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Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Δεκέμβριος 2020 -

**Day by day, what you choose, what you think and
what you do is who you become. (Heraclitus)**

Newsletter of the Hellenic Society of Archaeometry

- December 2020 -

Nr. 237

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

EARLIER OR LATER? DEBATING THE CHRONOLOGY OF THE EARLY POTTERY NEOLITHIC ENTITIES IN THE SOUTHERN LEVANT, THURSDAY 3RD DECEMBER 2020, FRENCH RESEARCH CENTRE, JERUSALEM

Accessible via Zoom : <https://zoom.us/j/91977724142?>

ABSTRACT:

The chronology of the different Early Pottery Neolithic cultural entities has been the subject of strong debates among the scientific community for decades. According to the specialists of this time period, the "Yarmukian" culture would be contemporary or later than the "Jericho IX-Lodian" one. However, the chronological data (relative and absolute dating) currently available for the Early Pottery Neolithic remains very fragile, preventing us from giving a clear opinion on this issue. The stratigraphic sequence of main EPN settlements have so far not been reconstructed in detail. Most of the C 14 dating proves to be problematic.

This workshop will be the opportunity to conduct a thorough critical review of the different theories put forward on the chronology of the "Yarmukian", "Jericho IX-Lodian" and other Early Pottery Neolithic entities by bringing together French and Israeli colleagues. It will be the opportunity to discuss methodological problems related to the dating of Levantine Neolithic sites and possible solutions to build an accurate chrono-stratigraphic framework for the EPN.

PROGRAMME:

9.30-9.45: Vincent Lemire (Director, CRFJ) & Ianir Milevski (head of the Prehistoric Branch, IAA) Welcome to the workshop -fruitful collaboration between the Centre de Recherche Français à Jerusalem (CRFJ) and the Israel Antiquities Authority (IAA)

9.45-10.15: Anna Eirikh-Rose (Researcher, IAA) & Julien Vleugué (Researcher, CNRS) The different Early Pottery Neolithic entities and the periodization problem.

10.15-10.45: Yosef Garfinkel (Professor, Hebrew University of Jerusalem) The Early Pottery Sequence in the Southern Levant

10.45-11.15: Avi Gopher (Professor, Tel Aviv University) Traditional Culture History dynamics: Pottery Neolithic time-space grids in the southern Levant

11.15-11.30: Coffee Break

11.30-12.00: Nimrod Getzov (Researcher, IAA) & Ianir Milevski (Researcher, IAA)
Between the Yarmukian culture and the Nahal Zippori horizon: on cultures and
chronological phases of the Pottery Neolithic in the southern Levant

12.00-12.30: Julien Vieugué (Researcher, CNRS), Anna Eirikh-Rose (Researcher, IAA),
Julie Bessenay (Post-doc), Philippe Lanos (Researcher, CNRS), Lucile Beck
(Researcher, CNRS), Christine Oberlin (Researcher, CNRS), Matthieu Lebon (Lecturer,
MNHN).

Building a high-resolution chrono-stratigraphic framework for the EPN period in the
Southern Levant: problems and solutions.

12.30-13.00: Discussion

13.00-14.30: Lunch

Organiser's contact: Anna Eirikh-Rose (anna@isrannique.org.il), Philippe Lanos
(philippe.lanos@univ-rennes1.fr) & Julien Vieugué (julien.vieugue@cnrs.fr)

2ND INTERNATIONAL CONFERENCE* ON GLOBAL ISSUES ON ENVIRONMENT AND CULTURE, UNIVERSITY OF HENAN & UNIVERSITY OF THE AEGEAN

(<http://huaxiahellas.com/conference-2021/>)

[* Due to Covid19 causing uncertainties the hosting city will be between Rhodes, Delphi, Mycenae and the time September 2021. Final arrangements are announced before the end of the year 2020]

Organized Jointly by the

- *Collaborative Innovation Center on Yellow River Civilization of Henan Province & Key Research Institute of Yellow River Civilization and Sustainable Development, Center for Hellenic Civilization (Henan University)*
- *Center for Yellow River Civilization, Laboratory of Archaeometry & Laboratory of Environmental Archaeology & Preventive Conservation (University of the Aegean)*

Under the Umbrella of

- *The Sino Hellenic Academic Project (www.huaxiahellas.com)*

The 2nd *International Conference* is a follow up after the success of the 1st Sino-Hellenic International conference in Kaifeng, Henan University in 2019

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

The conference will touch on these issues.

The GLOBAL ISSUES ON ENVIRONMENT AND CULTURE includes, but is not limited, to topics such as:

- *Enviro-cultural reports from Ancient literature sources*
- *Enviro-Cultural Issues in ancient Societies*
- *Cultural management, Innovation technologies & Sustainability*
- *Climate Change & Ancient Cultures*
- *Disaster Archaeology*
- *Silk Road: Operational sequences of artifacts & diffusion of ideas*
- *Geoarchaeological Issues*
- *Sacred Landscapes & religious aspects*
- *Archaeological Sciences-Archaeometry*
- *3D Reconstructions*

- *Remote Sensing applications*
- *Predictive Modeling of Archaeological Sites*
- *Archaeological Parks*
- *Geoarchaeological Parks*
- *Miscellaneous*

Chairman: Prof. Ioannis Liritzis

Officially Endorsed by:

'Manolis Andronikos' Interdisciplinary Centre for Archaeological Studies

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

MELLON POSTDOCTORAL RESEARCH
FELLOW APPLICATION*

Dear Colleagues,

It has come to our attention there was a procedural issue with the application portal for the Andrew W. Mellon Postdoctoral Research Fellow. This has now been resolved and an updated link can be found below. The extended deadline is now 9th December 2020. Any applications submitted before today have been saved, it is not necessary to re-submit.

The British Museum has recently announced an exciting new 3-year position, the Andrew W. Mellon Postdoctoral Research Fellow. The role would be based in the Scientific Research department and will involve research on West African metals and metallurgy.

