairo, that dates to the New Kingdom, the Egyptian empire that stretched from the 16th to the 11th century BCE.

The two findings, which stretch over a millennium and across socio-economic groups, raise the distinct possibility that opium is present among the large quantity of alabaster vessels found in Tutankhamun's tomb in the Valley of the Kings, Koh said.

There are clear signals of opium usage that goes beyond medicinal usage and into the spiritual realm throughout antiquity, stretching from ancient Mesopotamia to Egypt and through the Aegean, he said. During Tutankhamun's lifetime, for example, people in Crete were associated with the so-called "poppy goddess" in clearly ritualistic contexts. The poppy plant is mentioned in multiple ancient texts, including the Ebers Papyrus, Hippocrates, Dioscorides's *De Materia Medica*, and Galen.

King Tutankhamun's tomb and ancient opium

Egyptologist and archaeologist Howard Carter's discovery of Tutankhamun's tomb in November 1922 yielded an enormous haul of artifacts, including a vast number of exquisitely preserved Egyptian alabaster vessels that likely represented the finest available during Tutankhamun's reign, which lasted from 1,333 to 1,323 BCE.

In 1933, the analytical chemist Alfred Lucas, a member of Carter's research team, performed a cursory chemical study of the vessels, many of which contained sticky, dark brown, aromatic organics. At the time, Lucas was unable to chemically identify the organic materials, but he determined that most were not unguents or perfumes.

"That Lucas questioned whether any of the vessels contained perfumes or unguents at all and did not identify the remaining vessel contents as primarily aromatic in nature is significant given that the prevailing conventions at the time would have pressured him to do so," Koh said.

No further analysis of the organic materials has been conducted since Lucas' early attempt. The vessels—along with most other artifacts from Tutankhamun's tomb—are housed at the Grand Egyptian Museum in Giza, Egypt.

Looting, afterlife beliefs, and cultural significance

After his historic discovery, Carter had noted an ancient looting incident that targeted the contents of the alabaster vessels, the researchers said. Finger marks found inside the vessels suggested that the looters had attempted to meticulously scrape out their contents to the dregs. Many of the looted vessels contained that same dark-brown, aromatic substances that Lucas concluded were not perfumes, the researchers note. A few of the vessels were not looted and remain filled with their original contents.

Those contents, whatever they were, were considered important enough to accompany Tutankhamen into the afterlife and to inspire grave robbers to risk their lives in an attempted theft, Koh said.

It is unlikely, he added, that ancient people would have assigned such value to the standard unguents and perfumes of the day.

"We now have found opiate chemical signatures that show Egyptian alabaster vessels were attached to elite societies in Mesopotamia and embedded in more ordinary cultural circumstances within ancient Egypt," Koh said. "It's possible these vessels were easily recognizable cultural markers for opium use in ancient times, just as hookahs today are attached to shisha tobacco consumption. Analyzing the contents of the jars from King Tut's tomb would further clarify the role of opium in these ancient societies."

More information: Andrew J. Koh et al, The Pharmacopeia of Ancient Egyptian Alabaster Vessels: A Transdisciplinary Approach with Legacy Artifacts, Journal of Eastern Mediterranean Archaeology and Heritage Studies (2025). DOI: 10.5325/jeasmedarcherstu.13.3.0317
Provided by Yale University

Please visit the site: https://phys.org/news/2025-11-opium-ancient-egypt-alabaster-vase.html#google_vignette [Go there for pix]

GREEK INSCRIPTION AT ANCIENT THEATER OF APOLLONIA REVEALS NAME OF PROMINENT PRIESTESS **BY NISHA ZAHID**

Archaeologists in Gölyazı, Turkey, have uncovered a Greek inscription carved into a seat in a Roman-era theater, revealing the name of a female priestess who lived nearly two thousand years ago.

The discovery, made at the ancient Greek city of Apollonia (Greek: Ἀπολλωνία), dates to the 2nd century and offers new insight into the public and religious visibility of women in antiquity.

The name, “Lonidos,” (Greek: Λωνιδος) was found engraved on a marble seat in the uppermost tier of the theater, known as the summa cavea. Researchers believe the seat belonged to a high-ranking woman who served as a priestess, honored with a reserved place in the city’s main public venue.

The Hellenistic legacy of Apollonia ad Rhyndacum

The inscription is written in Greek, reflecting the Hellenistic roots of Apollonia ad Rhyndacum—named after Apollo, the Greek god of light, music, and prophecy. The city, founded by Greek settlers along the Rhyndacus River, became part of the Roman Empire yet continued to speak Greek and follow Hellenic traditions.

