



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

**ΔΟΙΚΗΤΙΚΟ
ΣΥΜΒΟΥΛΙΟ:**

Ι. Μπασιάκος (πρόεδρος),
Γ. Φακορέλλης (αντιπρόεδρος),
Ε. Φιλιπάκη (γραμματέας),
Α. Οικονόμου (ταμίας),
Γ. Θεοδώρου (μέλος),
Π. Λουκοπούλου (μέλος),
Μ. Παπαγεωργίου (μέλος)

Πληροφορίες:

Γ. Φακορέλλης (σύνταξη,
επιλογή ύλης)

E-mail: yfacorel@teiath.gr

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

BOARD:

I. Bassiakos (president),
Y. Facorellis (vice-president),
E. Philippaki (secretary),
A. Oikonomou (treasurer),
G. Theodorou (member)
P. Loukopoulou (member),
M. Papageorgiou (member)

Information: Y. Facorellis
(editor)

E-mail: yfacorel@teiath.gr

Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Ιούλιος 2018 -

Painting is silent poetry, and poetry is painting that speaks.
(Plutarch)

Newsletter of the Hellenic Society of Archaeometry

- July 2018 -

Nr. 208

ΠΙΝΑΚΑΣ ΠΕΡΙΕΧΟΜΕΝΩΝ – TABLE OF CONTENTS

ΣΥΝΕΔΡΙΑ – CONFERENCES/WORKSHOPS

- Workshop Analysis of Weave Structures in Museum Textiles: Textile Basics and Non-Woven Structures, The Foundation of the American Institute for Conservation (FAIC), October 8 - 10, 2018, The George Washington University and The Textile Museum, Ashburn, VA **page 4**
- WORKSHOP: Ancient Egyptian Perfume Workshop, Berlin, July 15, 2018 **page 5**
- 2019 ICOM-CC Glass and Ceramics and Icon Ceramics and Glass Group joint meeting, Call for Papers **page 6**
- EuroMed 2018 International Conference, October 29th - November 3rd, 2018, Filoxenia Center, Nicosia, Cyprus **page 8**
- Bioarchaeology in Egypt-International, Symposium of Animals in Ancient Egypt, Cairo, January 2019 **page 11**
- 1st International Conference TMM_CH, Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage, 10-13 October, 2018 Eugenides Foundation Athens, Greece **page 12**

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ – JOB VACANCIES/FELLOWSHIPS

- FELLOWSHIPS: PhD on climate studies, University of Dublin **page 15**

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

- Establishment of Art Characterization research laboratory at The Cyprus Institute in Nicosia **page 16**

INTERNET SITES

- New project website: Stelida Naxos Archaeological Project **page 18**
- The ACOR Photo Archive **page 19**

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

- New radiocarbon cycle research may alter history, by Daniel Aloi **page 20**

- ΑΣΤΡΟΝΟΜΙΚΕΣ ΧΡΟΝΟΛΟΓΗΣΕΙΣ ΤΟΥ ΤΕΛΟΥΣ ΤΟΥ ΤΡΩΙΚΟΥ ΠΟΛΕΜΟΥ ΚΑΙ ΤΗΣ ΕΠΙΣΤΡΟΦΗΣ ΤΟΥ ΟΔΥΣΣΕΑ **page 23**

- The Art of Painting in Ancient Greece **page 25**

ΕΙΔΗΣΕΙΣ - NEWS RELEASE

- Ashes from Santorini's Minoan eruption found in Smyrna excavation **page 26**

A Radical New Theory About the Origins of Art - Archaeologists are tapping cutting-edge neuroscience and psychology research to figure out how our

ancestors began making figurative art, by Derek Hodgson and Paul Pettitt	page 28
These Skeletons from an Ancient Egypt Cemetery Were Riddled with Cancer, by Owen Jarus	page 31
New evidence of ancient child sacrifice found in Turkey, by Katie Pavid	page 33
Archaeologists discover villa and mosaic of Ancient Greek fisherman Phainos in Turkey	page 36
Buried by the Ash of Vesuvius, These Scrolls Are Being Read for the First Time in Millennia - A revolutionary American scientist is using subatomic physics to decipher 2,000-year-old texts from the early days of Western civilization, by Jo Marchan	page 37
What did ancient Babylonians eat? A Yale-Harvard team tested their recipes, by Bess Connolly Martell	page 46
Gladiator Diets Were Carb-Heavy, Fattening, and Mostly Vegetarian To survive the arena, they ate a mash of barley and beans, by Ryleigh Nucilli	page 49
The Origins of Maps in the Near East, by Bleda S. Düring	page 52
Pompeii 2018: Week 2	page 55
Unique Byzantine-era winepresses unearthed in roofed water cistern in Tzippori, by Amanda Borschel-Dan	page 56
Corbyn vows to return Elgin Marbles to Greece if he becomes prime minister ..	page 58
Incredible 'Harry Potter' camera can reveal hidden texts on ancient parchment, by Mollie Cahillane	page 60
Ancient knowledge transfer: Egyptian astronomy, Babylonian methods	page 63

ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

WORKSHOP ANALYSIS OF WEAVE STRUCTURES IN MUSEUM TEXTILES: TEXTILE BASICS AND NON-WOVEN STRUCTURES, THE FOUNDATION OF THE AMERICAN INSTITUTE FOR CONSERVATION (FAIC), OCTOBER 8 - 10, 2018, THE GEORGE WASHINGTON UNIVERSITY AND THE TEXTILE MUSEUM, ASHBURN, VA

The Foundation of the American Institute for Conservation (FAIC) presents the "Analysis of Weave Structures in Museum Textiles: Textile Basics and Non-Woven Structures" workshop October 8 - 10, 2018 at The George Washington University and The Textile Museum in Ashburn, VA. The workshop will be instructed by Elena Phipps and organized by Maria Fusco.

Documenting the weave structures of ancient, historic and ethnographic textiles, is one of the most important contributions textile conservators can make to the body of knowledge about works of art in the museum context. This workshop will address the basics of textile structural analysis including the examination of yarns, identification of selvages and finishing treatments for textiles from a range of periods and cultures, and will focus on those textiles particularly composed with non-woven structures such as felting, looping, cross-looping, knotting, linking, twining, complex braiding and sprang, used by various cultures. Though among the most ancient methods of composing fiber-made objects, they can prove to be a challenge for many textile specialists.

The workshop will combine lectures on history and development of textiles and their analysis, practical exercises in the analysis of weave structures and the production of sample structures, as well as the first-hand examination of selected textiles in the museum collection.

The course will be followed by the "Simple Weaves and Complex Structures" workshop in April 2019. These workshops are supported by a grant from the National Endowment for the Humanities (NEH). Scholarships are available to support costs associated with attending these workshops. For more details and registration information, visit [URL: http://www.conservation-us.org/textile-basics-and-non-woven-structures](http://www.conservation-us.org/textile-basics-and-non-woven-structures).

WORKSHOP: ANCIENT EGYPTIAN PERFUME WORKSHOP, BERLIN, JULY 15, 2018

Ancient Egyptian Perfume Workshop
Create a piece of fragrant history
with Dora Goldsmith and Klara Ravat.

An olfactory artist and an Egyptologist came together to create a workshop, where you can make your own perfume based on an ancient Egyptian recipe that dates back to as early as the building of the pyramids.

Klara Ravat is an olfactory artist based in Berlin. She is the founder of the Smell Lab, a community project that focuses on the investigation and practice of the art and science of the sense of smell. Klara's Smell Lab offers scent design workshops, scent summits and smell walks, where the participants can immerse themselves in the mysterious world of olfaction.

Dora Goldsmith is a PhD student of Egyptology at the Freie Universität Berlin. The topic of her PhD project is the sense of smell in ancient Egypt, the exact title of her research being "The Archaeology of Smell in Ancient Egypt. A Cultural Anthropological Study Based on Written Sources". She is a fellow of the ELES-Foundation, which supports young talented researchers.

Throughout this workshop, we will follow an ancient Egyptian recipe step-by-step to create a solid perfume. You will receive a copy of the original hieroglyphic text with a translation and explanations, as well as all the required materials. Dora will guide you through the text and present an overview of the history of the recipe. Klara will introduce you to perfume-making and give you an insight into the materials. Beside the traditional, solid perfume, we will also make a modern, liquid version of the fragrance. The workshop will take three hours. At the end of the event, you will go home with two bottles. One of them will contain a solid perfume based on an ancient Egyptian recipe, the other its modern-day, liquid equivalent. Join us to create a piece of fragrant history that you can take home with you!

Price: 60€

Time and Date: July 15, 2018, 3pm-6pm

Location: Lacuna Lab, Berlin-Kreuzberg

For questions, e-mail: hello@smell-lab.com

Please visit the site: <https://www.smell-lab.org/ancientegyptian>

2019 ICOM-CC GLASS AND CERAMICS AND ICON CERAMICS AND GLASS GROUP JOINT MEETING, CALL FOR PAPERS

We are thrilled to announce the 2019 Interim Meeting of the Glass and Ceramics Working Group, held jointly with ICON Ceramics and Glass Group <https://www.facebook.com/ICONCGG/?fref=mentions> and hosted by the British Museum <https://www.facebook.com/britishmuseum/?fref=mentions>!

For details, you can read below, or visit this Call for Papers link http://www.conservationaffair.com/uploads/1/7/4/4/17443603/2019-meeting_first-announcement_final-19june2018.pdf.

The conference will take place September 5-7, 2019 and marks the 5th Interim Meeting of ICOM-CC Glass and Ceramics, and the 34th year of dedicated events from Icon's Ceramics and Glass Group. The joint conference promises to gather an impressive group of professionals specializing in the field of ceramics and glass conservation at a prestigious location in the heart of London.

Conference goals:

- Present relevant case studies in the conservation of glass and ceramics
- Disseminate research results
- Promote the application of new materials and technologies for conservation practice, as well as tools for analysis and documentation
- Identify further research and provide networking for future collaboration and activity

All aspects of the conservation, study, and research of glass- and ceramics-based cultural heritage are welcome, and papers may explore a wide variety of topics.

Structure and scope:

The three-day conference will include thematic sessions for paper presentations, as well as a small poster session.

We will also feature a dedicated student session. Students currently enrolled (or enrolled at the time of this announcement) in a conservation training program are invited to submit abstracts for this session. If selected, their contribution will be published in the proceedings as abstracts.

Submission details:

All professional paper contributions will be peer-reviewed by the members of the scientific committee, published in colour preprints, distributed in hard copy with attendee registration packets.

Dates:

10 September 2018: Abstracts due.

Please submit abstracts of 400 words or less for consideration (no images or graphs). The work must be original and not previously published. Include the title, author name(s),

professional title(s), affiliation(s), and contact email address(es). In the case of multiple authors, please list all authors, professional titles, affiliations and contact emails for each author, indicating the corresponding author.

For submissions to the student session, please indicate that you are submitting a paper to this session by including "Student Session" before the title of your abstract.

For submissions to the poster session, please indicate that you are submitting a poster by including "Poster" before the title of your abstract.

Submit abstracts to lfair@winterthur.org prior to 10 September 2018 for consideration.

15 November 2018: Abstract selection, notification of authors

5 March 2019: Manuscript due date

March - April 2019: Review of papers

15 May 2019: Distribution of final programme; Early registration open

Location:

The conference will be held at the BP Lecture Theatre in the Clore Centre for Education at the British Museum in London, United Kingdom.

Founded in 1753, The British Museum is located in the Bloomsbury (central) area of London and is the first national public museum in the world. Its permanent collection contains 8 million objects and holds one of the most comprehensive ceramics and glass collections worldwide.

The British Museum has also one of the oldest and largest conservation departments in the world. Since 2014, the department has been based in the British Museum's new state-of-the-art World Conservation and Exhibition Centre (WCEC). As part of the conference, delegates will have the opportunity to visit the conservation studios and see the ongoing conservation work.

Organizing Committee:

Lauren Fair, Coordinator, ICOM-CC Glass and Ceramics Working Group

Dana Norris ACR, Chair, Icon Ceramics and Glass Group

Duygu Camurcuoglu ACR, Ceramics, Glass, and Metals Conservator, British Museum

Contact:

A conference website will be coming soon, linked both to the ICOM-CC Glass and Ceramics Working Group page and the Icon Ceramics and Glass Group page.

For inquiries related to local organization, contact Dana Norris (danaenorris@yahoo.com<<mailto:danaenorris@yahoo.com>>) and Duygu Camurcuoglu (dcamurcuoglu@britishmuseum.org<<mailto:dcamurcuoglu@britishmuseum.org>>).

For inquiries related to content, contact Lauren Fair (lfair@winterthur.org<<mailto:lfair@winterthur.org>>).

EUROMED 2018 INTERNATIONAL CONFERENCE, OCTOBER 29TH - NOVEMBER 3RD, 2018, FILOXENIA CENTER, NICOSIA, CYPRUS

Dedicated on Digital Cultural Heritage Documentation, Preservation and Protection.

<http://www.fcc.com.cy>

Final extension of Papers

The newly established UNESCO CHAIR on Digital Heritage is announcing the International Conference EuroMed 2018 dedicated on Digital Cultural Heritage Documentation, Preservation and Protection.

This conference is a milestone event in the EU Year 2018, which is dedicated to Cultural Heritage. It's in cooperation with the European Parliament, the European Commission and the EU digital library Europeana and in collaboration with the prestigious publisher Springer-Nature to celebrate the 1.000.000 downloads of our publications.

www.euromed2018.eu and www.digitalheritage2018.eu

Twelve years of European – Mediterranean Conferences on Digital Heritage Documentation, Preservation and Protection (EuroMed): 2006 – 2018

In cooperation with:

the EU Projects: DARIAH-EU (www.dariah.eu) Research Infrastructure on e-Humanities and Art, ViMM: Virtual Museums (www.vi-mm.eu), INCEPTION (www.inception-project.eu/), the COST Action Innovation in Intelligent Management of Heritage Buildings, the EU Photoconsortium, the CARARE Consortium and the Michael-Plus Association and others more...

Panel Discussion on Looting and Destruction of CH with prominent professionals from UNESCO, ICOM, ICOMOS, Interpol, etc.

Workshops - Open to all participants:

1. The EU Workshop on how digital technologies can contribute to the preservation and restoration of Europe's most important and endangered cultural heritage sites:
 - Which technologies need to be developed to allow the creation a digital replica which must be of such definition and detail enabling their use for research and future preservation and reconstruction of damaged artefacts or sites?
 - Which standards needs to be agreed upon so that the digitised material will be accessible (long term) to all through a single access point, also providing access to complementary material (images, books, descriptions, drawings) illustrating the cultural and historic significance of the sites.
2. The 4th International Workshop on 3D Research Challenges in Cultural Heritage to be organized by the EU H2020 INCEPTION project and the Europeana's Task Force Group on Advanced documentation of 3D Digital Assets.

Final extension of Papers

Oct. 29th – Nov. 3rd, 2018; Cyprus

<http://www.digitalheritage2018.eu>

Paper submission deadline: 30th of June, 2018 (24:00 London-UK time)

Dear colleagues,

The 7th biannual European-Mediterranean (EUROMED) conference brings together researchers, policy makers, professionals, fellows and practitioners to explore some of the more pressing issues concerning Cultural Heritage today. In particular, the main goal of the conference is to focus on interdisciplinary and multi-disciplinary research on tangible and intangible Cultural Heritage, using cutting edge technologies for the protection, restoration, preservation, massive digitalization, documentation and presentation of the Cultural Heritage contents. At the same time, the event is intended to cover topics of research ready for exploitation, demonstrating the acceptability of new sustainable approaches and new technologies by the user community, owners, managers and conservators of our cultural patrimony.