An updated link can be found here: https://bmrecruit.ciphr-irecruit.com/templates/CIPHR/jobdetail_3194.aspx

The extended deadline is now: 9th December 2020

Apologies for any inconvenience caused

Kind regards

Imogen

2-YEAR RESEARCH MASTER **ARCHAEOLOGY IN GRONINGEN, THE** **NETHERLANDS***

The *two-year Research Master in Archaeology in Groningen* has twice been elected the best Archaeology graduate programme in the Netherlands. The curriculum combines intensive training and a flexible structure where you can develop your own specialisation. The programme has a broad geographical and chronological coverage – from the Arctic and North-western Europe to the Mediterranean and the Near East, from the Mesolithic to historical archaeology. Of course, you can specialize in Aegean prehistory – and you can also combine it with landscape archaeology, archaeobotany, zooarchaeology, pollen analysis, mortuary archaeology, material culture studies, digital technologies (i.a. GIS, drone-mapping, 3D modelling, Virtual Reality) and archaeological science (i.a. radiocarbon analysis, Bayesian chronological modelling, isotopic analysis, soil micromorphology).

Employment rates among our recent graduates are very high, with many of them getting competitive PhD positions in the Netherlands and abroad.

The fees are € 2143 for EU citizens, and €13500 for non-EU citizens per year. Groningen University is among the top 100 Universities in the world.

Groningen is a friendly, lively and very safe city with many international students, and has been voted one of the 20 best small cities in the world.

The Groningen Institute of Archaeology is situated at the heart of the city.

For more information on the programme, you can:

- attend the *Groningen Master Week*

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.rug.nl%2Feducation%2Fmaster%2Fmasterweek%2F&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003753050%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C1000&reserved=0> (the online Presentation of the Research Master Archaeology will take place on *Monday 23 Nov 16:00-17:00*, Dutch time)

- look up the webpage of the programme:

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.rug.nl%2Fmasters%2Farchaeology-research%2F%3Flang%3Den%23!programme&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003753050%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D>

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Ffrug.academia.edu%2FREMAArchaeologyGroningen&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003763044%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6I6I1haWwiLCJXVCI6Mn0%3D%7C1000&data=lxYZnBZuypZJ8acbSx7rJWwXGGXS7fssvKtXRboh1s%3D&reserved=0>

- look up our academia page:

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Ffrug.academia.edu%2FREMAArchaeologyGroningen&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003763044%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6I6I1haWwiLCJXVCI6Mn0%3D%7C1000&data=lxYZnBZuypZJ8acbSx7rJWwXGGXS7fssvKtXRboh1s%3D&reserved=0>

- write to the Director of Studies, Prof. S. Voutsaki: s.voutsaki@rug.nl

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Professor of Greek Archaeology
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<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Ffrug.academia.edu%2Fsvoutsaki&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003763044%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6I6I1haWwiLCJXVCI6Mn0%3D%7C1000&data=eYwGyLZ9voZcrNIGUsht%2FLGHTq2yShrYSOm68YuC8aU%3D&reserved=0>

*Follow Groningen Greek Archaeology

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.facebook.com%2Fgroningengreekarchaeology%2F&data=04%7C01%7CAEGEANET%40lists.ku.edu%7C9e0a793e73b0423d839d08d88a44f187%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637411376003763044%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6I6I1haWwiLCJXVCI6Mn0%3D%7C1000&data=MBMrqdtUWtxneifWKJONywsVf1GAuU2Ktr5HclwBo5U%3D&reserved=0> on Facebook*

OPENING AT UNIVERSITY OF GEORGIA **CAIS, USA**

The University of Georgia's (UGA) Center for Applied Isotope Studies (CAIS) is seeking a Director at the rank of Assistant, Associate, or Senior Research Scientist.

The CAIS is the largest isotope geochemistry/radiocarbon AMS dating facility in the U.S. and is accredited under ISO/IEC 17025:2017. CAIS contains state-of-the-art facilities for radiocarbon dating, environmental analyses, food flavor and beverage authenticity testing, and bio-based product testing (<https://cais.uga.edu>). CAIS's 40+ scientists collaborate in research and method development, serve the UGA research community and work with worldwide academic institutions, government agencies, and private companies.

The Director will oversee scientific, fiscal and regulatory activities, and work closely to develop, refine, and implement a vision for the Center's continuing growth and preservation of ISO/IEC accreditation. The Director interfaces with the UGA Office of Research for policy, reports, and personnel administration. The Director will have a commitment to a diverse workforce and maintain a high quality of researchers and staff members who are committed to world-class science and technology. The Director provides primary leadership for a robust and technologically advanced research and service center that generates annual revenues of approximately \$3M. The Director also ensures that CAIS operates with fiscal and scientific integrity and will be responsible for ensuring that it supports interdisciplinary work at UGA and offers training opportunities for undergraduate and graduate students. CAIS collaborates with UGA's Departments of Chemistry, Geography, Geology, Marine Science, Ecology, and Archaeology.

For more information go to: <https://www.ugajobsearch.com/postings/175843>

DOCTORAL SCHOLARSHIPS,
“UNDERSTANDING WRITTEN ARTEFACTS”,
HAMBURG, GERMANY, CALL FOR
APPLICATIONS: GSSP SCHOLARSHIPS FOR
INTERNATIONAL PHD CANDIDATES

The Graduate School of the Cluster of Excellence “Understanding Written Artefacts” and the Centre for the Study of Manuscript Cultures (CSMC) invite applications for doctoral scholarships within the Graduate School Scholarship Programme (GSSP) of the German Academic Exchange Service (DAAD) starting on 1 October 2021.

Successful applicants will receive a full scholarship (1200 EUR/month) plus health insurance and monthly allowances for a period of three years. An extension to four years is possible in well-grounded cases.

Who can apply?

We are looking for highly qualified and very motivated English-speaking international doctoral candidates (non-German citizens) holding a Master, Diploma or equivalent degree in any discipline concerned with the study of manuscript cultures and written artefacts, regardless of region (for an exemplary list of disciplines, please click [here](#)).

Please note: At the time of the nomination (in early 2021), the last final exam (Master degree) should not have been taken more than six years ago. Candidates who have been living in Germany for more than 15 months at the time of nomination are not eligible.

At Universität Hamburg, there exists the option of cotutelle (bi-nationally supervised doctoral degrees).

Language requirements

The working language at the CSMC is English and the doctoral dissertation (Dr. phil., Dr. rer. nat.) is written in either English or German. Therefore, candidates must demonstrate proficiency in English on at least level B1 (certified).

Knowledge of the German language is not required.

The application process

The application follows two steps: In a first step, a committee of PIs reviews all applications and makes a selection of promising candidates. The main criteria are the quality and innovative potential of the candidate’s research proposal, and its contribution to and compatibility with the Cluster’s existing research objectives.