Even under Roman administration, civic life, language, and religion in Apollonia retained strong Greek characteristics. Scholars say the discovery underscores how Greek culture shaped much of western Anatolia for centuries, blending seamlessly into Roman provincial life.

Priestess honored in a public setting

Prof. Dr. Derya Şahin, head of the excavation team from Bursa Uludağ University’s Archaeology Department, described the discovery as highly significant. She said finding a woman’s name carved into a theater seat suggests formal recognition within a public and sacred space. The inscription, she added, offers rare evidence of women’s active participation in religious and civic life nearly 1,800 years ago.

Şahin noted that seats in the upper cavea were often reserved for influential figures. The presence of a woman’s name there, she said, challenges long-held assumptions about gender and social status in ancient societies.

Architecture shaped by Greek and Roman traditions

The ancient theater, located on a hill overlooking Uluabat Lake in Bursa’s Nilüfer district, could once accommodate about 5,000 spectators. Built during the Hellenistic

period and later expanded under Roman rule, it combines Greek architectural principles with Roman engineering.

The structure features tiered seating, VIP sections similar to modern boxes, and an orchestra area roughly 28 meters (92 feet) wide. Its design reflects the cultural dialogue between Greece and Rome, where art, religion, and civic gatherings intersected.

Preserving a shared heritage

Archaeologists have recovered 42 seats so far, many displaced over centuries. Using a restoration technique known as anastylosis, they are reassembling the original materials to preserve the site's authenticity.

The team says the discovery of Lonidos' name transforms the theater from a ruin into a story of identity, faith, and cultural continuity. Though located in modern Turkey, Apollonia's remains reveal a world where Greek language, architecture, and religion flourished under Roman rule.

As restoration continues, researchers hope to learn more about Lonidos and the community she served. Each inscription, they say, brings ancient voices closer—reminding us that even a single carved name can bridge the histories of Greece and Rome in ancient Anatolia.

Please visit the site: <https://greekreporter.com/2025/11/13/greek-inscription-ancient-theater-apollonia-name-priestess/>

THE ROMAN EMPIRE’S ENTIRE ROAD NETWORK JUST GOT MAPPED, AND IT’S MIND-BLOWING A NEW STUDY IDENTIFIED OVER 68,000 MORE MILES OF ANCIENT ROMAN ROADS THAN WERE PREVIOUSLY KNOWN, BY MARGHERITA BASSI

They say all roads lead to Rome—but exactly how many Roman roads were there? According to new research, potentially over 68,000 miles (over 110,000 kilometers) more than previously known.

Meet Itiner-e, a new high-resolution digital dataset and map of the Roman Empire’s roads around 150 CE. A team of researchers used archaeological and historical records, topographic maps, and satellite imagery to create the behemoth, which charts 185,896 miles (299,171 km) of roads across almost 1,544,409 square miles (4,000,000 square km).

An Ancient Roman road map

“The Roman Empire’s road system was critical for structuring the movement of people, goods and ideas, and sustaining imperial control. Yet, it remains incompletely mapped and poorly integrated across sources despite centuries of research,” the researchers wrote in a study published today in the journal *Nature*. They describe Itiner-e as “the most detailed and comprehensive open digital dataset of roads in the entire Roman Empire.”

When the Roman Empire peaked in the second century CE, it encompassed more than 55 million people from modern-day Britain to Egypt and Syria. The new map reveals 68,734 miles (110,616 km) more of roads than previous estimates. According to the researchers, the increase comes from a higher coverage of roads in the Iberian Peninsula, Greece, and North Africa, as well as the modification of previously proposed roads around the actual landscape, such as winding mountain roads rather than unrealistic straight shots.

“This resource is transformative for understanding how mobility shaped connectivity, administration, and even disease transmission in the ancient world, and for studies of the millennia-long development of terrestrial mobility in the region,” the researchers said.

What we know and what we don’t

In total, Itiner-e consists of 14,769 road sections, with 34.6% categorized as main roads and 65.4% categorized as secondary roads. Notably, only 2.7% of the roads’ precise locations are certain. 89.8% are known with less precision, and 7.4% are theorized.

“This shows a discrepancy between our knowledge of the existence and location of Roman roads: we know all of the included roads were used at some point during the

Roman period, but their precise locations are not certain,” the team explained. They also noted that Itiner-e does not represent how the road system developed over time.