Topics and themes:

Researchers and practitioners willing to participate to the EUROMED 2018 conference are invited to submit papers on original works addressing the following subjects and research themes:

- i) DIGITAL HERITAGE DOCUMENTATION and PRESERVATION
- ii) PROTECTION, RESTORATION AND PRESERVATION OF TANGIBLE AND INTANGIBLE CULTURAL HERITAGE

More detail information regarding the themes can be found at: <http://www.euromed2018.eu/index.php/call-participation>

Submission of Papers:

Submissions for the event are completely electronic through the on-line submission website available at <http://www.euromed2018.eu/index.php/paper-submission>. The conference accepts only original, unpublished work written in English which will be blind-reviewed and published on SPRINGER-NATURE LNCS.

We are soliciting three types of contributions:

1. **Full research papers:** they present new innovative research developments and results. They will feature a full-length oral presentation and will be published in a high-quality proceedings volume. Each submitted paper must not exceed 12 pages in total.
2. **Project papers:** they focus on the description of project organization, use of technology and lessons learned. They will feature a short oral presentation and will be published in a high-quality proceedings volume. Each submitted paper must not exceed 10 pages in total.
3. **Short papers:** they present preliminary ideas and works-in-progress. These papers will have a short oral presentation and will be also available also as posters in conference breaks. Each short paper must not exceed 8 pages in total.

The 20 best submitted papers will be published on a special issue of upcoming International Journal Heritage in the Digital Era.
Final extension of Papers: **30th of June, 2018 (24:00 London-UK time)**.

→ <http://www.euromed2018.eu/index.php/important-dates>

Dr. Marinos Ioannides

Cyprus University of Technology
Department of Electrical Engineering, Computer Engineering and Informatics
Director of UNESCO Chair on Digital Cultural Heritage
Coordinator of the EU ERA Chair on Digital Cultural Heritage
Digital Heritage Research Laboratory
Arch. Kyprianou 31, CY 3036 Limassol, CYPRUS,
<http://www.digitalheritagelab.eu/>

Like us: <https://www.facebook.com/dhrlabcut>

Contact us:

Email: marinos.ioannides@cut.ac.cy

Tel. [+357-25-002020](tel:+357-25-002020), Fax. [+357-25-002899](tel:+357-25-002899)

**BIOARCHAEOLOGY IN EGYPT-
INTERNATIONAL, SYMPOSIUM OF
ANIMALS IN ANCIENT EGYPT, CAIRO,
JANUARY 2019**

Dear All

I would be most grateful if you would publicise and/or attend the joint Bioarchaeology in Egypt-International Symposium of Animals in Ancient Egypt conference to be held in Cairo in January 2019.

The web site is: www.BAE2019.org

We look forward to welcoming you all in.

Salima Ikram

Distinguished University Professor
Egyptology Unit Head
Department of Sociology, Egyptology & Anthropology
American University in Cairo
AUC Avenue, PO Box 74
New Cairo 11835
salima@aucegypt.edu, salimaikram@gmail.com
tel: 20-2-2615-1840; fax: 20-2-2797-4903

1ST INTERNATIONAL CONFERENCE
TMM CH, TRANSDISCIPLINARY
MULTISPECTRAL MODELLING AND
COOPERATION FOR THE PRESERVATION
OF CULTURAL HERITAGE, 10-13 OCTOBER,
2018 EUGENIDES FOUNDATION ATHENS,
GREECE

ABOUT

Innovative scientific methodologies and challenging projects marking future trends in the protection of cultural heritage, have initiated a universal conversation within a holistic approach, merging capabilities and know-how from the scientific fields of architecture, civil engineering, surveying engineering, materials science and engineering, information technology and archaeology, as well as heritage professionals on restoration and conservation and policy makers in cultural heritage. The combined utilization of digital documentation technologies with innovative analytical and non-destructive techniques, computational and digital techniques and archaeometric methods supports the creation of a transdisciplinary multispectral modelling towards the sustainable preservation of cultural heritage. Innovation is enhancing and revealing a critical dimension of the preservation of cultural heritage along with social participation and communication.

The National Technical University of Athens interdisciplinary team “Protection of monuments” [Prof. A. Moropoulou, Prof. Emer. M. Korres, Prof. A. Georgopoulos, Prof. C. Spyarakos, Ass. Prof. C. Mouzakis], scientific responsible for the Holy Aedicule’s rehabilitation of the Holy Sepulchre in Jerusalem, and the Technical Chamber of Greece, in cooperation with the Ministry of Culture and Sports and the Ministry of Digital Policy, Telecommunications and Media of the Hellenic Republic, organize the **1st International Conference on “TRANSDISCIPLINARY MULTISPECTRAL MODELLING AND COOPERATION FOR THE PRESERVATION OF CULTURAL HERITAGE” [TMM_CH]** on 10-13 October 2018, in Athens, Greece, discussing modern trends in the original agora of our technological and democratic roots.

TMM_CH international conference is organized under the auspices of H.E. the President of the Hellenic Republic, with the support of the Hellenic Parliament, in cooperation with the National Geographic Society, World Monuments Fund, ICOMOS, European Construction Technology Platform, European Society for Engineering Education, and other major international and European organizations, associations and networks in the field of cultural heritage preservation.

The conference will be held at the Eugenides Foundation, with reference to the Digital Exhibition of Advanced Technology “Tomb of Christ: the Monument and the Project” at the Byzantine and Christian Museum of Athens [21 May 2018 until 31 January 2019]. Scientific walk and talk visits to Acropolis and Ancient Agora [in the footsteps of the

Greek Peripatetic Philosophical School] and other major archaeological sites are planned on 13 October 2018.

The International Steering Committee and the International Scientific Committee welcome research contributions for oral and poster presentations in English. The submitted abstracts and papers will be peer reviewed. Accepted papers will be divided into sessions. Plenary lectures [after invitation] will cover major accomplishments, trends and technical challenges. Please check important dates for submission deadlines.

Selected papers will be published in a special edition of Springer LNBIP series [available in 2018 following the Conference] as well as to selected international Scientific Journals.

- Cultural heritage identity
- Cultural heritage revealing of values and historic representation
- Cultural heritage management towards sustainable development (tourism et al)
- Education and training for the preservation of cultural heritage
- History of architecture, historic materials and structures of cultural heritage
- Geometric documentation
- Digital, augmented (AR) and virtual (VR) documentation of cultural heritage
- 3D reconstruction of cultural heritage
- Interdisciplinary risk assessment and preservation of cultural heritage: design, materials and interventions / documentation, diagnosis, conservation, preservation, rehabilitation, reconstruction, restoration
- In situ advanced diagnostics and inspection by non-destructive techniques, robotics and unmanned aerial vehicles
- Laboratory testing and methods for characterization and validation of historic materials and structures
- Compatible and performing, repair and strengthening materials and techniques
- Criteria, methodologies and techniques to assess sustainable and compatible materials and interventions techniques
- Numerical modeling and structural analysis
- Seismic analysis and retrofit
- Standards, metadata, ontologies and semantic processing in cultural heritage
- Tools for multidimensional and multidisciplinary modeling
- Monitoring of monuments' response to environmental stresses and of structural health
- Enhancing resilience of cultural heritage against climate change and natural hazards
- Interdisciplinary knowledge based decision making
- Management of cultural heritage preservation projects and strategies
- Interdisciplinary projects and methodologies
- Historic architectural sites and preserved monuments as open labs of innovation and sustainable socioeconomic development
- Transdisciplinary cooperation and innovation for the preservation of cultural heritage
- Stakeholders' requirements for cultural heritage preservation
- Socio-economic and cultural impact of cultural heritage preservation
- Historic cities and centers: new strategies for protection by development and reuse
- Circular economy and innovative strategies for sustainable preservation of cultural heritage

- From research and innovation to policy for cultural heritage preservation
- Education and training for the preservation of cultural heritage
- Cultural heritage preservation with social accessibility and engagement

Please visit the site: <https://tmm-ch2018.com/>

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

FELLOWSHIPS: PHD ON CLIMATE STUDIES,
UNIVERSITY OF DUBLIN

On behalf of Frank Ludlow (Dublin), I announce the vacancy of a PhD position for the study of climate in first millennium Babylonia. The study of the climate data in the astronomical diaries will be part of the job.

The scholarship is now advertised at the link below:

<http://histories-humanities.tcd.ie/postgraduate/IRC-PhD-scholarships.php>

Frank Ludlow provides the following extra information:

"The ideal PhD student would be someone who has experience as an assyriologist, but also has experience in statistics, price data, conflict and climate, and finally who has experience in mapping (i.e. using ArcGIS software). I think we would be very lucky to find a person with all of those skills! Therefore, I would be happy to have a good assyriologist who is not afraid to be trained in the statistics and the GIS (I can provide that training), or a person who is good at the historical statistics and GIS, and who needs training in the sources"

Training in the reading of the sources may be done at Vrije Universiteit Amsterdam and with my assistance as regards the astronomical diaries.

It will be an important study in the current topical research into climate and the social, economic and historical impact of climate change.

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

ESTABLISHMENT OF ART CHARACTERIZATION RESEARCH LABORATORY AT THE CYPRUS INSTITUTE IN NICOSIA

Advances in Science and Technology have revolutionized the documentation and study of art and archaeology. Issues of style, iconography, technique, provenance and materiality addressed through innovative digital and analytical methods, have transformed the history of art, the archaeological method, the preservation of cultural heritage and their relevance for contemporary societies. Responding to these developments, the April 2018 establishment of the **Andreas Pittas Art Characterization Laboratories (APAC Labs)** at the research centre for **Science and Technology in Archaeology and Culture (STARC)** at The Cyprus Institute offers a holistic approach to art characterization. Specifically, the labs will pursue:

- A) Research, to advance the effective use of heritage science and technology in the characterization of works of art, monuments and related archaeological materials.
- B) Innovation, to develop task-specific service protocols related to material characterization, provenance, condition assessment, and identification of works of art and cultural heritage artefacts.
- C) Training and Education, to offer training events, workshops and seminars to experts and students from both the humanities and the sciences, thus exposing them to interdisciplinary methodologies and approaches.

The APAC Labs develop an interdisciplinary research pipeline that is based on a broad and multi-scale diagnostics approach, integrating inorganic / organic physico-chemical methods with reflectography, multi-spectral imaging, and surface 2D imaging/3D geometric characterization. Acquired data are archived in repositories as part of **Dioptra: the Edmée Leventis Digital Library for Cypriot Culture** (dioptra.cyi.ac.cy) and managed in coordination with Cyl's Cy-Tera High Performance Computing Facility.

Digital documentation, spectral imaging and analytical work on Byzantine icons, frescoes, mosaics and paintings by artists such as El Greco, Titian and Giovanni Barozio have already offered exciting results on aspects of technique and materials used. In addition, they have provided new insights into the history and preservation of these works. Scientific visualization has allowed the virtual reconstruction of heritage-at-risk monuments, such as the church of Christ Antiphonitis, fragments of archaic terracotta statues from Salamis, now dispersed across numerous museums and collections across the world, or fading graffiti in the medieval churches of Cyprus and Venice. Moreover, the use of virtual immersive environments offers tremendous possibilities in the simulation of heritage contexts, like the historic old city of Nicosia, or the prehistoric World Heritage Site of Choirokoitia.

As part of their research activities and development the APAC Labs will be offering fellowships for visiting scholars and students as well as training and workshops opportunities. For more details, updates and contact information please check the APAC Labs website: www.apac.cyi.ac.cy

The Cyprus Institute (CyI) is an internationally recognized research institution, created by the Cyprus Research and Educational Foundation (CREF) as part of its vision to help transform Cyprus into a knowledge-based economy, and to advance the welfare of the island and the region. It is carrying out pioneering research involving cutting-edge technologies, in order to address problems of regional and international significance; much of its research is funded by competitive national and European (FP7 and H2020) grants. At the same time, it provides training for future researchers and scholars through its high quality Doctoral and Master's programs. CyI comprises of three specialized multidisciplinary research centers, developed in partnership with leading international institutions in their respective thematic areas.

The Energy, Environment and Water Research Center (EEWRC) partnered with the Massachusetts Institute of Technology (MIT).

The Science and Technology in Archaeology and Culture Research Center (STARC) partnered with the Centre de recherche et de restauration des musées de France (C2RMF).

The Computation-based Science and Technology Research Center (CaSToRC) partnered with the University of Illinois.

INTERNET SITES

**NEW PROJECT WEBSITE: STELIDA NAXOS
ARCHAEOLOGICAL PROJECT**

Dear all

Greetings from Naxos (and nice to be back...).

Here is our new project website for all those interested in the earliest Cyclades...

<https://www.stelida.org/>

very best

Tristan Carter / Stringy

Undergraduate Chair / Associate Professor
Dept. of Anthropology, CNH 524
McMaster University
1280 Main Street West, Hamilton
ON, L8S 4L9, CANADA

Director [*Stelida Naxos Archaeological Project*](#)
Director [*McMaster Archaeological XRF Lab \[MAX Lab\]*](#)



THE ACOR PHOTO ARCHIVE

The American Center of Oriental Research (ACOR) in Amman, Jordan, is proud to share its new web-based photo archive that features close to 10,000 high-resolution digital images of cultural heritage sites from Jordan and the surrounding region. The online archive, being developed with a grant from the U.S. Department of Education, includes spectacular images of hundreds of sites in Jordan, Syria, Yemen, and Saudi Arabia taken by renowned author and photographer Jane Taylor, as well as a growing collection of photographs of Jordan by famed journalist (and archaeological enthusiast) Rami Khouri. Other recently added collections include photographs by Linda K. Jacobs and Charles Wilson.

In coming years, the archive will continue to grow as new collections from ACOR's rich archival holdings are digitized and made available.

To search the ACOR Photo Archive, please visit:
<https://acor.digitalrehab.com/>. You can also follow @acorarchives on Instagram.

All images presented online through our database are intended for open access, and are free to use for research and academic purposes. For image requests and permissions for publication please consult our online guidelines:
https://photoarchive.acorjordan.org/?page_id=431.

To learn more about the Photo Archive project or how to obtain high-resolution images, please email archives@acorjordan.org.

ACOR is a non-profit academic institution dedicated to promoting research and publication in the humanities and social sciences, with a particular focus on issues related to Jordan but also encompassing the broader Middle East. ACOR facilitates research by postgraduate researchers and senior scholars and assists in the training of specialists who focus on all phases of Jordan's past and present. To learn more, please visit www.acorjordan.org or email acor@acorjordan.org.

Please visit the site: <https://acor.digitalrehab.com/>

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

NEW RADIOCARBON CYCLE RESEARCH MAY ALTER HISTORY, BY DANIEL ALOI

Scientific research often depends on a degree of certainty in the data while allowing for the likelihood of change – new findings overriding old theories and creating new ones. Change is a given, especially true when taking weather and climate into account.

Archaeologist Sturt Manning and colleagues have revealed variations in the radiocarbon cycle at certain periods of time, affecting frequently cited standards used in archaeological and historical research relevant to the southern Levant region (Israel, southern Jordan and Egypt). These variations, or offsets, of up to 20 years in the calibration of precise radiocarbon dating could be related to climatic conditions.