In a second step, the selected candidates are nominated by the CSMC and submit their final application through a portal to the German Academic Exchange Service (DAAD),

who makes the final decision. More information on the process can be found in the GSSP Guideline for Applicants.

What we offer

Doctoral candidates will be integrated into a vibrant interdisciplinary research environment of more than 30 disciplines at two faculties (humanities, natural sciences) studying manuscripts and other written artefacts. Doctoral students present and discuss their research in colloquia, are closely guided by a supervising professor from their field and are encouraged to attend summer schools, workshops, talks and other events offered by the Centre for the Study of Manuscript Cultures (CSMC). They have access to facilities such as the artefact profiling lab and the library. Furthermore, doctoral students benefit from a workshop programme aimed at strengthening their soft skills. The enrolment as doctoral students guarantees full access to all facilities and services Universität Hamburg offers for this group.

Application documents and deadline

The following documents have to be submitted by e-mail as one PDF file before 15 January 2021 to the Coordinator of the Graduate School (contact see below):

A detailed research proposal of the planned dissertation project, compatible with the Cluster's research objectives Please structure it as follows and do not exceed 5 pages: 1. Abstract of the proposal 2. Research proposal 3. Work schedule outlined for 3 years.

CV (including full contact details, the educational and professional background, any relevant publications, and language skills).

A letter of motivation explaining the candidate's academic and professional interests, and how the doctoral programme would in their opinion contribute to achieving their personal career goals (1 page).

Copies of B.A./B.Sc., M.A./M.Sc. or other relevant certificates.

Proof of English language proficiency (at least at level B2).

Contact

Dr. Meryll Rebello

Coordinator of the Graduate School

meryll.rebello@uni-hamburg.de

PROJECT SCIENTIST, AUSTRIAN ARCHAEOLOGICAL INSTITUTE (OeAI) OF THE AUSTRIAN ACADEMY OF SCIENCES (OeAW), AUSTRIA

The Austrian Archaeological Institute (OeAI) of the Austrian Academy of Sciences (OeAW), Austria's leading non-university research and science institution, is offering a

PROJECT SCIENTIST (F*M)

(full-time, 40h per week)

starting on February 01, 2021 and is limited to 7 months.

Within the frame of the interdisciplinary research project P 30095-G26 „Geometric/Archaic Pottery from the Artemis Sanctuary, Lousoi“, funded by the Austrian Science Fund (FWF) and directed by PD Dr. Michael Kerschner, we advertise the position of a research assistant for the documentation and analysis of ceramic thin-sections.

The project follows an interdisciplinary approach. On the basis of archaeometric pottery analyses, cultural contacts between the region of the northern Peloponnese (Greece), where Lousoi is situated, and the Achaean colony of Metapontion (Italy) are to be investigated. The aim is to identify imports from various Greek production sites as well as local southern Italian productions.

Your tasks:

- Documentation and scientific analysis of ceramic thin-sections from the Metapontino (Southern Italy).
- Comparison of the results with the thin-section analyses of ceramic vessels from the northern Peloponnese (Greece).
- Close cooperation with the project staff responsible for ceramic petrography and geochemistry (Dr. P. Fragnoli and DI Dr. J. Sterba).
- Joint publication and lecture activities

Your profile:

- Completed Master's degree in Geosciences, Classical or Pre- and Early History Archaeology • Experience with thin-section analysis and ceramic petrography proven by passed examinations, attended summer schools, academic theses and/or publications.
- Very good knowledge of English and/or German. Reading skills in German are required.
- Ability to work in a team and openness in scientific exchange

Our offer:

- Entry into research by working on an FWF-supported project.
- An exceptional research environment at the Austrian Archaeological Institute and excellent infrastructural general conditions at the Austrian Academy of Sciences.

We offer an annual gross salary of € 41.171,20 according to the collective agreement of the Austrian Academy of Science.

We would be pleased to have awakened your interest in the position and ask you to send your detailed written application (CV, letter of motivation, photo, copies of certificates, 2 letters of reference, list of literature if applicable) electronically no later than January 04, 2021 at the latest at: <https://www.oeaw.ac.at/en/oeai/institute/career-and-further-training/open-positions>.

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

APPLICATIONS FOR THE ADVANCED MASTERS IN STRUCTURAL ANALYSIS OF MONUMENTS AND HISTORICAL CONSTRUCTIONS (15TH EDITION)

Dear Colleagues,

Please find below information about the Advanced Master Course in Structural Analysis of Existing Buildings, Monuments and Historical Constructions.

I kindly invite you to disseminate this information to anybody who could be interested in applying.

APPLICATIONS FOR THE ADVANCED MASTERS IN STRUCTURAL ANALYSIS OF MONUMENTS AND HISTORICAL CONSTRUCTIONS

After 10 years of European funding, 420 students from 70 countries, applications for the **Advanced Masters in Structural Analysis of Monuments and Historical Constructions** are opened up to January 20, 2021. This is the leading international course on conservation of heritage structures, **winner of the 2017 European Union Prize for Cultural Heritage "Europa Nostra"**, and a unique opportunity to meet people from all over the world.

This Master Course, which is running its 14th edition, is organized by a Consortium of leading European Universities/Research Institutions in the field, composed by **University of Minho** (coordinating institution, Portugal), the **Technical University of Catalonia** (Spain), the **Czech Technical University in Prague** (Czech Republic), the **University of Padua** (Italy) and the **Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences** (Czech Republic).

The course combines the most recent advances in research and development with practical applications.

A significant number of **scholarships**, ranging from 4,000 to 13,000 Euro, are available to students of any nationality.

Please find full details on the MSc programme, as well as electronic application procedure, in the SAHC website at www.msc-sahc.org

Visit also the SAHC blog <http://blog.msc-sahc.org> and www.linkedin.com/school/sahcmasterscourse/

Yours sincerely,

Paulo B. Lourenco
Course Coordinator

Editor of the International Journal of Architectural Heritage: Conservation, Analysis, and Restoration

Check out the first book resulting from the SAHC
Historic Construction and Conservation: Materials, Systems and Damage
Publisher: Routledge
More info: [link](#)



GUMBERT DISSERTATION AWARD 2021

The Centre for the Study of Manuscript Cultures (CSMC) at Universität Hamburg announces the

J. P. Gumbert Dissertation Award 2021

for a doctoral dissertation defended in 2019 or 2020. Johan Peter Gumbert (1936-2016) was Professor and Professor Emeritus of Western Palaeography and Codicology at Leiden University from 1979 to 2001, and an expert on Latin and Dutch manuscripts.