Comparison Of Roman Roads

At its most basic level, Itiner-e provides an impressive new visual of the ancient Roman territories that helps you appreciate how well-connected the empire was. If you compare it to a modern map, you might even find some nerdy easter eggs—like the fact that the road that connects modern-day Bologna, Modena, Parma, Piacenza, and Milan is the same as the one that connected ancient Bononia, Mutina, Parma, Placentia, and Mediolanum in 150 CE.

Please visit the site: <https://gizmodo.com/the-roman-empires-entire-road-network-just-got-mapped-and-its-mind-blowing-2000681707> [Go there for format, video, pix, and maps]



WHEN SUGAR GREW IN THE HOLY LAND - MEDIEVAL SUGAR MILL DISCOVERED, BY NATHAN STEINMEYER

When envisioning the agricultural produce of the Holy Land, sugar is not what comes to most people's minds, but for much of the Middle Ages, many areas of the Levant were important production centers for water-needy sugar cane. Recent excavations near Beth Shean, south of the Sea of Galilee, revealed a rock-carved, subterranean water installation that served as part of a sugar mill, demonstrating the power and sophistication of local environmental engineering.

Channeling Water

Deep beneath the sunlit pools of Gan Ha-Shelosh National Park, archaeologists uncovered a forgotten network of rock-hewn tunnels that illuminates medieval industry in the Holy Land. The tunnels were carved into the area's soft tufa bedrock and served to direct and manage water flow. Archaeologists determined that the system dates to the Mamluk period (c. 1291–1516 CE), a time in which the Beth Shean valley was a hub for the lucrative sugar cane industry.

Although sugar cane is not native to the Levant, the industry spread across the area with the Islamic conquest and became especially important during the Mamluk period, when sugar production was intensively practiced in the Nile Delta and Mesopotamia. Whereas those regions have abundant water resources, however, water in the Beth Shean valley is far more limited. To overcome this issue, the Mamluks utilized ingenious water systems, such as the one discovered at Gan Ha-Shelosh. The channels diverted brackish water from a nearby spring, bringing the water to a lower elevation while also reducing the area through which it could flow. This increased the water's speed as it met a paddle wheel that would spin and then turn a pair of millstones above.

According to project leader Amos Frumkin of the Hebrew University, "Understanding these hidden tunnels helps us see the Mamluk world not just as a military empire but as one deeply invested in harnessing natural forces for economic resilience."

Please visit the site: <https://www.biblicalarchaeology.org/daily/ancient-cultures/ancient-israel/when-sugar-grew-in-the-holy-land/>

ANCIENT EGYPT'S GOLD: NEW REVELATIONS REWRITE THE BOOM THAT BUILT AN EMPIRE, BY NISHA ZAHID

A new study reveals how the gold rush that once swept across ancient Egypt became a profitable boom that helped build the empire's wealth and power. Led by archaeologist Leigh Bettenay, researchers traced the origins of ancient Egypt's gold-mining system — one that turned Nubia's deserts and river valleys into some of the richest sources of precious metal in the ancient world.

The research, published in the *Journal of Archaeological Science*, challenges long-held views that ancient Egyptian gold production was small and mostly came from hard-rock veins. Instead, the study argues that placer mining — recovering gold from riverbeds and desert streams — was far more important than previously thought.

Using new quantitative models, the team shows that these simple methods could have yielded enormous profits, turning Nubia into a mining powerhouse for the Pharaohs.

Revisiting Nubia's lost goldfields

For decades, scholars estimated that Pharaonic Egypt produced about 18 tons of gold, with only limited input from placer deposits. Bettenay's team disputes this, suggesting the figure could be many times higher. Their analysis focuses on Nubia's vast gold-bearing terrain — roughly 250,000 square kilometers — where the Nile and dry wadis carried traces of gold through the desert.

By comparing four different mining models, the researchers evaluated how ancient laborers extracted and processed the metal. These included lode mining, wadi workings, Nile placer mining, and alluvial clast mining. The models account for manpower, travel time, ore grades, and losses in processing, then calculate profitability in terms of gold returned for labor invested.

The results suggest that placer mining along the Nile and nearby desert channels delivered the highest returns, while deep lode and clast mining required larger workforces and offered lower yields. Even with primitive tools, mining near the Nile could have been remarkably efficient and profitable for the time.

Modeling the economics of a golden empire

The study's models reveal surprising details about the economics behind ancient mining. For a typical 50-person team, returns on investment ranged between 77 and 124 percent, depending on the method. The most successful scenario — placer mining in shallow wadis — produced the highest output of gold per worker per day.