Manning, the Goldwin Smith Professor of Classical Archaeology in the Department of Classics and director of the Cornell Tree-Ring Laboratory, is the lead author of “Fluctuating Radiocarbon Offsets Observed in the Southern Levant and Implications for Archaeological Chronology Debates,” published May 29 in the Proceedings of the National Academy of Sciences.

Pre-modern radiocarbon chronologies rely on standardized Northern and Southern Hemisphere calibration curves to obtain calendar dates from organic material. (The current Northern Hemisphere standard is IntCal13, published in 2013.) These standard calibration curves assume that at any given time radiocarbon levels are similar and stable everywhere across each hemisphere.

The Cornell-led team had questions and suspicions.

“We went looking to test the assumption behind the whole field of radiocarbon dating,” Manning said. “We know from atmospheric measurements over the last 50 years that radiocarbon levels vary through the year, and we also know that plants typically grow at different times in different parts of the Northern Hemisphere. So we wondered whether the radiocarbon levels relevant to dating organic material might also vary for different areas and whether this might affect archaeological dating.”

Some research has “suggested there might be regional differences in radiocarbon levels, and hence problems for the standard model,” he said. “We set out to ... see if we could observe such differences over time, and whether [they] were relevant to archaeological dating. If the existing assumed dates were to change, then you might discover a more complicated story, which is what we found – an unrecognized but visible complication that affects the radiocarbon standard used up to now for the southern Levant region. This finding changes dates at certain periods in the past, which affects the history we write.”

The authors measured a series of carbon-14 ages in southern Jordan tree rings, with established calendar dates between 1610 and 1940 A.D.

They found that contemporary plant material growing in the southern Levant shows an average offset in radiocarbon age of about 19 years compared with IntCal13.

Manning noted that “scholars working on the early Iron Age and Biblical chronology in Jordan and Israel are doing sophisticated projects with radiocarbon age analysis, which argue for very precise findings. This then becomes the timeline of history. But our work indicates that it’s arguable their fundamental basis is faulty – they are using a calibration curve that is not accurate for this region.”

The standard IntCal13 curve is constructed from measurements of radiocarbon levels in trees from Central and Northern Europe and North America. Comparing his team’s results against IntCal13, “trees growing in southern Jordan are showing a different amount of radiocarbon compared with trees in central and northern Europe, and in North America,” Manning said.

“IntCal13 offers a pretty good guide to mid-latitude areas of the Northern Hemisphere but not, we discover, for other regions like the southern Levant. This affects the timeline of the past in these areas.”

Apparent fluctuations in the offset through time may be a consequence of climatic changes, periods of warming and cooling modulating the local growing seasons, the researchers say.

“These variations seem to relate to changes in regional climate, which likely see growing seasons move a little earlier or later,” Manning said. “For example, we see larger offsets [in the periods] 1685-1762 A.D. and 1818-1912 A.D., and these seem to link with generally warming conditions in the southern Levant.”

Applying their results to previously published chronologies, the researchers also show how even the relatively small offsets they observe can shift calendar dates by enough to alter ongoing archaeological, historical and paleoclimate debates.

“We have only investigated tree-rings from A.D. 1610-1940 so far, but we can reasonably assume that a similar pattern of radiocarbon fluctuations occurred in the centuries before for this region,” said Manning, who has published extensive research on radiocarbon and tree-ring chronologies, and has written about and taught courses on climate change through history. “There has been much debate for several decades among scholars arguing for different chronologies sometimes only decades to a century apart – each with major historical implications. And yet these studies ... may all be inaccurate since they are using the wrong radiocarbon information.”

“Our work,” he added, “should prompt a round of revisions and rethinking for the timeline of the archaeology and early history of the southern Levant through the early Biblical period.”

His co-authors on the PNAS paper are Cornell Tree-Ring Laboratory senior researcher Carol Griggs ’77, Ph.D. ’06, and postdoctoral researcher Brita Lorentzen ’06, Ph.D. ’15; Christopher Bronk Ramsey and David Chivall of the Oxford University School of Archaeology; and A.J. Timothy Jull and Todd E. Lange of the University of Arizona’s Accelerator Mass Spectrometry Laboratory.

Please visit the site: <http://news.cornell.edu/stories/2018/06/new-radiocarbon-cycle-research-may-alter-history> [Go there for pix and charts] [Download article at <http://www.pnas.org/content/early/2018/05/23/1719420115>]

ΑΣΤΡΟΝΟΜΙΚΕΣ ΧΡΟΝΟΛΟΓΗΣΕΙΣ ΤΟΥ **ΤΕΛΟΥΣ ΤΟΥ ΤΡΩΙΚΟΥ ΠΟΛΕΜΟΥ ΚΑΙ** **ΤΗΣ ΕΠΙΣΤΡΟΦΗΣ ΤΟΥ ΟΔΥΣΣΕΑ**

Π Ρ Α Κ Τ Ι Κ Α Τ Η Σ Α Κ Α Δ Η Μ Ι Α Σ Α Θ Η Ν Ω Ν, ΔΗΜΟΣΙΑ ΣΥΝΕΔΡΙΑ
ΤΗΣ 19ΗΣ ΟΚΤΩΒΡΙΟΥ 2017

ΕΠΙΣΤΗΜΟΝΙΚΗ ΑΝΑΚΟΙΝΩΣΗ ΤΟΥ ΣΤΑΥΡΟΥ ΠΑΠΑΜΑΡΙΝΟΠΟΥΛΟΥ, ΤΗΣ ΠΑΝΑΓΙΩΤΑΣ ΠΡΕΚΑ-ΠΑΠΑΔΗΜΑ, ΤΟΥ ΠΑΝΑΓΙΩΤΗ ΜΗΤΡΟΠΕΤΡΟΥ, ΤΗΣ ΕΛΕΝΑΣ ΜΗΤΡΟΠΕΤΡΟΥ, ΤΩΝ ΠΑΝΑΓΙΩΤΗ ΑΝΤΩΝΟΠΟΥΛΟΥ, ΓΙΩΡΓΟΥ ΣΑΡΑΝΤΙΤΗ, ΚΟΣΜᾶ ΓΑΖΕΑ, ΠΑΝΑΓΙΩΤΗ ΝΑΣΤΟΥ, ΚΩΣΤΑ ΚΥΡΙΑΚΟΠΟΥΛΟΥ ΚΑΙ ΤΗΣ ΑΛΕΞΑΝΔΡΑΣ ΤΣΙΡΩΝΗ ΔΙΑ ΤΟΥ ΑΚΑΔΗΜΑΪΚΟΥ κ. ΑΝΤΩΝΙΟΥ ΚΟΥΝΑΔΗ

Ε Ν Α Θ Η Ν Α Ι Σ 2 0 1 7

ΑΝΑΤΥΠΟΝ ΕΚΤΟΣ ΕΜΠΟΡΙΟΥ ΕΚ ΤΩΝ ΠΡΑΚΤΙΚΩΝ ΤΗΣ ΑΚΑΔΗΜΙΑΣ
ΑΘΗΝΩΝ, τ. 92 Α' (2017)

Εισαγωγή

Στὰ ὀμηρικὰ ἔπη δὲν ὑπάρχει σαφὴς διάκριση μεταξὺ λόγου καὶ μύθου. Ὁ ποιητὴς χρησιμοποιοῦν δύο μόνο φορῆς τὴ λέξη «λόγος» καὶ μάλιστα στὸν πληθυντικό, ἴσως χάριν τοῦ μέτρου (Ο 393, α 56) καὶ ἑκατοντάδες φορῆς τὴ λέξη «μύθος» (147 φορῆς στὴν Ἰλιάδα καὶ 151 στὴν Ὀδύσεια). Στὴν πραγματικότητα ἡ λέξη «μύθος» στὸν Ὅμηρο ἔχει ὅλες τὶς σημασίες πὺν προσέλαβε ἀργότερα ἡ λέξη «λόγος», καὶ ἡ ἀκριβὴς κάθε φορὰ ἔννοια τῆς λέξης ἐξαρτᾶται ἀπὸ τὰ συμφραζόμενα. Ἔτσι, σὲ κάποια ἀπὸ αὐτὰ σημαίνει λόγια, κουβεντούλα, ἀφήγηση ἢ ἀκόμη ἀγόρευση, συμβουλή, συνομιλία, γνώμη καὶ λογικὸ ἐπιχείρημα.

Ἡ σημαντικὴ σχέση μεταξὺ μύθου καὶ λόγου φαίνεται στὴν ἀναφορὰ τοῦ Πλουτάρχου: «Ὅτι μὲν οὖν ἡ παλαιὰ φυσιολογία καὶ παρ' Ἑλλήσι καὶ βαρβάροις λόγος ἦν φυσικὸς ἐγκεκαλυμμένος μύθος, τὰ πολλὰ δι' αἰνιγμάτων καὶ ὑπονοιῶν ἐπίκρυφος, καὶ μυστηριώδης θεολογία τὰ τε λαλούμενα τῶν σιγωμένων ἀσαφέστερα τοῖς πολλοῖς ἔχουσα καὶ τὰ σιγώμενα τῶν λαλουμένων ὑποπτότερα, κατάδηλόν ἐστιν» (Περὶ τῶν ἐν Πλαταιαῖς Δαιδάλων, ἀπ. 157, 16-21).

[Εἶναι ὀλοφάνερο, λοιπόν, ὅτι ἡ παλαιὰ φυσικὴ ἐπιστήμη καὶ στοὺς Ἑλληνες καὶ στοὺς βαρβάρους ἦταν φυσικὸς λόγος κρυμμένος βαθιὰ μέσα σὲ μύθους, καὶ ἀπόκρυφη καὶ μυστηριώδης θεολογία, πὺν ἐκφράζεται ὡς ἐπὶ τὸ πλεῖστον μὲ αἰνιγματικὰ λόγια καὶ ὑπονοούμενα, καὶ ἡ ὁποία κάνει, γιὰ τοὺς πολλούς, καὶ τὰ λεγόμενα νὰ εἶναι ἀσαφέστερα ἀπὸ ὅσα ἀποσιωπῶνται καὶ τὰ ἀποσιωπώμενα νὰ εἶναι πὺν ἀμφίβολα ἀπὸ τὰ λεγόμενα.]

Ἡ ἐπιστημονικὴ ὁμάδα γνωρίζει τὴν ἄποψη τῆς ἀρχαιολόγου E. S. Sherratt (1990) ὅτι τὰ ἔπη περιέχουν ἀναχρονισμοὺς καὶ βρῖθουν ἀπὸ παραδοξότητες. Ὡστόσο, ἡ ὁμάδα γνωρίζει καὶ τὴν ἄποψη τοῦ γεωλόγου John Kraft καὶ τῶν συνεργατῶν του (2003), ὁ

όποιος μαζί με τόν ιστορικό John Luce τῆς ἴδιας συγγραφικῆς ομάδας ἐγκωμίασαν τόν Ὅμηρο γιά τήν ἀκρίβεια μερικῶν ἐκ τῶν ἐξετασθέντων χωρίων του, πού ἀφοροῦν θέματα ἱστορικῆς τοπογραφίας καί γεωμορφολογίας τῆς Τρωάδος, μετὰ ἀπό γεωλογικῆς ἐρευνῆς πεδίου εἴκοσι καί πλέον χρόνων. Ὁ E. Cline (2013) ἔχει συγκεντρώσει ὅλα τὰ ἀποτελέσματα πού προέκυψαν τὰ τελευταῖα 23 χρόνια μετὰ τὸ 1990 ἀπό τίς ἀρχαιολογικῆς καί λοιπῆς μελέτες σχετικὰ μετὰ τόν Τρωικὸ Πόλεμο. Ὅπως ἐπισημαίνεται, οἱ διάφορες περιγραφές (γιά τὰ ἄρματα, τόν ἐξοπλισμὸ ἢ τὴν τακτικὴ τοῦ πολέμου) οἱ ὁποῖες ἀνήκουν σὲ ἄλλες ἐποχὲς πρὶν ἢ μετὰ τὴν ἐποχὴ πού οἱ ἀρχαιολογικῆς μελέτες δίνουν γιά τόν Τρωικὸ Πόλεμο μποροῦν κάλλιστα νὰ ἀποδοθοῦν στοὺς αἰῶνες προφορικῆς παράδοσης πού μεσολάβησαν καί πού, ὅπως ἦταν φυσικό, ἀλλοίωσαν κάποια στοιχεῖα ἡσσονος σημασίας. Σὲ ἀντιδιαστολὴ ὁ συγγραφέας παραθέτει ὁμηρικῆς περιγραφῆς πού ἀνήκουν ἀποκλειστικὰ στὸ τέλος τοῦ 13ου αἰῶνα π.Χ., δηλαδὴ στὴν ἐποχὴ πού περιγράφεται αὐτὸς ὁ πόλεμος.

Ἔτσι, στὸν κατάλογο τοῦ στόλου πού ἀναφέρεται στὴν Ἰλιάδα, περιλαμβάνονται πόλεις πού κατοικοῦντο μόνο ἐκεῖνη τὴν ἐποχὴ καί ὄχι τὴν ἐποχὴ κατὰ τὴν ὁποία θεωρεῖται ὅτι ἔζησε ὁ Ὅμηρος (8ος αἰῶνας π.Χ.). Ἀναφέρονται τοποθεσίαι πού ἦταν θαμμένες τὴν ὁμηρικὴ ἐποχὴ, δηλαδὴ τὸν 8^ο αἰῶνα π.Χ., οἱ ὁποῖαι ἀνακαλύφθηκαν μετὰ τίς ἀνασκαφῆς τὸν 20^ο αἰῶνα.

Στὴν Ἰλιάδα, γιά παράδειγμα, ὁ Πάτροκλος σκαρφαλώνει τρεῖς φορὲς στὰ (ἐξωτερικὰ) τείχη τῆς Τροίας. Οἱ ἀνασκαφῆς ἀπέδειξαν ὅτι ὑπάρχει μέρος τῶν (ἐσωτερικῶν) τειχῶν ὑπὸ κατάλληλη κλίση καί ἀνοίγματα ἀνάμεσα στοὺς δομικοὺς λίθους τὰ ὁποῖα θὰ διευκόλυναν κάποιον νὰ σκαρφαλώσει.

Ὅμως, τὴν ἐποχὴ πού ἔζησε ὁ Ὅμηρος τὰ τείχη αὐτὰ ἦταν θαμμένα κάτω ἀπὸ τὸ ἔδαφος σὲ μεγάλο βάθος. Εἶναι φανερό ὅτι ὑπάρχουν πολλῆς ἀπόψεις, διαφορετικῆς μεταξύ τους, ὡς πρὸς τὴν ἐρμηνεία τῶν ὁμηρικῶν ἐπῶν.

THE ART OF PAINTING IN ANCIENT GREECE

by Dimitris Plantzos

published by Lockwood Press, distributed by ISD

360 pages, 334 color illustrations, \$69.95, paperback, ISBN 9781948488051

Special introductory price of \$56 is available until July 31st for orders quoting 1087-18.

This new and richly illustrated overview of Greek painting combines a fresh scholarly approach to visual arts with the most complete survey to date of the painted monuments of classical antiquity. The Art of Painting in Ancient Greece covers a wide chronological and geographical span, from the Bronze Age murals of Knossos, Santorini and Mycenae to the opulent villas of the Roman Empire, from Anatolia and Egypt in the East to Campania and Etruria in the West.