As a frequent guest at the Universität Hamburg, Professor Gumbert was associated with the CSMC from its very beginning as well as with the COMSt-Network (Comparative Oriental Manuscript Studies).

The successful dissertation contributes to any aspect of the study of manuscripts and other written artefacts from fields such as art history, history, codicology, epigraphy, material sciences, palaeography, or philology. Its research focus can be on any period or region. The dissertation must be written in English.

The award includes a prize money of 5,000 Euros and a fellowship for a research stay at CSMC (earliest from April 2021).

Nominations can be submitted by the first or second supervisor or by the doctoral students themselves. Members of CSMC or Universität Hamburg are excluded. Nominations must include:

- the doctoral dissertation thesis
- one review by the supervisor and final PhD certificate
- curriculum vitae
- a half-page statement describing in which

respect the dissertation has established new grounds for the study of written artefacts beyond one discipline.

Please send nominations to applications.csmc@uni-hamburg.de before Friday, 8 January 2021, 12.00 pm CET (the deadline is not negotiable).

Files must be in PDF format and attachments must NOT exceed 20 MB in sum; for attachments larger than 20 MB, please use a file hosting service.

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

THE RIDDLE OF THE ROSETTA: HOW AN ENGLISH POLYMATH AND A FRENCH POLYGLOT DISCOVERED THE MEANING OF EGYPTIAN HIEROGLYPHS, JED Z. BUCHWALD AND DIANE GRECO JOSEFOWICZ

Price:\$39.95 / £34.00
ISBN:9780691200903
576 pages

In 1799, a French Army officer was rebuilding the defenses of a fort on the banks of the Nile when he discovered an ancient stele fragment bearing a decree inscribed in three different scripts. So begins one of the most familiar tales in Egyptology—that of the Rosetta Stone and the decipherment of Egyptian hieroglyphs. This book draws on fresh archival evidence to provide a major new account of how the English polymath Thomas Young and the French philologist Jean-François Champollion vied to be the first to solve the riddle of the Rosetta.

Jed Buchwald and Diane Greco Josefowicz bring to life a bygone age of intellectual adventure. Much more than a decoding exercise centered on a single artifact, the race to decipher the Rosetta Stone reflected broader disputes about language, historical evidence, biblical truth, and the value of classical learning. Buchwald and Josefowicz paint compelling portraits of Young and Champollion, two gifted intellects with altogether different motivations. Young disdained Egyptian culture and saw Egyptian writing as a means to greater knowledge about Greco-Roman antiquity. Champollion, swept up in the political chaos of Restoration France and fiercely opposed to the scholars aligned with throne and altar, admired ancient Egypt and was prepared to upend conventional wisdom to solve the mystery of the hieroglyphs.

Taking readers from the hushed lecture rooms of the Institut de France to the windswept monuments of the Valley of the Kings, *The Riddle of the Rosetta* reveals the untold story behind one of the nineteenth century's most thrilling discoveries.

Jed Z. Buchwald is the Doris and Henry Dreyfuss Professor of History at the California Institute of Technology. He lives in Altadena, California. Diane Greco Josefowicz is a writer, editor, and activist.

She has served for more than a decade as science and technology editor for the Victorian Web (victorianweb.org). She lives in Providence, Rhode Island. Buchwald and Josefowicz are the authors of *The Zodiac of Paris: How an Improbable Controversy over an Ancient Egyptian Artifact Provoked a Modern Debate between Religion and Science* (Princeton).

Twitter @dianegreco

Please visit the site:

<https://press.princeton.edu/books/hardcover/9780691200903/the-riddle-of-the-rosetta>



MEASURING A THREAT TO POMPEII'S PAINTINGS, BY MICHAEL EISENSTEIN

Spectroscopic analysis reveals that Pompeii's murals may be vulnerable to the leaching of ions from volcanic debris.

Volcanic material ejected by Mount Vesuvius has preserved the ancient Italian city of Pompeii for nearly 2,000 years, providing a time capsule of life in the Roman Empire. But findings from researchers led by Maite Maguregui, at the University of the Basque Country in Spain, show that debris may also be causing degradation of Pompeii's priceless murals.

Salt accumulation is a known threat to these artworks. The ions responsible for salt formation have generally been found in groundwater. However, pyroclastic materials produced by volcanic eruption are rich in fluoride ions, which also form salts, but such ions are difficult to analyze with portable instruments.

To measure the ionic impact of volcanic debris, Maguregui's team turned to laser-induced breakdown spectroscopy (LIBS). LIBS offers a portable solution to interpret the distinctive emission bands produced by different molecules after laser illumination, and can readily discern fluoride from other ions. "This has been applied by NASA's Mars exploration studies, but never in the field of cultural heritage," says Maguregui.

LIBS offered a new perspective on Pompeii's murals. "The first surprise was seeing fluorine everywhere," says graduate student Silvia Pérez-Diez. Further analysis at selected sites allowed her and Maguregui to determine how fluoride-based salts might form. "When those paintings are excavated, some remains of volcanic materials are there, and humidity or rainwater can leach these ions and promote crystallization of salts," says Pérez-Diez.

These findings reveal a hidden factor that could confound efforts at preservation and restoration, since these crystallized salts can degrade some of the paints used. Now, Maguregui hopes to profile Pompeii's fluoride accumulation more extensively.

