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Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Σεπτέμβριος 2019 -

**No man ever steps in the same river twice, for it's
not the same river and he's not the same man.**

(Heraclitus)

Newsletter of the Hellenic Society of Archaeometry

- September 2019 -

Nr. 222

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS
DYES IN HISTORY AND ARCHAEOLOGY 38,
6-8 NOVEMBER 2019, UNIVERSITY OF
AMSTERDAM, THE NETHERLANDS

The provisory programme for this year's Dyes in History and Archaeology conference is now available. More information and online registrations at <http://www.dha38.nl> and <https://www.uva.nl/en/shared-content/faculiteiten/en/faculteit-der-geesteswetenschappen/events/conferences/2019/11/dyes-in-history-and-archaeology.html?1565097056286> until 15 October.

PROVISORY PROGRAMME

Wednesday, 6 November

17h-19h Welcome reception and registration,

Ateliergebouw, Hobbemastraat 22, NL-1071 ZC, Amsterdam

Thursday, 7 November

9h00-9h30 Arrivals at the University of Amsterdam Theatre

Nieuwe Doelenstraat16-18

1012 CPAmsterdam

9h30-9h45 Welcome

9:45-11:00 Session 1 ? Chair: Maarten van Bommel

9:45-10:05

Tannins and the weighting of silk: the effects on pigments made from silk extracts

David Peggie & Jo Kirby

10:05-10:25

What is **bruzu?koks*??* or study on the dyewood discarded on the coast of the Baltic sea

Anete Karlson & Valda Valkovska

10:25-10:45

The colorful Saxon flowers and their dye sources

Irina Petroviciu, Iulia Teodorescu, Florin Albu, Marian Virgolici, Eugenia Nagoda & Andrei Medvedovici

10:45-11:00

Questions

11:00-11:30 Coffee break

11:30-12:45 Session 2 ? Chair: Dominique Cardon

11:30-11:50

The materials used to create the Tahitian chief mourner's costume and other Pacific bark cloth objects in the British Museum collection

Diego Tamburini & Caroline R. Cartwright

11:50-12:10

Studies on the Central American dyestuff **Justicia spicigera**.

Joan M. Esson, Victor J. Chen & Gregory D. Smith

12:10-12:30

Citt? Paradiso: The Purples of Dura-Europos

Zvi Koren

12:30-12:45

Questions

12:45-13:05 Poster pitches (6 posters - 3 min. presentation each)

13:05-14:15 Lunch + Poster session

14:15-15:30 Session 3 ? Chair: Suzan Meier

14:15-14:35

Dyeing with lac-dye in France and England in the 18th century

Dominique Cardon & Anita Quye

14:35-14:55

Natural Dyes in Worth Carpets at the Victoria and Albert Museum

Laura Maccarelli, Roisin Morris & Terry Schaeffer

14:55-15:15

Comparison of Archival Documents and Analysis Results in the Materials of Ottoman Palace Fabrics

Recep Karadag & Emine Torgan G?zel

15:15-15:30

Questions

15:30-15:50 Poster pitches (6 posters - 3 min. presentation each)

15:50-16:15 Coffee break + Poster session

16:15-17:30 Session 4 ? Chair: Ana Serrano

16:15-16:35

Lac production in north east India: The history of its trade and current methods of production and marketing

Cheryl Porter

16:35-16:55

Reconstruction of Persian dyes used in manuscripts based on traditional recipes and development of a spectral database by non-invasive analytical techniques

Mojtaba Mahmoudi Khorandi, Maurizio Aceto, Monica Gulmini, Oliver Hahn, Samanehalsadat Ehteram, Angela Benotto & Angelo Agostino

16:55-17:15

>From India with love: a non-invasive method for the identification of
>lac
dye in paintings and textiles

Maurizio Aceto

17:15-17:30

Questions

19h Conference diner at restaurant de Kantjil & de Tijger

Spuistraat 291-293, 1012 VS Amsterdam

Friday, 8 November

9h00-9h30 Arrivals at the University of Amsterdam Theatre

Nieuwe Doelenstraat16-18

1012 CPAmsterdam

09:30-10:45 Session 5 ? Chair: Art Ness Proa?o Gaibor

09:30-09:50

The Z?tl family: a tradition of dyeing in Austria

Regina Hofmann-de Keijzer, Matthijs de Keijzer & Alfred Atteneder

09:50-10:10

Calico-printing with the first synthetic dyes: unpublished samples and letters from the Koechlin family

Marie-Anne Sarda

10:10-10:30

From Brilliant to Fanal - Precipitation of Triphenylmethane dyes in the early 20th century

Rika Pause & Klaas Jan van den Berg

10:30-10:45

Questions

10:45-11:15 Coffee break

11:15-12:30 Session 6 ? Chair: tbc

11:15-11:35

On the set of Fellini?s movies: investigating and preserving multi-material stage costumes

Francesca Sabatini, Jacopo La Nasa, Camilla Guerrini, Isetta Tosini, Sara Bonadio, Federica Ursino, Marta Cim?, LiciaTriolo & Ilaria Degano

11:35-11:55

The coal tar chemistry of Vincent van Gogh's ink drawings

Frank Ligterink, Art Ness Proa?o Gaibor, Johan Neevel, Sanne Berbers, Inez van der Werf, Teio Meedendorp, Rob Erdmann & Birgit Reissland

11:55-12:15

Conserving the Rainbow ? Preservation of the Dye Collection of the Hochschule Niederrhein

Marc Holly, Christoph Herm & J?rgen Schram

12:15-12:30

Questions

12:30-13:00 Poster pitches (10 posters (Max, probably 8)- 3 min. presentation each)

13:00-14:15 Lunch + Poster session

14:15-15:30 Session 7 ? Chair: Zvi Koren

14:15-14:35

Development of a Toolbox for studying the Chemistry of light-induced degradation (TooCOLD)

Iris Groeneveld, Mimi den Uijl, Govert Somsen, Freek Ariese, Peter Schoenmakers & Maarten van Bommel

14:35-14:55

Visible-excited spectrofluorimetry as a non-invasive tool for the ?in situ? identification of natural dyes in historical textiles

Silvia Bruni, Margherita Longoni, Silvia De Meo, Francesca Scalzo, Angela Dibenedetto & Vittoria Guglielmi

14:55-15:15

New approach for dyes extractions with gel application of ammonia-EDTA for microextraction from textiles

Ilaria Serafini , Giulia Germinario, Alessandro Ciccola, Ludovica Ruggiero, Marco Sbroscia, Flaminia Vicenti, Claudia Fasolato, Armida Sodo, Marcella Ioele, Fabio Talarico, Paolo Postorino & Roberta Curini

15:15-15:30

Questions

15:30-15:50 Poster pitches (6 posters - 3 min. presentation each)

15:50-16:15 Coffee break + Poster session

16:15-17:30 Session 8 ? Chair: Jo Kirby Atkinson

16:15-16:35

The Burgundian Black Collaboratory: a look behind the scenes of an interdisciplinary research on black dyes

Natalia Ortega Saez, Jenny Boulboul? & Claudy Jongstra

16:35-16:55

New method of natural indigo reduction using Baker?s Yeast as a biocatalyst

Younsook Shin, Kyunghee Son & Dong Il Yoo

16:55-17:15

Investigation of wars dye on blue and brown Yemeni cotton ikats

Julie H. Wertz, Richard Newman, Mark Nesbitt, Meredith Montague, Robin Hanson, Elizabeth Dosp?l Williams & Mary McWilliams

17:15-17:30

Questions

17:30-17:45 Closing remarks

Information regarding the excursion on Saturday will be distributed in time.

Dr. Ana Serrano

Cultureel Erfgoed Onderzoeker / Conservation Scientist Rijks erfgoedlaboratorium /
Cultural Heritage Laboratory

Ministerie van Onderwijs, Cultuur en Wetenschap / Ministry of Education, Culture and
Science Rijksdienst voor het Cultureel Erfgoed / Cultural Heritage Agency Afdeling
Conservering & Restoratie Hobbemastraat 22 | NL-1071 ZC | Amsterdam Postbus 1600 /
P.O. Box 1600 | NL-3800 BP | Amersfoort The Netherlands

LinkedIn <https://nl.linkedin.com/in/afaserrano>

https://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=webmail



**MA-XRF 2019, SCANNING IN
CONSERVATION, ART AND
ARCHAEOLOGY, OCTOBER 15-16, 2019,
CATANIA, ITALY**

Dear Colleagues,

Many thanks for the number of submitted abstracts. Since the MA-XRF workshop is limited to two days, we have now opened the **POSTER SESSION** in order to give possibility to all Authors to present their work. Please, take into consideration that all papers will be reviewed by Scientific Committee of the MA-XRF workshop and that each Author can present only one work. The new abstract submission deadline for the MA-XRF workshop is now postponed to **September 1, 2019**. The new important dates for the workshop are detailed below.

You will find the abstract-template and detailed submission information at the [MA-XRF 2019 website](#).

The abstract submission will be managed through the Easy-Chair conference system at the link: <https://easychair.org/my/conference?conf=maxrf2019>

NEW IMPORTANT DATES:

- 1 September 2019 – New Abstract deadline (for orals and posters)
- 5 September 2019 - Notification to authors
- 15 September 2019 - Registration deadline ([click here for registration](#))
- 20 September 2019 - Final program

Looking forward to meet you in Catania,

Best regards

Paolo Romano and Koen Janssens
(On behalf of the Scientific Committee)

**TENTH INTERNATIONAL CONFERENCE ON
THE BEGINNINGS OF THE USE OF METALS
AND ALLOYS (BUMA X) 7TH –
10TH SEPTEMBER 2020, MAHA CHAKRI
SIRINDHORN ANTHROPOLOGY CENTRE,
BANGKOK, THAILAND**

Dear All

The Tenth International Conference on the Beginnings of the Use of Metals and Alloys (BUMA X) 7th – 10th September 2020, Maha Chakri Sirindhorn Anthropology Centre, Bangkok, Thailand

Website

The conference website is now up and running:
<https://sites.google.com/view/bumaxbangkok2020/>

You can find this website to find relevant information concerning the conference, including the important dates, paper submission and guidance, registration, and the venue.

Call for papers – 15 August - 20 December 2020

This year conference theme is set to “diversity and connection of metallurgy across Asia”. This is to reflect Southeast Asia being a host of the BUMA conference for the first time. The region, in recent years, has seen significant progress on archaeometallurgical research since it commenced in the mid-1960s. Situated at the end of the Eurasian transmission route, Southeast Asian metallurgy is intimately connected to those developed in neighbouring Eurasian populations. This certainly demonstrates a long history of connection and transmission of metallurgical knowledge as well as people across Eurasia and beyond. This provides the scholars a great opportunity to further explore how rich, complex, and diverse the ancient metallurgy and its socio-cultural processes and interactions involved were throughout the vast region.

This “diversity and connection” is hoped to be demonstrated through contributions from archaeological expeditions, analytical results of finds, new approaches and new technologies in archaeometallurgical studies, new interpretations of previous data, comparative studies, as well as experimental and ethnographic data drawn from various regions in Asia, covering from Near East, Middle East, Central, North, South, East, and Southeast Asia.

These sessions are preliminarily proposed in hope of capturing the main theme as well as open a forum for other related topics. However, the participants are encouraged to

propose new sessions or papers relevant to the main theme. The current themes are as follows:

Archaeometallurgy in Southeast Asia
Archaeometallurgy in East Asia
Archaeometallurgy in Central Asia
Archaeometallurgy in North Asia
Archaeometallurgy in South Asia
Archaeometallurgy in Western Asia (including Middle East and Near East)
Archaeometallurgical connection between Asia and Europe
New analytical techniques in archaeometallurgy

For more information, please visit:

<https://sites.google.com/view/bumaxbangkok2020/call-for-papers>

Please do not hesitate to direct any enquiries to the local organising committee via these e-mail addresses:

Conference-related: reg.bumax@gmail.com

Papers and presentation-related: bumaxbkk@gmail.com

On behalf of the local organising committee,

Best regards,

Pira Venunan

Pira Venunan PhD

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<https://www.facebook.com/Department-of-Archaeology-SU-1473619919548138/>

HMS RESEARCH IN PROGRESS MEETING,
15TH NOVEMBER, 2019, MCDONALD
INSTITUTE FOR ARCHAEOLOGICAL
RESEARCH, UNIVERSITY OF CAMBRIDGE

This is a reminder that abstract submissions for this year's HMS Research in Progress Meeting at the University of Cambridge should be submitted by the end of next week (1st of September). Please find the call for papers below.

Call for Papers - DEADLINE 1st OF SEPTEMBER
Historical Metallurgy Society Research in Progress Meeting

Friday the 15th November, 2019 to be held at the McDonald Institute for Archaeological Research, University of Cambridge

<http://hist-met.org/meetings/research-in-progress-meeting-2019.html>
<https://www.facebook.com/events/474320303343533/>

The Historical Metallurgy Society Research in Progress Meeting is back for another year, with the aim of bringing together a wide variety of contributors, from historical and archaeological metallurgists to field archaeologists, historians, and economists. We invite submissions from anyone currently working on, or recently having finished a project on archaeological or historical metallurgy, from historical and archaeological metallurgists to excavators, historians and economists. We are particularly keen in bridging the gap between archaeologists working in the academic, contract and public sectors, and fostering links between metallurgical specialists across different disciplines. Whether you are a researcher, a student or a non-specialist with an interest in the field, we welcome you to share your research and meet others working in the field.

Proposals for 10-15 minute oral communications are invited from anyone undertaking work in any area of ancient, historical, or industrial metallurgy, and/or other relevant areas of research. Please send your abstract as an attached text document to hmsresearch19@gmail.com by the **1st of September**.

The HMS prize will be awarded to the best presentation by a student or a recent graduate (anyone who has completed their studies within the past 12 months) at this annual meeting, as chosen by members of the HMS council attending the meeting. If you are eligible and wish to be considered, please indicate this in your abstract submission.

In addition to the prize, The Historical Metallurgy Society is offering a small number of travel bursaries for students presenting at the meeting. If you are a student and would like to be considered please indicate with your submission.

Please direct any general enquiries to the following e-mail address: hmsresearch19@gmail.com

Best regards,

HMS Research in Progress 2019 Organising Committee

**EARLY IRON PRODUCTION -
EXPERIMENTAL ARCHAEOLOGY - THE
LEVANT AND AFRICA, RESEARCH
WORKSHOP OF THE ISRAEL SCIENCE
FOUNDATION, 2-7 FEBRUARY 2020, ISRAEL**

The workshop will be held in collaboration with *Dr. Jane Humphris* (British Institute in Eastern Africa), partly at Ariel University and partly in a beautiful farm in the center of Israel.

The workshop/course includes two days of lecture sessions, in we will present the various technological and cultural aspects of early iron production in the Levant and Africa followed by a one day symposium with invited researchers in the field, and will culminate by “Hands-on” and active participation in a three-day iron smelting experiment. **The smelting experiments** will be directed by two professional iron smelters and ancient technologists, *Mr. Lee Sauder and Mr. Jake keen*.

Students from all relevant disciplines are welcome;

- 4 academic credit points are offered
- limited number of scholarships are available

More details regarding, registration, costs etc, will be announced soon!
in the meantime, please feel free to contact me,
Adi Eliyahu-Behar

Adi Eliyahu Behar, Ph.D
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Ariel University
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adieli@ariel.ac.il

WORKSHOPS: RECREATE THE ESSENCE OF MUMMIFICATION, AMSTERDAM, SEPTEMBER 28, 2019

Learn all about the smells of mummification and their significance with Dora Goldsmith at this workshop <<https://www.mediamatic.net/en/page/374727/recreate-the-essence-of-mummification>>.

What you will do

Throughout this workshop, you will learn about the smells that defined the mummification chambers and tombs, and the scents that the ancient Egyptians themselves wished to be surrounded by in their life after death. In the first hour, Dora will teach you about the olfactory motivation for mummification and the substances employed during the process. In the second hour, she will give you a detailed insight into the materials. You will be able to smell each ingredient and you will learn about their significance for the Egyptians and the reasons behind their use. In the third and last hour, you will recreate the essence of mummification in a bottle by using the very same ingredients the ancient Egyptians employed for embalming their dead.

Don't worry, you will end up with an exceedingly pleasant smell.

Dora Goldsmith

Dora Goldsmith is 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". Dora's PhD project incorporates linguistic and cultural anthropological research. She records and translates all ancient Egyptian texts that include words related to olfaction, which help her define the role of smells in the ancient Egyptian society. In order to better apprehend the ancient Egyptian documents she works with, Dora also employs the method of experimental archaeology or 'learning by doing'. She reconstructs the smells the ancient sources describe.

Mediamatic is an art center dedicated to new developments in the arts since 1983. We organize lectures, workshops and art projects, focusing on nature, biotechnology and art + science in a strong international network.

Information

Time and Date: September 28, 2019, 11am-2pm

Price: 90€| Students / Artists / Stadspas: 63€

Location: Mediamatic, Dijkgracht 6, Amsterdam Tickets available on <https://www.mediamatic.net/en/page/374727/recreate-the-essence-of-mummification>

Please note that this workshop will be held in English.

Jack M. Sasson
243 Hales Wood Rd
Chapel Hill, NC 27517
jack.m.sasson@gmail.com



ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

POST-DOCTORAL FELLOW IN
ARCHAEOBOTANY (REF NO.
STARC PDFA 19 12), THE CYPRUS
INSTITUTE

The Cyprus Institute (CyI) is a non-profit research and educational institution with a strong scientific and technological orientation, emphasizing international collaborations and cross-disciplinary research and post graduate education. CyI, through its established research centers, addresses challenging issues that are important at both the regional and international levels. Many of its research activities are being carried out in partnership with leading institutions in the respective thematic areas.

The selected Post-Doctoral Fellow, who will be engaged in the activities of the *People in Motion* project, will be responsible for the microanalytical study of dental calculus deposits on ancient teeth with the aim of identifying microdebris of different origin to allow reconstruction of past lifeways and networks of contact, where possible. In this direction, the successful candidate is expected to set up an open access reference collection for the identification of relevant microdebris, as well as to conduct the actual analysis of archaeological dental calculus deposits.

Job
Description

The appointment will be on a full time basis, for a fixed-term period of two years.

The Project

People in Motion aims at exploring human mobility across the Mediterranean during the Early and Middle Byzantine period. Human mobility has played a key role in the formation of the multi-ethnic Byzantine state. The proposed project will be the first to systematically explore the scale, nature, and impact that migration had on those who relocated and on the local communities in the lands they inhabited based on the most direct evidence of the people in motion, human skeletal remains. To this end, the project will focus on material from Tunisia, Morocco, Italy, Greece and Cyprus. Human mobility and its effect will be explored using a combination of macroscopic (geometric morphometric analysis of cranial and dental morphology), microanalytical (dental calculus microdebris analysis of indigenous and imported plant species and minerals), and biochemical (strontium

isotope analysis) methods. The aforementioned markers of palaeomobility will be examined in conjunction with cultural evidence of different ethnic identities in order to formulate a coherent biocultural narrative on the issue of migration and integration.

Responsibilities

The successful candidate will be carrying out the following activities

- Creation of open access reference database (digital images and slides) of microremains of a dietary and environmental nature (e.g. phytoliths, starches, fibers) with an emphasis on Eastern Mediterranean and North African flora.
- Microscopic examination of dental calculus deposits from Byzantine era human skeletal assemblages from Greece, Cyprus, Italy, Morocco and Tunisia.