Surveying the techniques, materials, and works produced, as well as ancient literary accounts, the book engages in five main lines of inquiry: Why did the Greeks cover the walls of their sanctuaries, agoras, palaces, homes, and even their tombs with painted images? What topics, real or imaginary, did they choose to depict? How were those images created? What were the techniques employed and the materials used? Who painted those images? And how does the spectacular phenomenon of Greek monumental painting compare with other branches of Greek art, from mosaics and vase painting to sculpture?

Table of Contents

Preface

1. Studying Greek Painting~

2. The forgotten forerunners: monumental painting in the Aegean during the Greek Bronze Age~ 3. Early Greek Painting~ 4. The fifth century: tetrachromy and shadow-painting~ 5. The Greek gaze~ 6. Late Classical to Early Hellenistic~ 7. Hellenistic painting after Alexander~ 8. Painting in the Greco-Roman world~

Notes~

Bibliography~

Index~

Photographic Credits

Please visit the site: <https://www.isdistribution.com/BookDetail.aspx?aId=96391>

EΙΔΗΣΕΙΣ - NEWS RELEASE

ASHES FROM SANTORINI'S MINOAN ERUPTION FOUND IN SMYRNA EXCAVATION

Archaeologists found ashes from one of the largest volcanic eruptions in recorded history during excavations some 270 kilometers away in an ancient city that has developed to become Turkey's third largest.

Now located in the heart of Izmir's Bayraklı district, the ancient city of Smyrna, established 5,000 years ago by the Greek tribe of Aeolians and later inhabited by Ionians, was an important port city and trade outpost on the coast of the Aegean Sea with good inland connections.

It was mostly abandoned after it was captured by the Anatolian kingdom of Lydia in the 6th century B.C. when Alexander the Great and his commanders decided to re-establish the city on a larger hill located south of the Gulf of Izmir in the 4th century B.C., which formed the basis of modern Izmir, and the old city came to this day as a mound located some 500 meters inland. The site has been excavated continuously since the late 19th century with scientific excavations starting in the late 1920s during the early periods of today's Turkey.

A new excavation in the old Smyrna was launched in 2007 and managed to reveal various important findings since then, including the latest discovery of ashes from the Minoan eruption that took place some 3,600 years ago.

Professor Cumhuri Tanrıver, the head of the Smyrna excavation team, told Anadolu Agency that the ashes would shed light on Izmir's history. "In this year's drilling work, ashes from the Santorini Volcano have been found, which is known as the Minoan eruption in history and the largest volcano explosion in 10,000 years," Tanrıver said, adding that the ashes have been tested at the Geography Department of Ege University.

Tanrıver noted that the volcanic explosion in Santorini spread ashes in the region and triggered tsunamis throughout the Aegean, causing the Minoan civilization in Crete to collapse.

"Once the ashes are examined, they will provide us the opportunity to see what changes the explosion caused in Smyrna and how it affected the people their culture. It will be an indicator like a touchstone.

We will also be able to chronologically rank some events in Smyrna that for which could not set an exact date before," he said.

Tanrıver said the first house belonging to Greek culture has been discovered in Smyrna excavation, allowing academics to understand how people were constructing houses at the time and the city planning.

"The earliest written work in the Aegean was also discovered here. The Temple of Athena, considered the first large Greek temple in Anatolia, is also located here," Tanriver said.

Some 100 people, including academics and experts from Turkey and abroad, are taking part in the Smyrna excavation.

Please visit the site: <https://www.dailysabah.com/history/2018/06/03/ashes-from-santorinis-minoan-eruption-found-in-smyrna-excavation>

A RADICAL NEW THEORY ABOUT THE ORIGINS OF ART - ARCHAEOLOGISTS ARE TAPPING CUTTING-EDGE NEUROSCIENCE AND PSYCHOLOGY RESEARCH TO FIGURE OUT HOW OUR ANCESTORS BEGAN MAKING FIGURATIVE ART, BY DEREK HODGSON AND PAUL PETTITT

Visual culture and the associated forms of symbolic communication are regarded by paleoanthropologists as perhaps the defining characteristic of the behavior of Homo sapiens. One of the great mysteries of archaeology is why figurative art, in the form of the stunningly naturalistic animal depictions, appeared relatively suddenly around 37,000 years ago in the form of small sculpted objects and drawings and engravings on cave and rock shelter walls.

Since the discovery and authentication of such Paleolithic art more than a century ago, theories have abounded as to what this meant to its Ice Age hunter-gatherer creators. But theories often say more about modern preconceptions regarding the function of art. How can we tell if we're on the right track to understanding the remote and alien societies that created the first images?

In a radical new approach to the issue, we applied recent findings from visual neuroscience, perceptual psychology, and the archaeology of cave art, that begin to make sense of the intriguing representations and forward what we hope can be tested scientifically.

HANDS DOWN

This hand stencil has been deliberately placed so its left side matches with a natural crack in the wall of El Castillo Cave. Paul Pettitt/Gobierno de Cantabria

The first clue to their provenance came from the ancient hand marks (positive prints and negative stencils), which predate the earliest animal depictions by a considerable period. Recent dating shows that they were created by Neanderthals more than 64,000 years ago. The second clue came from the widespread inclusion of natural cave features—such as ledges and cracks—as parts of animal depictions. The final clue relates to the environment in which Upper Paleolithic hunter-gatherers, along with other predators, were stalking the large herbivores—such as bison, deer, and horses—that formed their prey and which often lay hidden in camouflage in the tundra environment.

We argue that hand marks initially supplied the idea to archaic humans that a graphic mark could act as a representation, however basic it was. This was a beginning of sorts, but how could hand marks give rise to the more complex animal depictions? We needed to be able to explain how that gap was bridged.

SEEING THE UNSEEN

Fortunately, the way hunters relate to the environment has changed little since early times in that they remain acutely sensitive to particular animal contours. So much so, that in challenging lighting situations—and where prey might be well camouflaged—the hunter becomes hypersensitive to such features.

In such ambiguous circumstances, it's better to “see” an animal when it's not there—to mistake a rock for a bear—than not see it. Such better-safe-than-sorry, hair-trigger cues are cognitive adaptations that promote survival. In dangerous conditions, the human visual system becomes increasingly aroused and is even more easily triggered into accepting the slightest cue as an animal.

In El Castillo Cave, this natural stalagmite column bears a boss in the shape of an upright bison, which has been elaborated by painting in black pigment. Marc Groenen/Gobierno de Cantabria

In short, we are preconditioned to interpret ambiguous shapes as animals. Recent evidence from visual neuroscience shows that when individuals are conditioned to see particular objects—faces, say—they are more likely to see them in ambiguous patterns. Upper Paleolithic hunters conditioned themselves due to the need to detect animals, but this effect was reinforced by the suggestive features of the caves.

Caves are full of suggestive cues. They are dangerous places, often inhabited by predators, thereby stimulating increased arousal levels. Hunters entering the caves with an overactive visual system will have regularly “mistaken” the natural cave features for animals. The cave walls also simulated the outdoor environment, where hunters regularly had to be able to spot their prey in camouflage.

All the hunters needed to do to “complete” a depiction was to add one or two graphic marks to the suggestive natural features based on the visual imagery in their “mind's eye.” A typical example of this can be seen at Chauvet Cave, where two giant deer (*Megaloceros*) are depicted by complementing the natural wall fissures (highlighted in brown) with lines (highlighted in black) painted onto the cave wall to complete the animal outlines.

These images depicting paintings in Chauvet Cave are based on work done by Carole Fritz and Gilles Tosello of France's National Center for Scientific Research.

This potentially explains how the very first representational depictions arose.

CORROBORATING EVIDENCE

We've tried to combine our respective expertise in visual psychology and Paleolithic art and, unlike many other theories, our approach is open to refutation. For example, if someone finds depictions of animals that predate the first hand marks, this would overturn our main proposition. Similarly, if earlier figurative depictions come to light that do not derive from natural features, this would also challenge our theory.

But as we were making the final touches to our academic paper, valuable corroborative evidence came to light supporting the theory. Namely, the dating of a negative hand stencil and a geometric mark from the Monte Castillo cave art complex in Spain dating to a minimum of 64,000 years ago and almost certainly made by Neanderthals.

When later humans entered the same caves and saw these, the Neanderthals may literally have “handed on” to our own species the notion that a graphic mark could act as a figurative representation.