Please visit the site: <https://www.nature.com/articles/d43978-020-00017-y>

INSIGHTS INTO THE COMPOSITION OF ANCIENT EGYPTIAN RED AND BLACK INKS ON PAPYRI ACHIEVED BY SYNCHROTRON- BASED MICROANALYSES

Thomas Christiansen, Marine Cotte, Wout de Nolf, Elouan Mouro, Juan Reyes-Herrera, Steven de Meyer, Frederik Vanmeert, Nati Salvadó, Victor Gonzalez, Poul Erik Lindelof, Kell Mortensen, Kim Ryholt, Koen Janssens, and Sine Larsen

PNAS November 10, 2020 117 (45) 27825-27835;
<https://doi.org/10.1073/pnas.2004534117>

Abstract

A hitherto unknown composition is highlighted in the red and black inks preserved on ancient Egyptian papyri from the Roman period (circa 100 to 200 CE). Synchrotron-based macro-X-ray fluorescence (XRF) mapping brings to light the presence of iron (Fe) and lead (Pb) compounds in the majority of the red inks inscribed on 12 papyrus fragments from the Tebtunis temple library. The iron-based compounds in the inks can be assigned to ocher, notably due to the colocalization of Fe with aluminum, and the detection of hematite (Fe₂O₃) by micro-X-ray diffraction. Using the same techniques together with micro-Fourier transform infrared spectroscopy, Pb is shown to be associated with fatty acid phosphate, sulfate, chloride, and carboxylate ions. Moreover, micro-XRF maps reveal a peculiar distribution and colocalization of Pb, phosphorus (P), and sulfur (S), which are present at the micrometric scale resembling diffused “coffee rings” surrounding the ocher particles imbedded in the red letters, and at the submicrometric scale concentrated in the papyrus cell walls. A similar Pb, P, and S composition was found in three black inks, suggesting that the same lead components were employed in the manufacture of carbon-based inks. Bearing in mind that pigments such as red lead (Pb₃O₄) and lead white (hydrocerussite [Pb₃(CO₃)₂(OH)₂] and/or cerussite [PbCO₃]) were not detected, the results presented here suggest that the lead compound in the ink was used as a drier rather than as a pigment. Accordingly, the study calls for a reassessment of the composition of lead-based components in ancient Mediterranean pigments.

Please visit the site: <https://www.pnas.org/content/117/45/27825>

RETHINKING THE CONCEPT OF "HEALING SETTLEMENTS": WATER, CULTS, CONSTRUCTIONS AND CONTEXTS IN THE ANCIENT WORLD

Maddalena Bassani, Marion Bolder-Boos, Ugo Fusco
Oxford: Archaeopress, 2019.
Pp. iv, 176.
ISBN 9781789690378
£35.00.

Review by Mark Locicero, University of British Columbia. mloc87@gmail.com
[Authors and titles are listed at the end of the review.]

Research on the subject of water in the ancient Mediterranean world is certainly flourishing, with numerous publications in the last few years addressing the stubbornly fluid yet persistently present relationships between water and power, the senses, landscape, urbanism, resource usage, and ancient technology. The book under review emerged from a session held at the 2016 Roman Archaeology Conference (RAC), and is the product of the long-standing research group at the University of Padua, which has produced numerous specialist monographs, dissertations, and conferences on the theme of thermo-mineral waters. It contains fifteen papers divided into two sections. These sections reflect the stated goals of the volume: to present examples of archaeological contexts characterized by thermo-mineral waters and waters considered to be sacred, and to discuss cult places/deities concerned with health/fertility. The contributions range widely across the Mediterranean, comprising case studies from North Africa, Bulgaria, the Iberian Peninsula, Gaul, mainland Greece, and peninsular Italy. There is a clear focus on the Republican-Imperial Roman periods, with a few papers examining pre-Roman or classical Greek thermo-mineral sites. Most of the contributions combine archaeological, epigraphic, and archival sources to present local cases studies and how they compare with more well-known patterns.

Bassani and Fusco start off the first section with an introduction to the history of the field of thermo-mineral studies and some general methodological aspects. They emphasize the need to continue rejecting the knee-jerk reaction of ascribing healing powers to a particular deity simply because their statue is found in context with thermo-mineral waters. The following paper by Bassani continues this introduction, drawing upon the author's extensive work at Montegrotto Terme (Aquae Pataviae) and the compilation of a database of 140 thermo-mineral sites in the Italian Peninsula. Fusco's paper presents the imperial-period remains at three thermo-mineral sites in and around Veii, including an intriguing network of underground tunnels and a roughly rectangular two-story cistern from the end of the 1st c. BCE to early 1st c. CE. Marcato draws attention to case studies from Roman Alpine and Gallic provinces. The presentation of the different kinds of evidence available for these sites (e.g., coins, tabellae defixionum) is useful in itself, but more importantly, this contribution highlights the lack of context and quantitative recording for the vast majority of votives, which hampers the study of cultic depositions more generally. Zanetti presents material from the two Germaniae and Raetia, and

similar to the previous contribution, takes a systematic approach to the evidence from these Roman provinces. This systematic approach allows the author to draw out larger regional trends, such as the kind of ex votos deposited.

The contribution by Carneiro and Soutelo compares the Roman healing spa of Chaves in Portugal with others in the Iberian Peninsula, and explores how architecture reflects the relationship between sacred and profane areas in a sanctuary. With reference to recent work on the sensory impact of urban water displays, they track the influence of these structures on Hispanic healing spas. Borgia continues with case-studies from Asia Minor, underlining the lacuna of systematic research on thermo-mineral bath complexes, in comparison with the more well-known fresh-water baths. Puzzlingly, the paper suggests both that thermo-mineral complexes developed only where geologically possible, and that they were intentionally isolated from urban centres due to unspecified hygiene reasons. Given ongoing discussions of hygiene, toilets, and sewers in the ancient Mediterranean world, surely thermo-mineral baths would have produced the same kinds of waste as any other thermal facility. While brief, contributions like the following one by Avramova are especially interesting, as the general lack of well-preserved and excavated thermo-mineral sites offer intriguing possibilities for future research. Closing out this section is an overview of thermal spas from Roman North Africa (Koehler), which suffers from the same issues of early unstratigraphic excavation as other thermo-mineral sites. However, Koehler makes good use of maps and descriptions from 18th-century travellers, and includes several helpful charts of spas across the provinces of North Africa. This contribution is the only one to consider the *nachleben* of Roman healing spas and their much-debated relationship to hammam baths.