Required Knowledge, Skills, Qualifications and Experience

- PhD (or equivalent) in Environmental Archaeology/Archaeobotany
- Relevant experience of 2 (two) years (incl. PhD experience)
- Experience in the set up and management of reference collections
- Record of publications in environmental archaeology
- Ability to use laboratory protocols for the analysis of dental calculus and the preparation of reference material without supervision
- Experience in optical microscopy
- Experience in the analysis of starch granules and/or phytoliths
- Ability to write reports
- Ability to work to multiple and tight deadlines
- Excellent knowledge of the English language both verbal and in writing
- Highly motivated with the ability to work independently
- Excellent communication and interpersonal skills and the ability to adapt to a multicultural, multinational environment
- High level organizational, analytical and problem-solving skills

Job Requirements

Preferred Qualifications/Experience

- Experience in Eastern Mediterranean and/or North African archaeology (preferable)
- Some experience in SEM/EDX would be beneficial to the candidate
- Experience in modern botany is desirable

Application/Contact

For full consideration, interested applicants should process their application at The Cyprus Institute JobBoard (<http://jobboard.cyi.ac.cy/>) based on the instructions given. Applicants should submit a curriculum

vitae including a letter of interest and a list of three references (including contact information) (all documentation should be in English and in PDF Format). For further information, please contact Dr Efthymia Nikita, (e.nikita@cyi.ac.cy). Please note that applications which do not follow the announcement's guidelines will not be considered.

Recruitment will continue until the position is filled.

Starting Date Thursday, August 1, 2019
Closing Date Sunday, September 15, 2019
Center [STARC](#)
Status Open

Please visit the site: <https://jobboard.cyi.ac.cy/?q=node/4293>

**NORTHWESTERN UNIVERSITY/ART
INSTITUTE OF CHICAGO CENTER FOR
SCIENTIFIC STUDIES IN THE ARTS (CSSA) |
CHICAGO, IL, USA, ASSOCIATE SCIENTIST**

The Northwestern University/Art Institute of Chicago Center for Scientific Studies in the Arts (CSSA) is seeking an Associate Scientist to provide intellectual and operational leadership to its external research projects program wherein joint research collaborations are undertaken with cultural heritage institutions across North America and the world. The Center provides its resources, from Northwestern University and the Art Institute of Chicago, to external users via a merit-review proposal system to undertake objects-based and objects-inspired scientific research in the arts.

These external projects are critical to the Center's mission to provide scientific support for the investigation of art collections, to develop new technology to look at art, and to research new methods to conserve art for future generations.

Details about the Center are available at <https://scienceforart.northwestern.edu>.

The successful candidate will primarily report to the Center's co-Director Dr. Marc Walton

<https://wcms.northwestern.edu/entity/open.act?type=page&id=96f4cd1c816977243a7b21e364ace3ae&confId=2a3d4d5d8169772475f6e42a747ea891> (Research Professor of Materials Science and Engineering, Northwestern University) with Dr. Francesca Casadio,

<https://wcms.northwestern.edu/entity/open.act?type=page&id=96f274f3816977243a7b21e3865b6150&confId=2a3d4d5d8169772475f6e42a747ea891> (Grainger Executive Director of Conservation and Science at the Art Institute of Chicago) as co-supervisor. The Associate Scientist will work with a postdoctoral fellow to manage the external collaborations of the Center, provide mentorship to postdoctoral fellows, graduate and undergraduate students at the Center, and conduct independent research projects that enhance and augment the external research program. The position is funded for four years as supported by the Andrew W. Mellon Foundation.

Primary duties

1. Direct both applied research and analytical work to support external projects by carrying out state-of-the-art scientific research using a combination of macro, micro and nano benchtop and synchrotron-based instruments a) to characterize materials, structures and components of artworks either in their original state or after aging or deterioration; b) to improve and develop new treatment and preservation strategies; and c) to broaden ways of studying works of art
2. Strengthen and enhance relationships with curators, conservators, art historians and archaeologists from external institutions to foster collaborative international research projects
3. Develop and / or strengthen relationships with various experimental and analytical research facilities at Northwestern University and in the Chicago area

4. Assist external institutions during the phase of proposal writing, and provide detailed reports to participating institutions after the analyses are conducted
5. Work with the Center co-Directors to foster understanding and assimilation of results and approaches of scientific research in the arts among curators, conservators, university professors and their students, administrators, other staff, the general public and other AIC and NU support groups through:
 - * The production of high-level scientific research publications in the field of cultural heritage science and object-based art history
 - * Travel to attend conferences, present papers and confer with colleagues in the US and internationally
 - * The design of media tools, and press materials (website, data visualization tools etc.) for general public
6. Planning and supervise lab activities and external projects
7. Actively engage in developing and using innovative instrumentation, sample preparation and data treatment approaches to conduct research

Minimum qualifications

Ph.D. in chemistry or physical science and a minimum of 3 years of experience in conservation science and experimental research in an academic or museum setting. It is preferred that the candidate has ample experience working within museums as well as the application of advanced analytical imaging methods to works of art: namely, but not limited to, macro-XRF, hyperspectral imaging (visible and near infrared), optical coherence tomography, data fusion, etc.

Application

Application materials consisting of a cover letter, a CV, and the names and contact information of three references should be uploaded to <https://openposition.mccormick.northwestern.edu/apply/index/Nzg=> by October 15, 2019 for full consideration.

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

CALL FOR PROPOSALS – AHRC FUNDED

CDP PHD STUDENTSHIPS IN HERITAGE

TOPICS

Historic England and the English Heritage Trust invite proposals from universities and other Higher Education Institutes to co-supervise PhD studentships in a range of heritage topic areas. This call is not open to individual students. This call is open till November 22nd 2019.

Please feel free to share this email with your contacts and networks.

Details of the opportunity and application process are given below. Initial enquiries to the email addresses below are welcome.

The call for proposals

We are looking for collaborative proposals from a university or other Higher Education Institutes, and specialists at either Historic England or English Heritage. The university/HEI would host the PhD student, fully funded for four years by AHRC. Historic England or English Heritage would provide staff time for co-supervision, access to resources and contacts, practical experience to complement the student experience.

For the 2019 Call for Proposals we are looking to co-design proposals in these priority areas (areas 4,6 and 7 may be of particular interest to this list):

Historic England: topics from our Research Agenda

1. Social value of heritage
2. Economic value of heritage
3. Contested values in heritage

See <https://historicengland.org.uk/research/agenda/research-theme-value/>

4. Materials science

See <https://historicengland.org.uk/research/agenda/research-theme-innovate/>

English Heritage:

5. Untold Stories of the National Heritage Collection
6. Insect pests and historic collections and interiors
7. Temperature sensitivity of historic collections made of vitreous materials (such as painted stained glass and enamels)

For initial enquiries about the topic areas and about who to contact to develop proposals, please contact either Edmund Lee Edmund.Lee@HistoricEngland.org.uk about priority areas 1 to 4 or Andrew Hann Andrew.Hann@english-heritage.org.uk for priority areas 5 to 7.

Before you apply note that

Under the latest round of our Collaborative Doctoral Partnership, funded by the Arts and Humanities Research Council, we are funded to offer co-supervision of three four-year PhD studentships within these areas.

These PhD students need to be co-supervised by a named principle and secondary academic supervisor at the university, and a named principle and secondary supervisor from Historic England or English Heritage.

Students will benefit from a clear connection of their research with the expertise in practical issues in heritage management of the national agencies.

Making an application

To apply please visit our Collaborative Research Opportunities webpage at <https://historicengland.org.uk/research/support-and-collaboration/researchopportunities/> and download the Priority Research Topics 2019 document and the Proposal Form and Guidance.

The deadline for applications to be received is November 22nd 2019.

We will assess proposals giving equal weight to three criteria:

- relevance to our chosen priority research topics
- academic strength of the proposal
- use of the collaboration with Historic England / English Heritage to enhance the students experience

Successful proposals will be notified in early 2020, ready to recruit students to start in October 2020.

Kind regards

Robin

INTERNET SITES

PODCAST: THE CHANGING FIELD OF ARCHAEOLOGY WITH IAN HODDER AN INFLUENTIAL ARCHAEOLOGIST DISCUSSES HIS LONG CAREER

Growing up in the UK, Ian Hodder was surrounded by artifacts of ancient societies. He participated in his first organized archaeological dig in his hometown of Cambridge at the age of 13, and since then he has worked at archaeological sites around the world.

Over his long career, he has pushed the field in important new directions, promoting ethnoarchaeology (the study of the relationship between material culture and people) in the 1970s and 80s and more recently exploring how digital tools can further archaeological research and knowledge sharing.

In this episode, Hodder discusses his training, his decades-long work at the Turkish site of Çatalhöyük, and his recent Getty Foundation-funded project, Çatalhöyük Living Archive.

Transcript

JAMES CUNO: Hello, I'm Jim Cuno, president of the J. Paul Getty Trust. Welcome to Art and Ideas, a podcast in which I speak to artists, conservators, authors, and scholars about their work.

IAN HODDER: Humans often think of themselves as being independent agents. But in fact, their lives are very caught up in material things and they come to determine the way that we act.

CUNO: In this episode, I speak with Ian Hodder about his long and distinguished career in archaeology.

Ian Hodder is the Dunlevie Family Professor in the department of anthropology and professor of classics at Stanford University. For the past 25 years, Ian has led Stanford's archaeological excavations at the UNESCO World Heritage Site of Çatalhöyük in Turkey, a large Neolithic settlement that flourished around 7000 BCE. These excavations have revealed new information about the origins of human settlements, the rise of civilization, the emergence of religion, and early object-making, including wall paintings, sculpture, and figural ceramics.

Over the years, Ian and his team members have made available their findings through the Living Archive of Çatalhöyük, a GIS web application designed to serve as a database for archaeologists, art historians, and the general public to explore the site and its associated artifacts. Ian was recently at the Getty with other members of his excavation team to meet with members of other excavation teams similarly engaged with digital site mapping.

I took advantage of Ian's visit to the Getty to interview him for this podcast.

Well, hello, Ian. Welcome to the Getty podcast.

HODDER: Thank you.

CUNO: Now you took your first academic degree in prehistoric archaeology. How did you get interested in archaeology, and why prehistoric archaeology?

HODDER: Well, I started digging when I was very young. I lived in Oxford, in England, and got involved in excavations of medieval sites around Oxford. And that just sort of was something I did as a hobby, to try and see whether I was interested or not.

CUNO: Was that as a teenager?

HODDER: Yeah. There are pictures of me digging on some medieval priory or something when I was about thirteen. It was something that just I was very fascinated by very, very early on. It was partly that I went to an all boys school and, you know, we didn't get to meet anybody except other boys, and so it was a great way of meeting girls.

But I was very fascinated by the whole process of how you work out what was going on, from traces in the ground. You know, the intellectual problem of trying to work out what happened from a few— few bits of evidence. And so that's why I ended up being more interested in prehistoric archaeology, because I sort of liked the sort of text-free nature of that.

CUNO: Yeah. Did you find anything that you remember that was particularly interesting to you?

HODDER: No, I absolutely remember it being very very boring. Bits of medieval glazed pottery, you know, and a pit or a ditch everywhere, that sort of thing. I never found anything at all interesting. It was just the intellectual, and excitement and the social thing of being in a team.

CUNO: Were you ever able, under the direction, let's say, of the archaeologist who was leading the dig, to put two and three and four and five things together to come up with some meaningful or interesting interpretation of intellectual activity or—?

HODDER: Yes. I mean, I can think of a number of examples like that. At one point, I went to dig on the Fishbourne Villa with Barry Cunliffe.

We were just trying to work out what the garden looked like in the villa and tracing the pattern of the Roman flowerbeds. So I mean, it was extraordinary. Yeah, lots of examples like that.

CUNO: When you went back to school, did you read classics?

HODDER: Yes. You know, in England in those days, you gave up science when you were about eleven. And I did Greek, Latin and ancient history, all the way through to A levels, and so the end of high school. Then I did prehistoric archaeology at university.

CUNO: Yeah. So you went to London, I think, first, and then you went to Cambridge to study. And what was it about those two universities that attracted your attention? Were there specialists in the fields?
[inaudible].

HODDER: Yes. I mean, in those days, London was, in my view, the best place to do prehistoric archaeology. The Institute of Archaeology there was a very, very large center. It had fifty or sixty people teaching.

CUNO: Wow.

HODDER: I believe nowadays there are about eighty. So I mean, it's one of the largest centers of prehistoric archaeology in the world. So it includes Roman archaeology, as well, though, and conservation, other things. And of course, it had a fantastic tradition. People like Gordon Childe, who had been there for a long time and really established the degree program there. So you know, very important people, very exciting people— And I enjoyed that very much.

CUNO: Our listeners are probably interested in understanding how it is you link the together the academic experience in the classroom with the fieldwork. And especially if the fieldwork occurs someplace far distant from where the academic work in the classroom happens. So how did you integrate the life of the school year into that, with the digging in the summer?

HODDER: In those days, archaeology in England was largely done by students of various sorts, so that there were very few professional arc— you know, field archaeologists. Most of the excavation on these projects like Fishbourne was done by huge dragoons of high school and undergraduate students, relatively untrained and so on.

And so there was a very natural, close link between the degree course and then all the people you met and worked with on these projects. I mainly ended up working abroad. And the Institute of Archaeology had a team working at Knossos in Crete. And so I excavated there for several years. And it was basically the same faculty and the same students that I was working with in London.

CUNO: After you took your degree, your first fieldwork was at an Iron Age and Roman site in Essex. And then I think your second was in West Yorkshire, England. But then your next fieldwork was in Kenya, and the one after that was in Sudan. How could you go from one in England all the way to Sudan— what is the practice of archaeology that can apply itself across such a field of sites and cultures?

HODDER: My first work in England was while I was still a graduate student. And I was always very interested in not just being an academic. I mean, I always wanted to dig as well as to write. And so I started my own excavation of a Roman villa near Cambridge while I was at Cambridge. But the move to Africa was partly serendipitous, because I visited Kenya for other reasons and realized that there was something I could do there that was interest to me.

But the reason I was interested was that I had come to a sort of critical position in archaeology, where I felt that the way that archaeologists were interpreting the past was inadequate. I felt that archaeologists were trying to interpret the data in some sort of universalistic way, with various laws and predictions that they would have about what material culture might mean in the past. And I felt that it was important to have a better understanding of the way that material culture actually had meaning to people.

And so I wanted to do ethnography, or what was then called ethnoarchaeology, to try to come up with a better understanding of, what was the relationship between material culture and humans? And in particular, I was interested in the symbolic or social-symbolic aspects of things. Rather than just saying, you know, for example, that the burial is a direct reflection of society, which is what many people had argued up to that point, I tried to show in my ethnoarchaeological work that the way that people bury each other is very much embedded in a set of beliefs and ideas. And understanding those beliefs and ideas was important, if you were going to interpret the past.

Another example was that, people had started arguing that the way humans threw away rubbish was just something that was determined by a set of simple laws. You know, for example, that the more people you have in a settlement, the more organized the rubbish is, something like that. So that they want to interpret the past distributions of rubbish in terms of these universal laws. And I felt very strongly that in fact, the way that people threw away rubbish, or stuff, was very much dependent on the set of conceptions they had about dirt, and pure and impure, and male and female, and so on and so forth.

And I showed that in my ethnoarchaeological work, that these beliefs and ideas about how you throw away stuff had a very important impact on the archaeological record. So for example, I studied a society where men and women were seen to be very separate, and where women were thought to be polluting, in a way. And so that the bones that were associated with women were pig bones, had to be deposited separately from the bones that were associated with men, which were cattle bones.

And so it's a very simple, obvious thing that, you know, as an archaeologist, you would dig these settlements and see that the cattle bones and the pig bones were deposited separately. That wasn't because of some sort of universal thing about the behavioral aspects of rubbish; but it was because of a set of ideas that this society had.

And so that's what led to the development of what came to be called post-processual archaeology.

CUNO: Yeah, I want to ask you about that because it's so interesting, not only in what it means, but what it meant to archaeology. But help us understand it. So all of these are prehistoric sites, so therefore, there's no textual evidence to look at— How do you determine these relationships and the meanings of these relationships when you find these disparate materials across a large site?

HODDER: Well, the approach that I argued was a sort of contextual approach. So the idea was that rather than assuming that, you know, something meant something universally, you could look for contextual clues within the data that you're looking at, that would help you to understand something or other. So for example, you may have some distribution of artifacts within a house that would separate one type of artifacts in one part of the house from another type of artifacts.

Well, what does that separation mean? One way you could answer that would be to go to look at the burial record and see whether one— were these different types of artifact were associated with men or women, or with older people and younger people? And that would allow you then to go back into the house and say, well, so the house seems to be differentiated between male and female or older and younger social groups. So it's all a matter of trying to sort of fit together contextual clues that helps to interpret the pathing that you're seeing.

The work that I did in Africa was ethnoarchaeological, in the way that I described. I was studying modern material culture and modern ideas.

I was going around, you know, compounds and houses of people living in different parts of Kenya and Sudan and Zambia, studying them in the present day and trying to understand their contemporary use of material culture, and using that to interpret the past.

CUNO: Were there any differences within the archaeological profession—this is back home in Britain—questioning the ethnoarchaeology that you were doing?

HODDER: Questioning it?

CUNO: Yeah, as to the value of it or as to is it really archaeology or— Because you're, after all, you're not digging, you're just interpreting the past on the basis of evidence found in the present?

HODDER: Prehistoric archaeology, but I would say all archaeology, has always used ethnographic analogy, right from the beginning. So I mean, I think the idea of using ethnographic analogy is well-established.

And certainly, at the time that I was doing this ethnoarchaeological work, there were lot of other people doing the same sort of thing. It became quite a trendy thing to do. It's less common nowadays.

But yeah, no, I don't think there was any questioning of it as an approach. I think people recognize that, you know, to adequately understand the past, you need ethnographic analogy. You need a better understanding of the relationship between humans and material culture.

CUNO: So I know that you're engaged in something called post-processual archaeology, but how does it relate to the field generally?

HODDER: So archaeology in the sixties and the seventies—well, prehistoric archaeology particularly, but I think it had a larger influence—what was often called processual archaeology, the new archaeological or the processual archaeology. And the fundamental idea there was a archaeology could be like a natural science, in the end, and that a series of laws could be built about the relationship between humans and material culture and environments.

It's very, very much influenced by ideas of adaptation to the environment, and that there should be predictable relationships between people, the size of the community, the technologies they had, and so on. So it was quite sort of ecological, quite sort of

materialist, in many ways. And very much eschewing any sort of emphasis on interpreting symbolism and meaning and so on.

The idea of processual archaeology is that culture is process. So that rather than culture being a set of ideas in someone's head, it's a process of adaptation to the environment. And so post-processual archaeology arose as a critique of that. Post-processual archaeology argues that in fact, what's—the ideas in people's heads are important, and that it's not just a matter of adaptation to the environment. And rather than embracing the natural sciences, it looked towards the social sciences and looked at what sort of developments that had been there in philosophy and social theory, for example, about material culture or about agency, these sorts of issues.

And so post-processual archaeology was something that developed in the eighties and nineties and early two-thousands, as an approach that was integrated with social theory, and in particular, took the social role of the archaeologist as an important issue. So one of the things that processual archaeology had argued was that archaeology should be entirely objective and independent of society and politics. But post-processual archaeology argued that that was unrealistic, and that in fact, archaeology was very much embedded in a whole series of political and social issues, and that we needed to take that, you know, seriously and head-on.