Such operations benefited from low labor costs, as wages in the New Kingdom era were valued in grain and represented only a fraction of the gold's worth. This made even modest yields profitable. The researchers estimate that a productive campaign could

produce hundreds of grams of gold per expedition — a significant amount when multiplied across hundreds of mining teams.

Historical evidence supports the models. Accounts from modern artisanal miners along the Nile show similar daily yields, suggesting that Bronze Age techniques were both realistic and effective. Bettenay notes that, unlike large-scale modern mines, Egypt's early miners relied on manpower, not machinery — yet their economic returns could rival small industrial operations today when adjusted for value.

Shifting fortunes and lasting legacy

The paper also links Egypt's political power to its control over Nubia's goldfields. Before 1100 BCE, Egypt's gold was so abundant that it was valued at just one-third the price of silver. But after Egypt lost control of Nubia, gold became scarce, and its value tripled by 960 BCE. Researchers interpret this as clear evidence that the empire's prosperity hinged on the Nubian gold supply.

The findings further suggest that ancient miners were shrewd in understanding profitability — even if they didn't calculate it like modern economists. They organized expeditions, optimized labor, and chose sites that balanced effort and return. In Bettenay's view, this marks one of the earliest examples of resource-driven economic planning in human history.

A new view of Egypt's golden foundation

Ultimately, the study redefines how Egypt's wealth was made. Rather than small, isolated mines, it paints a picture of a thriving mining industry stretching from desert wadis to the Nile valley — one that likely produced hundreds of tons of gold over centuries.

These operations, though manual and dangerous, created the financial backbone that powered Egypt's temples, armies, and monumental architecture. The Egyptian gold boom of the New Kingdom, the researchers conclude, was not a myth of buried treasure but a story of ingenuity, labor, and economic mastery that helped shape one of the world's earliest great civilizations.

Please visit the site: <https://greekreporter.com/2025/11/05/ancient-egypt-gold-built-empire/> [Go there for pix]

3,500-YEAR-OLD BABYLONIAN TABLET **MAY CONTAIN EARLIEST KNOWN** **DEPICTION OF A GHOST,** **BY LIVIA GERSHON**

A curator at the British Museum details the spooky find in a new book.

A tablet made in ancient Babylon around 1500 B.C.E. may be the earliest known depiction of a ghost, a top scholar of ancient Middle Eastern inscriptions argues in a new book.

The clay tablet is part of a guide to exorcising ghosts held in the collections of the British Museum, reports Dalya Alberge for the Observer. Irving Finkel, a curator in the London museum's Middle Eastern department and the author of the forthcoming book *The First Ghosts: Most Ancient of Legacies*, says the image on the tablet is only visible when viewed from above under a light. The museum acquired the artifact in the 19th century, but it has never been exhibited.

“You’d probably never give it a second thought because the area where the drawings are looks like it’s got no writing,” Finkel tells the Observer. “But when you examine it and hold it under a lamp, those figures leap out at you across time in the most startling way.”

The tablet is small enough to fit in a person’s hand. As Patrick Pester reports for Live Science, at least half of it is missing. But the object still holds carefully detailed instructions on getting rid of pesky ghosts. The directions call for the exorcist to make figurines of a man and woman; prepare two vessels of beer; and, at sunrise, speak ritual words calling on the Mesopotamian god Shamash, who was responsible for bringing ghosts to the underworld. Finkel says the idea was to transfer the ghost into one of the figurines.

The text’s final line urges readers to “not look behind you!” This warning is probably intended as an instruction aimed at the figurines entering the underworld, but it’s possible it’s directed at the exorcist.

According to Finkel, the drawing was most likely made by a master craftsman who was highly skilled in drawing in clay. The tablet may have been held in an exorcist’s library or a temple.

There was a whole school of specialist magic, which was to appease ghosts and to send them back where they belong without any further trouble.

Finkel tells Artnet News’ Amah-Rose Abrams that he decided to write the new book after reading a history of ghosts that began in the 18th century.

“I suddenly thought, ‘Well, what about our stuff? What about Mesopotamia?’” he says.

In early civilizations like Mesopotamia, people expected to encounter ghosts, the scholar explains. Ancient chroniclers Pliny, Lucian and Plautus all reference ghosts in their writings, per History.com; some observers even left instructions on how to get rid of particular sorts of spirits.

The Babylonian tablet featured in the new book focuses specifically on removing an older male ghost by having a young woman lead him to the underworld.