Thanks to the primed visual system of the later hunter-gatherers—and the suggestive environment of the caves—it was Homo sapiens who took the final step creating the first complex figurative representations, with all the ramifications that followed for art and culture.

~~~~~

This article was originally published at The Conversation and has been republished under Creative Commons.

Please visit the site: <https://www.sapiens.org/archaeology/paleolithic-cave-art-animals/>

---

---

## **THESE SKELETONS FROM AN ANCIENT EGYPT CEMETERY WERE RIDDLED WITH CANCER, BY OWEN JARUS**

Archaeologists have uncovered six cases of cancer while studying the bodies of ancient Egyptians who were buried long ago in the Dakhleh Oasis. The finds include a toddler with leukemia, a mummified man in his 50s with rectal cancer and individuals with cancer possibly caused by human papillomavirus (HPV).

The researchers found these cancer cases while examining the remains of 1,087 ancient Egyptians buried between 3,000 and 1,500 years ago.

Extrapolating from these cases, the researchers estimated that the lifetime cancer risk in the ancient Dakhleh Oasis was about 5 in 1,000, compared with 50 percent in modern Western societies, wrote El Molto and Dr. Peter Sheldrick in a paper published in a special cancer issue of the International Journal of Paleopathology. "Thus, the lifetime cancer risk in today's Western societies is 100 times greater than in ancient Dakhleh," they wrote.

Molto, a retired anthropology professor at Western University in Ontario, Canada, cautioned that some people living at Dakhleh could have died of cancer without any traces being left in their remains and that people in the ancient world tended to have shorter life spans than people today. However, even accounting for these factors, the researchers believe the risk of cancer was considerably lower in ancient Egypt.

In five of the six cases, scientists determined that they had cancer by studying lesions (holes and bone damage) on their skeletons. Those holes were left when cancer spread throughout their bodies. For instance, a woman in her 40s or 50s had a hole on her right hip bone that is about 2.4 inches (6.2 cm) in size that researchers believe was caused by a tumor. In one case (the man in his 50s with rectal cancer), an actual tumor was preserved. Researchers cannot be certain where the cancers originated in many of the cases.

### **Young adults**

Three of the six cases (two females and one male) were people in their 20s or 30s, an age when it is rare for people to get cancer, the researchers said.

"When the Dakhleh cases were first presented at professional meetings, a common comment against accepting the diagnosis of cancer was that 'their ages were too young,'" wrote Molto and Sheldrick, a physician in Chatham, Ontario, in their paper, referring to the three young adults.

However, recent research has revealed that HPV is a major cause of several forms of cancer, including those that often affect young adults. "HPV is a confirmed cause of cancer of the uterine cervix and testes, and it evolved in Africa long before Homo sapiens emerged," wrote Molto and Sheldrick in their paper.

"The two female and the male burials from Dakhleh, all young adults, could have, respectively, developed cancer of the uterine cervix and testicular cancer," the authors wrote. "We know from current cancer epidemiology research that both types of cancers peak in the young adult cohorts."

While scientists were not able to genetically test the three young adults to see if they had HPV, other studies confirm that it did exist in the ancient world, Molto and Sheldrick wrote, noting that the virus likely existed in the ancient Dakhleh Oasis.

#### **No ancient treatments**

So far, research into Egyptian medical texts and human remains have revealed no indication that the ancient Egyptians had a specific treatment for cancer.

"They knew that something nasty was going on," Molto told Live Science. However, "we have no indication as to specific treatments for cancer, because they didn't understand [what cancer was]," Molto said, adding that the ancient Egyptians may have tried to treat some of the symptoms such as skin ulcers.

The researchers said they hope that in the future, data will be gathered on cancer and other diseases in the modern-day Dakhleh Oasis.

This data could then be compared to the ancient rate to provide more clues as to how the risk of cancer has changed over time.

Please visit the site: <https://www.livescience.com/62908-ancient-egypt-cancer.html>

---



## **NEW EVIDENCE OF ANCIENT CHILD SACRIFICE FOUND IN TURKEY, BY KATIE PAVID**

Remains of young people who were ritually sacrificed have been found from Bronze Age Mesopotamia.

Led by Museum scientific associate Dr Brenna Hassett, a team examined burial practices at Başur Höyük, a Bronze Age cemetery in Turkey. It contains a series of individuals who were buried between 3100 and 2800 BCE.

The site dates to 500 years before the famous Royal Cemetery of Ur, a luxurious series of tombs that form the resting place of Mesopotamian rulers.

An excavation of Başur Höyük uncovered a large, coffin-like stone tomb that contained multiple burials, with an unprecedented number of high-status grave goods for the period and region.

In three graves were found the remains of at least 11 people, male and female, ranging from age 11 to young adults.

Several people were buried outside the tomb with elaborate ornaments and grave goods.

Brenna says, 'The burials are remarkable because of the youth of the individuals, the number that were buried and the large wealth of objects that were buried with them.'

'Women and children in Mesopotamia were occasionally buried with grave goods, but they were normally personal belongings.'

'There are various pieces of evidence which suggest that these young people did not die accidentally or naturally - rather they were sacrificed.'

Human sacrifice in the ancient Near East The ancient Near East was made up of the region that now includes modern-day Iraq, as well as parts of Turkey, Iran, Syria and Kuwait. Its history begins from about 4,000 BCE.

Much of this area formed Mesopotamia, a collection of cultures bonded by their writing systems and gods. It is often thought of as the cradle of Western civilisation.

Many early human societies like this one used human sacrifices as a tool as they got bigger and more complex.

Brenna says, 'Previously, the most well-known example of human sacrifice from this area is the monumental discovery of the Royal Cemetery of Ur, where hundreds of burials were identified as sacrifices.'

'It has been suggested that practicing human sacrifice was one of the ways that complex civilizations like the one that rose up in Mesopotamia consolidated their power.

'This discovery moves the investigation 500 years earlier and more than 500 miles to the north.'

### **How do we know this was human sacrifice?**

Two children were buried lying in the tomb, with eight other young people buried at their feet. They appear to have been carefully positioned, and adorned with valuable goods and elaborate decoration in a deliberate display of social value.

Although researchers are unable to confirm exactly how these people died, at least two of the retainers from the outside of the tomb show evidence of sharp force trauma including stabbing and cutting wounds, suggesting unnatural deaths.

In particular, one of the young adult males suffered trauma to his hip and head, and seems to have suffered a violent end, perhaps being stabbed in the hip and skull by a sharp point. The head wounds are similar to the reconstructions of skull trauma seen in the sacrificial burials at the Royal Cemetery of Ur.

Brenna says, 'It is unlikely that these children and young people were killed in a massacre or conflict. The careful positioning of the bodies and the evidence of violent death suggest that these burials fit the same pattern of human sacrifice seen at other sites in the region.

The burial has parallels with the elaborate burials from the Royal Cemetery of Ur.

### **Why were they sacrificed?**

The burials show evidence of large political and social upheavals around this time, when early states were forming in southwest Asia.

Human sacrifice, the act of killing people for ritual purposes, is usually associated with hierarchical centralised societies.

It can be done to achieve various spiritual, political, martial or economic goals.

Because this period in Mesopotamia was a time of political upheaval, instability and crisis, Brenna thinks that sacrifices like this one were a way of controlling a city or state's population.

In the northernmost region, in the valleys of the upper Tigris river, the evidence from Başur Höyük shows that people were developing new ways of demonstrating their power. This ranged from outrageous displays of wealth like depositing of a fortune in bronze goods in a burial, to the ultimate deposit of sacrificed human lives.

Başur Höyük sits on an important crossroads between metalworking cultures and the region known as Mesopotamia, often thought of as the cradle of western civilisation, inhabited by modern-day Iraq, as well as parts of Turkey, Iran, Syria and Kuwait.

Brenna says, 'This exciting discovery will change the way we look at the development of the world's first states.'

In addition, excavations have revealed a further series of mysterious burials from the site, including a mass death pit containing at least fifty individuals buried simultaneously.

A new Arts and Humanities Research Council grant was awarded to Prof David Wengrow from UCL, Brenna, and the Museum's team of ancient DNA experts, Prof Ian Barnes and Dr Selina Brace, to investigate the very beginnings of civilisation as we know it.

[jack.m.sasson@gmail.com](mailto:jack.m.sasson@gmail.com)

Please visit the site: <http://www.nhm.ac.uk/discover/news/2018/june/new-evidence-of-ancient-child-sacrifice-found-in-turkey.html> [Go there for pix]

---

## **ARCHAEOLOGISTS DISCOVER VILLA AND MOSAIC OF ANCIENT GREEK FISHERMAN PHAINOS IN TURKEY**

After a property developer in noticed ancient ruins some 3-meters deep during a groundbreaking procedure in Turkey’s southwestern city of Muğla, he called local property authorities to verify the findings.

Bodrum Underwater Archaeological Museum Director Tayfun Selçuk, accompanied by three other experts examined the site and confirmed that the ruins are the remains of the villa of the richest fisherman of the Roman period, a Greek named Phainos. The ruins date back to 2nd century AD.

The site is located in what was once known as the ancient Greek city of Halicarnassus and the discovery of the villa has unearthed many ancient artifacts.

Along with the ruins of the actual structure, experts have also located 10 tombs with some human remains, a 20 square meter mosaic, a well, a Roman bath, and other luxury items such as pottery, perfume bottles, and fishing equipment.

Nevertheless, the item that is intriguing archaeologists the most is the mosaic of the famous Greek fisherman.

“The first findings of Phainos, the most famous fisherman of his time, was first discovered in the ancient city of Halicarnassus in 1890s. More mosaics and villa ruins that had the marks of Phainos were later discovered during the excavations at the city centre,” archaeologist Candan Temizel noted, adding, “Those findings which have been unearthed should be careful protected. This invaluable world heritage should be shared.”

**Please visit the site: <http://www.tornosnews.gr/en/greek-news/culture/31684-archaeologists-discover-villa-and-mosaic-of-ancient-greek-fisherman-phainos-in-turkey.html> [Go there for pix]**

---

**BURIED BY THE ASH OF VESUVIUS, THESE  
SCROLLS ARE BEING READ FOR THE FIRST  
TIME IN MILLENNIA - A REVOLUTIONARY  
AMERICAN SCIENTIST IS USING  
SUBATOMIC PHYSICS TO DECIPHER 2,000-  
YEAR-OLD TEXTS FROM THE EARLY DAYS  
OF WESTERN CIVILIZATION,  
BY JO MARCHAN**

The charred papyrus scroll recovered from Herculaneum is preserved in 12 trays mounted under glass. Here is PHerc.118 in tray 8. The scroll was physically unrolled in 1883-84, causing irreparable damage.

It's July 12, 2017, and Jens Dopke walks into a windowless room in Oxfordshire, England, all of his attention trained on a small, white frame that he carries with both hands. The space, which looks like a futuristic engine room, is crowded with sleek metal tables, switches and platforms topped with tubes and boxes. A tangle of pipes and wires covers the walls and floor like vines.

In the middle of the room, Dopke, a physicist, eases the frame into a holder mounted on a metal turntable, a red laser playing on the back of his hand. Then he uses his cellphone to call his colleague Michael Drakopoulos, who is sitting in a control room a few yards away. "Give it another half a millimeter," Dopke says. Working together, they adjust the turntable so that the laser aligns perfectly with a dark, charred speck at the center of the frame.

Dozens of similar rooms, or "hutches," are arrayed around this huge, doughnut-shaped building, a type of particle accelerator called a synchrotron. It propels electrons to near light speed around its 500-meter-long ring, bending them with magnets so they emit light. The resulting radiation is focused into intense beams, in this case high-energy X-rays, which travel through each hutch. That red laser shows the path the beam will take. A thick lead shutter, attached to the wall, is all that stands between Dopke and a blast of photons ten billion times brighter than the Sun.

The facility, called Diamond Light Source, is one of the most powerful and sophisticated X-ray facilities in the world, used to probe everything from viruses to jet engines. On this summer afternoon, though, its epic beam will focus on a tiny crumb of papyrus that has already survived one of the most destructive forces on the planet—and 2,000 years of history. It comes from a scroll found in Herculaneum, an ancient Roman resort on the Bay of Naples, Italy, that was buried by the eruption of Mount Vesuvius in A.D. 79. In the 18th century, workmen employed by King Charles III of Spain, then in charge of much of southern Italy, discovered the remains of a magnificent villa, thought to have belonged to Lucius Calpurnius Piso Caesoninus (known as Piso), a wealthy statesman and the father-in-law of Julius Caesar.

The luxurious residence had elaborate gardens surrounded by colonnaded walkways and was filled with beautiful mosaics, frescoes and sculptures. And, in what was to become one of the most frustrating archaeological discoveries ever, the workmen also found approximately 2,000 papyrus scrolls.

The scrolls represent the only intact library known from the classical world, an unprecedented cache of ancient knowledge. Most classical texts we know today were copied, and were therefore filtered and distorted, by scribes over centuries, but these works came straight from the hands of the Greek and Roman scholars themselves. Yet the tremendous volcanic heat and gases spewed by Vesuvius carbonized the scrolls, turning them black and hard like lumps of coal. Over the years, various attempts to open some of them created a mess of fragile flakes that yielded only brief snippets of text. Hundreds of the papyri were therefore left unopened, with no realistic prospect that their contents would ever be revealed. And it probably would have remained that way except for an American computer scientist named Brent Seales, director of the Center for Visualization & Virtual Environments at the University of Kentucky.

Seales is in the control room now, watching intently: frowning, hands in pockets, legs wide.

The papyrus scrap in the white frame, held between two layers of transparent orange film, is just three millimeters across, and sports one barely visible letter: an old-fashioned Greek character called a lunate sigma, which looks like a lowercase “c.” Next to the turntable, shielded inside a tungsten tube, is a high-resolution X-ray detector, called HEXITEC, that has taken engineers ten years to develop. Seales believes that it will pick up the desperately faint signal he’s looking for and, in doing so, “read” the tiny Greek letter. “When I started thinking about this, this technology didn’t exist,” he says. “I don’t think there’s another detector in the world right now that could do this kind of measurement.” If it works, imaging the single letter on this charred crumb could help to unlock the secrets of the entire library.

A wailing alarm sounds as Dopke exits the hutch before Drakopoulos swings shut the 1,500-pound, lead-lined door. Back in the control room, computer screens show a live feed of the papyrus from multiple angles as Drakopoulos clicks his mouse to raise the shutter and flood the hutch with radiation. Sitting next to him, an engineer prepares to capture data from the detector. “Ready?” he asks. “I’m going to press Play.”

\*\*\*\*\*

Seales, who is 54, has wide-set eyes beneath a prominent brow, and an air of sincere and abiding optimism. He’s an unlikely pioneer in papyrus studies. Brought up near Buffalo, New York, he has no training in the classics. While European curators and textual scholars yearn to discover lost works of classical literature in the Herculaneum scrolls, Seales, an evangelical Christian, dreams of finding letters written by the apostle Paul, who was said to have traveled around Naples in the years before Vesuvius erupted.

Seales came of age in the 1970s and ’80s—the era of early video games, when big-dreaming Californians were building computers in their garages—and he was a techie from a young age. With no money for college, but with a brain for complex mathematics and music (he played violin at his local church), Seales won a double scholarship from

the University of Southwestern Louisiana to study computer science and music. Later, while earning his doctorate, at the University of Wisconsin, he became fascinated with “computer vision,” and began writing algorithms to convert two-dimensional photographs into 3-D models—a technique that later enabled vehicles such as Mars rovers, for example, to navigate terrain on their own. Seales went to work at the University of Kentucky in 1991, and when a colleague took him along to the British Library to photograph fragile manuscripts, Seales, captivated by the idea of seeing the unseeable, found the challenge thrilling.

The British Library project was part of a “digital renaissance” in which millions of books and hundreds of thousands of manuscripts were photographed for posterity and stored online. Seales helped make a digital version of the only surviving copy of the Old English epic poem Beowulf, using ultraviolet light to enhance the surviving text. But working with the warped, cockled pages made him realize the inadequacy of two-dimensional photographs, in which words can be distorted or hidden in creases and folds.

So in 2000, he created three-dimensional computer models of the pages of a damaged manuscript, Otho B.x (an 11th-century collection of saints’ lives), then developed an algorithm to stretch them, producing an artificial “flat” version that didn’t exist in reality. When that worked, he wondered if he could go even further, and use digital imaging not just to flatten crinkled pages but to “virtually unwrap” unopened scrolls—and reveal texts that hadn’t been read since antiquity. “I realized that no one else was doing this,” he says.

He began to experiment with a medical-grade computed tomography (or CT) scanner, which uses X-rays to create a three-dimensional image of an object’s internal structure. First, he tried imaging the paint on a modern rolled-up canvas. Then he scanned his first authentic object—a 15th-century bookbinding thought to contain a fragment of Ecclesiastes hidden inside. It worked.

Buoyed by his success, Seales imagined reading fragments of the Dead Sea Scrolls, which include the oldest biblical writings ever found, dating to as far back as the third century B.C., sections of which remain unopened today. Then, in 2005, a classicist colleague took him to Naples, where many of the excavated Herculaneum scrolls are displayed at the National Library, a few steps from a window with a view across the bay to Vesuvius itself. Seared by gases at hundreds of degrees centigrade and superheated volcanic materials that in time hardened into 60 feet of rock, the distorted, crumbling rolls were believed by most scholars to be the very definition of a lost cause.

For Seales, viewing them was an “almost otherworldly” experience, he says. “I realized that there were many dozens, probably hundreds, of these intact scrolls, and nobody had the first idea about what the text might be. We were looking at manuscripts that represent the biggest mysteries that I can imagine.”

\*\*\*\*\*

He isn’t the first to try to solve these mysteries. In 1752, when Charles III’s workmen found the carbonized lumps inside what’s now known as the Villa dei Papiri, they assumed they were pieces of coal and burned them or threw them in the sea. But once they were identified as scrolls, Camillo Paderni, an artist in charge of the recovered

antiquities, set about opening the remaining ones. His method involved slicing the rolls in half, copying any visible text, then scraping away each layer in turn to reveal what was beneath.

Hundreds of rolls were transcribed that way—and destroyed in the process.

In 1754, a Vatican priest and conservator named Antonio Piaggio dreamed up a new scheme: He glued goldbeater's skin (a calf's extremely thin yet tough intestinal membrane) to a scroll's surface, then used a contraption involving weights on strings to ease it open.

Artists watched this excruciatingly slow process and copied any exposed writing in pencil sketches known as *disegni*. Many of the flaky outer layers of the scrolls were removed before the inner portion could be unwound, and the papyrus often tore off in narrow strips, leaving layers stuck together. Hundreds of scrolls were pulled apart using Piaggio's machine, but they revealed only limited text.

Scholars searching the transcribed fragments for lost works of literature have largely been disappointed. A few pieces of Latin works were discovered, including parts of the *Annales*, by Quintus Ennius, a second-century B.C. epic poem about the early history of Rome, and *Carmen de bello Actiaco*, which tells of the final hours of Antony and Cleopatra. The vast majority of the opened scrolls contained Greek philosophical texts, relating to the ideas of Epicurus, an Athenian philosopher in the late fourth and early third centuries B.C., who believed that everything in nature is made up of atoms too small to see. Some are by Epicurus himself, such as a piece of *On Nature*, a huge work that was previously known but lost. But most are by Philodemus, an Epicurean employed by Piso in the first century B.C., and cover Epicurus' views on ethics, poetry and music.

None of the Herculaneum scrolls has been opened since the 19th century, and scholars have instead focused on squeezing information out of the already-revealed texts. A step forward came in the 1980s, when Dirk Obbink of Oxford University and Daniel Delattre of France's National Center for Scientific Research independently worked out how to reassemble fragments dissected under Paderni. In the 1990s, Brigham Young University researchers photographed the surviving opened papyri using multispectral imaging, which deploys a range of wavelengths of light to illuminate the text. Infrared light, in particular, increased the contrast between the black ink and dark background. That was a "huge breakthrough," says Obbink. "It enabled us to read vastly more of the unrolled rolls."

The new images triggered a wave of scholarship into Epicurean philosophy, which had been poorly understood compared with the rival ideas of Plato, Aristotle or the Stoics. But the texts were still incomplete. The beginnings of all the manuscripts remain missing. And the prose is often scrambled, because letters and words from different layers of a scroll wound up next to one another in two-dimensional renderings. "What we'd really like to do," says Obbink, "is to read a text from beginning to end."

That was thought impossible, until Seales saw the scrolls in Naples and realized that his research had been leading to exactly this grand challenge. "I thought, I'm a year away," Seales says. "All I have to do is get access to the scrolls, and we can solve this."

That was 13 years ago.



\*\*\*\*\*

Seales vastly underestimated, among other things, the difficulty of getting permission even to study the scrolls. Conservators are understandably reluctant to hand out these terribly fragile objects, and the library in Naples refused Seales' requests to scan one. But a handful of Herculaneum papyri ended up in England and France, as gifts from Ferdinand, son of Charles III and King of Naples and Sicily.

Seales collaborated with Delattre and the Institut de France, which has six scrolls in its possession. Two of the scrolls are in hundreds of pieces after past attempts to open them, and Seales eventually received permission to study three small fragments.

The first problem he hoped to solve was how to detect ink hidden inside rolled-up scrolls. From the late third century A.D. onward, ink tended to include iron, which is dense and easy to spot in X-ray images. But the papyri found at Herculaneum, created before A.D. 79, were written with ink made primarily of charcoal mixed with water, which is extremely difficult to distinguish from the carbonized papyrus it sits on.

At his lab in Kentucky, Seales subjected the papyrus scraps to a battery of noninvasive tests. He looked for trace elements in the ink—anything that might show up in CT—and discovered tiny amounts of lead, perhaps contamination from a lead inkwell or water pipe. It was enough for the Institut de France to give him access to two intact papyri: blackened sausage-shaped artifacts that Seales nicknamed “Banana Boy” and “Fat Bastard.” Seales arranged for a 600-pound high-resolution CT scanner to be sent by truck from Belgium, and he made intricately detailed scans of the scrolls. But after months of analyzing the data, Seales was disheartened to find that the ink inside the scrolls, despite the traces of lead, was invisible.

What was worse, the scans showed the layers inside the scrolls to be so carbonized that in many places there was no detectable separation between them. “It was just too complicated for our algorithms,” Seales admits. He played me a video of the CT scan data, showing one of the scrolls in cross-section. The whorls of papyrus glowed white against a dark background, like closely wound strands of silk. “Just take a look at that,” said Seales. “This is when we knew we were doomed for the present time.”

What makes virtual unwrapping such a complex challenge is that, even if you imaged the inside of a rolled-up scroll written in ink that glowed brightly in scans, you would still only see a dizzying mess of tightly packed letters floating in space, like a three-dimensional jigsaw puzzle—but without a final picture to use as a guide. To decipher that jumble of letters, Seales' key innovation was to develop software to locate and model the surface layer within a wound-up scroll, which analyzes each point in as many as 12,000 cross-sections.

Then he looks for density changes that correspond to the ink, and applies filters or other techniques to increase the contrast of the letters as much as possible. The final step is to figuratively “unroll” the image for reading.

Seales spent 2012 and 2013 as a visiting scientist at the Google Cultural Institute in Paris, amping up his algorithms to cope with the complex structures the CT scans had revealed. He got the chance to try his new approach soon afterward, when Pnina Shor, at the Israel Antiquities Authority, or IAA, in Jerusalem, contacted him about a carbonized roll of parchment found in the ancient town of Ein Gedi, on the western shore of the Dead Sea.

The scroll was excavated from the remains of a synagogue, which was destroyed by fire in the sixth century A.D. The charred, cigar-shaped lump was far too fragile to open, but Israeli researchers had recently CT-scanned it. Would Seales take a look at the data? Shor handed over a hard drive, and Seales and his colleagues went to work.

In the meantime, Seales was chasing a new idea for reading carbon-based ink: X-ray phase-contrast tomography, a highly sensitive form of imaging that can detect subtle density changes in a material—the kind that might result from applying ink to papyrus—by measuring the changing intensity of the beam as it passes through an object. Only a large particle accelerator, though, can produce such a beam. One of the nearest was in Grenoble, in southeastern France.

Seales' initial requests for "beam time" were rejected, but he was subsequently approached by an Italian physicist named Vito Mocella, who had close ties to the facility, and in December 2013 Delattre took Banana Boy and another scroll to Grenoble.

Seales waited eagerly for the promised data, but the files did not arrive. Then, in January 2015, Mocella's group published the results without him. It was, Seales says, an "excruciatingly frustrating" experience. "I believed we were collaborating, until I realized that the feeling was not mutual."

News stories around the world reported that Herculaneum scrolls had been deciphered at last. But, in fact, Mocella had claimed to read only letters, and some scholars are cautious about even those, not least because the group did not publish enough information for others to replicate the analysis. Mocella finally shared his data with Seales and others after publication. After reviewing it, Seales concluded that the findings were a bust. "The dataset did not produce any contrast at the ink," he told me. Seales thinks the researchers, who were without software to model the surfaces within the scrolls, were seeing "ghosts"—random patterns in the papyrus' fiber structure that just happen to look like letters. He is now convinced that phase-contrast tomography alone is not sufficient to read the Herculaneum scrolls in any meaningful way. (Mocella insists the letters he saw were real, and he took issue with Seales' version of the incident. "From my point of view, I and my team are still working with Brent, since we've given him, as with other specialists like him, most of the scans," Mocella said.)

By that point Seales had finished a preliminary analysis of the Ein Gedi scroll, and in July 2015 he and the IAA announced their results.