CUNO: And do you mean both in the context of the artifacts as they were found, as well as in the current interpretation of the artifacts?

HODDER: Yes, it was all socially inflected. And it was—it's very influenced by a feminist movement or indigenous rights, particularly Native American indigenous rights, and so on. So the notion that there are many different stakeholders, whose views need to be taken into account when one is engaging in archaeology.

So those sorts of ideas became quite common during the period that I mentioned, from the eighties to the two-thousands. And it was a very, very contentious time. Many people felt very angry about these new ideas, and that died down over time. And I think most people now in prehistoric archaeology, feel that some answer in the middle is the right one and those aspects of both arguments that need to be taken into account. And so I think most people pick and choose from both, and that the sort of—the monolithic nature of that processual/post-processual archaeology debate has rather dissipated—at least I hope it has—and we can sort of move on.

CUNO: Was it generational? Was it as simple as that?

HODDER: Yes. It's been, very, very generational. I mean, archaeology expanded massively in the sixties and seventies, honestly, because of the expansion of universities, but also because of the expansion of, development and new building and infrastructure development that meant that rescue archaeology had to really expand. So they came of age in this processual archaeology framework. And then as that generation grew older and a new generation emerged, who wanted to shake the boat and— But now that they've grown older, everyone's waiting for the next generation. What are they going to come up with? And it's not very clear yet, but—

CUNO: How did the debates make themselves felt? Were they in the classroom, where they in publication, were they on site and in the excavations or in the sites of interpretation? Was it all three, was it everywhere?

HODDER: Yes, everywhere. It was a very—I mean, very obviously, in literature and in the publications, you could very easily identify who was in which camp by looking at the words they used. You know, for example, if you used the word environment, that meant you're processual archaeology; if you used the word landscape, it means you were post-processual archaeology. And lots of things like that.

CUNO: Yeah. Well, you've been at Stanford since 1999 and before that, you were at Cambridge for twenty-two years, from '77 to '99. What caused you to leave Cambridge for Stanford, and did it have anything to do with the methodology that you were interested in?

HODDER: I moved from Cambridge to Stanford partly for personal reasons. But for me, it was also an opportunity to move on in a number of different ways, because I had come to find Cambridge rather restricting in a number of ways. I mean, it's a very old university and a very wonderful university, but it's not easy to do things there because of the weight of tradition and the weight of committee and administrative structures.

And I felt an enormous freedom at Stanford. I just felt like the world opened up. You know, that I could do so much more, so much easily more. And I was being very well supported at Stanford, so it's been great to set up an archaeology center there and to build up a group of people who I think are very effective and having a major world impact.

CUNO: Was it then at Stanford that you started write about entanglement theory, as distinct from evolutionary theories? Or was that something that preceded the [inaudible]?

HODDER: No, you're right. That's something that happened after I got to Stanford.

CUNO: So what is entanglement theory?

HODDER: Well, you sort of contrasted it with evolutionary theory. And the contrast is, in a way, very similar to what I was saying before, that you know, many people want to see evolution as something which is very systematic and law-like, and that one can generate a series of principles about how cultural evolution works, in the same way that one can about biological evolution, and that there should be some sort of Darwinian-type theory that we could all use to look at the evolution of culture.

And I've always felt that that's not going to happen. You know, cultural evolution is much more complex and less definable, and very much dependent on things like agency and intention and purpose and meaning and being. And so the idea of entanglement is to try and find some way of talking about the fact that we are caught up in, or entangled with, a set of larger processes than ourselves.

There are these larger infrastructural dependencies that to some extent, direct us down pathways. But that there's a huge amount of contingency and specificity to it that means that in the end, you know, what one is talking about is really historical rather than evolutionary.

CUNO: Yeah.

HODDER: The other aspect of entanglement is to say that, you know, humans often think of themselves as being independent agents. But in fact, their lives are very caught up in material things, in many ways, and that we get increasingly entangled in those things, and they come to determine the way that we act.

And so an example is that, I mean, a long time ago, 6,000 years ago, we invented the wheel. And we elaborated the wheel and we got more and more entangled with wheels—cogs and, you know, all sorts of parts and machines and so on—they are all wheel-based. And now we're so caught up in a particular type of wheel, the car wheel, that—and particularly in California—you know, you can't conceive of a society without that entanglement with wheels.

And in fact, that entanglement is leading us in directions that as a species, may be deleterious, but we can't pull back. We can't stop our dependence on wheels because so much is tangled up in wheelness. And there are many, many, many, many examples like that, that show that, we're being led in a certain direction by our entanglements.

CUNO: Is it too simplistic to think that this is the influence of anthropology being felt in archaeology, or maybe influencing archaeology, and maybe that's part of the resistance in archaeology, or was the resistance in archaeology, to post-processual archaeology?

HODDER: Yes. I mean, I think that's right. You know, archaeology has always been divided, really, between the humanities and the sciences, in a way. And the role of anthropology is certainly relevant there.

Although I would say nowadays that in many ways, archaeology is contributing to anthropology by this focus on material culture.

You know, that anthropology has tended to be about humans and social things. And archaeologists have always had this particular interest in things and how they work and how they're managed and how people deal with them. People often talk about something called the material turn in anthropology. And that is a sort of shift towards looking at things more carefully, and how humans interact with them. And so I think that archaeology has played a big part in that. So it's a contribution back, if you like, to anthropology.

CUNO: Yeah. Well, for the last twenty-five years at Stanford, you've led an archaeological excavation at the UNESCO World Heritage site of Çatalhöyük in Turkey, which I gather is a large Neolithic settlement that flourished around 7000 BC. What's so important about that site, and how does that profit from your particular approach to archaeology and anthropology?

HODDER: Well Çatalhöyük is an amazing site that was inhabited from about 7000 to 6000 BC in central Anatolia. And it's very well-known because it has a fantastic concentration of art. Quite a lot of it is sort of geometric art, but there's quite a few beautiful panels that tell sort of narrative scenes of people teasing and baiting wild animals and so on, or people removing the heads of humans and taking them off, with birds taking them off in the same—vultures.

So it's very sort of evocative art. And then the other reason it's an important site is it's very large, at a very early date. In fact, the earlier excavator there, James Mellaart, talked about it as a town. So it's, you know, very important, in terms of the early development of human societies and the ultimate shift from hunter-gathering to living in urban contexts.

CUNO: How did the site become available to you? How did you begin to dig there?

HODDER: Well, the site, as I said, had been excavated in the 1960s by James Mellaart. And he got himself involved in a whole series of scandals and controversies that led to the site being closed down in 1965, and the site was not allowed to be opened after that. And so I came along in the early nineties, and I think the Turkish government had come to realize that it was a shame that this important site had been left derelict.

And so they were quite keen, in the end, for me to come and restart excavation. So I just talked to the government there, and also got support from the British side, because it had been a British project.

And as you know, archaeologists have this strange notion that if one person digs a site, no one else should ever touch it.

CUNO: Right.

HODDER: And so I had to get permission from Britain and from James Mellaart to start again. But so that's how it started.

CUNO: Yeah. I think people would be interested to know how it is that one digs. In other words, not just physically how one does it, but how does one get the permission to do so? And what are those political terms under which one has to work to do the work that you do in archaeology? And how has that changed over the course of the twenty-five years you've been there? What's it like to work in Turkey?

HODDER: Well, initially, It was a very high-level decision. I mean, the permission that one gets to dig these important sites in Turkey is different from normal sites. And so these very visible sites have to be signed off by the president and by the cabinet. But once that had happened in the early nineties, I then had to apply annually for a permit; but it was a fairly routine process.

And so I always had a very positive relationship with the Turkish government and with the Turkish Ministry of Culture and Tourism, that led to the putting the site forward for the UNESCO World Heritage status.

CUNO: So that happened under your watch.

HODDER: Yeah.

CUNO: Now they have investment in it.

HODDER: Now they have investment in it. And so that's good. So in many ways, my early fifteen, twenty years in Turkey were wonderful. And there were many other

projects that were taking place in Turkey during that period, foreign projects. But things have really deteriorated recently, and I'm glad that I'm no longer working there. It's become more or less impossible for new projects to start in Turkey.

CUNO: Because of the government?

HODDER: The government has become, you know, very focused, very nationalistic, fundamentalist government that are very suspicious of foreign intervention and foreign engagement in their heritage. And so most projects like Troy and so on have been transferred over to Turkish teams. It's just become very, very difficult-stroke-impossible to work there anymore.

CUNO: When did you last work there?

HODDER: So the Çatalhöyük project finished in 2017, and is now being taken over by a Turkish team, which I'm very supportive of. I mean, I'm very glad. I was going to finish after twenty-five years anyway, so my ending was a planned ending. And I'm very glad that we were able to plan for another Turkish team to take over.

CUNO: I understand that of course, digging occurs typically over the summer, because you have academic responsibilities back at your home institution. So you dig over the summer, and then you spend your intervening months teaching, but also doing the writing up of the results of your excavations or your digs or interpretations. What is the backlog like?

HODDER: Well, I've always been very wary of that. And so the way that I ran Çatalhöyük was that as well as a dig site, Çatalhöyük was a lab site. And so we had twelve labs in the dig house at Çatalhöyük.

CUNO: What does that mean, these twelve labs?

HODDER: So laboratories where people would process and study the finds. Say for example, the ceramics go into the ceramics lab, and they are studied and photographed and analyzed and so on there, so that we never did get a sort of backlog. Not any serious backlog, anyway, that built up. And so that's how we've managed to publish. So we published throughout the twenty-five years very quickly.

We have a website, which is in English and Turkish, where all the data are available. We have an online database and people can look into everything that we've found, and looking at the maps of everything we've found and where we found them. That's available immediately. But we also have, I think, 600 articles that have been published, and about fifteen volumes that are being produced or have been produced.

CUNO: Yeah. Now, you're here at the Getty to meet with three other teams working at different sites on different kinds of projects, but funded by the Getty Foundation, to advance the digitization projects, analyses, and publications that you're doing. And you're calling it the Living Archive. Describe that, and describe the work that you're doing.

HODDER: Yes. So as you say, we produce a very large archive of data from Çatalhöyük. We actually have five terabytes of data, which is a very large database of images and of records and tables and measurements and so on. And you know, I've always been very worried that that stuff just gets put into some sort of archive that's static, and then is no longer really accessible.

And I felt that we have a long-term responsibility, particularly at a site like Çatalhöyük, which is of great public interest, to make the data available over the long term. And while the project is running, we can certainly do that ourselves. But what happens when we hand the archive over to some institution? And the tendency has always been, in archaeology, that the archive dies, in the sense that it just becomes a static archive that no longer changes.

And becomes increasingly difficult to interrogate, as technologies change and so on. So the idea of a living archive is to allow two things, really. One is a very straightforward and easy way of interacting with the archive, so that you don't have to know a lot about the archive or have a lot of technical expertise in order to ask questions of it. But the word living also refers to the idea that we want to encourage other people to add to the archive and change the archive and continue playing with it.

I mean, there's a huge amount of data that we can't study at all. But it's all there in the archive, and it allows other people to go in to do their own studies, their own analyses, and then add their results to the database. So it's always growing and always developing and always potentially changing. And so that's the long-term aim. I mean, there're lots of problems with it, but the Getty support is allowing us to compare our problems with three other projects and to see, you know, what solutions other people are dealing with, what technologies they're using, and to go over the solutions that they're coming up with.

CUNO: Yeah. I mean, this idea of a living archive also calls to mind, at least to me, this post-processual theory or practice that archaeology exercised beginning in the eighties, nineties, and two-thousands, as you mentioned, in the sense that it's not only objectively cataloging data; it's also leaving the trace of the thought processes that were deployed in the process of cataloging that data and writing theories from that data, in a sense of a kind of self-awareness in the process.

HODDER: That's right. That's exactly right, yeah. So I call that reflexive archaeology. So you're sort of thinking about what you're doing, what the impact of it is. I mean, I've often worked on other people's archives. And I find it so difficult to make sense of what they're doing, or did, unless I can talk to someone. I used to study, you know, museum archives in England. And unless I could actually talk to the field director at the time, you know who had dug the stuff, it was very difficult to know what the archive was, and to reinterpret it and make sense of it. So our idea has been exactly as you described, to— One way I describe it is documenting the documentation. So it's sort of trying to document why it is, what we're thinking about, what questions we have when we're putting together a particular set of data.

So for example, everybody in my project writes diaries about what they're doing and what questions they have, what their thought process is as they make these decisions. And these diaries are also on the database. And we also have videos of the team and ask them what they're doing. And ask them in the trenches. You know, "Show us what

you're doing and— Why did you decide, that this was a pit and not a ditch?" And these sorts of things.

And that provides a surround information, if you like, a donut of information around the primary data that later on, someone can look at and use to make sense of the primary data. So it's about contextualization again.

CUNO: Yeah. So what's the biggest challenge for you on this project?

HODDER: I would say there's two challenges. One is that all of these different projects are similar, in the sense that they have two types of data. One is the geospatial data, which are sort of maps. And the other is a sort of semantic web-type set of data, which is for example, your typology, how you categorize different types of artifact.

I have ceramic bowls and inverted-rim bowls and carinated inverted-rim bowls, you know, so I have a sort of typological scheme. Other people have schemes about photographs or, you know, buildings. But we all have some sort of semantic web, tree structure of definitions of things, and we have a map. And actually, linking those two together turns out to be surprisingly difficult.

CUNO: Technologically?

HODDER: Yeah, just because, you know, I don't want just to see all the inverted rim bowls; I want to understand what is the relationship between inverted rim bowls and all bowls. But how do I show both of those things on the same map? So that's one which I don't think is a, you know, insoluble problem.

What I do think is an insoluble problem at the moment, the other challenge we have, is the long-termness. The sustainability of these things. So while my project exists, I have the staff to manage the archive. And while the Getty provides us funding to support that, you know, it functions. But most funders are talking about three years, maybe—I've had up to, I guess, twelve years funding from some research foundations.

But that all comes to an end at some point. I would like our archive to be ever-present. And so an obvious place for it to be ever-present is in the Stanford library or in the British Academy, or somewhere like that. But none of these places does that. They will look after a dead archive, but they won't look after a living archive. They don't have the resources to maintain interactivity.

CUNO: Yeah, in perpetuity.

HODDER: In perpetuity, yeah. They will all do it for a short period of time.

CUNO: Yeah, yeah.

HODDER: And so at the moment, it's a real gap. Libraries have had a long tradition of focusing on the preservation of books and literature, that has always been their main focus. And really, they're set up and designed to do that, to preserve books. And so the idea of focusing on the different question of how do people interact with data and literature is something which I think they're not set up to fund and to support over the

long term. And the idea of trying to keep something sustainably alive, which is what the digital offers, that you can keep going into the book and interacting with it. That's really a problem. And I don't really see what the solution is to that, I must say.

Stanford has agreed to take the Çatalhöyük archive. I mean, both the physical archive, which is millions of boxes of papers, and the digital archive. So they've agreed to long-term store the digital archive. And so it always will be there. But to get it out in some way that's usable involves having some software, some sort of interface. And they will not sustain the interface.

CUNO: It's just a commit too great for them to make.

HODDER: Yes, yeah. So I don't really know the solution is. I mean, what we were talking about in these meetings was trying to get some group of funding bodies to put pressure on the main libraries to reconfigure their aims and goals, so that they do see that this is important. And for example, at Stanford, there is a recognition that things are moving on and that some solution has to be found.

CUNO: Yeah.

HODDER: It's not the storage space. It's the architecture of the interface between you and that dead data in there and how do I get it out and interact with it? What I was talking about earlier was this sort of idea that, you know, you would invite the world to come in and interact with Çatalhöyük data and to discover new things in it and add to it. Someone is going to have to mediate that. Otherwise you'll get, you know, people producing absolute rubbish.

CUNO: Right. So the living archive presents a problem because it's always got to be fed with intelligence, as well as data. And what Stanford can only promise is that they'll provide access to it in its current condition.

HODDER: Yes, forever. They're happy to say that they will look after it forever as a dead set of data, yeah.

CUNO: Not very appealing.

HODDER: Well, that exactly. And so you would've thought it was in their interest to shift. But I think my understanding of libraries is that they're so sort of caught in the sort of notion of preserving that they don't have the sort of vision of interacting. That may be unfair, but you know what I mean? It's set up to preserve an archive, not to really facilitate some sort of interface.

CUNO: Yeah. So I was going to ask you is, what's next for you? Maybe what's next for you is what you've just described.

HODDER: Yes, I see it as a real challenge to try and find some solution to this. And I'm not sure. I'm going to just talk to people and see whether— I mean, in many ways, you would've thought that Stanford would be a place where this could happen, because of the link to Silicon Valley and so on and— But I do think it's very much an institutional issue.

And it may not be terribly onerous. It may be that once one could set up a structure for it, that you could slot in lots of different projects into it. So it may be that there would be one, you know, overall design thing that you could create that then everybody could use. So it would be more that all the libraries provided a service that all projects could use.

CUNO: Well, we hope that the contribution, the small contribution the Getty has made to your project helps in some way, inching it forward in some way or drawing attention to it, so that you'll have the results that you've been hoping for.

HODDER: Yes. The meeting in these last few days has been really excellent and we got a huge amount out of it and learnt a lot from it, and we're looking forward to further meetings. I mean, it's been— It's very unusual. The design of this is unusual because normally, one just gets a grant from somewhere, you know, and you remain just in that relationship with the grantor and the grantee. And the idea of having a whole series of projects that talk to each other is really great. Really a wonderful idea.

CUNO: Yeah. Well, before we close, I just want to say one thing. Having attended the meeting yesterday, I was impressed by how many of these teams, the four teams, comprise representatives from many different universities.

HODDER: Yes.

CUNO: So it isn't just from Stanford; it's Stanford and two or three other specialists drawn from otherwise. Is that something that's characteristic of the digital inquiry?

HODDER: Yes, absolutely, yes.

CUNO: That it draws from available talent wherever it might be.

HODDER: Yes. I mean, my team has about 160 researchers, and they're in twenty-two different countries.

CUNO: Yeah.

HODDER: And a whole range of different institutions.

CUNO: Yeah, well, we wish you all the luck.

HODDER: Thank you very much for your support. Thank you.

Please visit the site: <http://blogs.getty.edu/iris/podcast-the-changing-field-of-archaeology-with-ian-hodder/> is posted a 40'+ podcast "The Changing Field of Archaeology with Ian Hodder".

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

SATELLITES ARE TRANSFORMING HOW ARCHAEOLOGISTS STUDY THE PAST - ARCHAEOLOGY FROM SPACE’ DESCRIBES HOW REMOTE SENSING HELPS LOCATE AND MONITOR ANCIENT SITES, BY ERIN WAYMAN

Archaeology from Space
Sarah Parcak
Henry Holt and Co., \$30

The term “space archaeology” may conjure up images of astronauts hunting for artifacts from little green men, but the field is much more down to Earth. Space archaeologists use satellite imagery and other remote-sensing techniques to look for ancient sites on our planet. As archaeologist Sarah Parcak explains in her new book, *Archaeology from Space*, these tools have transformed studies of antiquity. “We’ve gone from mapping a few dozen ancient sites in one summer-long archaeological season to mapping hundreds, if not thousands, of sites in weeks,” she writes.