“It’s obviously a male ghost and he’s miserable,” Finkel tells the Observer. “... You can’t help but imagine what happened before. ‘Oh God, Uncle Henry’s back.’ Maybe Uncle Henry’s lost three wives. Something that everybody knew was that the way to get rid of the old bugger was to marry him off. It’s not fanciful to read this into it. It’s a kind of explicit message. There’s very high-quality writing there and immaculate draughtsmanship.”

The First Ghosts also describes objects like bronze amulets used to get rid of ghosts and rituals, at least one of which involved a human skull.

In a 2018 British Museum video, Finkel said that ancient Mesopotamians relied on funerary rituals to keep the dead from rising again. Ghosts, having been deprived of eternal rest, were generally considered objects of sympathy.

“So there was a whole school of specialist magic, which was to appease ghosts and to send them back where they belong without any further trouble,” he added.

All major ancient civilizations held beliefs involving the survival of souls after bodily death, wrote Joshua J. Mark for World History Encyclopedia in 2014. In many cases, these souls belonged to a realm of the dead but might return to the living world due to improper funeral rites or unfinished business. Ghost stories with similar themes can be found in ancient China, Mesoamerica, Egypt, India, Greece, Ireland, Scotland and Rome.

In Mesopotamia, souls could return as ghosts that manifested themselves as sickness among the living. Doctors called on those suffering from these kinds of illness to confess any sins that may have summoned the dead before treating them with spells to placate the ghosts.

Despite his field of studies, Finkel has no personal experience with spirits himself.

“I would like to see a ghost. I’ve never seen one. It’s very annoying to me,” he said in the video.

Please visit the site: https://www.smithsonianmag.com/smart-news/3500-year-old-babylonian-tablet-may-hold-earliest-known-ghost-image-180978923/?utm_source=smithsoniandaily&utm_medium=email&utm_campaign=editorial&lctg=91670219 [Go there for pix]

DISCOVERED: 4,000-YEAR-OLD TEMPLE IN KUWAIT, BY HUDA ATA

The find brings the total number of known temples in Failaka to four

Dubai: Archaeologists in Kuwait have uncovered a 4,000-year-old temple dating back to the Dilmun civilization on Failaka Island, in what is being described as one of the country's most significant archaeological discoveries in decades, Al Qabas newspaper reported.

The find was announced on Sunday by the National Council for Culture, Arts and Letters (NCCAL), which revealed that the ancient structure was discovered by a joint Kuwaiti–Danish team from the Moesgaard Museum during the 2025 excavation season.

According to Mohammed bin Redha, Acting Assistant Secretary-General for the Antiquities and Museums Sector at the NCCAL, the team uncovered the complete layout of a Bronze Age temple located directly beneath another Dilmun temple discovered last year, confirming that two temples were built on the same site, one atop the other, both dating back roughly 4,000 years.

Bin Redha said the NCCAL continues to support archaeological missions engaged in excavation, restoration, and scientific research throughout Kuwait as part of its efforts to preserve and promote the nation's ancient heritage.

Excavations this season focused on the area east of the Dilmun palace and temple at a mound known as Tell F6, which belongs to the early Dilmun period.

Dr. Stefan Larsson, head of the Danish mission, said previous digs had revealed wall fragments believed to form part of a small temple platform dating to around 1900 BCE.

The newly discovered structure, found beneath that level, included foundations, seals, and pottery vessels, confirming its connection to the early Dilmun period. "This marks a major step in understanding the religious practices of the Dilmun Kingdom," Larsson said.

Dr. Hassan Ashkanani, professor of archaeology and anthropology at Kuwait University, called the find "a remarkable archaeological milestone", noting that the discovery of two temples from between 1900 and 1800 BCE adds a new dimension to the understanding of ancient Dilmun's religious and civic architecture.

The find brings the total number of known temples in the island's southwest to four, suggesting the area once served as a major administrative and spiritual center in the Bronze Age.

Dr. Ole Herslund, excavation supervisor since 2022, said the ongoing research aims to analyse both temples in detail, from their architectural layouts to the daily rituals practiced within them, to better understand how Dilmun's religious, cultural, and political institutions shaped life on the island.

Failaka, located about 20 kilometers off Kuwait's coast, was a thriving hub of the Dilmun civilization, which flourished across the Gulf region during the Bronze Age.

Please visit the site: <https://gulfnews.com/world/gulf/kuwait/discovered-4000-year-old-temple-in-kuwait-1.500321771>