"We absolutely hit a home run," Seales says.

Unlike the authors of the Herculaneum scrolls, the Hebrew scribes had mixed metals into their ink. Seales' software correctly mapped the letters to the rolled-up parchment, then virtually unfurled it, revealing all of the surviving text, in perfect sequence, on each of the five wraps of the scroll. There were 35 lines of text in two columns, composed of Hebrew letters just two millimeters tall. Israeli researchers identified the text as the first two chapters of the Book of Leviticus, dating to the third or fourth century A.D. It was a hugely significant find for biblical scholars: the oldest extant copy of the Hebrew Bible outside of the Dead Sea Scrolls, and a glimpse into the history of the Bible during a period from which hardly any texts survive.

And it was proof that Seales' method worked. Following Mocella's publication, however, the Institut de France refused further access to its Herculaneum scrolls. Which is why Seales turned his attention to Oxford.

\*\*\*\*\*

The Bodleian Libraries, at Oxford University, possess four Herculaneum scrolls, which arrived in 1810, after they were presented to the Prince of Wales. They are kept deep inside the building, in a location so secret that even David Howell, the Bodleian's head of heritage science, says he doesn't know where it is.

Seales wasn't permitted to see the intact papyri, never mind scan them. But one of the four, known as "P.Herc. 118," was sent to Naples in 1883, to be unrolled using Piaggio's machine. It came back as a mosaic of crumbs, which were glued onto tissue paper and mounted behind glass in 12 wood frames. The text appears to be a history of Epicurean philosophy, probably by Philodemus, but it has been particularly challenging for scholars to interpret. A fragment might seem covered with continuous lines of writing, says Obbink, "but really every inch you're jumping up or down a layer."

To prove the value of his approach, Seales asked the Bodleian to let him analyze P.Herc. 118. If all went well, he hoped, he might get a shot at scanning the intact scrolls later. "We wouldn't necessarily have chosen to get involved, except for Brent's enthusiasm," says Howell. So in July 2017, the 12 frames were removed from storage and taken to Howell's third-floor office—something of a coup for Seales, given their invaluable nature. Cheerful and ruddy-faced, Howell has worked in conservation for close to 35 years, and even he felt daunted as the protective glass frames were removed, exposing the fragile papyrus beneath. "These are the most terrifying objects I've ever handled," he says. "If you sneeze, they'd blow away."

Seales and another colleague scanned these scroll fragments using a hand-held 3-D scanner called an Artec Space Spider. Meanwhile, Howell carried out hyperspectral imaging, which uses hundreds of wavelengths of light. Howell listened to Pink Floyd through noise-canceling headphones to escape the grinding noise of the scanner, he says, plus the knowledge that if anything went wrong, "I might as well pack my bags and go home and not come back."

After Seales returned to Kentucky, he and his colleagues spent months mapping all of the available 2-D images onto the 3-D template produced by the Artec Space Spider. This past March, they returned to Oxford to present the results on a big screen to a packed conference room. At such a high resolution, the charred papyrus resembled a dark-brown mountain range as seen from above, with lines of text snaking over the ridges and peaks. There was a gasp from the audience as Seales' student Hannah Hatch rotated the image, then zoomed into creases and peeked over folds, flipping seamlessly between high-resolution photographs, infrared images and even the disegni drawings—all matched up to the 3-D template.

Shortly afterward, James Brusuelas, an Oxford papyrologist working with Seales, revealed several new details visible in the scans, such as the name Pythocles, who was a young follower of Epicurus. More important, Brusuelas was able to decipher the column structure of the text—17 characters per line—which will be crucial for reading the rest of

the roll, particularly when trying to join different fragments together. “We have the basic information we need to put Humpty Dumpty back together again,” he said.

The audience buzzed with questions and applause. It was the reaction Seales was hoping for, and a step toward his real goal—gaining access to intact scrolls.

He’d saved his own presentation until last. It wasn’t about P.Herc. 118, but rather one tiny letter: the lunate sigma.

\*\*\*\*\*

Driving south from the stone archways and quadrangles of Oxford, the road soon cuts through flat green fields reaching to the horizon. On the day I visited, fork-tailed red kites hovered high in the blue July sky. After 15 or so miles a sprawling campus of low gray buildings came into view. At first, it resembled an ordinary industrial park, until I noticed the names of the roads: Fermi, Rutherford, Becquerel, all giants of 19th- and 20th-century physics. Behind a wire fence a huge, silver dome, more than a quarter-mile in circumference, rose from the grass like a giant flying saucer. This was Diamond Light Source, and Seales was waiting inside.

He’d brought a speck of charred papyrus from one of the Herculaneum scrolls he studied a decade earlier. The ink on it, he had found, contained a trace of lead. In Grenoble, direct X-ray imaging of the scrolls had not been enough to detect the ink. But when you fire hugely powerful X-rays through lead, the metal emits electromagnetic radiation, or “fluoresces,” at a characteristic frequency. Seales hoped to pick up that signal with a detector placed beside the fragment, which was specially calibrated to capture photons at lead’s characteristic frequency.

It was a long shot. The minuscule fluorescence of the letter would be swamped by radiation from the protective lead lining the room—like looking for a flickering candle from miles away on a rainy night, Seales said, as we stood in the crowded hutch. But after several days of intense work—optimizing the angle of the detector, shielding the main X-ray beam with tungsten “flight tubes”—the team finally got what it was looking for: a grainy, but clearly recognizable, “c.”

“We’ve proven it,” Seales said in triumph as he displayed the legible image to the Oxford audience in March. It is, Seales hopes, the last piece of the puzzle he needs to read the ink inside a Herculaneum scroll.

The results have scholars excitedly re-evaluating what they might now be able to achieve. “I think it’s actually very close to being cracked,” says Obbink, the Oxford papyrologist. He estimates that at least 500 Herculaneum scrolls haven’t been opened. Moreover, excavations at Herculaneum in the 1990s revealed two unexplored layers of the villa, which some scholars believe may contain hundreds or even thousands more scrolls.

Many scholars are convinced that Piso’s great library must have contained a range of literature far wider than what has been documented so far. Obbink says he wouldn’t be surprised to find more Latin literature, or a once-unimaginable treasure of lost poems by

Sappho, the revered seventh-century B.C. poet known today only through the briefest of fragments.

Michael Phelps, of the Early Manuscripts Electronic Library, in California, who recently used multispectral imaging to reveal dozens of hidden texts on reused parchment at St. Catherine's Monastery, in Egypt, calls Seales' methods "revolutionary." Scholars have long faced a choice between attempting to read concealed texts (and potentially destroying them in the process) or conserving them unread. "Brent Seales' technology is removing that dilemma," Phelps says.

Successfully reading Herculaneum scrolls could trigger a new "renaissance of classical antiquity," says Gregory Heyworth, a medievalist at the University of Rochester in New York. He points out that virtual unwrapping could be applied to countless other texts. In Western Europe alone, he estimates, there are tens of thousands of manuscripts dating from before A.D. 1500—from carbonized scrolls to book covers made from older, glued-together pages—that could benefit from such imaging.

"We'd change the canon," Heyworth says. "I think the next generation is going to have a very different picture of antiquity."

\*\*\*\*\*

Seales has lately been enhancing his technique, by using artificial intelligence to train his software to recognize subtle differences in texture between papyrus and ink. He plans to combine such machine learning and X-ray fluorescence to produce the clearest possible text.

In the future, "it'll all be automated," he predicts. "Put it in the scanner and it will all just unfurl."

Seales is still negotiating with curators in Oxford, Naples and Paris for access to intact scrolls. He has surmounted huge technical hurdles, but the complex political challenge of navigating the gatekeepers, winning beam time at particle accelerators and lining up funding can, very occasionally, puncture his optimism. "How does a guy like me make all that stuff happen all at once?" he said in one such moment. He shrugged and looked around him. "It's more than a computer scientist is really capable of doing."

Then belief returned to his wide, hazel eyes. "I refuse to accept that it's not possible," he said. "At every turn, there has been something that opened up." Reading a complete intact scroll at last, he went on, would be "like returning home to your family, who have been waiting all along for you to do the thing you started."

**Please visit the site: <https://www.smithsonianmag.com/history/buried-ash-vesuvius-scrolls-are-being-read-new-xray-technique-180969358/>**

---

## **WHAT DID ANCIENT BABYLONIANS EAT? A YALE-HARVARD TEAM TESTED THEIR RECIPES, BY BESS CONNOLLY MARTELL**

Even ancient Babylonian chefs knew the value of a good cookbook.

Not unlike today's chefs, the ancient Babylonians favored recipes of stews filled with savory meats, herbaceous herbs, and earthy vegetables. Unlike today, the recipes for these dishes were not presented alongside colorful photos in a hardbound book, but rather were impressed into the surface of clay tablets using reed styluses.

There are only four remaining ancient Babylonian culinary tablets detailing the world's oldest known recipes — and they might have remained, unused, forever in a display case in the Yale Babylonian Collection were it not for an invitation to a cooking event at New York University in early May in which teams prepared foods from around the globe and different time periods.

Agnete Lassen, associate curator of the Yale Babylonian Collection, and Chelsea Alene Graham, digital imaging specialist at the Institute for the Preservation of Cultural Heritage, were part of the team that painstakingly recreated — step by step — three stews from one of the tablets as closely as possible to how they would have been prepared and eaten almost 4,000 years ago.

“Our idea was to revisit the old translations and see where we could improve our understanding of the terminology and approach a better understanding of these recipes,” says Lassen, explaining that the recipes come from the same period and probably from the same place.

“They might not have been written by the same person but they relate to the same interest in culinary recipes,” she says.

The event, “An Appetite for the Past,” was hosted by NYU's Institute for the Study of the Ancient World and Department of Nutrition and Food Studies. Seven teams were invited to attend. Some chose to focus on the archaeological or textual aspects of the cuisine they represented, while others created modern interpretations of ancient dishes from ancient China, the Mediterranean, and Roman and medieval times. On the last day of the event, each of the teams presented the fruits of their collaborative research at a tasting symposium, where attendees were invited to sample the various foods that had been prepared.

The re-interpretation of the recipes, says Lassen, was done by a member of the team at Harvard University, Gojko Barjamovic, and the recipes were cooked and tested multiple times over the course of the spring at the Harvard Science and Cooking Lab by food chemist Pia Sørensen, and Patricia Gonzalez from the Basque Culinary Center.

“Studying the chemical processes was a key element in the re-interpretation the recipes,” says Lassen. “It really was an interdisciplinary collaboration connecting the study of ancient text with chemistry and culinary science.”

The Yale-Harvard team prepared three recipes which were all from one tablet: two lamb stews — one with beets and one with milk and cakes of grain — and a vegetarian recipe enriched with beer bread.

The variety of ingredients, complex preparation, and cooking staff required to create these meals suggest that they were intended for the royal palace or temple — the haute cuisine of Mesopotamia, says Lassen. Few cooks were able to read cuneiform script, she adds, hence the recipes were most likely recorded to document the current practices of culinary art.

“This event gave us the opportunity to really connect with the people from that time,” says Graham. “By experiencing some of the processes that they would have used to cook these recipes and to taste the flavors that were prominent and popular then, you feel closer to the culture and the people, and I think that helps us to tell their story. It is interesting to think of all the tools we are aided by now and how cooking these recipes is so much easier for us than it was for them.”

The undertaking was not without its challenges, says Lassen. “Not only were some of the ingredients that were used during this time period not available, but two of the tablets are poorly preserved — there are big holes in them. Some of these terms that appear in the Akkadian original are difficult to translate because these are words that don’t appear very often in the other texts that we have and that makes it very difficult to decipher them.”

“Having an understanding of what the food is supposed to feel and taste like is very important,” says Lassen. “We didn’t know what we were looking for. When we were recreating one of the recipes I kept thinking they were doing this wrong, ‘this is not how I would make this.’ And then when it had boiled for a while it suddenly transformed itself into something delicious.”

Like the home cooks of today, the Babylonians didn’t always specify the exact measurements of the ingredients, notes Lassen, so the team created the stews “to taste.”

While some of the Babylonian recipes were attempted prior to the event, one was new to the team and was prepared for the first time at the event. Called the “unwinding,” it is a vegetarian stew made with leek and onion. Lassen says that there doesn’t seem to be any particular reason for this name, but that one hypothesis suggests it has to do with one of the stew’s ingredients, dried lumps of crushed grains that were “almost like hard cakes that you add to the stew and then it melts into the stew,” says Lassen. “That could be ‘unwinding.’

It could also simply be a more literal word for a comfort food.”

“Making a stew is a very basic human thing and I think that is one of the reasons that we really went into this project,” says Lassen.

“There is something really human about eating and food and tasting things, and that’s what we wanted to explore by recreating these recipes. Maybe not entirely as they as they would have prepared it — maybe our ingredients taste a little bit different — but still approximating something that nobody has tasted for almost 4,000 years.”

The group worked on the recipes with Nawal Nasrallah, a culinary historian and chef who specializes in Medieval Arabic cuisine and has studied the cuneiform cookbooks

and their links with later Iraqi traditions— which, says Graham, augmented the experience for each of the team members by helping them to “read between the lines to learn more about the culture, and enrich the tablets and recipes with the stories of the people who created them.”

Adds Lassen: “Recreating foods gives us a profound sense of a deep history and connection with people that lived a very long time ago.”

**Please visit the site: <https://news.yale.edu/2018/06/14/what-did-ancient-babylonians-eat-yale-harvard-team-tested-their-recipes>**

---



## **GLADIATOR DIETS WERE CARB-HEAVY, FATTENING, AND MOSTLY VEGETARIAN TO SURVIVE THE ARENA, THEY ATE A MASH OF BARLEY AND BEANS, BY RYLEIGH NUCILLI**

What epitomizes the ideal western male physique more than the Roman gladiator? Rippling with lean muscle, gladiators' bodies represent corporeal perfection—or so films and television shows such as *Gladiator* and *Spartacus* would have us believe.

In reality, what we know about gladiators' diet and physiques suggests a very different physical appearance than the one depicted in classical art and contemporary popular culture. According to archaeological research, their abdominals and pectorals were likely covered in a quivering layer of subcutaneous fat. Why? The evidence suggests gladiators carbo-loaded. They ate a diet high in carbohydrates, such as barley and beans, and low in animal proteins.

Their meals looked nothing like the paleo or meat-and-fish centric diets now associated with elite warriors and athletes.

Current knowledge of gladiators' physiques comes from a group of medical anthropologists at the Medical University of Vienna and a nearly 2,000-year-old gladiator grave located in what is now Ephesus, Turkey. (When its inhabitants were interred, the area was part of the Roman Empire.) The mass grave houses the bones of 67 gladiators and one female slave, thought to be the spouse of one of the men buried there.

Researchers were able to identify the buried bodies as gladiators through reference to a set of reliefs carved into the marble slabs that marked the grave. These reliefs depict gladiatorial battle scenes and were dedicated to fallen gladiators.

Although none of the 68 skeletons was complete, enough arm and leg bones, as well as skulls and teeth, were preserved for researchers to be able to study and understand the nutritional and medical realities of the men to whom they once belonged. Using a technique called “isotopic analysis,” the team was able to test the skeletal remains for elements including calcium and zinc. This enabled them to partially reconstruct their diets. Based on the elemental mixtures they recovered using the analysis, the team concluded that the bodies in the grave ate few animal proteins and plenty of carb-rich legumes, as well as a healthy dose of calcium. This relatively meat-free diet is described in texts from the time, too: Pliny's *Natural History* refers to gladiators by the nickname *hordearii*, which translates to “barley eaters.”

Interestingly, according to the researchers, gladiators' primarily vegetarian diet was not a consequence of their poverty or slave status. While it is popularly believed that the ranks of men and women who fought as gladiators were comprised entirely of slaves, that's only partly true. Though the majority of gladiators were prisoners of war and convicts, some rejoined voluntarily to earn wages after their initial term of conscription had ended.

Nonetheless, given this lowly status, one might assume that a carb-heavy, mostly meat-free diet was a cost-cutting measure. After all, why feed prisoners extravagant fare?

Well, you might do it to improve their battlefield performance. The Vienna team posits that the fighters ate weight-gaining foods because extra fat created a layer of bodily protection. Nerve endings would have been less exposed, and bleeding cuts would have been less perilous. As an added benefit, the extra, protective layer of fat would have created a more satisfying spectacle: The gladiators could sustain wounds and gush blood, but, because the wounds were shallow, they could keep on fighting.

Harvard Classics Professor Kathleen Coleman, who is unaffiliated with the University of Vienna team, agrees with the notion that the gladiator diet was carefully considered. Since everyone wanted the best possible fight, she says, “I assume that they knew about the link between diet and performance [and] they certainly wanted to fatten gladiators up.” Even if the fare wasn’t a cost-cutting measure, though, “the ancient sources sneered at the gladiator’s ‘mash,’ as they called it.”

If this research is correct, though, why has a seemingly inaccurate picture of gladiators persisted for so long? The short answer: because the ancients were a lot like us! They idealized forms in a manner akin to an ancient sort of Photoshop. In ancient Greece, for example, ideas of the beautiful, perfect body were derived from men competing in athletic competitions, and to make up for a lack of true perfection in the real world, artists depicted everyone—gladiators, gods, and philosophers—as closer to perfect specimens.

Across the Roman Empire, training gladiators was a popular source of revenue. More than 100 gladiator schools stretched from modern-day Vienna, Austria, to Ephesus, Turkey, and beyond. The most famous schools were clustered around the Coliseum, and visitors to Rome can still see the remnants of Ludus Magnus, the largest school that was connected to the Coliseum by tunnels.

Based on the archaeological evidence that still exists, experts describe the training centers as “fortress prisons.” They usually had one exit door, which faced the public arena. Inside the school, a rotating body of experts trained the men and women in different fighting techniques and weaponry. Gladiators could not leave, and they presumably ate their bean-heavy mash without complaint in the spartan surroundings.

Notably, the gladiators’ extra fat doesn’t mean they were unhealthy, and their treatment wasn’t all harsh. In fact, both the archaeological evidence from the Ephesus site and writing from the period suggest the opposite. Gladiators were a significant investment, and archaeological sites evidence the fortresses as “also [including] heated floors for winter training, baths, infirmaries, plumbing, and a nearby graveyard.” Though prisoners, they likely received superior medical care. For example, the historical record shows that at least some gladiators were treated by elite doctors, such as Galen of Pergamum, the Greek physician and writer whose theories and research deeply influenced the medical field for centuries. The quality of gladiators’ medical care is also evidenced by a comparison of injuries on the bones of average citizens to those of the gladiators, which evince superior care with clean, smooth healing lines along old breaks.

Gladiators' good-health was not just a consequence of quality medical treatment. They also regularly drank calcium supplements made of either charred plant or bone ash. Like modern athletes, they took their calcium—scholarly analyses describe the calcium levels in gladiators' bones as “exorbitant” compared to average citizens. And the Elder Pliny records the same in *Natural History* XXXVI.203: “‘For abdominal cramp or bruises,’ states Marcus Varro, and I quote his very words, ‘your hearth should be your medicine chest. Drink lye made from its ashes, and you will be cured. One can see how gladiators after a combat are helped by drinking this.’”

Gladiators did have the occasional chance to nosh on more decadent foodstuffs. To kick off gladiator games, elite Romans held large banquets, which the fighters might be invited to. The first-century B.C. historian Livy described these feasts as shows complete with sacrificial animals, athletes, and famous horses, while “banquets too were prepared for the delegations with equal sumptuousness and attention to detail.”

But while some gladiators had the chance to feast, if they chose, before their upcoming fights, others faced death as part of the entertainment. During banquets, when guests “were all sated with dining and drink, [the hosts] called in the gladiators,” wrote the Greek philosopher and historian Nicolaus of Damascus in his *Athletica*. “No sooner did one have his throat cut than the masters applauded with delight.”

**Please visit the site: <https://www.atlasobscura.com/articles/what-did-gladiators-eat>  
[Go there for pix]**

---

## **THE ORIGINS OF MAPS IN THE NEAR EAST,** **BY BLEDA S. DÜRING**

We live in a world of which every corner has been mapped, and in which we constantly use maps to navigate our way. Yet this use of maps is relatively recent. Maps originated in the ancient Near East but why aren't there more?

There is nothing self-evident about maps. They require a reduction of complex landscapes to a flat and simplified synoptic representation drawn at a much reduced scale. Maps are so deeply engrained in western cultures that we take them for granted, and this blinds us from realising that they are in fact complex abstractions with a highly specific cultural genesis.

Maps as we know them today do not originate from navigational needs. Studies of European mapping programmes from the 18th Century onwards demonstrate that creating accurate maps was undertaken by governments seeking to enhance their tax revenues from the countryside. Our present use of maps for navigation is a secondary usage of a technology developed for very different purposes, similar to modern GPS.

How relevant are these considerations of maps as originating in taxation, for older maps? I argue that mapmaking in earlier periods, including Mesopotamia and the Greek world cannot be linked to state control. This explains why early maps are both relatively rare and are often concerned with relatively abstract subjects such as the world as a whole.

The Neolithic site of Çatalhöyük has the claim for the world's oldest map, dating to ca. 6400 BCE. The relevant image features among the sites' evocative wall paintings. James Mellaart, the excavator, eloquently described the scene as showing a town in the foreground with rectangular houses packed tightly together, as in the excavated settlement, with an erupting double peaked volcano looming behind the town, which he identified with Hassan Dağ.

Curiously, Mellaart's interpretation has been widely accepted by both archaeologists and cartographers. But the painting is not a map. It shows the supposed town from an oblique perspective, whereas the volcano is shown in profile. Thus, it would resemble the town landscape as seen by a bird. Further, the Hassan Dağ volcano is some 130 kilometers from the site and cannot be seen from it. Various scholars have raised the possibility that we are really looking at two distinct wall painting episodes that have visually become part of a single panel only due to chance factors of preservation. Both the 'volcano' and the 'town' have strong parallels at the site itself when seen in isolation. In summary, the Çatalhöyük map is problematic when subjected to close scrutiny of its constituent components.

For the earliest true maps we need to turn to Bronze Age Mesopotamia. At the end of the third millennium BC, we have building plans to scale, occurring for example on the lap of Gudea, the ruler of Lagash. The earliest true maps that we know of date to the Late Bronze Age, including the famous Nippur map dating to around 1400 BCE.

Like in the Greek world, the art of mathematics was well developed in Mesopotamia. It seems plausible to link mathematics and mapmaking, given that producing a map without recourse to measured surveying techniques in combination with an understanding of mathematics is impossible. Indeed one can only marvel at the close correspondence between the Nippur map and the plan produced by the archaeological mission to Nippur. The map shows the river, a canal, the city wall and its gate, and various large structures including the main temple, all in accurate proportions.

Despite the detail and accuracy achieved in the Nippur map, mapmaking does not seem to have been of great importance in Mesopotamia. Surveys of the extant evidence of maps do not include more than a dozen examples, a figure which contrasts starkly with the hundreds of thousands of cuneiform texts from Mesopotamia (the British Museum alone has some 130.000).

Why were maps not more widely used in Mesopotamia? First, navigating Mesopotamian landscapes would have been a relatively straightforward affair. The landscape was dotted with distinctive cities and towns, and the main rivers and canals would have provided both an easy means of transport and orientation. Thus, maps would have not have been required for navigation. Further, in Mesopotamia mapping as a means of increasing taxation revenues would have made little sense. Whereas in Europe the main resource for income generation was good quality land, the situation was radically different in Mesopotamia. There, the main resource was labour rather than land – which was abundant. Thus, in Mesopotamia land obtained its value from the labour invested in it, for example by creating and maintaining irrigation channels with which it could be farmed. Thus, producing detailed maps of landholdings in the countryside would have been a rather pointless exercise, as there was no clear relationship between land per se and productivity.

To sum up, mapmaking in Mesopotamia is probably best understood as akin to the mathematical exercises of which many examples have been found on cuneiform tablets: a pastime towards improving mathematical skills and knowledge rather than something that served practical purposes such as navigation or taxation.

It is remarkable that maps remain relatively rare in Mesopotamia. This fact runs counter to a by now well established idea that mapmaking was linked with states seeking to enhance control and exploitation of their populations. Moreover, maps do not seem to have been used for navigational purposes, or one would again expect more of them to have been found. Thus it would seem that both uses of maps are secondary developments, in which mapmaking for navigation became important at first for navigating the open seas where there are relatively few other ways of orienting oneself, and mapmaking as a tool for control and exploitation developed in particular historical contexts characterised by centralising states depending heavily on agriculture for taxation.

Instead, the few maps found in Mesopotamia, like those of the better investigated case of classical Greece and the Hellenistic world, at first developed as a pastime for the intelligentsia interested in the mathematical problem of how they could establish the dimensions of the world and how those could be best represented in a synoptic image.