The second section consists of five papers that more generally address issues of healing sanctuaries and cults. While anatomical votives are certainly the central characters in these papers, these contributions continue the current discussion of complementary and multi-faceted interpretations of these objects. Bolder-Boos and Calapà offer a helpful introduction to the subject, advocating for research beyond rigid and all-encompassing categories, and suggest instead to concentrate on case studies to understand the complex relationship between ritual practice and medical healing. The next contribution by Calapà presents material evidence for cult practices in caves in Etruria. It uses the example of “milk caves” to caution against the direct correlation of early modern fertility practices with ancient cultic activity. Bolder-Boos offers an overview of possible attributes of Herakles/Hercules in Rome, and uses a group of Republican temples in Ostia to propose that Hercules was also worshipped as a healing god here. Although this contribution does fit under the broader “rethinking” of healing settlements, it is the only one that drifts away from the general theme of the book, reminding researchers only that Hercules can have healing associations. Edlund-Berry and Turfa take a landscape approach to healing cults, and present a series of brief case studies from central Italy focusing on watery and forested places as places of cultic and economic connection. They conclude that cults served local needs in connection with local geography, an issue often overlooked by architectural or material-focused approaches to healing cults. The final contribution (Gorrini) combines a close reading of epigraphic evidence (i.e., temple inventories) with votive objects made from precious metals. Although this contribution does depart from the site-votive-deity focus of several of the papers in this volume, the identification of numerous vessels specialized for transporting, containing, and mixing water reminds us to acknowledge the potential sacrality of seemingly “everyday” objects. The volume ends with a final note by Ghedini and Zanovello, who emphasize the need for additional

systematic studies and additional specialist meetings, as well as for a common language with shared databases.

Generally speaking, all of the contributions were well illustrated, with a good mix of colour and black-and-white images, and plans that usually (but not always) are of a high quality. Although the volume as a whole is targeted at specialists or researchers working in particular regions of the ancient Mediterranean world, the introductory chapters of each section do offer a helpful point of departure. The level of English varies in the text, with some contributions containing minor but awkward spelling and grammatical errors. A desideratum would be the addition of more maps, especially in contributions covering wider regions, as many of the sites listed are small and otherwise difficult to locate. Along the same lines, a single map in the introduction with principal sites mentioned would undoubtedly produce the desired “gasp” the editors expect from readers. It is necessary to read all of the contributions to appreciate the wide diffusion of such sites across the ancient Mediterranean world, which may be difficult for non-specialists.

Continuing this expansion further, the concluding look forward to future research could have been strengthened by proposing other avenues, such as digital approaches to cult or the role of gender, class, and economics in healing settlements. The role of healing settlements in museums and public outreach would also be a point for future research to address: one has only to think of the prominent role that anatomical votives from thermo-mineral sites play in attracting crowds to museums around the world. A single concluding page advocating for more of the same kind of research conducted over the past two decades is certainly valuable, but including these other existing fields of research would surely strengthen the field going forward.

Despite these minor shortcomings, this volume succeeds in giving voice to both established and junior researchers, and expands the available published material for thermo-mineral sites across the ancient Mediterranean world.

Authors and titles

Bassani, M., Fusco, U., “Methodological Aspects”

Bassani, M., “Shrines and Healing Waters in Ancient Italy. Buildings, Cults, Deities”

Fusco, U., “The thermo-mineral springs at Veii (RM) and its territory: new discoveries and old excavations”

Marcato, M., “Cult and healing water in Roman Gaul”

Zanetti, C., “Places of Worship and healing water in Roman Germaniae and Raetia”

Carneiro, S., González Soutelo, S., “Healing by Water: Therapy and Religion in the Roman spas of the Iberian Peninsula”

Borgia, E., “Preliminary considerations on thermal spas in the Eastern Roman provinces: the case of Asia Minor”

Avramova, M., “Roman healing settlements in Bulgaria: past scholarship and future perspectives”

Koehler, J. 2019, “Before the Hammam: the ancient spas of Roman North Africa”

Bolder-Boos, M., Calapà, A., “Cult places and healing: some preliminary remarks”

Calapà, A., “Sacred caves and ‘fertility cults’. Some considerations about cave sanctuaries in Etruria”

Bolder-Boos, M., “Hercules and Healing”

Edlund-Berry, I., Turfa, J.M., “Lacus and Lucus: lakes and groves as markers of healing cults in central Italy”

Gorrini, M.E., “Nomina Nuda Tenemus? The epigraphical records of dedications in two healing sanctuaries in Athens and in Oropos”

Ghedini, F., Zanovello, P., “Results and Future Prospects”

Please visit the site: <https://bmc.brynmaur.edu/2020/2020.11.37/>

POLLUTION AND HUMAN MOBILITY IN THE SOUTHERN LEVANT DURING THE IRON AGE USING CHEMICAL AND ISOTOPIC ANALYSIS OF HUMAN TOOTH ENAMEL

Tzilla Eshelab, Naama Yahalom-Mack, Ofir Tirosh, Aren Maeir, Yehudit Harlavane, Ayelet Gilboa, Yigal Erela

The extent of pollution and human mobility in the Iron Age in the southern Levant is estimated in this study through lead (Pb) and strontium (Sr) concentrations and isotopic compositions in human tooth enamel. The concentrations of Pb and other trace metals (Cu, Co, Cd, Zn) and Pb/Ca along with Ba/Ca ratios are used to determine background levels of metals and exposure to metal pollution. Strontium isotopic ratios are used to trace individuals' residence as children and young adults, and Pb isotopic ratios are used for determining sources of in-vivo pollution.

Seven teeth from the Natufian to the Pre-pottery Neolithic periods were used to establish metal-concentration baselines, and their Pb concentrations were compared with previous results. Forty-one additional samples (31 individuals) were selected from secure archaeological contexts, mostly urban sites, from the Iron Age (~1200 – 586 BCE; 28 individuals) and from the Persian Period (~586–332 BCE; 3 individuals).

Based on their Pb/Ca ratios, five individuals were found to be in-vivo polluted, and four additional individuals were possibly polluted, all dating to the Iron Age, suggesting that just under a third of the sampled Iron Age individuals were exposed to heavy metals to some extent. All individuals except one (from the coastal site of Dor) plot within the $^{87}\text{Sr}/^{86}\text{Sr}$ range of local, bioavailable Sr in soils (0.7058–0.7102). The unpolluted and possibly polluted individuals from coastal sites have a different $^{87}\text{Sr}/^{86}\text{Sr}$ range (0.7081–0.7112) than the inland unpolluted individuals ($^{87}\text{Sr}/^{86}\text{Sr} = 0.7079\text{--}0.7084$), suggesting that the former have more coastal/marine contribution in their diet. This Sr isotopic distribution pattern reflects a generally non-mobile population in both coastal and inland sites.