With the witty Parcak as a guide, the book offers a lively, inspiring trip around the world, back in time and even into the future. Parcak begins with the basics of space archaeology, explaining how, for example, satellite images can reveal the locations of walls or the foundation of a former building. Even long-buried ruins can leave a mark on the surface, affecting the growth of vegetation and so resulting in “crop marks.” These outlines become apparent from high above and with instruments attuned to certain wavelengths of light.

In example after example, Parcak demonstrates the capabilities of different technologies. (Of course, old-fashioned digging is still integral to confirming what’s in the ground.) Many of the book’s anecdotes and tales of fieldwork focus on what Parcak and colleagues have learned about ancient Egypt. While studies of monuments and tombs have revealed aspects of everyday Egyptian life — “Like us, they wrote on walls and obsessed over cats” — satellite data have filled in some bigger-picture details. In the first survey of large-scale settlement patterns in the ancient Nile Delta, Parcak’s team discovered that people largely abandoned the region near the end of Egypt’s Old Kingdom some 4,000 years ago. Reading about how environmental changes, and droughts in this case, contributed to the Old Kingdom’s demise feels remarkably timely in this era of climate change. Parcak notes that part of archaeology’s value lies in learning lessons in resiliency from past societies.

Looking to the future, Parcak predicts artificial intelligence will be the next big thing in space archaeology. She estimates that only about

10 percent of Earth's land has been mapped for archaeological sites, and machines will scan satellite data much faster than humans. For now, citizen scientists can help via Parcak's online platform GlobalXplorer.

Parcak is a natural storyteller whose enthusiasm is infectious. By the end of the book, I was wishing I had paid more attention in my college archaeology courses.

Buy Archaeology from Space from Amazon.com. Science News is a participant in the Amazon Services LLC Associates Program. Please see our FAQ for more details.

Please visit the site: <https://www.sciencenews.org/article/space-satellites-transforming-how-archaeologists-study-past> [Go there for many embedded linx]

EΙΔΗΣΕΙΣ - NEWS RELEASE

TREASURE TROVE DISCOVERED AT EGYPT'S ATLANTIS, WHERE CLEOPATRA WAS CROWNED, BY CANDIDA MOSS

In Plato's Critias the fictional city of Atlantis—a rival to ancient Athens—was cursed by the gods, besieged by earthquakes and floods, and disappeared into the ocean. For centuries, people wrote pseudo-histories about the ancient city and its supposed location. According to Stanford professor Dan Edelstein, some of the theories about Atlantis even provided fodder for Nazi mythology. But for all of the interest it generated, Atlantis never actually existed. There were, however, places that suffered its fate.

In 1933 British RAF Group-Captain Cull was flying his plane over Aboukir, a Royal Air Force base east of Alexandria in Egypt, when he glimpsed something in the water below him. From his vantage point, Cull could make out the outlines of structures beneath the water.

Unbeknownst to him, Cull had located Heracleion, an important ancient Egyptian city that had lain hidden beneath the water for nearly 1500 years.

According to legend, this lost metropolis had hosted its namesake, Heracles, and lovers Paris and Helen before they fled to Troy.

Cleopatra, Egypt's most famous queen, had even been crowned in one of the temples there.

Before its discovery, Heracleion (which was also known in the ancient world by its Egyptian name, Thonis) was almost the stuff of mythology.

Though it is now buried several miles off the coast, Thonis-Heracleion was once a thriving port city. If you were bringing goods into Egypt, this is where your items would be taxed and inspected. The focal point of the city was a huge temple dedicated to the god Amun-Gereb, around which a network of canals snaked and flowed. In between them small islands housed residences, religious sites, and commercial buildings, almost like an ancient Venice.

By the fifth century, Heracleion was no more, its role as Egypt's main port having been assumed by Alexandria in the second century.

According to written records, a steady succession of earthquakes, perhaps as many as 23, struck North Africa between A.D. 323-1303. The most severe occurred in A.D. 365. The coastline fell and the cluster of cities that lay in the Canopic branch of the Nile vanished into the Mediterranean.

Even before Cull flew over Heracleion, there had been rumors of underwater ruins for over a century. In 1866 Mahmoud Bey El-Falaki, the official astronomer to the Viceroy

of Egypt, had published a map that located the nearby ancient town of the Canopus on the edge of the coastline. But it took nearly 70 years to identify and excavate the area. It was only in 1996, when a team of Egyptian and European archaeologists, working under the leadership of Franck Goddio, founder of the Institut Européen d'Archéologie Sous-Marine, began to truly explore the uncharted waters of the ancient port. It took years to locate Heracleion itself: the team had to start from scratch surveying the seabed, taking soil samples, and collecting geophysical information in an effort to locate archaeological remains.

The time and effort paid off. During an underwater expedition in 2000, divers saw a large stone head emerge from the murky dark waters. It was the head of the god Hapi, the personification of the Nile's annual flood. Speaking to Archaeology.org in 2000, Goddio described the city of Heracleion as "an intact city, frozen in time." It was almost like a sub-marine Pompeii.

In the past few months divers at Heracleion have discovered what can only be described as a treasure trove of artifacts from the site.

Among the recent discoveries are gold jewelry, coins, and a missing piece of a large ceremonial boat that, when complete, measured 43 feet in length and 16 feet across. According to Egypt's Ministry of Antiquities, they also discovered two previously unearthened temples: the first was large and included stone columns while the second, smaller temple was crumbling and buried beneath 3 feet of sediment.

Goddio and his team discovered the artifacts by using sophisticated underwater scanning tools that can locate and produce images of items buried under the seabed.

To date the excavation has also uncovered 700 anchors, 64 ships, numerous other gold coins, tiny sarcophagi used for the animals that were sacrificed to Amun-Gereb, a number of colossal statues like that of Hapi, and the temple of Amun-Gereb itself.

Many of the coins found at Heracleion date to the time of King Ptolemy II, who ruled Egypt from 283 to 246 B.C.. Ptolemy II's father had been a companion and bodyguard of Alexander the Great and he participated in Alexander's military campaigns in Afghanistan and India. Some have even claimed that Ptolemy I was Alexander's half-brother. After Alexander's death in 323 B.C., Ptolemy became the governor of Egypt and he and his successors styled themselves as the new pharaohs in Egypt. When Heracleion was first discovered it was the huge statues of Ptolemy II and his queen (and sister), Arsinoe, that helped draw attention to the site. The statues were so large that the ceiling of the British Museum had to be dismantled before they could be exhibited.

It is not known exactly which temples were unearthened in this season's excavation but there are some important candidates that have yet to be discovered. The fifth-century B.C. historian Herodotus writes that the Temple of Heracles was a refuge for runaway slaves. Herodotus notes that if a slave took refuge there and had the "sacred marks" set on them it would not be lawful for the slave's original owner to claim them.

According to legend, this practice was instrumental in the history of the Trojan war. Herodotus says that when Paris and Helen arrived in Heracleion, Paris's attendants became supplicants at the temple. They revealed the whole story about Paris's deceit of

Menelaus and the abduction of Helen. As a result the warden of the city, Thonis, refused Paris and Helen refuge. They would continue their journey to Paris's hometown of Troy and the rest, as they say, is history.

Please visit the site: <https://www.thedailybeast.com/heracleion-treasure-trove-discovered-at-egypts-atlantis> [Go there for pix]

CHEESECAKES WERE SERVED TO ATHLETES AT THE FIRST OLYMPIC GAMES IN 776 B.C. TO GIVE THEM ENERGY

National Cheesecake Day on July 30th offers a slice of one of America's favorite desserts. Order up a slice of cheesecake with your favorite topping. Get it delivered or make it at home.

The first "cheese cake" may have been created on the Greek island of Samos. Physical anthropologists excavated cheese molds which were dated circa 2,000 B.C.

It is possible that an ancient form of cheesecake may have been a popular dish in ancient Greece. It has been found that the earliest attested mention of a cheesecake is by Greek physician Aegimus, who wrote a book on the art of making cheesecakes.

We may be able to credit the ancient Greeks with creating this delicious dessert. The oldest written recipe for cheesecake has been traced back to Greek physician Athenaeus.

James Kraft developed a form of pasteurized cream cheese in 1912. In 1928, Kraft acquired the Philadelphia trademark and marketed pasteurized Philadelphia Cream Cheese. Today, cheesecake makers use this brand more than any other.

A cheesecake (at least an American-style cheesecake) is not a cake; it's a baked cheese custard pie with a crust. The uncooked custard filling is poured into a crust and then baked.

It is believed that cheesecakes were served to athletes competing during the first Olympic games in 776 B.C. to give them energy.

Modern commercial American cream cheese was developed in 1872, when William Lawrence, from Chester, New York, while looking for a way to recreate the soft, French cheese Neufchâtel, accidentally came up with a way of making an "unripened cheese" that is heavier and creamier; other dairymen came up with similar creations independently.

Even though he is best known for his signature sandwiches, Arnold Reuben (1883-1970) is generally credited for creating the New York Style cheesecake. Reuben was born in Germany and he came to America when he was young. The story goes that Reuben was invited to a dinner party where the hostess served a cheese pie. Allegedly, he was so intrigued by this dish that he experimented with the recipe until he came up with the beloved NY Style cheesecake.

Greek brides and grooms were also known to use cheesecake as a wedding cake. It also became a custom for a Greek bride to bake and serve cheesecakes to her new husband's friends as a gesture of hospitality.

Incidentally, this concept eventually paved the way for wedding cakes to become a tradition that continues today.

The Cheesecake Factory, Inc. is an American restaurant company and distributor of cheesecakes based in the United States. It is one of the most popular chain restaurants in the US. In total, there are more than 200 locations. The Cheesecake Factory is known for its extensive menu, which is nearly 6,000 words long and lists more than 250 items.

The price of ordering the whole Cheesecake Factory cheesecake line-up is almost \$400.

The most expensive cheesecake sold for \$4,592.42 (£3,496.44; 3,955.57€) and was made by chef Raffaele Ronca (USA) at Ristorante Rafele in New York, NY, USA on October 30, 2017. The cheesecake included ingredients such as buffalo ricotta, white truffle, and gold leaves.

The largest cheesecake weighed 4,240 kg (9,347.60 lb) and was created by Cheeseberry Company (Russian Federation), in Stavropol, Russian Federation, on 23 September 2017. The cake measured 2.8 m (9 ft 2 in) in diameter, and 0.85 m (2 ft 9 in) tall.

On the “The Golden Girls,” the cast consumed more than 100 cheesecakes over the course of the TV show’s seven-year run.

Cheesecake Kit Kats exist, and you can actually buy them on Amazon Prime. Here’s the link.

Styles of Cheesecakes:

Pennsylvania Dutch-style cheesecake uses a slightly tangy type of cheese with larger curds and less water content, called pot or farmer’s cheese.

Philadelphia-style cheesecake is lighter in texture, yet richer in flavor than New York style cheesecake.

Farmer’s cheese cheesecake is the contemporary implementation for the traditional use of baking to preserve fresh cheese and is often baked in a cake form along with fresh fruit like a tart.

Country-style cheesecake uses buttermilk to produce a firm texture while decreasing the pH (increasing acidity) to extend shelf life.

Lactose free cheesecake may be made either with lactose-free cream cheese or as an imitation using Vegan recipes combining non-dairy cream cheese alternatives with other lactose-free ingredients.

Please visit the site: <https://southfloridareporter.com/cheesecakes-were-served-to-athletes-at-the-first-olympic-games-in-776-b-c-to-give-them-energy/>

EARLIEST FORM OF WRITING MAY HAVE BEEN FOUND IN ISRAEL, RESEARCHER SAYS

The images in the 6,000-year-old copper hoard from Nahal Mishmar are a secret visual code used by Chalcolithic metal workers, one scholar claims. Many colleagues are skeptical By Ariel David

A cache of copper artifacts made some 6,300 years ago may contain a secret code used by ancient Levantine metal workers, which would make this one of the earliest forms of primitive writing in the world.

That's the new and controversial theory of an Israeli researcher who believes he has deciphered the meaning of the exquisite but as-yet-enigmatic artifacts that were uncovered decades ago in a remote desert cave in Israel.

More than 400 copper objects were found in 1961, wrapped in a tattered mat in a cavern on the nearly inaccessible slopes of Nahal Mishmar, a seasonal stream that flows into the Dead Sea.

The so-called Nahal Mishmar hoard was one of the greatest prehistoric finds in Israel and in the world. It revealed a previously unsuspected sophistication and advanced knowledge of metallurgy among the people who inhabited the Levant during the Chalcolithic, or Copper Age.

The treasure belonged to a culture that modern archaeologists have named Ghassulian – not because we have any idea what these people called themselves, but because it was first identified at a site in Jordan called Teleilat Ghassul.

Carbon 14 dating of the mat that held the Nahal Mishmar artifacts has shown that the hoard goes back to around 4300 B.C.E. and many of the myriad objects, shaped as bowls, maces, crowns and scepters, display a level of craftsmanship that was thought unthinkable for that period.

Most of the artifacts were produced using the lost-wax technique, a complex and time-consuming process. Even more surprisingly, analyses have shown they were made of then-unique alloys of copper with arsenic, antimony and other metals, which would have had to be sourced as far as Anatolia or the Caucasus.

Though most researchers agree the objects had some kind of ritualistic purpose, the hoard has remained somewhat of a mystery for archaeologists, who are hard pressed to explain what was the exact use of the artifacts, or what meaning can be ascribed to the motifs that decorate them.

Part of the enigma stems from the fact that the Ghassulians lived before recorded history and have left us no writings to tell us about themselves.

Or did they?

The depictions of horned animals, birds, human noses and other motifs found on the artifacts are not just random decorations or symbolic images, claims Nissim Amzallag, a researcher from the Department of Bible studies, Archeology and the Ancient Near East at Ben Gurion University.

Amzallag, who focuses on the cultural origins of ancient metallurgy, theorizes that these representations form a rudimentary three-dimensional code, in which each image symbolizes a word or phrase and communicates a certain concept.

In other terms, the Nahal Mishmar hoard should be seen as a precursor to the early writing systems that would emerge centuries later in Egypt and Mesopotamia, Amzallag says.

The researcher recently published his study of the hoard in *Antiguo Oriente*, a peer-reviewed publication of the Center of Studies of Ancient Near Eastern History at the Pontifical Catholic University of Argentina.

Not as easy as A-B-C

In his work, Amzallag analyzes several key pieces in the hoard and speculates on the possible semantics of the iconography. Many of the depictions can be interpreted as logograms, that is, graphic symbols that represent a particular word or phrase, he says.

Logograms formed the basis of the earliest writing systems, such as Sumerian cuneiform and Egyptian hieroglyphics. In their simplest form, logograms could signify a word by resembling the physical object they were meant to represent, such as an ox or a stalk of wheat.

But when they had to convey more abstract concepts, ancient writing systems would turn to what linguists call the “rebus principle:” using a character, or phonogram, whose corresponding word sounds very similar to the complex idea that the writer is trying to communicate.

This trick is still commonly employed in rebus puzzles created using modern languages. For example, in English, the pronoun “I” can also be written by drawing the image of an eye.

The same logic was at work in the code of Nahal Mishmar, Amzallag says. For example, one of the most recurring decorative motifs in the artifacts is that of a two-headed or four-headed horned animal, possibly a juvenile ibex.

While there is no particular connection between ibexes and metallurgy, the West Semitic word used for young ungulates does sound very similar to the designation of “dust” and “ore” (in Hebrew *'ofer* is a young deer and *afar* is dust). It is therefore possible that the young ibexes were a phonogram for the mineral ore that made up these very artifacts, and the fused bodies of the animals represented the need to mix two or more ores to create the alloys used in the Nahal Mishmar hoard, Amzallag suggests.

To give another example, the frequent representation of a human nose, “anp” in early Semitic languages, could be connected to its use as a verbal root to express the boosting of a fire by blowing air on it – an action that was a key part of the smelting process, the researcher says in the article. And further, Amzallag sees a semantic link between the representations of nesting birds and the craft of metal working itself because the term for nesting in early Semitic languages is similar to qayin – an archaic designation of metallurgy.

Not all the symbols that the scholar claims to have deciphered follow the rebus principle, and some are more mundane representations of physical phenomena. So, for example, he interprets the frequent depictions of round globular masses to represent the form that raw copper takes when it is heated.

If you haven't guessed it already, all the 16 signifiers that Amzallag says he has decoded have a meaning connected to copper smelting and metal working. Ultimately, his paper ventures to “translate” the iconography of several of the artifacts, into what turns out to be something resembling a series of simple recipes on how to make the objects that compose the Nahal Mishmar hoard: take a certain number of different ores, crush them, place them on a very hot fire, cast tools from the molten metal.

But why would the super-skilled Ghassulian metal workers need to – ehm – “write down” such basic instructions?

At the time, the process of heating rocks and extracting metal from them was seen as a magical, almost divine activity, Amzallag explains, and those who engaged in it would have felt close to unlocking the secrets of the universe.

“The sun, for example, looks very much like a sphere of molten metal, so they would have felt that they understood what the sun is, and they could make a small sun of their own,” Amzallag tells Haaretz. “They thought they understood what the universe is made of, and would have felt like gods themselves.”

The knowledge of this divine craft would have been kept within a close circle of people, and shared only with a select few, he notes.

“It is a mysterious occupation whose secrets you don't learn easily – it requires initiation and several rites of passage, and having a visual code is part of that,” Amzallag says. “They didn't aim to create writing – they aimed to understand and represent what they were doing.”

Maybe it's just a goat

Amzallag is not exactly a mainstream researcher and is known for his somewhat creative and esoteric theories. As reported in Haaretz last year, he has made waves by publishing studies that claim to show that YHWH, the God of the Israelites in the Bible, originated as a deity in the Canaanite pantheon worshipped initially by metal workers in the late Bronze and early Iron ages.

His new study on the Nahal Mishmar hoard is “highly speculative” and based on assumptions that are difficult to prove or disprove, says Dina Shalem, an archaeologist for Kinneret College and the Israel Antiquities Authority.

The first problem, one which Amzallag recognizes himself in the paper, is that the analysis only works if we agree that the Ghassulians spoke a Semitic language, and that we can decipher the supposed symbolism of Chalcolithic iconography using words that are similar to those appearing hundreds or thousands of years later in Semitic texts from the Bronze and Iron ages.

“We don’t know enough to say what language they spoke,” says Shalem, who has dug multiple Chalcolithic sites across Israel.

Archaeologically speaking, major cultural changes occurred in the Levant during the transition between the Copper and the Bronze Age, she notes.

“The burial customs, the architecture are completely different,”

Shalem says. “Some things do display some continuity, but it’s hard to tell whether this applies to the language.”

Going deeper into the study, Shalem notes there could be other, equally valid interpretations of the Ghassulian iconography. For example, the figures that Amzallag sees as representations of young ibexes could well be goats. And the frequent doubling or quadrupling of bodies may not be connected to alloys and smelting at all, as it is a figurative motif that appears also in contexts not linked to metallurgy, such as in ossuaries.

“In earlier periods we find two-headed anthropomorphic figurines,” she says. “The doubling of something can simply be a way to emphasize its importance.”

Other colleagues are more inclined to give the study the benefit of the doubt. While he disagrees with some of the specific interpretations, the theory as a whole is solid, says Daniel Sivan, an emeritus professor of Semitic languages at Ben-Gurion University.

“He makes some very bold, controversial claims, but there is something to this theory that the origins of writing are connected to metallurgy,” Sivan tells Haaretz. “It’s a new and interesting concept and it deserved to be published.”

The earliest proto-writing?