~~~~~

Bleda S. Düring is Associate Professor in Near Eastern Archaeology at Leiden University.

For further reading:

Düring, B. S. 2017. Reconsidering the origins of Maps in the Near East. In From the Four Corners of the Earth, edited by D. Kertai and O. Nieuwenhuys. Münster, Ugarit Verlag, pp. 3-81.

Please visit the site: <http://www.asor.org/anetoday/2018/06/Origins-of-Maps> [Go there for pix and nice format]

POMPEII 2018: WEEK 2

In the W sector of the dig we excavated what we had taken to be an intact stretch of the construction fill from the foundation trench of the trachyte temple podium. This stratigraphic unit seemed to consist of debris resulting from the in-situ finishing of the blocks (figure 1). A cavity full of lapilli can be associated with the shuttering (formworks) of the concrete substructures, which also retained the baulk of the foundation trench. The lapilli were probably redeposited from above after the post itself had decomposed. A smashed thin-walled goblet was found at the bottom of the trench, possibly in primary deposition (figure 2; video). The upper level of the fill, however, included fragments of trachyte with traces of metal clamping (figure 3). Two blocks of the bottom course of the podium showed evidence of the robbing of a lead clamp that originally joined them (figure 4). The early excavators of the site, Sogliano and Mau, had in fact debated the question of whether the temple was still under construction or already being spoliated at the time of the eruption.

Another possibility is to link the finds with the ancient revisiting of the site post-79 CE to quarry and recycle building material (up to three courses of blocks on the S and E sides of the podium are missing). We'll investigate this issue further.

In addition, we continued to remove the backfill of the trenches opened in the 2006 excavations. In Trench IIN we re-exposed the levels reached previously, bringing back to light the features below the temple court. Our special thought goes to Raphaele-Anne Kok-Merlino, who supervised the area in 2006. We remember her fondly and, by resuming activities in her sector, we hope to make her important contribution known to the public. A row of curb-stones delimits a sidewalk provided with a drain (figure 5). These structures can be clearly associated with the finds from the E part of Trench IIS in 2017: they can be interpreted as the W limit of a N-S street branching off from Via Marina (which was eventually obliterated for the construction of the sanctuary triporticus). W of the sidewalk are the visible remains of two rooms paved with cocciopesto floors. The analysis of the W sector of Trench IIS (which we reached by the end of the week) will surely provide more clues as to the nature and function of these features. Meanwhile we will expand the area, excavating another portion of the Roman-period stratigraphy of the court.

Dr. Kate Trusler from the Department of Anthropology at Mizzou came to visit the site and we look forward to collaborating with her for the study of the faunal assemblages. We also opened our doors to Prof.

Rebecca Futo Kennedy and her students from Denison University for a close-up tour of the dig.

All are welcome! Feel free to contact Dr. Marcello Mogetta (mogettam@missouri.edu) or Dr. Ilaria Battiloro

Please visit the site: <https://www.archaeological.org/news/pompeii/28306> [Go there for pix]

UNIQUE BYZANTINE-ERA WINEPRESSES UNEARTHED IN ROOFED WATER CISTERN IN TZIPPORI, BY AMANDA BORSCHEL-DAN

The only examples of their kind discovered to date, they are a testament to a flourishing wine trade in the interfaith city

Two subterranean Byzantine period winepresses were discovered in recent excavations at Tzipori National Park. Unearthed inside a massive five-arched water cistern about 200 meters outside of town, they are the only winepresses that have been documented to date that were built inside a covered water reservoir.