Polluted Iron Age individuals, on the other hand, from both inland and coastal sites, have $^{87}\text{Sr}/^{86}\text{Sr}$ values which fall in a narrow range (0.7083–0.7086), possibly affected to some extent by coastal/marine sediments. Lead isotopic composition of four out of five individuals clearly deviate from local soil values, indicating an external contribution of Pb, some of which possibly originated from lead-rich Cu-ores in the Arabah. We thus propose a correlation between pollution and mobility in the Iron Age southern Levant. A possible explanation might be that polluted individuals had interactions with the coast or the marine environments, where they came into contact with metals, as a result of exposure to metalworking, use and/or trade.

Please visit the site:

<https://www.sciencedirect.com/science/article/abs/pii/S0305440320301837>

to

download full article.

HIBERNATION IN HOMININS FROM ATAPUERCA, SPAIN HALF A MILLION YEARS AGO **HIBERNATION DES HOMINIDES D'ATAPUERCA, EN ESPAGNE, IL Y A UN DEMI-MILLION D'ANNEES**

Antonis Bartsiokas, Juan-Luis Arsuaga
L' Anthropologie, 2020, 102797

Abstract

Both animal hibernation and human renal osteodystrophy are characterized by high levels of serum parathyroid hormone. To test the hypothesis of hibernation in an extinct human species, we examined the hominin skeletal collection from Sima de los Huesos, Cave Mayor, Atapuerca, Spain, for evidence of hyperparathyroidism after a thorough review of the literature. We studied the morphology of the fossilized bones by using macrophotography, microscopy, histology and CT scanning. We found trabecular tunneling and osteitis fibrosa, subperiosteal resorption, 'rotten fence post' signs, brown tumours, subperiosteal new bone, chondrocalcinosis, rachitic osteoplaques and empty gaps between them, craniotables, and beading of ribs mostly in the adolescent population of these hominins. Since many of the above lesions are pathognomonic, these extinct hominins suffered annually from renal rickets, secondary hyperparathyroidism, and renal osteodystrophy associated with Chronic Kidney Disease - Mineral and Bone Disorder (CKD-MBD). We suggest these diseases were caused by poorly tolerated hibernation in dark cavernous hibernacula. This is particularly evidenced by the rachitic osteoplaques and the gaps between them in some of the adolescent individuals along with the evidence of healing mainly in the adults. The sublayers in the rachitic osteoplaques indicate bouts of arousal from hibernation. The strong projection of the external lip of the femoral trochlea, the rachitic osteoplaques with the empty gaps between them, the "rotten fence post" sign, and the evidence of annual healing also point to the presence of annually intermittent puberty in this extinct human species. The hypothesis of hibernation is consistent with the genetic evidence and the fact that the SH hominins lived during an extreme glaciation. Alternative hypotheses are examined. The present work will provide a new insight into the physiological mechanism of early human metabolism which could help in determining the life histories and physiologies of extinct human species.

Please visit the site:

<https://www.sciencedirect.com/science/article/pii/S0003552120300832?dgcid=author>

EΙΔΗΣΕΙΣ - NEWS RELEASE

WHY DID ANCIENT EGYPTIAN SCRIBES USE LEAD-BASED INK?

A new study uncovers the science behind ancient writing traditions By Nora McGreevy

When ancient Egyptians put pen to paper—or, more accurately, ink to papyrus—they took steps to ensure that their words would endure, a new study suggests.

As detailed in the Proceedings of the National Academy of Sciences, researchers from the University of Copenhagen in Denmark and the European Synchrotron Radiation Facility (ESRF) in Grenoble, France, have found that ancient scribes likely added lead to their inks to help their writing dry.

More than a millennia later, reports Cosmos magazine, 15th-century European Renaissance artists employed lead for similar purposes.

According to the London National Gallery, lead-based pigments found in many Old Master paintings are “known to aid the drying of paint films.”

Per a University of Copenhagen statement, the study’s authors analyzed 12 papyrus fragments dated to between 100 and 200 A.D., when Egypt was under Roman control. The team used X-ray microscopy to determine the raw materials used in different inks, as well as the molecular structure of the dried ink affixed to the ancient paper.

Ancient Egyptians began writing with ink—made by burning wood or oil and mixing the resulting concoction with water—around 3200 B.C.

Typically, scribes used black, carbon-based ink for the body of text and reserved red ink for headings and other key words in the text, wrote Brooklyn Museum conservator Rachel Danzing in a 2010 blog post.

Though black and red inks were most common, shades of blue, green, white and yellow also appear in ancient texts.

Ruins of the city Tebtunis, where the only temple library to survive from ancient Egypt was discovered in the 1900s (Kim Ryholt / University of Copenhagen)

The researchers write that the Egyptians created red inks with iron-based compounds—most likely ocher or other natural earth pigments. The team also identified the presence of lead; surprisingly, they found no lead white, minium or other compounds that would typically be present in a lead-based pigment.

Instead, the ancient ink’s lead pigments appeared to wrap around the papyrus’ cell walls and iron particles. The resulting effect looked “as if the letters were outlined” in lead, according an ESRF statement. This find indicates that the ancient Egyptians devised a

system of adding lead to red and black inks specifically for the purpose of binding the words to paper.

“We think that lead must have been present in a finely ground and maybe in a soluble state and that when applied, big particles stayed in place, whilst the smaller ones ‘diffused’ around them,” says co-author Marine Cotte in the ESRF statement.

The 12 analyzed papyrus fragments are part of the University of Copenhagen’s Papyrus Carlsberg Collection. The documents originated in Tebtunis, the only large-scale institutional library known to have survived from ancient Egyptian times, per the university statement.

According to the University of California, Berkley, which holds a large collection of Tebtunis papyri, many of the ancient texts were excavated from Egypt’s Fayum basin in the early 20th century.

Lead author Thomas Christiansen, an Egyptologist at the University of Copenhagen, notes that the fragments were likely created by temple priests. Because ancient Egyptians would have required a significant amount of complex knowledge to craft their inks, Christiansen and his colleagues argue that ink manufacturing probably took place in separate, specialized workshops.

A papyrus fragment of a long astrological treatise from the Tebtunis temple library (left) and X-ray fluorescence maps showing the distribution of iron (red) and lead (blue) in the red letters that write out the ancient Egyptian word for "star" (right) (ESRF / The Papyrus Carlsberg Collection)

“Judging from the amount of raw materials needed to supply a temple library as the one in Tebtunis, we propose that the priests must have acquired them or overseen their production at specialized workshops, much like the Master Painters from the Renaissance,” says Christiansen in the university statement.