But assuming the secret visual code did exist, is it right to identify it as the earliest form of proto-writing, as Amzallag suggests in his paper? And is it connected to the writing systems that developed later in the Middle East?

There are several, highly disputed finds that are even older than the Nahal Mishmar hoard and which carry symbols that some scholars have claimed could be the earliest known examples of writing. These include the Dispilio tablet, an engraved wooden tablet found in a lake in Greece and dated to around 5200 B.C.E., and the Tartaria tablets, engraved artifacts found in a Neolithic village in Romania.

But the interpretation and dating of these and other finds is highly controversial. Most scholars agree that the first scripts were developed in Mesopotamia and Egypt at the dawn of the Bronze Age, around 3,200 B.C.E., more than a millennium after the Nahal Mishmar hoard was squirreled away for reasons unknown.

There are no obvious similarities between the two-dimensional ideograms of cuneiform or hieroglyphic and the purported three-dimensional visual code of Nahal Mishmar. This is true both in form and in function. While the code developed by the metal workers of the Levant would have been an elaborate equivalent of a secret handshake, the first ascertained writing systems of antiquity were likely created for financial reasons, such as the need to record amounts of goods and transactions.

Still, given that the unique alloys in the Nahal Mishar artifacts show that already in the Chalcolithic there was a trade network that allowed for the transfer of goods and knowledge over vast distances, it is possible that ideas like the rebus principle were first developed by the Ghassulian metal workers and later adopted by other civilizations in the region, Amzallag speculates.

“The eventuality of a relationship between the visual code developed first among the Ghassulians and later in Egypt and in Mesopotamia should not be ruled out,” he concludes in his paper.

While it cannot be ruled out, there is also little evidence supporting such a claim, as it is unlikely that the metal workers – the supposed keepers of this secret code – would travel so far and wide to spread it, counters Shalem.

“When you look at the trade and import of raw materials, such as metals coming from Turkey, things would move from hand to hand, from one trader to another,” she says. “It wasn’t a single person who traveled to Anatolia to procure the goods, and certainly it was not the metal workers themselves who did the travelling.”

Please visit the site: [https://www.haaretz.com/archaeology/premium.MAGAZINE-earliest-form-of-writing-may-have-been-found-in-israel-researcher-says-1.7619705](https://www.haaretz.com/archaeology/premium/MAGAZINE-earliest-form-of-writing-may-have-been-found-in-israel-researcher-says-1.7619705)

MASSIVE SANCTUARY COMPLEX OF HELLENISTIC ERA UNEARTHED IN CYPRUS

Cyprus Department of Antiquities of the Ministry of Transport, Communications, and Works announced the completion of the 2019 excavation season at the location of Pachyammos, Geroskipou (Plot 223) under the direction of Archaeological Officer Dr Eustathios Raptou, for the purposes of a development project for the construction of a hotel unit.

Investigations in the area commenced in 2015, initially with small trial trenches, with the work accelerating during in the past few months. Following the completion of the last season (June 2019), it has with relative certainty become clear that the remains uncovered belong to a large sanctuary complex of the Hellenistic period, which unfortunately has been seriously disturbed through the centuries, after its abandonment.

Even though mostly only the foundations of the buildings have been preserved to date, it has become clear from the architectural remains that the sanctuary complex comprises a Greek style temple ‘peristyle in antis’ surrounded by a ‘peribolos’ wall, or an enclosure. The temple occupies the southeastern side of the complex. On its northeastern side, there was a large courtyard or an atrium, surrounded by long stoas, possibly provided with colonnades and a series of rooms. Investigations have up to now revealed only the eastern side (almost in its entirety) and parts of the northern and western sides, where investigations need to be continued further.

In the northwestern corner of the courtyard, the foundation of a huge structure, almost square in plan, has been uncovered made from unworked stones. It is believed that this structure is the foundation of a cistern, since a partially preserved aqueduct leads into it. The aqueduct consists of a long wall with debris from stone channels and clay water pipes. It runs across the plot under investigation in a northeasterly to southwesterly direction and has been uncovered over a distance of tens of meters. Along its course, to the north of the courtyard, a second cistern foundation has been revealed, which partly preserves the hydraulic plaster that coated the bottom of the cistern.

Clay pipes extend from this structure along both sides of the cistern, running parallel to the aqueduct.

The organization of the space and the typology of the buildings refer to a Greek type sanctuary constructed during the Ptolemaic period, probably on the remains of a preexisting local sanctuary from which slight evidence has come to light during the excavation. The discovery of important hydraulic installations indicates an increased need for and extensive use of large quantities of water, perhaps suggesting the existence of groves and gardens related to the cults in antiquity.

The above views are preliminary, and only the continuation of investigations and study of the finds will enable us to draw firm conclusions concerning this important archaeological discovery.

In a recent consultation with the Archbishop, it was decided that the uncovered archaeological site should be preserved as a unit within its natural environment together with the coastal protection zone, at a safe distance from the hotel and within a green zone. The Department of Antiquities will continue the excavations to reveal the archaeological remains.

It has also been decided that any architectural plans of the development project should be modified in close collaboration with the Department of Antiquities and must be adapted to the archaeological finds so as to guarantee the unity of the archaeological site and its harmonious coexistence with the project.

Finally, the archaeological site will be made accessible to the public and its protection will be ensured, by not allowing extensions or additions of new buildings to the project in the future.

Please visit the site: <https://www.tornosnews.gr/en/greek-news/culture/36308-massive-sanctuary-complex-of-hellenistic-era-unearthed-in-cyprus.html> [Go there for pix]

WHO WERE THE MYSTERIOUS NEOLITHIC PEOPLE THAT ENABLED THE RISE OF ANCIENT EGYPT? HERE'S WHAT WE'VE LEARNED ON OUR DIGS, BY JOEL D. IRISH, CZEKAJ- ZASTAWNY AGNIESZKA, JACEK KABACINSKI

To many, ancient Egypt is synonymous with the pharaohs and pyramids of the Dynastic period starting about 3,100BC. Yet long before that, about 9,300-4,000BC, enigmatic Neolithic peoples flourished. Indeed, it was the lifestyles and cultural innovations of these peoples that provided the very foundation for the advanced civilisations to come.

But who were they? As it turns out, they haven't actually been studied much, at least relative to their successors. But our excavations of six burial sites – with some of the analyses recently published – have now provided important insights into their mysterious ways of life.

One reason why we know so little about Neolithic Egypt is that the sites are often inaccessible, lying beneath the Nile's former flood plain or in outlying deserts.

With permission from Egypt's Supreme Council of Antiquities (SCA) we – members of the Combined Prehistoric Expedition – explore Neolithic sites in Egypt's western desert. The sites we are currently excavating lie along the former shores of an extinct seasonal lake near a place called Gebel Ramlah.

Though not lush, the Neolithic was wetter than today, which allowed these ancient herders to populate what is now the middle of nowhere.

We focus on the Final Neolithic (4,600-4,000BC), which was built on the success of the Late Neolithic (5,500-4,650BC) with domesticated cattle and goats, wild plant processing and cattle burials. These people also made apparent megaliths, shrines and even calendar circles – which look a bit like a mini Stonehenge.

During the final part of the Neolithic period, people started burying the dead in formal cemeteries. Skeletons provide critical information because they are from once living people who interacted with the cultural and physical environments. Health, relationships, diet and even psychological experiences can leave telltale signs on teeth and bone.

In 2001-2003 we excavated three cemeteries from this era – the first in the western desert – where we uncovered and studied 68 skeletons.

The graves were full of artefacts, with ornamental pottery, sea shells, stone and ostrich eggshell jewellery. We also discovered carved mica (a silicate mineral) and animal remains, as well as elaborate cosmetic tools for women and stone weapons for men.

We learned that these people enjoyed low childhood mortality, tall stature and long life. Men averaged 170cm, while women were about 160cm. Most men and women lived beyond 40 years, with some into their 50s – a long time in those days.

Strangely, in 2009-2016, we dug two more cemeteries that were very different. After analysing another 130 skeletons, we discovered that few artefacts accompanied them, and that they suffered from higher childhood mortality as well as shorter lives and stature. We're talking several centimetres shorter and perhaps ten years younger for adults of both sexes.

Astonishingly, the largest of these two cemeteries had a separate burial area for children under three years of age, but mostly infants including late-term foetuses. Three women buried with infants were also found, so perhaps they died in childbirth. In fact, this is the world's earliest known infant cemetery.

Interpreting the findings

So what can this tell us about these peoples, let alone their descendants? As it turns out, a lot. We can use the findings to make interpretations about gender, life-stage, well-being, status and other things.

For example, why were there such differences between the two grave sites? They could have been separate populations, but it is unlikely based on overall physical similarities. So perhaps they imply variation by status – with one graveyard being for the elite and the other for workers. This is the earliest such evidence in Egypt.

The sites also shed light on the family structures of the time. The overall sex ratio across all cemeteries is three women to each man, which may indicate polygamy. However, the total number of burials and a lack of reference to individual houses suggests these were extended family cemeteries.

We also believe that attainment of “personhood” – the age children are socialised into being “people” – was from three years, given their inclusion in adult cemeteries.

There is also clear evidence of respect for previously buried people by later mourners reusing the graves to bury their dead. When coming across old skeletons, they often carefully repositioned the bones of these ancestors. In some interesting cases, they even made attempts to “reconstruct” the skeletons by replacing teeth that had fallen out back into the skeleton – and not always correctly (see lead image).

These behavioural indicators, together with the seemingly innovative technological and ceremonial architecture mentioned earlier, such as the calendar circles and shrines, imply a level of sophistication well beyond that of simple herders. Taken together, the findings provide a glimpse of things yet to come in Ancient Egypt.

Conservation of sites

A key component of our work involves conservation of Egyptian (and world) heritage. We found no evidence of grave looting, unlike for sites in the Nile Valley. The last people to touch Neolithic material at Gebel Ramlah lived during that time. However,

wind-related erosion has reached a point where once-buried remains lie on or near the surface.

In fact, the pace of destruction has increased significantly since 2001. Once exposed, the context of these sites can be lost and organic material can get sandblasted to bits. This means that if we hadn't discovered these remains when we did, they would have soon been lost forever. But sadly this likely means that other sites from the time are literally disappearing.

For that reason, we and the SCA have decided that, when we have studied our material, all will be reburied on site to, hopefully, survive for thousands more years.

Please visit the site: <https://theconversation.com/who-were-the-mysterious-neolithic-people-that-enabled-the-rise-of-ancient-egypt-heres-what-weve-learned-on-our-digs-121070> [Go there for pix]

ALMOST HUMAN MEDICINE - WHY OUR ANCESTORS DRILLED HOLES IN EACH OTHER'S SKULLS, BY ROBIN WYLIE

Thousands of years ago, people were performing a form of surgery called "trepanation" that involves boring holes through a person's skull.

For a large part of human prehistory, people around the world practised trepanation: a crude surgical procedure that involves forming a hole in the skull of a living person by either drilling, cutting or scraping away layers of bone with a sharp implement.

To date, thousands of skulls bearing signs of trepanation have been unearthed at archaeological sites across the world.

But despite its apparent importance, scientists are still not completely agreed on why our ancestors performed trepanation.

Anthropological accounts of 20th-Century trepanations in Africa and Polynesia suggest that, in these cases at least, trepanation was performed to treat pain – for instance, the pain caused by skull trauma or neurological disease.

Trepanation may also have had a similar purpose in prehistory. Many trepanned skulls show signs of cranial injuries or neurological diseases, often in the same region of the skull where the trepanation hole was made.

But as well as being used to treat medical conditions, researchers have long suspected that ancient humans performed trepanation for a quite different reason: ritual.

The earliest clear evidence of trepanation dates to approximately 7,000 years ago. It was practised in places as diverse as Ancient Greece, North and South America, Africa, Polynesia and the Far East.

People probably developed the practice independently in several locations.

Archaeologists have turned up some of the best evidence for ritual trepanation ever discovered

Trepanation had been abandoned by most cultures by the end of the Middle Ages, but the practice was still being carried out in a few isolated parts of Africa and Polynesia until the early 1900s.

Since the very first scientific studies on trepanation were published in the 19th Century, scholars have continued to argue that ancient humans sometimes performed trepanation to allow the passage of spirits into or out of the body, or as part of an initiation rite.

However, convincing evidence is hard to come by. It is almost impossible to completely rule out the possibility that a trepanation was carried out for medical reasons, because some brain conditions leave no trace on the skull.

However, in a small corner of Russia archaeologists have turned up some of the best evidence for ritual trepanation ever discovered.

The story begins in 1997. Archaeologists were excavating a prehistoric burial site close to the city of Rostov-on-Don in the far south of Russia, near the northern reaches of the Black Sea.

The site contained the skeletal remains of 35 humans, distributed among 20 separate graves. Based on the style of the burials, the archaeologists knew that they dated to between approximately 5,000 and 3,000 BC, a period known as the Chalcolithic or "Copper Age".

Less than 1% of all recorded trepanations are located above the obelion point

One of the graves contained the skeletons of five adults – two women and three men – together with an infant aged between one and two years, and a girl in her mid-teens.

Finding multiple skeletons in the same prehistoric grave is not particularly unusual. But what had been done to their skulls was: the two women, two of the men and the teenage girl had all been trepanned.

Each of their skulls contained a single hole, several centimetres wide and roughly ellipsoidal in shape, with signs of scraping around the edges. The skull of the third man contained a depression which also showed evidence of having been carved, but not an actual hole. Only the infant's skull was unblemished.

The job of analysing the contents of the grave fell to Elena Batiava, an anthropologist now at the Southern Federal University in Rostov-on-Don, Russia. She immediately recognised the holes as trepanations, and she soon realised that these trepanations were unusual.

They had all been made in almost exactly the same location: a point on the skull called the "obelion". The obelion is on the top of the skull and towards the rear, roughly where a high ponytail might be gathered.

Opening the skull in this location would have risked major haemorrhage and death

Less than 1% of all recorded trepanations are located above the obelion point. What's more, Batiava knew that such trepanations were even less common in ancient Russia. As far as she was aware at the time, there was just one other recorded case of an obelion trepanation: a skull unearthed in 1974 at an archaeological site remarkably close to the one she was excavating.

Clearly, finding even one obelion trepanation is remarkable. But Batiava was looking at five, all of them buried in the same grave.

This was, and is, unprecedented

There is a good reason why obelion trepanation is uncommon: it is very dangerous.

The obelion point is located directly above the superior sagittal sinus, where blood from the brain collects before flowing into the brain's main outgoing veins. Opening the skull in this location would have risked major haemorrhage and death.

This suggests the Copper Age inhabitants of Russia must have had good reason to perform such trepanation procedures. Yet none of the skulls showed any signs of having suffered any injury or illness, before or after the trepanation had been performed.

Among the 137 skulls, they found nine with conspicuous holes

In other words, it appeared as if all of these people were trepanned while they were completely healthy. Was their trepanation evidence of some sort of ritual?

It was an intriguing possibility. However, Batiava had to give up the trail. She had many more skeletons to analyse from all over southern Russia, and could not afford to get sidetracked by just a few skulls, however enigmatic.

Before she gave up, Batiava decided to search through Russia's unpublished archaeological records, in case any more strange obelion trepanations had been discovered but not reported.

Surprisingly, she got two hits. The skulls of two young women with obelion trepanations had been discovered years earlier: one in 1980 and another in 1992. Each one had been unearthed less than 31 miles (50km) from Rostov-on-Don, and neither showed any signs of having been trepanned for a medical reason.

This gave Batiava a grand total of eight unusual skulls, all clustered in a small region of southern Russia and potentially all of about the same age. A decade later, even more came to light.

In 2011, an international team of archaeologists was analysing 137 human skeletons. They had recently been excavated from three separate Copper Age burial sites around 310 miles (500km) south-east of Rostov-on-Don, in the Stavropol Krai region of Russia, close to the modern-day border with Georgia.

The archaeologists had not set out to discover trepanations. They were there to learn about the general health of the prehistoric inhabitants of the region. But among the 137 skulls, they found nine with conspicuous holes.

Southern Russia may have been a centre for ritual trepanation

Five of them were standard examples of trepanation. The holes had been made in a variety of different locations around the front and side of the skull, and all of the skulls showed signs of having suffered a physical trauma, suggesting that the trepanations had been performed to treat the effects of the injuries.

But none of the other four trepanned skulls showed any signs of damage or disease. What's more, all four had been trepanned exactly above the obelion point.

Quite by chance one of the researchers – Julia Gresky, an anthropologist at the German Archaeological Institute (DAI) – had already read Batiyeva's paper describing the unusual trepanations from the Rostov-on-Don region.

Now Gresky, Batiyeva and other archaeologists have teamed up to describe all 12 of the obelion trepanations from Southern Russia. Their study was published in April 2016 in the American Journal of Physical Anthropology.

The 12 skulls would have been remarkable discoveries wherever they had been found. But the fact that they were all discovered in the same tiny corner of Russia meant that a connection seemed likely. If there was no link, the odds that a batch of such rare trepanations would turn up exclusively in southern Russia would have been exceedingly low.

Gresky, Batiyeva and their colleagues argue that, while this idea is difficult to prove, the clustering of these unusual trepanations suggests that southern Russia may have been a centre for ritual trepanation.

The owners of the other skulls seem to have survived their operations

Maria Mednikova of the Russian Academy of Sciences in Moscow is an expert on Russian trepanation. She believes that trepanations in specific, dangerous areas of the cranium may have been performed to achieve "transformations" of some kind. She suggests that, by trepanning in these places, people thought they could acquire unique skills that ordinary members of society did not have.

We can only speculate as to why these 12 apparently healthy people were trepanned in such an unusual and dangerous way. But thanks to the trepanation holes themselves, we can infer a surprising amount about the fate of the people after they received their trepanation.

One of the 12 skulls belonged to a woman under the age of 25, who had been buried at one of the sites near Rostov-on-Don. It showed no signs of healing, suggesting that she died during her trepanation or shortly afterwards.

However, the owners of the other skulls seem to have survived their operations. Their skulls showed bone healing around the edges of the trepanation holes – although the bone never completely re-grew over the holes.

Three of the 12 skulls showed only slight signs of healing around the trepanation hole, suggesting that their owners only survived between two and eight weeks after the operation. Two of these individuals were women between 20 and 35 years of age. The third was an elderly person between 50 and 70 years old, whose sex could not be determined.

The other eight skulls showed more advanced healing. Based on what we know about bone healing today, these individuals probably survived for at least four years after their operations.

It appeared as if all of these people were trepanned while they were completely healthy

These eight survivors included all five of the people from the mass grave near Rostov-on-Don, whose bizarrely-trepanned skulls first attracted Batieva's attention almost 20 years ago.

The two men, two women and one adolescent girl had all survived with their obelion holes for years. The girl, who based on her skeleton was between 14 and 16 years old, must have been trepanned when she was no older than 12, and possibly much younger.

It is still possible that these 12 people were suffering from diseases or head injuries. In that case, the trepanning operation may have worked for at least eight of them.

But it is also possible that Batieva and her colleagues are right, and these people were trepanned for a ritual purpose. If that is true, we can only guess at what benefits they received – or believed they had received – throughout the rest of their lives.

Please visit the site: <http://www.bbc.com/earth/story/20160826-why-our-ancestors-drilled-holes-in-each-others-skulls> [Go there for pix]

FORGOTTEN SCULPTURE OF ALEXANDER THE GREAT FOUND IN GREEK MUSEUM'S STORAGE, BY TASOS KOKKINIDIS

An ancient sculpture of Alexander the Great was recently discovered in a Greek museum's storage room, a leading archaeologist revealed recently on Facebook.