Tzipori was home to a flourishing mixed pagan, Christian and Jewish community during the 4th-7th centuries CE. In the third century CE, it was the seat of Rabbi Yehuda Hanasi, aka Judah the Prince, where he began compiling the Mishnah. There is no iconography on the wine presses and, according to National Parks Authority archaeologist Dr. Zvika Tzuk, in such a heterogeneous society, it would be impossible to know who made the wine at these two presses.

However, he told The Times of Israel, based on an obscure Jewish law practiced during the Shmita year (every seventh year in the agricultural calendar when the fields are meant to “rest”), the size of the smaller wine press could be an indication that it was used by Jews of the era.

“But this is just a guess, and we cannot really know,” said Tzuk.

There are other examples of roofed Byzantine-era wine presses in the country. Last year, during digs near the Ramat Negev Regional Council, a team of Israel Antiquities Authority archaeologists discovered a large Byzantine-era structure dating to the fourth century CE, inside of which was the remains of a wine press.

What is unique about the Zippori wine presses, however, is the reuse of a water cistern as its base, said Tzuk.

According to Tzuk, “This winepresses were found in the largest of two arched-reservoirs in the Zippori National Park, which are part of the impressive water system at the site, including long aqueducts that provided water to the ancient city of Zippori. The area of the large reservoir in which the winepress was found is 5 x 9 meters, its depth is 3.5 meters, and its ceiling rests on five arches.”

Tzipori’s vast water system of aqueducts and cisterns dates back to the 1st and 2nd centuries and was in use until the 7th or 8th. These wine presses were converted in the 4th century, said Tzuk, with additional quarrying into the soft chalk stone and some construction.

There was a flourishing wine trade from the Holy Land during the populous Byzantine era. Wine, quaffed by all sectors of Tzipori’s residents, was documented in one of the

town's most noted mosaics: the Mona Lisa of the Galilee. Apart from the portrait of the lovely lady from which the mosaic derives its name, there is also a spirited depiction of a wine-drinking contest between the Greek deity Dionysus — god of wine and theater — and the hero Heracles, his half-brother.
(Spoiler: the god wins.)

The National Parks team hope that the Arches Cisterns will become as visited a site as the currently more famous mosaics for which the town is known. Located just adjacent to the site's entrance hall, they are an easy first stop on a tour of the ancient town.

This finding was discovered in the framework of excavations launched in 2002 for tourist development and research in the Zippori National Park. It was led by the National Park's Tzuk, who worked under the auspices of the Israel Antiquities Authority together with Dr. Yossi Bordowitz, Dr. Dror Ben Yosef, and Prof. Jim Parker, vice president of the New Orleans Baptist Theological Seminary. Students from the Reali School in Haifa and the Oded School in the Yodfat area also participated in the excavation.

Upon completion of the excavations, the Nature and Parks Authority intends to reconstruct part of the arches and roof and to present the site to the visitors in as close to its original state as possible.

Please visit the site: <https://www.timesofisrael.com/unique-byzantine-era-winepresses-unearthed-in-roofed-water-cistern-in-tzipori/> [Go there for pix]

CORBYN VOWS TO RETURN ELGIN MARBLES TO GREECE IF HE BECOMES PRIME MINISTER

‘As with anything stolen or taken from occupied or colonial possession – including artefacts looted from other countries in the past – we should be engaged in constructive talks with the Greek government about returning the sculptures’

Jeremy Corbyn has pledged to give the Elgin Marbles back to Greece if he became prime minister.

The Labour leader said the marbles – also known as the Parthenon sculptures – belonged to Greece and that if elected, he would open talks on returning them.

When asked whether he would consider returning the long-disputed carved figures, Mr Corbyn stressed that they were “made in Greece, and that is where they were for thousands of years until they were taken”, the country’s Ta Nea newspaper reported.

“It is very clear to me that the Parthenon sculptures belong to Greece,” he was quoted as saying.

The Elgin Marbles, made in the 5th century BC, were removed from the Parthenon temple on the Acropolis in Athens by Lord Elgin, the then Ottoman ambassador, in the early 1800s. Since 1816 they have been housed in the British Museum.

Their status has long been hotly disputed. Greece, which for decades has called for their return, with several formal requests, has also in the past threatened legal action and proposed solutions such as mediation by Unesco.

Lord Elgin insisted he had permission to take the sculptures, saying he had the permission of officials of the ruling Ottoman empire, and that he was worried about their being damaged.

Opponents of their removal from London say that the move would pave the way for requests from other countries for artworks in British museums to be returned.

Supporters of the Greek position argue that the Ottoman authorities were a foreign force and had no right to let the artefacts go.

Ta Nea reported: “In the exclusive interview given to Nea, Jeremy Corbyn agrees that, if elected, he will begin the return of the Parthenon sculptures to our country.”

Mr Corbyn reportedly said: “They were made in Greece and have been there for many centuries until Lord Elgin took them.

“As with anything stolen or taken from occupied or colonial possession – including artefacts looted from other countries in the past – we should be engaged in constructive talks with the Greek government about returning the sculptures.”

Mr Corbyn has long been a supporter of the marbles’ repatriation but this is the first time as party leader that he has made his intent so clear.

The UK government’s position is that the ownership of the sculptures is a matter for the trustees of the British Museum, according to a House of Commons briefing paper.

The British Museum website says: “The Acropolis Museum allows the Parthenon sculptures that are in Athens to be appreciated against the backdrop of ancient Greek and Athenian history. This display does not alter the trustees’ view that the sculptures are part of everyone’s shared heritage and transcend cultural boundaries. The trustees remain convinced that the current division allows different and complementary stories to be told about the surviving sculptures.”

It says the British Museum Act 1963 bans the trustees from permanently disposing of objects unless they are duplicates of others already in the collection or are “unfit to be retained ... and can be disposed of without detriment to the interests of students”.

A Labour spokesperson said Mr Corbyn was stating his long-standing personal view and that he was right to call for constructive talks.

Please visit the site: <https://www.independent.co.uk/news/uk/home-news/corbyn-return-elgin-marbles-greece-british-museum-a8381681.html> [BM response at <https://www.express.co.uk/news/uk/972093/Elgin-Marbles-British-Museum-Jeremy-Corbyn>]

INCREDIBLE 'HARRY POTTER' CAMERA CAN REVEAL HIDDEN TEXTS ON ANCIENT PARCHMENT, BY MOLLIE CAHILLANE

An imaging technique at Duke Libraries can make decayed texts visible again. Multispectral imaging (MSI) captures images under different colors of light. MSI shows details that are usually invisible to humans or a standard camera. Particularly useful for historians, archivists, and conservators to fight decay.

'Mischievous managed' and a tap of a wand reveals a hidden map in the Harry Potter world.

And similarly, an imaging technique at Duke Libraries can make decayed texts visible again.

Multispectral imaging (MSI) captures images under different colors of light, which can reveal details that are invisible to humans or a standard high-resolution camera.

Duke has had MSI since November 2016, and has found it particularly valuable to historians, archivists, and conservators.

Multispectral imaging (MSI) captures images under different colors of light, which can reveal details that are invisible to humans or a standard high-resolution camera.

It works by taking pictures of objects under individual colors of light that span the spectrum, in addition to some that humans can't see such as ultra-violet infrared lights.

Under white or full-spectrum light, we see all the wavelengths reflecting from an object 'smushed together,' said Mike Adamo, a digitization specialist at Duke Libraries.

But MSI isolates the object's response from a single color at a time.

Computer algorithms then search for differences between the individual images and combine them, pulling out subtle details that might be indiscernible under white light.

The 'Star Wars' roboshuttle gets closer to launch: First...Microsoft's underwater cloud: First subsea datacenter...Amazon launches \$200 Echo Look 'style assistant' camera that...Previously unknown 'deep faults' in Oklahoma could be...

'The algorithms enhance the subtle variations in how different regions of the object absorb and reflect color and bring them forward,' Adamo said.

'From that you might be able to identify something that you are looking for.'

In one project, the team unearthed clues about the original owners of a rare copy of Pliny's Natural History, which is currently part of the collections at the Rubenstein Rare Book & Manuscript Library.

The team at Duke Libraries used MSI to read an ancient Hebrew text rendered completely illegible by decay. It works by taking pictures of objects under individual colors of light that span the spectrum, in addition to some that humans can't see such as ultra-violet infrared lights

'It's remarkable because it has these beautiful painted initial letters and title page, but it is also remarkable because of the way it was used in the Renaissance,' said Andrew Armacost, head of collection development and curator of collections at the Rubenstein Library.

'It has a lot of handwritten annotations in the pages, and someone compiled an index in the back before anyone had ever indexed this text.'

Armacost believed that a smudged crest on the back of a book cover could help solve the mystery of who wrote those notes.

MSI revealed an image of two lions flanking a castle tower, and he hopes this crest will help them identify the authors.

The technique can also be used to read text that has been erased and written over. Computer algorithms then search for differences between the individual images and combine them, pulling out subtle details that might be indiscernible under white light

Conservation has used the imaging set-up to help visualize and document condition issues like the degradation of some kinds of ink.

HOW DOES MULTISPECTRAL IMAGING WORK?

Multispectral imaging (MSI) works by photographing objects under individual colors of light that span the entire visible spectrum plus some that go beyond human perception, from the ultra-violet to the infrared.

MSI isolates the object's response from a single color at a time.

Computer algorithms then search for differences between the individual images and combine them, pulling out subtle details that might be indiscernible under white light.

The system can also be used to track the effectiveness of conservation treatments such as tape or leftover adhesives.

In another experiment, the team used MSI to read police reports from a 2000-year old kidnapping in a small Egyptian village.

'We have multiple police reports filed at different stages of the process, and we really wanted to know who they were writing to,' said Josh Sosin, Director of the Libraries' Duke Collaboratory for Classics Computing and Associate Professor of Classical Studies.

'That information can tell you a lot about the situation.'

'Ancient history is often detective work, where you try to reclaim one tiny bit of information in the hopes that that is going to be the bridge to some other tiny bit, which will open doors to three more tiny bits,' Sosin said.

'And if you are careful about this, and keep track of everything, you start to be able to build up a rich and full picture.'

The team is excited to see what new questions researchers bring to the table.

'This brings a whole new capability into the library's quiver,' Sosin said.

'It gives us a new way to help researchers, and the joy of discovery that comes with it. And we do it in a very Duke way: working as a team across institutional and departmental boundaries to achieve more than any one of us could on our own!'

Please visit the site: <http://www.dailymail.co.uk/sciencetech/article-5814467/Incredible-Harry-Potter-camera-reveal-hidden-texts-ancient-parchment.html>

ANCIENT KNOWLEDGE TRANSFER: EGYPTIAN ASTRONOMY, BABYLONIAN METHODS

Egyptian Astronomical Instructions based on Babylonian Methods Historian of Science of the Excellence Cluster TOPOI at the Humboldt University Berlin and an Egyptologist at the University of Oxford show that Egyptian astronomers computed the course of Mercury with Babylonian methods

Egyptian astronomers computed the position of the planet Mercury using methods originating from Babylonia, finds a study of two Egyptian instructional texts from Oxford's Ashmolean Museum. The study was carried out by Mathieu Ossendrijver, a historian of ancient science at Humboldt University Berlin and Exzellenzcluster Topoi, and Andreas Winkler, an Egyptologist at Oxford University's Faculty of Oriental Studies. The instructional texts date to 1-50 AD and are written in the Demotic language, a late stage of ancient Egyptian, on two 'ostraca' (potsherds, or broken pieces of ceramic material). They are the only known texts from Greco-Roman Egypt with instructions for computing astronomical phenomena with Babylonian methods.

The instructions correspond exactly to methods invented in the ancient state of Babylonia several centuries earlier (400-300 BC).

Surprisingly, the ostraca employ a mathematical formulation not found in Babylonian texts but whose existence has long been suspected by historians of astronomy. The ostraca prove that native Egyptian scholars were as competent in Babylonian astronomical computation as their colleagues writing in Greek, suggesting a more important role for native Egyptian scholars in the transmission of Babylonian astronomy to Greco-Roman Egypt than previously thought.

By the early second century BC, Babylonian astrology and astronomy had spread to Egypt. Like their Babylonian colleagues, Egyptian astrologers began to produce horoscopes in order to determine the fate of a newborn. The production of a horoscope required computing the zodiacal positions of the Moon, the Sun and the five planets known in antiquity: Mercury, Venus, Mars, Jupiter and Saturn. Both Demotic horoscopes and Greek horoscopes have been found in Egypt, and in 1999 the American historian of astronomy Alexander Jones proved that some Egyptian astrologers writing in Greek were using Babylonian methods.

But until now little has been known about the computational methods of the native Egyptian astrologers writing in Demotic.

The two newly identified Demotic texts with computational instructions shed new light on the mathematical skills of the native Egyptian astrologers. Both ostraca contain instructions regarding three distinct Babylonian algorithms. Each of them is concerned with a particular phenomenon of Mercury: its first appearance as an evening star, its first appearance as a morning star, or its last appearance as a morning star. The inscriptions offer the first unequivocal proof that native Egyptian astrologers, like their colleagues writing in Greek, were capable of computing positions of Mercury, a planet with a comparably complicated motion, using Babylonian methods. An analysis of the

instructions suggests that the native Egyptian scholars adapted these methods before their colleagues writing in Greek, as well as independently of those colleagues. First, the ostraca predate all known Greek tables for Mercury that were computed with these methods, and are in fact the only instructional texts with Babylonian astronomy that have been found in Egypt thus far. Second, they use a Babylonian loanword for 'degree', while the astrologers writing in Greek used a Greek word for this.

A surprising aspect of the instructions is that they employ a mathematical formulation that is unknown from Babylonia. While the Babylonians directly computed the variable distance travelled by Mercury along the zodiac – for example, between two occurrences of its first appearance as an evening star – the Egyptian scholars first divided the zodiac into tiny steps of variable length. The distance travelled by Mercury was then obtained by counting off a fixed number of these steps, with identical results to those obtained by their Babylonian counterparts. In 1957, the mathematician Bartel van der Waerden first suggested the existence of this alternative formulation.

While it has not yet been identified in any Babylonian text, we now see it in these two Demotic texts written by native Egyptian scholars.

Publication:

Mathieu Ossendrijver, Andreas Winkler, 2018, Chaldeans on the Nile: Two Egyptian Astronomical Procedure Texts with Babylonian Systems A1 and A2 for Mercury, in: C. J. Crisostomo, E. A. Escobar, T. Tanaka, N. Veldhuis (eds.), *The Scaffolding of Our Thoughts: Essays on Assyriology and the History of Science in Honor of Francesca Rochberg*, Leiden: Brill, 382–419.

Contact

Dr. Nina Diezemann
Exzellenzcluster Topoi, Presse und Öffentlichkeitsarbeit Telefon +49 30 838-73190
nina.diezemann@topoi.org

Please visit the site: https://www.hu-berlin.de/en/press-portal/nachrichten-en/May18/nr_180604_00 [See also <http://www.ox.ac.uk/news/arts-blog/ancient-knowledge-transfer-egyptian-astronomy-babylonian-methods#>]