Angeliki Kottaridi said the sculptural portrait of the Macedonian king had been forgotten for years in the warehouses of the Archaeological Museum in the town of Veria, in northern Greece.

She added that this “brand new” portrait of Alexander the Great is unknown to archaeologists and historians.

“It was lost for decades, hidden in a dark corner of the warehouse amidst pottery cages and dirt,” Kottaridi stated in amazement.

The sculpture was first discovered decades ago in rubble near the town of Veria. The priceless object was basically discovered all over again just a few weeks ago, as staff were cleaning the storage room of the museum.

Kottaridi announced that the re-discovered Alexander will feature in a major exhibition scheduled for 2020 at the Aigai Museum.

Please visit the site: <https://greece.greekreporter.com/2019/08/02/forgotten-sculpture-of-alexander-the-great-found-in-greek-museums-storage/> [Go there for pix]

AN ANCIENT EGYPT-TO-BLACK SEA ROUTE? ADVENTURERS TO TEST THEORY, BY DIANA SIMEONOVA

Were the ancient Egyptians able to use reed boats to travel as far as the Black Sea thousands of years ago?

A group of adventurers believe so, and will try to prove their theory by embarking on a similar journey in reverse.

In mid-August the team of two dozen researchers and volunteers from eight countries will set off from the Bulgarian port of Varna, hoping their Abora IV reed boat will take them the 700 nautical miles through the Bosphorus, the Aegean and as far as the island of Crete.

The team is specifically seeking to prove a hypothesis lent credence by Herodotus, the expedition's German leader, Dominique Goerlitz, told AFP.

The ancient Greek historian wrote: "Egyptians sailed through the Black Sea to get materials that they could not have from the east Mediterranean."

Goerlitz, 53, and his team say they drew inspiration for the design of the 14-metre (46-foot) boat from ancient rock drawings from upper Egypt and the Caucasus.

The construction was carried out with the help of volunteers and two members of the Aymara indigenous community from Bolivia's Lake Titicaca, Fermin Limachi and his son Yuri.

Graphic of the reed boat and map of the route planned by a group of adventurers who will attempt to prove ancient Egyptians sailed as far as the Black Sea to trade.

It is no accident that the Abora IV bears a striking resemblance to the famous Ra II reed boat that Norwegian adventurer Thor Heyerdahl used in his 1970 attempt to cross the Atlantic—Limachi's father helped build that vessel too.

Large bundles of totora reed were lashed together with ropes to form the main body of the vessel before it was equipped with a wooden mast and two reed compartments for sleeping.

In all, 12 tonnes of totora reed and two kilometres (a mile) of rope went into making the boat, which will have two sails—measuring 62 square metres (670 square feet) and 40 square metres (430 sq ft), Fermin said.

"The main question of all is whether this boat... is able to cross the difficult island shelves of the Aegean Sea," Goerlitz said.

Reaching the Cyclades islands and then Crete will be crucial for proving his initial hypothesis, he added, as the Minoan civilisation which flourished there from 2,700 to 1,200 BC was long proven to have traded with Egypt.

The construction was carried out with the help of volunteers and two members of the Aymara indigenous community from Bolivia's Lake Titicaca, Fermin Limachi and his son Yuri

Large bundles of totora reed were lashed together with ropes to form the main body of the vessel before it was equipped with a wooden mast and two reed compartments for sleeping:

"I am 100 percent sure that this ship will never sink. And as long as the ship is floating we have a safety raft here," said volunteer Mark Pales, a 42-year-old electrician from the Netherlands

Once hoisted into the water on Thursday, the boat will need two and a half weeks to soak, taking in between five and 10 tonnes of water.

Thanks to the billions of air chambers inside its porous construction material, the boat cannot crack or sink, according to Goerlitz.

Dangers on the high seas

During his last such expedition, the Abora III in 2007, he set out from New York bound for southern Spain in a bid to prove that Stone Age man made similar trans-Atlantic journeys.

Goerlitz's team sailed for 56 days before a storm ripped apart his boat 900 kilometres (560 miles) short of Portugal's Azores Islands.

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Another volunteer, Heike Vogel, a parcel company employee from Germany, was looking forward to her first time sailing, after helping on two previous expeditions without venturing on board.

"It will be a new situation for me," said Vogel, 35.

In order to communicate with large cargo vessels on their way—a major danger on the high seas—Goerlitz's crew will have modern satellite and radio communication equipment on board.

"Of course, it would be totally arrogant and stupid (not to use modern equipment). It is an experiment of science and not of risk," he said.

Please visit the site: <https://phys.org/news/2019-07-ancient-egypt-to-black-sea-route-adventurers.html> [Go there for pix]

THROUGH GEMSTONES, A GLIMPSE INTO ANCIENT EGYPTIAN CIVILIZATION, BY MICHELE W. BERGER

Doctoral student Shelby Justl’s research expands what we know about who controlled semiprecious stones like red jasper and carnelian, plus their cultural and economic significance.

On the second day of fieldwork in Abydos, Egypt, Penn doctoral student Shelby Justl stumbled upon something rare: an inscribed piece of ancient limestone called an ostrakon. “You rarely find writing in Egyptian archaeology. Writing is either on papyrus, which decays easily, or on stone that fades over time,” she explains. “I translated the text and determined this was a land-transfer document, a bill of sale of two arouras of land.”

Another ostrakon had previously surfaced in Abydos, on the site of an ancient town call Wah-Sut. The archaeological team that made the discovery knew the text mentioned gold, but Justl translated it in full. “It was a receipt,” she says, “recording a delivery of raw gold, red jasper, and lapis lazuli, listing the exact quantities of each material.”

Though the first inscription was intriguing, the second one hooked Justl. The receipt confirmed the arrival of large quantities of semiprecious stones coming from far away, but it also raised many questions. In ancient Egypt, how were the stones transported from mines to towns? Who was receiving them? And who controlled this semiprecious stone industry? Justl has spent the bulk of her Ph.D. research delving into these questions, and with guidance from her advisor, Penn archaeologist Joseph Wegner, and a trip to the British Museum last summer, she may finally have some answers.

Justl didn’t start her time in Penn’s Department of Near Eastern Languages and Civilizations thinking she would study semiprecious stones. Her master’s work had been on production of faience, a bright blue, glazed ceramic material. But fieldwork in Egypt in 2014 shifted her trajectory, and for the past few years she’s focused on how ancient Egypt managed and processed materials like red jasper and carnelian.

It’s well-documented that the Egyptians held these particular gems in high esteem, says Wegner, associate curator of the Penn Museum’s Egyptian Section. “Certain amulets were supposed to be made from carnelian or jasper,” he says, “to protect against evil spirits or for other religious reasons. They were also markers of social status. It wasn’t easy to acquire jewelry in ancient times, and the people who owned these items were making statements about their wealth and social position. Many also envisioned taking them into the afterlife.”

Red jasper is opaque, a dark reddish-brown, and the slightly translucent carnelian is orange-red. Given the stones’ splendor, it’s not hard to grasp their place of honor in such a society. From there, it’s also not a far leap to understanding why large quantities are not often discovered. Unlike with pottery fragments, typically on the larger side archaeologically speaking, remnants of red jasper and carnelian are minuscule. Though

they do get collected during excavations, the particulars around each discovery are often sparse.

To do the project she envisioned, Justl needed a large, well-labeled, provenanced collection of these semiprecious stones. Then she learned about an ongoing British Museum excavation at Amara West, a site in present-day Sudan known during ancient times as Kush. Amara West served as the capital of Kush during the reigns of Seti I and Ramses II, from 1290 to 1213 B.C.E. Here, these pharaohs installed an official called the deputy of Kush to act as the local authority.

In Amara West, “the museum had unearthed 78 semiprecious stone items,” Justl says. “That’s a large quantity. Most often, you’ll only find a few. Sixty-seven of these stones contained data describing where they had been found.” They hadn’t yet been photographed or catalogued, so during the summer of 2018, Justl spent a month in London studying the materials.

Control by the pharaohs

Sifting through the British Museum’s items—mostly jewelry like earrings and necklaces—she learned that more than 70% of the stones with recorded locations had been found in just three areas: the palace of the deputy of Kush; facilities behind his palace, used either for storage or production; and facilities behind a nearby temple, also used for storage or production.

This told Justl a great deal about the stones’ import. “The storage facilities are positioned as close to the palace and to the temple as they could be,” she says. “It suggests these are valuable items and indicates closely supervised management.”

For Justl, it crystallized the idea that processing and distribution of semiprecious stones happened mostly in capital cities controlled by the pharaoh and government, where the stones could be protected.

Archaeological reports from Amara West dating back as early as 1938 strengthened the theory. Elsewhere, tomb scenes confirmed that part of the tribute the deputy of Kush sent to the pharaoh in the Egyptian capital included valuable stones like carnelian and jasper.

What Justl doesn’t yet know, and what may never become clear, is the degree to which ordinary citizens had access to semiprecious stones, given the evidence pointing to their place in the lives of society’s elite. Difficulties addressing this result partially from lack of access to pertinent ancient sites. In Abydos, for example, the modern town lies atop the ancient one. Beyond that, the historical record in general is incomplete, primarily chronicling activities of the pharaoh, the government, and the elite, with much less about common citizens.

“I’m still pursuing this question,” Justl says. “Where Amara West has a concentration of semiprecious stones within the temple and palace economies, at some other sites, it could be a household industry.”

This may not, however, indicate that workers had better access to the gems, she adds, noting that “it probably means the stones were still controlled and distributed by the pharaoh and temples, with people simply working at workshops in their homes.”

Despite the unanswered questions, this research brings into greater focus a historical period important to a modern picture of what ancient civilization was like. “It’s helping us understand how ancient Egypt worked as a society,” Wegner says, “the economic and administrative side, the complexity of the culture.”

Funding for this work came from the 2018 Penn Museum Summer Research and Field Work Funds.

Shelby Justl is an eighth-year doctoral student in the Department of Near Eastern Languages and Civilizations in the School of Arts and Sciences at the University of Pennsylvania.

Joseph Wegner is an associate professor of Egyptian archaeology in the Department of Near Eastern Languages and Civilizations in the School of Arts and Sciences and associate curator at the Penn Museum at the University of Pennsylvania.

Please visit the site: <https://penntoday.upenn.edu/news/through-gemstones-glimpse-ancient-egyptian-civilization>

THIS BREAD WAS MADE USING 4,500-YEAR-OLD EGYPTIAN YEAST, BY JASON DALEY

After extracting the dormant yeast from cooking vessels, an amateur gastroegyptologist used ancient grains to recreate an Old Kingdom loaf.

Seamus Blackley, best known as one of the minds behind the Xbox, is a hardcore amateur baker and Egyptologist. Recently, he decided to combine his two hobbies. As Alix Kroeger at the BBC reports, along with University of Queensland archaeologist and ancient brewing expert Serena Love, he negotiated access to 4,500-year-old Old Kingdom vessels used to bake bread and make beer from the Peabody Essex Museum and Museum of Fine Arts in Boston.

Richard Bowman, a doctoral candidate in microbiology at the University of Iowa, helped in the process, injecting a nutrient solution into the ceramics, which reawakened dormant yeasts. The team then extracted the yeasty liquid. While most of the yeast was sent off to a laboratory for study, Blackley took one sample home, setting out to recreate the taste of ancient Egypt by baking with its yeast.

“It’s such a magical thing, to think we can share food in a rather genuine way with our distant ancestors,” Blackley writes on Twitter.

While it’s possible that humans began making some form of bread as early as about 30,000 years ago, they didn’t begin using yeast to produce beer, wine and leavened bread until about 6,000 years ago.

Since then, yeast used for producing food has undergone a lot of changes, with strains from around the world combining with one another, and picking up mutations along the way.

It’s likely that the yeast the team captured is the real deal. While previous experiments have scraped the interiors of the bowl, which could easily be contaminated, and other techniques destroy the bowls to gain access to the yeast, this method is non-invasive. “You pump a fluid in carefully with a syringe and some sterile cotton in contact with the ceramics. It soaks in and you vacuum it back out,” Bowman tells Will Pavia at The Times.

Genomic sequencing will conclude whether the ancient yeast is the real deal or contaminated with modern microbes. In the meantime, Blackley couldn’t resist baking with his sample. He cultivated the yeast for a week using unfiltered olive oil, hand-milled barley and einkorn, one of the earliest forms of wheat, until he had a starter, like that used to make sourdough bread.

Sarah Cascone at artnet News reports he then mixed the starter with barley, einkorn and kamut, all of which would have been at an ancient Egyptian baker’s disposal. “Modern wheat was invented long after these organisms went to sleep,” he says. “The idea is to make a dough with identical ingredients to what the yeast ate 4,500 years ago.”

Blackley documented his bread-baking adventure on his Twitter profile.

He noted that the scent as it baked was different from other loaves of bread he's made with the same combination of ancient grains, but with modern yeast. "It's much sweeter and more rich than the sourdough we are used to. It's a big difference," he wrote.

Describing the look and taste of it, Blackley noted that the crumb "is light and airy," particularly for a 100 percent ancient grain loaf.

"The aroma and flavor are incredible," he added. "I'm emotional. It's really different, and you can easily tell even if you're not a bread nerd. This is incredibly exciting, and I'm so amazed that it worked."

That being said, Blackley was careful to note that this loaf was just for practice, and he's sure some modern yeast likely contaminated the sample. He hopes to try again with a purer strain of Old Kingdom yeast and has future plans to work with Love to replicate the tools and baking methods, like cooking bread in ceramic pots, used by the ancient Egyptians. He also wants to work with a ceramicist to recreate the cooking vessels. Already the team has secured permission to collect samples from cooking pots in other museums, and they hope to gather yeast from the Old, Middle and New Kingdoms, each separated by 500 to 700 years, to understand if and how the yeasts changed over time.

Luckily, we have something to go along with the Pharaoh's bread. Last year, the British Museum tasked a team with figuring out how to brew beer using ancient Egyptian methods, which produced suds similar to white wine.

Please visit the site: <https://www.smithsonianmag.com/smart-news/bread-was-made-using-4500-year-old-egyptian-yeast-180972842/> [Go there for pix ad for embedded linx]

THE SHROUD OF TURIN: LATEST STUDY DEEPENS MYSTERY RESEARCHERS CAST DOUBT ON THE FINDINGS OF THE CONTROVERSIAL 1988 STUDY, BY K.V. TURLEY

A new French-Italian study on the Shroud of Turin throws doubt on what many thought was the definitive dating of the cloth believed by millions to be the burial cloth of Jesus Christ.

This latest two-year study was headed and funded by French independent researcher Tristan Casabianca, with a team of Italian researchers and scientists: Emanuela Marinelli, who has written extensively about the shroud; Giuseppe Pernagallo, data analyst and senior tutor at the University of Catania, Italy; and Benedetto Torrisi, associate professor of economic statistics at the University of Catania.

In 1988 radiocarbon tests on the Shroud of Turin dated the cloth to between 1260 and 1390. The implication was clear: The shroud was a medieval forgery. After a 2017 Freedom of Information (FOI) request, a new team of researchers gained access to the original data used for the 1988 test. The findings of this new team are that the 1988 test results were unreliable.

Three laboratories involving researchers from the University of Arizona, Oxford University, and the Swiss Federal Institute of Technology contributed to the 1988 study, which was carried out under the auspices of the British Museum.

When the scientists performed a radiocarbon analysis of the Turin shroud, their results were published in the journal *Nature* in 1989. They provided what was said to be “conclusive evidence” of the medieval origin of the artifact.

For many years the raw data used in these tests was never released by the institutions involved, despite multiple requests for them to do so. Finally, in response to the 2017 FOI, all raw data kept by the British Museum was made accessible to researchers for the first time.

“For almost 30 years, scholars asked in vain for the raw data from the three laboratories and the supervising institution, the British Museum,” Casabianca told the Register. “I graduated in law, so I had the idea to make a legal request based on the Freedom of Information Act. The British Museum was the only institution to fully and quickly answer my request.”

Only then, after the British Museum acceded to the FOI — something it was legally obliged to do — did Casabianca and his teams gain access to hundreds of unpublished pages from the earlier study. The subsequent examination of the data by the Franco/Italian team found evidence, now published in Oxford University’s

Archaeometry, which suggests that the methods employed by the 1988 scientists were flawed.

This news comes as no surprise to Russ Breault, the president of the Shroud of Turin Education Project Inc.

“It is amazing that it took a Freedom of Information request to finally get the raw data from the British Museum, who oversaw the 1988 dating tests,” he told the Register. “The decision not to publish all the data in Nature was no doubt so they could achieve the coveted ‘95% confidence’ regarding the medieval date.”

Casabianca’s team found that the 1988 carbon dating was unreliable, as only pieces from the edges of the cloth were radiocarbon tested. It has been long held by some scholars that those sample areas had been affected by exposure to fire in 1532 while the shroud was stored in the Sainte-Chapelle, in Chambéry, France.

“The tested samples are obviously heterogeneous from many different dates,” Casabianca, a convert to Catholicism, told the Register.

“There is no guarantee that all these samples, taken from one end of the shroud, are representative of the whole fabric. It is, therefore, impossible to conclude that the Shroud of Turin dates from the Middle Ages.”

Like others engaged in the study of the shroud, Breault also has doubts about the samples used in 1988. He said that the latest study “tells us there is something anomalous with the single sample used to date the shroud. This is something we have long suspected because the corner chosen was absolutely the most handled area of the cloth, exactly where it was held up by hand for hundreds of public exhibitions over the centuries.”

He further pointed out: “If you were looking for the worst possible sample location, you would choose from one of the two outside corners — right where the sample was cut in 1988.”

Doubts persist elsewhere, too, about the methodology and findings of the 1988 study.

David Rolfe, the editor of the British Society for the Turin Shroud newsletter, is also a filmmaker whose award-winning work such as *The Silent Witness* (1978) has done much to bring the shroud to the attention of a wider audience. For some time he has been skeptical about the research that took place in 1988. He told the Register that the latest findings “confirmed that the abandonment of the agreed protocols rendered the test unreliable.”

Rolfe explored that “abandonment of protocols” in his 2015 film *A Grave Injustice*. He explains how all the controls, initially put in place for the 1988 tests, that the scientists might proceed in a rigorously scientific manner, were disregarded.

Rolfe thinks that knowledge of the shroud and its fabric has grown significantly in the decades since the 1988 test. This, he says, is especially relevant when considering the samples taken for the 1988 study and underlines the real suspicion that the area from which the samples came was a mended or patched part of the shroud, and these patches

almost certainly dated from the medieval era, during which period the cloth was known to have been exhibited.

He suggests: “For reasons of their own self-interest, the individuals supervising the test and those running the labs — in Oxford in particular — glossed over the abandonment of the protocols, as they needed to give the impression of accuracy and infallibility of the new method.”

When the 1988 findings were published, Rolfe says: “No one was prepared to challenge the weight and might of the combined authority of the British Museum and Oxford. No academic [was], or, for that matter, the vast majority of clerics were, brave enough to challenge this authoritative verdict.” In the end, Rolfe feels that “the [1988] result matched the prevailing intellectual zeitgeist.”

Casabianca shared Rolfe’s view about the necessity of adhering to agreed protocols in any future test.

“New tests, with robust protocols, are needed,” he said. “We have to learn from the failure of the 1988 carbon dating.”

He added: “On a much deeper level, I would like to emphasize that those findings show why Christians should have no reason to be afraid of the scientific process. The quest for truth is at the heart of our faith and will never be a danger for our belief system. That’s why we should not be afraid of new tests on the Turin shroud.”

Regardless of the possibility or outcome of any further tests, Casabianca, quoting St. John Paul II from his 1998 address in Turin, said that the shroud’s “message will remain a ‘challenge to our intelligence.’”

Nevertheless, the work recently carried out by Casabianca and his team raises the question: Why has it taken more than 30 years and a FOI to access the raw data involved in the 1988 tests?

Breault told the Register, “Usually when something is revealed only under duress it is because there is something to hide. Is that the case here?” He observes that “not publishing all the data for the most significant carbon-dating event of the 20th century sure seems foolish, almost as foolish as only taking one sample!”

One other aspect of the 1988 test leaves Breault perplexed.

“In April of 1988, when the sample was being selected and cut, the entire process was caught on film,” he said. “However, when it came time to cut up the sample into sections and deposit them into stainless steel vials, they went into a room outside the view of the camera.” This fact is not helpful, he contends, going on to ask: “Did they not know the whole world would be watching?”

In light of the latest findings, the 1988 testing, its results and the scientists involved in them will doubtless be the subject of further speculation. As to further tests, only the Vatican can authorize these. To do so, however, would cast doubt on the 1988 tests. As Breault acknowledged: “Politically the Church does not want to be viewed as anti-

science. Hence, the shroud is often referred to as a ‘symbol of Christ’s suffering, worthy of veneration.’”

He said that this definition is necessary, as the word “symbol” does not make a statement regarding the authenticity of the artifact. To call the shroud a “relic” would imply it is authentic, whereas to call it an “icon” is to suggest that it is manmade.

As to what might happen next in attempting to authenticate the shroud, Breault says: “[Any] decision could only come from the Pope.”

For Casabianca and his team, their latest groundbreaking research is only the start.

As Casabianca told the Register: “I would say that when the lack of reliability of this carbon dating was shown, we were already aware it was just the first step [in] bringing important new data to the community of scholars and [having it] published in a prestigious academic journal.” However, with regard to the mysterious Shroud of Turin, he says that, as far his team is concerned, “Our task is far from over.”

Please visit the site: <http://www.ncregister.com/daily-news/the-shroud-of-turin-latest-study-deepens-mystery>

REMAINS OF GRAECO-ROMAN SENATE BUILDING UNCOVERED IN NORTH SINAI

The Egyptian archeological mission working in Tel al-Farma (ancient Pelusium) in North Sinai have uncovered part of a huge building dating to the Graeco-Roman Period, used as a seat for the ancient Senate.

The Secretary-General of the Supreme Council of Antiquities Mostafa al-Waziri said that preliminary studies conducted on the ruins show that the architectural planning and the place of construction indicate that it was likely used to hold meetings for the city elders and citizen representatives, to take decisions on the general affairs of the city and its citizens, during Pelusium's period of prosperity beneath the rule of the Ptolemaic and Romans.

The head of the Egyptian Antiquities Sector Ayman Ashmawy said that the building is made of red and limestone bricks. It is about 2,500 square meters in size, rectangular on the outside and with circular entrances from the inside. It also features a main gate in the eastern side that flows to the main street of the old city of Pelusium.

Regarding for the interior design of the building, the head of the Central Department of the Antiquities of Lower Egypt Nadia Khader said that it consists of the remains of three circular bases used to sit, the thickness of each at 60 cm. She specified that it was built of red bricks and covered with marble.

She added that the mission also uncovered parts of the city's old streets.

Please visit the site: <https://www.egyptindependent.com/remains-of-graeco-roman-senate-building-uncovered-in-north-sinai/>

ARCHAEOLOGISTS DISCOVER INTACT TOMB FROM FIRST CENTURY BC IN KOZANI, GREECE, BY NICK KAMPOURIS

Archaeologists recently discovered an intact tomb dating to the first century BC in the area of Mavropigi in West Macedonia's Kozani region.

The major discovery was made public by a statement issued recently by Kozani's Ephorate of Antiquities.

“During the ongoing excavations of the Ephorate of Antiquities of Kozani in the Mavropigi lignite mine, within the partially demolished modern settlement of Mavropigi, and specifically under the foundation of a house, important grave goods were discovered, dating to the end of the 1st century BC,” the statement notes.

The excavation will continue, but the Ephorate noted in its statement that the bronze funeral bier, found under the skeletal remains of the buried person, is unique, at least for Northern Greece. As a completely intact object, it represents a unique discovery for the whole of Greece, according to published archaeological data.

The broader region of Western Macedonia is covered in archaeological sites of great historical interest, and many excavations are currently underway to unearth even more significant discoveries, from many different eras of Greek history.

Please visit the site: <https://greece.greekreporter.com/2019/08/06/archaeologists-discover-intact-tomb-from-first-century-bc-in-kozani-greece/>

POMPEII ARCHAEOLOGISTS UNCOVER 'SORCERER'S TREASURE TROVE'

Archaeologists working in the buried Roman city of Pompeii say they have uncovered a "sorcerer's treasure trove" of artefacts, including good-luck charms, mirrors and glass beads.

Most of the items would have belonged to women, said Massimo Osanna, director of the Archaeological Park of Pompeii.

A room with the bodies of 10 victims, including women and children, was excavated in the same house.

Pompeii was engulfed by a volcanic eruption from Mt Vesuvius in AD 79.

The fatal eruption froze the city and its residents in time, making it a rich source for archaeologists.

The trove was found in what remained of a wooden box. The wood itself had decomposed and only the bronze hinges remained, preserved by the volcanic material which hardened over it.

In it were crystals, ceramic, amethysts and amber. Scarabs (beetle-shaped amulets) from the Middle East were identified, along with various gems, including a carnelian with a craftsman figure and a glass bead engraved with the head of Dionysus, the Roman god of wine, fertility and ritual madness.

It was more likely the objects belonged to a servant or a slave, rather than the owner of the house, Mr Osanna told the Italian news agency Ansa. None of the artefacts was made of gold, much favoured by the wealthy of Pompeii.

"They are objects of everyday life in the female world and are extraordinary because they tell micro-stories, biographies of the inhabitants of the city who tried to escape the eruption," Mr Osanna said.

Archaeologists are now trying to establish kinship ties between the bodies found in the house via DNA analysis.

"Perhaps the precious box belonged to one of these victims," Mr Osanna speculated. The items in the box may have been worn during rituals as charms against bad luck, rather than as ornamentation, he said.

The chest was uncovered in the House of the Garden in Region V of the archaeological park - the same area where an inscription was discovered last year, indicating that the eruption may have taken place in October 79, two months later than previously thought.

The house itself would have belonged to a man of high status, confirmed by the quality of the amber and glass beads found in the trove, archaeologists say.

Most people in Pompeii were not killed by slow-moving molten lava, but by a vast cloud of hot gas and fragments, called a pyroclastic flow.

The cloud surged over the city, killing its residents wherever they were, and burying them in ash, preserving their final moments.

Please visit the site: <https://apple.news/AwAu7Wc5QQvKWKF-4pm8XcQ> [Go there for pix]

ANCIENT TOMBS UNEARTHED IN NEMEA, GREECE SHED LIGHT ON MYCENAEAN CIVILIZATION, BY ASSIL GIACHEIA

The Greek Ministry of Culture announced on Sunday that archaeologists have discovered two ancient, unlooted chamber tombs dating from the Late Mycenaean period, (1400 – 1200 BC), near Nemea in the Peloponnesian Peninsula.

The newly-found tombs at the Aidonia burial site include five full burials and the skeletons of fourteen individuals whose remains had been transferred there from other tombs.

The finds will shed more light on the Mycenaean civilization, the Greek Culture Ministry announced.

Both chamber tombs provided an array of clay pots and figurines to the discoverers, as well as other small objects.

However, these findings are in rather sharp contrast with the burial sites from the early Mycenaean period (1600 – 1400 BC), which were excavated in Aidonia in previous years. These burial chambers contained table and storage vessels, as well as weapons and other objects which would have belonged to high-status individuals.

Still, the two newly-discovered Mycenaean chamber tombs at Aidonia pave the way to a better understanding of the development of the ancient settlement and its ties to neighboring villages.

Located next to the vineyards of Nemea, Aidonia was a key settlement in the Mycenaean civilization, which enjoyed its greatest period of flourishing from the 17th to the 12th century BC, the press statement noted.

Excavation at the Aidonia burial site first began in the late 1970s, after the site containing tombs from 1700-1100 BC had already been extensively looted, most likely in 1976-77. The Archaeological Service excavations which followed this, in 1978-1980, and 1986, under the direction of Kalliopi Krystalli-Votsi and Constantina Kaza, brought to light a total of twenty chamber tombs.

These consisted of gravesites carved into the rock, with three sections, including an access road, entrances and burial chambers. Few of the Aidonian chamber tombs were found unlooted during that dig, but one pit included a treasure trove of ancient jewelry.

The finds in a pit located inside one of these tombs even helped experts link them to a set of jewelry which was about to be sold in an auction house in New York in 1993 and was eventually repatriated, the ministry noted.

Ongoing archaeological activity in Aidonia has prompted the resumption of excavations to investigate tombs which were considered to be in danger of being looted.

The Ephorate of Antiquities of Corinth launched a new, systematic research program in 2016, under the direction of Konstantinos Kissa, the Assistant Professor of Archeology at the Universities of Graz, Austria and Trier, Germany. Kim Shelton, Director of the Nemea Center of Archeology, and Professor at the University of California, Berkeley, is also collaborating with Kissa in the research.

Their research has documented the existence of this additional cluster of tombs that had been missed in all the excavations carried out in previous years.

Please visit the site: <https://greece.greekreporter.com/2019/08/12/ancient-tombs-unearthed-in-nemea-greece-shed-light-on-mycenaean-civilization/>

POTTERS AND THEIR FINGERPRINTS, **BY AKIVA SANDERS**

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At sites dating from the 7th millennium BCE onward, ceramics form the most ubiquitous category of artifact recovered at excavations in the Near East. Anyone who has participated in an excavation can tell you that pottery finds often reach the point that each sherd becomes totally unremarkable.

But upon cleaning these piles of unearthed ceramics an observer may sometimes be taken aback by the discovery of fingerprint, left behind by the hands of the individual who originally formed the pot. This opens an unexpected channel of corporeal communication to a long-vanished individual. Although the vast majority of these fingerprints are too fragmentary to study individual potters, it has recently been shown that differences in distributions of ridge density among these archaeological fingerprints can reveal differences in gender among the producers of ceramics.

A reanalysis of ceramics from Early Bronze Age (EBA) Hama, Syria, in the National Museum of Denmark by an international team from Denmark, France, Italy, and the United States presents a unique opportunity to study what ancient fingerprints can tell us about the gender organization of ceramic industries. This follows a pilot study on the topic using Late Chalcolithic (LC) to Middle Bronze Age (MBA) ceramics from Tell Leilan, Syria.

The ceramic assemblage from Hama comes from the same periods as the Tell Leilan ceramics, but offers the perspective of a smaller site throughout these periods, in a neighboring region (Inland Western Syria), as well as a larger sample size (429 fingerprints). The Hama sample also includes many more complete vessels, a larger variety of objects, including figurines and miniature vessels, and an opportunity for collaboration with other scholars.

The most notable result observed from Tell Leilan was the change in the demographic composition of potters involved in forming and finishing ceramics during the period of rapid changes in social structure and day-to-day interaction that accompanied the site's urbanization, ca. 2600 BCE. In the pre-urban phases of the site's occupation (mid-4th to mid-3rd millennium BCE), both adult men and women participated in the forming of all types of ceramics. But during subsequent urban phases of occupation (ca. 2600-1726 BCE, including a ca. 150 year hiatus), all types of ceramics were formed by adult men only. This shift was interpreted as evidence for stricter division of labor by gender, family, and social class concurrent with the emergence of urbanism, state-type central institutions, and mass society.

This was the primary result that we were looking to complement using the Hama ceramic assemblage, a site that appears never to have been truly urban in a neighboring region with a different set of ceramic types. However, Hama does seem to have been an important pilgrimage site and possibly a significant trading center within the social,

economic, and ritual spheres of urban Ebla by the EB IV through the MBA (ca. 2500-1650 BCE).

In the earlier phases at Hama, as at Tell Leilan, both adult males and females seem to have been involved in the process of forming and finishing all different types of ceramics. With ceramics from Hama Period J, on the other hand, corresponding to the EB IV palatial phases of nearby Ebla in the mid-3rd millennium, forming and finishing ceramics seems to have become the exclusive purview of males, as at contemporary levels at Tell Leilan.

But at Hama there is also evidence that the production process increasingly included children from the age of about eight, a result not observed at Tell Leilan. These findings confirm the disappearance of women from aspects of the ceramic production process in the mid-3rd millennium and are correlated to increasing professionalization of the industry, as apprenticeship from a young age became more important.

This type of apprenticeship among same-gender children of professionals can also be seen in texts of the contemporary Ur III period in Southern Mesopotamia. Participation of children seems to be the most marked in production of goblets and cups, whose great quantity and broad distribution across Western Syria has been interpreted as part of the rise in banqueting events that buttressed the power of emerging palace households. A similar pattern of the child participation at Hama in pottery production continues into the following MBA period.

The mostly zoomorphic Early Bronze IV and Middle Bronze Age figurines from Hama levels J and H present an interesting complement to the ceramics dating from those periods. They seem to have been produced through collaboration between adult males (and possibly also females) and children, peaking around late childhood. Figurine production may represent a small-scale endeavor, employed primarily for the enjoyment of the figurines' own producers, or it may have been used in the early stages of potter's apprenticeship, transforming the practice of child's play into training for the system of large-scale ceramic production.

The evidence of fingerprints from Hama illustrates the impact the dramatic social transformations of the mid-3rd millennium had on the lives of men, women, and children alike in Inland Western Syria.

Akiva Sanders is a graduate student at the University of Chicago.

For Further Reading:

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R.P. Wright, "Crafting social identity in Ur III southern Mesopotamia." *Archeological Papers of the American Anthropological Association* 8.1 (1998): 57-69.

Please visit the site: <http://www.asor.org/onetoday/2019/08/Potters-and-Their-Fingerprints> [Go there for a better and nicer format]

HAVE ARCHAEOLOGISTS FOUND THE LOST CITY OF THE APOSTLES? BY R. STEVEN NOTLEY

Recent discoveries have placed the biblical city of Bethsaida closer to shore where Peter and Andrew left their nets to follow Christ.

Excavators at work at El-Araj, which they now consider to be the likely site of the New Testament town of Bethsaida.

After recent headlines announced that archaeologists in Israel had uncovered the Church of the Apostles, questions followed. What church is this? And what do these findings tell us about the days of Jesus and his earliest followers?

The world's attention has turned to a small excavation on the northern shore of the Sea of Galilee, a project I have been involved with as the academic director since the beginning. Our findings have rekindled the debate about the location for Bethsaida, the home of Peter, Andrew, and Philip referenced in John 1:44.

Every year millions of Christians travel to the Holy Land in their desire to visit places mentioned in the Bible. They journey from Dan to Beersheba with Bibles in one hand and cameras in the other. Not long ago, no one knew about these places. Yet, today signposts proclaim each location to pilgrims: Caesarea, Megiddo, Capernaum, and more. How did all this happen?

The rediscovery of the land of the Bible has been a slow process that began in earnest in the middle of the 19th century, once European and American travelers could make the trip. Mark Twain famously recorded his visit to the Holy Land in *Innocents Abroad* (1869). His impressions were not altogether favorable:

We traversed some miles of desolate country whose soil is rich enough, but is given over wholly to weeds—a silent, mournful expanse. ... A desolation is here that not even imagination can grace with the pomp of life and action. ... We never saw a human being on the whole route.

... There was hardly a tree or a shrub anywhere. Even the olive and the cactus, those fast friends of a worthless soil, had almost deserted the country.

Edward Robinson, a scholar from Union Theological Seminary in New York City, was among the first to attempt to locate the lost cities of the Bible. Now considered the father of modern historical geography in the Holy Land, he traveled the region by horseback in the 1830s and 1850s, accompanied by Eli Smith, an expert in Semitic languages. Robinson and Smith discovered that the Hebrew place names from long ago were often remembered in their Arabic equivalents. (For example, the town of Jesus at Capernaum, Kfar Nahum in Hebrew, was remembered in Arabic as Tel Hum.)

The geography of the sacred

When I first came to Israel in 1983 as a PhD candidate at the Hebrew University in Jerusalem, I learned—as many scholars and pilgrims do—how being in the land of the Bible changes your perspective. You are drawn to the geographical contours of the sacred narrative. You see how the setting for these ancient characters, where they lived and traveled, shaped how they saw the world, and, at times, how they saw God.

These early musings about land and Scripture were deepened when I became a graduate professor. I wanted my students to understand the interplay between land, language, and ancient literature, and how it should inform our reading of the Scripture, particularly the Gospels.

If one of the central tenets of historic Christianity is the incarnation, should not the aspects of history, material culture, and geography be crucial to our understanding of the life and message of the historical Jesus?

Take Bethsaida, for example. It is one of the most frequently mentioned cities in the Gospels, home to at least three of Jesus' disciples (John 1:44), and a location for his ministry (Mark 8:22).

Jesus repeatedly traveled there by boat (Luke 9:10), and according to Luke, the countryside near Bethsaida was the location for the feeding of the multitudes (Luke 9:12–17). And yet, there was not a strong archaeological consensus around where this lakeside village was located.

I had the opportunity to spend time with the late Mendel Nun, a member of the Ein Gev kibbutz (an agricultural commune) and a fisherman on the Sea of Galilee for over 50 years. Walking its shores with Nun was illuminating. He knew the area like the back of his hand. It was on a visit to el Araj that he introduced me to the question of first-century Bethsaida.

Nun was not the first to speculate about the location of this elusive site. Already Robinson had theorized that the New Testament village had been situated on et-Tell, a small hill three kilometers (one and a half miles) from the current lakeshore.

Even in his day, not everyone embraced Robinson's proposal. He was challenged by an American civil engineer and architect, Gottlieb Schumacher, who had resettled in Haifa. Schumacher's objection to Robinson remains a serious—and rather obvious—obstacle to the identification of et-Tell as a fishing village: It is too far from the lakeshore.

Schumacher offered instead the site of el Araj, with its close proximity to the lake and numerous architectural fragments found in the area. Nun also believed that el Araj was a more likely candidate and published his observations more than 20 years ago in *Jerusalem Perspective*.

A new location for Bethsaida

I first addressed the question of the Bethsaida's location at a conference organized in Jerusalem in 2000, then presented papers at the annual conferences of the Society of Biblical Literature (SBL) and the American Schools of Oriental Research (ASOR) in the years to follow. Finally, I published "Et-Tell is not Bethsaida" in *Near Eastern*

Archaeology in 2007. A spirited forum ensued on the pages of the journal. It concluded with the excavator of et-Tell, Rami Arav's observation that archaeology alone could answer this question with any certainty. He challenged those of us who thought Bethsaida lay elsewhere to excavate.

And so we did.

The process at el Araj started five years ago, when Marc Turnage, a PhD candidate at Bar Ilan University in Israel, organized what we call a "shovel survey," digging and sifting the soil from several five-meter by five-meter squares to a depth of 30 centimeters (about a foot). Archaeologists then collect and date the pottery, glass, and coins they've found to create a profile of the site and its settlement.

Our team determined that there was settlement at el Araj over a thousand years spanning the Roman, Byzantine, Islamic, and Crusader periods —precisely the time frame of Bethsaida, according to historical sources.

Our excavations began in 2016 under the direction of Professor Mordechai Aviam from the Kinneret Institute for Galilean Archeology at Kinneret College, Israel. With a limited budget, the scale of our efforts was initially small. Many excavations involve a hundred or more volunteers for six weeks. Our team was less than 20, working for two weeks.

In the upper strata we found remains from a Crusader sugar factory, which had mostly reused still-standing Byzantine walls. In the following season, we continued to excavate what we now know was a Byzantine monastery that accompanied a church. This is a common combination in Galilee. Although we were not yet able to identify the walls of the church, its existence was unmistakably signaled each season by the discovery of individual gold-gilded glass tesserae, which are only found in wall mosaics of ornate churches. We also decided to dig two probes to see if there were Roman remains under the Byzantine floors.

The results were remarkable. Beneath the Byzantine pavement, dated with numerous coins, we encountered a layer of about 40 cm of silt, later identified from the Jordan River. There were no archaeological artifacts in this layer. Below the alluvial soil, we immediately encountered a compacted dirt floor with Roman pottery, coins, and lacking any Byzantine objects. The most amazing discovery were portions of a mosaic floor. These belonged to a Roman bath, which was indicated by accompanying ceramic vents and roof tiles.

The Roman bath captured the imagination of the international media and for good reason. This was the first evidence of urbanization in the region: A Roman bath is not a common feature in a Jewish village.

However, the Jewish historian Josephus reports that Herod Philip, son of Herod the Great, transformed the village of Bethsaida into a city and renamed it Julias after the wife of Caesar Augustus and the mother of Tiberius (Antiquities 18:28). The bathhouse aptly belongs to what we would expect from Herod Philip's urbanization.

While no one excavating at el Araj has declared the search for Bethsaida over, in light of these discoveries, el Araj should now be considered the leading candidate for Bethsaida-Julias.

A New Testament fishing village

The new finds in 2017 encouraged us to enlarge our excavation, and last year we quadrupled our efforts to 40 volunteers for four weeks.

We excavated areas beyond the main site. We found no Crusader and little Byzantine settlement in these outlying areas—but Roman walls, pottery, and coins instead.

Moving to an area 100 meters north of the main excavation, we found more evidence that el Araj was the site of a large settlement in the Roman period. We found only Roman period houses, walls, pottery, coins, and a large Roman taboon (oven).

Together with these discoveries we have found evidence of Jewish life.

Distinctive limestone dishes and knife-pared Herodian lamps that were only made in Jerusalem prior to 70 C.E. present clear indications of Jewish settlement at el Araj.

These finds add to the mounting evidence that el Araj was the site of a Jewish village that was transformed into a city in the Roman period, precisely as it is reported in the New Testament and early Jewish sources. It certainly was not four meters under the lake as some have contended. (One modern theory promoted by the excavators at et-Tell suggests that the lake was much higher in the first century, and that's why their location is so far removed from the water.)

The importance of the Roman settlement should not be overlooked. If el Araj was settled in the period of the New Testament, then it lay on the lakeshore between the Sea of Galilee and et-Tell, and therefore is the more likely location for a first-century fishing village as the New Testament describes.

Byzantine pilgrims drawn to el Araj

Some have questioned the attention drawn toward what is being called the Church of the Apostles. By itself, the Byzantine church should not be considered evidence for the location of first-century Bethsaida.

However, coupled with the extensive and increasing archaeological evidence from the earlier Roman period at el Araj, the church does take on increased significance.

To understand how remarkable this find is, no other Byzantine churches been found in the area on the lakeshore between Capernaum and Kursi, the eastern side of the Sea of Galilee known as ancient Gergesa.

Moreover, what we have found is precisely what was reported by pilgrims traveling this region in the Byzantine period. In other words, not only do we not have any other churches in the immediate vicinity of el Araj, we have no other churches mentioned other

than the one we are currently excavating. Together this reinforces the identification of our church with the one Byzantine pilgrims report was at Bethsaida.

Memories are long in the East, and it seems that the Christian community had not forgotten the location for the hometown of the apostles when they reestablished a Christian presence at the site of el Araj in the fifth century C.E.

As for the church itself, until recently, many doubted it existed at all. Aviam and I have both received correspondence from scholars who contend that we have misread the pilgrimage reports. Many think Willibald, a Bavarian bishop, was confused when he reported that he visited a church at Bethsaida in 725 C.E., built over the house of Peter and Andrew. Instead, they contend he meant Capernaum and the octagonal Byzantine church there.

Those assumptions will now need to be re-thought in light of the new evidence. Next year we hope to excavate the church entirely with the hope of finding its inscription, a routine feature in these churches.

In addition, we intend to expand our excavation in the vicinity to strengthen the material evidence for Bethsaida-Julias at el Araj in the Roman period.

Crossroads of history

Why should Christians care about the archaeological efforts at el Araj and the search for first-century Bethsaida? The setting for biblical stories often influences how we read them. Not in the sense of proving or disproving what is written, but in providing a greater understanding of the world in which the redemptive story unfolds.

Regarding the geographical setting of Bethsaida itself, one historical detail does come to mind that is underscored by its geographical setting, the area our team is exploring right now. When Jesus heard that John had been killed by Herod Antipas (Mark 6:14–29), he withdrew to the other side to Bethsaida (Mark 6:45).

This withdrawal to Bethsaida had geopolitical significance. Bethsaida was under the legal jurisdiction of Herod Philip not Antipas. Herod Antipas had just murdered John the Baptist. To remain in Galilee (Capernaum, Magdala, etc.) would have put Jesus and his disciples at risk. So, he instructed them to travel to the other side, to Bethsaida, which lay outside of Galilee and beyond the reach of Antipas.

Bethsaida was not a marginal location in the life of Jesus and his apostles. The more we can know about this city, the better we can understand its place in the gospel story. Hopefully, in the coming seasons we can gain new insights into this fascinating town and how it served as a crossroads for Jewish and Christian history.

R. Steven Notley is distinguished professor of New Testament and Christian origins on the New York City campus of Nyack College. Notley lived 16 years in Jerusalem and was the founding chair of the New Testament studies program at the Jerusalem University College. Since 2016 he has served as the academic director of the El Araj

Excavation Project in its search for first-century Bethsaida-Julias, the lost city of the apostles.

Please visit the site: <https://www.christianitytoday.com/ct/2019/august-web-only/archeologists-lost-city-apostles-bethsaida-el-araj-israel.html>

SCIENTISTS ARE USING MACHINE LEARNING TO UNLOCK THE MYSTERIES OF LONG-DEAD LANGUAGES, BY HENRY BEWICKE

As home to many of the most important ancient civilizations on Earth, the lands around the Mediterranean hold enormous historical significance.

As the Romans, ancient Greeks and Egyptians built and expanded their empires across the region, they laid some of the great scientific and cultural foundations on which modern civilization is built.

Predating both the Romans and ancient Greeks, the ancient Mesopotamian civilizations arguably made just as many important contributions to future society, culture and science.

And now, thanks to machine learning, researchers are deciphering the script of these lesser-known cultures.

“The influence that Mesopotamia has on our own culture is something that people don’t know much about,” says Émilie Pagé-Perron, coordinator of the MTAAC project (Machine Translation and Automated Analysis of Cuneiform Languages). With research funding from the Digging into Data Challenge, the project is using 21st-century technology to explore Mesopotamian cuneiform texts from the 21st century BC.

Cracking cuneiform

Mesopotamia was located in what is now Iraq, Kuwait and parts of Turkey, Syria and Iran. In the third and fourth millennia it was home to a number of overlapping civilizations, which conceived important scientific concepts and technologies including astrology, the 60-minute hour and metal-work.

One of ancient Mesopotamia’s most influential civilizations, the Sumerians, gave the world one of the first written languages. The distinctive cuneiform (wedge-shaped) script was adapted from a series of earlier pictograms and written on soft clay tablets using a reed stylus.

Although cuneiform passed to other Mesopotamian cultures, which refined and altered it to suit their own languages and dialects, knowledge of how to read and write the various cuneiform scripts was gradually lost to time.

In the 19th century, translators managed to decipher the writing system; and in 1872 the Assyriologist George Smith translated the most famous example of cuneiform, the Epic of Gilgamesh, a 4000-year-old poem widely believed to be the earliest surviving great work of literature.

Unfortunately, translation of cuneiform tablets is still a time-consuming process and there are very few modern scholars who are able to decipher them. Sumerian is what is known as a "language isolate", one that has no genealogical relationship to any other language spoken today.

But modern technology has given researchers new hope of unravelling the script imprinted on the roughly 300,000 cuneiform tablets discovered to date, of which only around 10% have been translated so far.

Have you read?

Back from the dead

The cuneiform tablets, which had until now been translated using conventional methods, have provided an insight into everyday life in ancient Mesopotamia. The records include legal and scientific documents, financial accounts, beer recipes, as well as creative works such as the Epic of Gilgamesh.

The MTAAC project aims to scan and translate 67,000 cuneiform administrative texts using machine learning and neural machine translation technologies.

The highly standardized documents earmarked for the translation project offer the perfect opportunity to train machine learning algorithms on cuneiform script and understand its intricacies, many of which still elude scholars.

This will then provide the foundations for translation of more complex cuneiform texts in the future and hopefully strengthen methodologies which could be applied to other ancient languages.

Back to Babylon

There is already a drive to bring back spoken Babylonian, and it would not be the first time a language has been brought back from the dead.

Before its revival in the late 19th century, Hebrew had not been a spoken mother tongue for well over 1,000 years and was limited to use in religious contexts.

While algorithms may not be able to decode meaning in words perfectly yet, they are making rapid progress in translation of text and even real-time speech. And their potential to help decipher long-lost languages could tell us much about the great civilizations of the past.

Please visit the site: <https://www.weforum.org/agenda/2019/01/scientists-using-machine-learning-to-unlock-oldest-languages>

PHYSICISTS DISCOVER HIDDEN TEXT IN WHAT WAS THOUGHT TO BE BLANK EGYPTIAN PAPYRI - IT'S THE LATEST EXAMPLE OF HOW CUTTING-EDGE PHYSICS TECHNIQUES CAN UNLOCK THE PAST, BY JENNIFER OUELLETTE

Physicists at the BESSY-II synchrotron radiation facility in Germany used multiple methods to reveal hidden text in supposedly blank patches on ancient papyri from Elephantine Island in Egypt.

A team of German scientists has used a combination of cutting-edge physics techniques to virtually "unfold" an ancient Egyptian papyrus, part of an extensive collection housed in the Berlin Egyptian Museum.

Their analysis revealed that a seemingly blank patch on the papyrus actually contained characters written in what had become "invisible ink" after centuries of exposure to light.

Most of the papyri in the collection were excavated around 1906 by an archaeologist named Otto Rubensohn, on Elephantine Island, near the city of Aswan. They've been gathering dust in storage for much of the ensuing decades, and because they are so fragile, more than 80% of the text within remains undeciphered. "Today, much of this papyrus has aged considerably, so the valuable texts can easily crumble if we try to unfold or unroll them," said co-author Heinz-Eberhard Mahnke of Helmholtz-Zentrum Berlin and Freie Universität Berlin. That makes noninvasive imaging methods essential to the project.

In 2016, an international team of scientists developed a method for "virtually unrolling" a badly damaged ancient scroll found on the western shore of the Dead Sea, revealing the first few verses from the book of Leviticus. The so-called En Gedi scroll was recovered from the ark of an ancient synagogue destroyed by fire around 600 CE. To the naked eye, it resembled a small lump of charcoal, so fragile that there was no safe way to analyze the contents. The team's approach combined digital scanning with micro-computed tomography—a noninvasive technique often used for cancer imaging—with segmentation to digitally create pages, augmented with texturing and flattening techniques. Then they developed software (Volume Cartography) to virtually unroll the scroll.

"Much of this papyrus has aged considerably, so the valuable texts can easily crumble if we try to unfold or unroll them."

The artifacts analyzed by the German team were made of a different material, and hence a different approach was needed to uncover the hidden text. "The En Gedi scroll is parchment," said Mahnke. "We are dealing with papyrus." Papyrus is produced from the stems of the plant in two layers, perpendicular in the direction of the fiber, he noted.

The varying thickness of the base writing material can make it harder to identify script. Also, the papyri he and his colleagues studied were folded along orthogonal lines, rather than rolled up, so that the objects took up the least amount of space. "Mathematically, a scroll is a roll, topologically identical whether it's a nicely rolled cylinder or heavily distorted," said Mahnke. A folded papyrus doesn't have that advantage.

So Mahnke and his colleagues used the synchrotron radiation source at the BESSY II facility (Berlin Electron Storage Ring Society for Synchrotron Radiation) in Berlin for their experiments, building on work earlier this year demonstrating proof of principle on a mock-up sample. Synchrotron radiation differs from conventional X-rays in that it's a thin beam of very high-intensity X-rays generated within a particle accelerator. Electrons are fired into a linear accelerator (linac), get a speed boost in a small synchrotron, and are injected into a storage ring, where they zoom along at near-light speed. A series of magnets bend and focus the electrons, and in the process, they give off X-rays, which can then be focused down beam lines.

Secrets revealed

That makes it ideal for non-invasive imaging, since in general, the shorter the wavelength used (and the higher the energy of the light), the finer the details one can image and/or analyze. And the technique can be used to image fragile archaeological artifacts without damaging them. Shine that high-energy X-ray beam onto a fragile papyrus and the photons excite the atoms, emitting echoing X-rays in response. Those echoes will fluoresce in different ways depending on the atoms present in the sample.

According to Mahnke, it was common for ancient Egyptian scholars to use a black ink made from charred bits of wood or bone—in other words, carbon-based inks. But they would also use colored inks, which contain traces of metallic elements such as iron, copper, mercury, or lead. The X-ray fluorescence produced when imaging the samples should therefore indicate whether those metallic elements are present.

For instance, the German team found traces of lead in the blank patch of papyrus and were able to discern faint, blurry characters. Infrared spectrometry identified the ink as a colorless lead carboxylate.

However, "We suspect the characters may have originally been written in bright minium (red lead) or perhaps coal-black galena," said Mahnke. Over the centuries, those inks would have slowly transformed into invisible lead carboxylate, leaving a seeming blank space on the papyrus.

In order to enhance the brightness to gain better contrast between the papyrus and the characters, the team combined absorption edge radiography and tomography to further illuminate the sample. That gave them a clearer image of the characters, although nobody has yet been able to translate them. Analysis of another papyrus revealed the Coptic word for "Lord."

The best part: the German researchers were able to virtually open the fragile papyri without ever touching them. It should now be possible to use these techniques to study the remaining papyri in the Elephantine Island collections. "The greater challenge is the

revealing of text written in carbon ink, which shows practically no contrast in absorption tomography," said Mahnke. "One needs to find out subtle differences to make a distinction between the organic (carbon based) material and the ink (also carbon-based) [that is] good enough for a contrast."

Jennifer Ouellette is a senior reporter at Ars Technica with a particular focus on where science meets culture, covering everything from physics and related interdisciplinary topics to her favorite films and TV series. Jennifer lives in Los Angeles.

Please visit the site: <https://arstechnica.com/science/2019/08/physicists-discover-hidden-text-in-what-was-thought-to-be-blank-egyptian-papyri/> [Go there for pix]



INSCRIPTION FOUND IN PALEOCHORIA **LINKS GODDESS ARTEMIS TO** **AMARYNTHOS SANCTUARY**

A partially preserved inscription linking Artemis with the ancient town of Amarynthos was unearthed in Paleochoria, Evia, 2 km east of the modern-day town with the same name, the Ministry of Culture said on Monday, according to ANA.

The fragmentary inscription, "... of Artemis in Amarynthos", was reused in a Roman-era fountain, confirming that the foundations of the building in Paleochoria were related to the sanctuary of the goddess Artemis, first mentioned in Linear B tablets found in the Mycenaean palace of Thebes as "a-ma-ru-to".

The discovery was made during this season's excavations of the sanctuary by the Swiss Archaeological School in Greece (director Karl Reber) and the Antiquities Ephorate of Evia (Amalia Karapaschalidou, honorary ephor).

Excavations to locate the sanctuary began in 2006. This year's dig focused on the Paleochora area where a modern house was razed in 2018 after a University of Thessaloniki geological survey located remains of ancient buildings next to it.

In an announcement, the Ministry of Culture noted the find was "particularly significant, as the remains of the prehistoric settlement excavated in the '70s and '80s in the same area by the Greek Archaeological Service was one of the most important sanctuaries of ancient Euboea (Evia)."

Visit of the Swiss ambassador to the excavation of Amarynthos, in the presence of the director and the scientific secretary of the Swiss Archeological School in Greece. Photo Source: Greek Minister of Culture and Antiquities

It added that in recent years excavations have revealed two stoas dating to Hellenistic times, which serve to delineate the sanctuary east and north.

"With the discovery of the south wing of the eastern stoa," the Ministry said, "the sanctuary's limits on three sides are now known."

The monumental foundation that can most probably be identified with the altar of the sanctuary. Photo Source: Greek Minister of Culture and Antiquities

The site lies near a natural harbor. It was inhabited in the prehistoric and Classical periods, until Roman times (3000 B.C.-1st century AD), while during the Byzantine period two churches were built on top of the hill.

Please visit the site: <https://www.tornosnews.gr/en/greek-news/culture/36529-inscription-unearthed-in-paleochoria-links-goddess-artemis-to-amarynthos-sanctuary.html> [Go there for pix]

ANCIENT CITY OF TROY 600 YEARS OLDER THAN PREVIOUSLY BELIEVED, BY PHILIP CHRYSOPOULOS

New archaeological discoveries from excavations at the site of the ancient city Troy in Turkey's northwestern Canakkale province suggest that people had settled in the area six centuries earlier than experts had previously believed.

According to a report from the Daily Sabah, Rustem Aslan from the Archeology Department of Canakkale Onsekiz Mart University (COMU) stated that the ancient city of Troy had been destroyed and re-established many times because of war, fires, and earthquakes.

A total of 10 layers of settlements, or cities, had been discovered as a result of 156 years of archaeological excavations carried out in the city in the south of the Dardanelles, and each layer had been named and numbered, from Troy I to Troy XI.

Aslan declared that this year they came across a new layer — which they have decided to call “Troy 0.”

“We found traces of burns, pottery and wooden beams in the Troy 0 layer,” Aslan told the Daily Sabah, adding that the new findings put the founding history of Troy centuries back into antiquity.

“This shows that the settlement's history dates back to some 5,500 years before our day,” Aslan explained. In other words, the new discoveries indicate that the storied city was likely founded around the year 3,500 BC.

The archaeologist said that previously unearthed layers of human settlement belonged to a period between 3000 BC and 1300 AD, all the way from ancient Greek times to the Byzantine era.

The Turkish government had declared 2018 the “Year of Troy” in honor of the 20th anniversary of the ancient city's recognition as a priceless UNESCO World Heritage Site.

The city of Troy was at the center of the Trojan War, which took place in approximately the 13th century BC. The entire war was immortalized by the Greek poet Homer in his epic “The Iliad,” which described the Achaeans' besieging of the city in a desperate attempt to conquer it.

Please visit the site: <https://eu.greekreporter.com/2019/08/22/ancient-city-of-troy-600-years-older-than-previously-believed/>