Christiansen and Cotte previously led University of Copenhagen researchers in a similar study that detected copper in black ink found on ancient papyri. The 2017 paper marked the first time the metal was identified as a “literal common element” in ancient Egyptian ink, as Kastalia Medrano reported for Newsweek at the time.

For the earlier study, the researchers analyzed papyrus fragments, also from the Papyrus Carlsberg Collection, that spanned about 300 years but bore significant similarities in chemical makeup. Those similarities across time and geography suggest “that the ancient Egyptians used the same technology for ink production throughout Egypt from roughly 200 B.C. to 100 A.D.,” Christiansen noted in a 2017 statement.

The team behind the new paper hopes to continue studying the molecular composition of pigments, as well as further investigate the innovative techniques that ancient Egyptians devised.

As Cotte says in the ESRF statement, “By applying 21st-century, state-of-the-art technology to reveal the hidden secrets of ancient ink technology, we are contributing to the unveiling [of] the origin of writing practices.”

Please visit the site: <https://www.smithsonianmag.com/smart-news/renaissance-painters-ancient-egyptians-used-drying-techniques-make-their-words-stick-180976176/>

THE NECROPOLIS OF TRAPEZA, AEGION, COMES TO LIGHT WITH NUMEROUS GRAVE OFFERINGS

A large number of grave offerings and high-quality burial items were discovered during the five-year excavation programme at the Mycenaean necropolis of Trapeza, seven kilometers southwest of Aegion. The findings testify to the region's amazing cultural and social vitality.

The plateau is identified with the city of Rhyes, the metropolis of Croton in Magna Graecia during the colonization of the 8th century BC.

The Mycenaean necropolis is located on the southwestern slope of the plateau and on the ancient road leading to the citadel of historical times. The excavated tombs are arranged on at least three levels of terraces along the south side of Trapeza, a few meters from each other, in a parallel arrangement and with a north-south orientation.

These are chamber tombs carved into the soft rock of the subsoil.

The necropolis comprises tombs with chambers no wider than 3.5-4 meters and streets not exceeding a length of 6-7 meters and a width of 1.5 meters. The burial chambers have various shapes; circular, rectangular and even almost quadrangular with rounded corners and walls with irregular contours. Elongated pits were unearthed below the chambers, carved niches in the streets' retaining walls for the secondary deposition of older burials, as well as elliptical or square pits dug in the street surfaces which were found to be empty and could have been originally been carved for concealing ritual ware. The side chambers in the streets of the tombs where children were buried are of particular importance.

The tombs were used repeatedly and over a long period of time. The tomb chambers collapsed in historical times, between the Geometric and Archaic period, as indicated by the artefacts found in "craters" formed in the ground owing to the collapse of the chambers' roofs.

The necropolis, founded in the LH IIIA 1 period, experienced its heyday during the Early Palatial period of the Mycenaean world, i.e. in parallel with the heights reached by the great centers of Mycenae, Tiryns and Pylos. A significant reuse of the tombs dates back to the 12th century BC, during the Post-Palatial period, probably after the early LH IIIC, when the tombs were repeatedly reopened, being at the same time a place of burial customs and complex ritual practices until the end of the Bronze Age, probably in the advanced Sub-Mycenaean period.

The quality of the finds of the Mycenaean necropolis of Trapeza is proved by the valuable sets of vessels that show a dependence on palace standards but also autonomous links with other regions, from the western Peloponnese to Crete. The grave goods are enriched with numerous seal stones and all kinds of beads and tesserae from various materials – glass, faience, gold, carnelian, rock crystal – that make up necklaces and

ornate jewelry, ox head shaped gold-amulets indicating trading relations with the eastern Aegean and Cyprus. A few tombs show elements of elitism, declaring social prestige and a possible connection with the palaces especially by a valuable combination of weapons and tools.

The Post-Palatial period from the 12th century BC and after includes various phases of use, which impress mainly for their ritual practices. These relate to the treatment of the bones and remains of the former deceased, who are regarded as glorious ancestors and become the recipients of offerings. The purpose of these ceremonies is to create a genealogical bond by activating the memory of a past perceived as an integral part of the community.

Moreover, the findings from the backfills of the streets of tombs provide exclusive evidence of social practices that are a milestone in the conducting of a funeral, but also of rituals such as offerings and libations in front of the sealed chamber doors during posthumous visits to the tombs. Thus, the necropolis also becomes a place for transmitting traditions and a collective memory.

The location of the Mycenaean settlement of Trapeza is not yet clear.

During the early cycle of use of the necropolis, the settlement was possibly situated on a hill, about 100 meters south of Trapeza. Today, research of a Middle Helladic settlement is in progress at this site, yielding sporadic evidence of Mycenaean pottery.

The systematic excavation of Trapeza in Aigion, is headed by Dr. Andreas G. Bordonis of the Ephorate of Antiquities of Achaia.

Participating in the interdisciplinary research programme of the Mycenaean necropolis are Elisabetta Borgna, Professor of Aegean Archaeology at the University of Udine, with a group of students from the Universities of Udine, Trieste and Venice, as well as postgraduate students from Greek universities.

Please visit the site: <https://www.archaeology.wiki/blog/2020/10/26/the-necropolis-of-trapeza-aigion-comes-to-light/> [Go there for pix]

HUMANS IN ANCIENT TURKEY ADAPTED TO CLIMATE CHANGE, THRIVED, BY BROOKS HAYS

Using radiocarbon dating, researchers created a fine-scale archaeological timeline of societal activity across a northern stretch of the Levant during the early and late Bronze Age.

New archaeological research suggests populations in ancient Turkey were able to adapt and flourish in the face of two periods of climate change, occurring between 4,500 and 3,000 years ago.

The findings -- published this week in the journal PLOS One -- suggest human responses to climate change are surprisingly variable. The challenges presented by climate change can stress societies beyond the breaking point, but also provide opportunities for resiliency and ingenuity.

For the study, researchers collected and analyzed local, fine-scale archaeological data across a northern portion of the Levant known as Tell Tayinat. The Levant is a historical region of human occupation that stretches across the eastern edge of the Mediterranean Sea.

"The study shows the end of the Early Bronze Age occupation at Tayinat was a long and drawn out affair that, while it appears to coincide with the onset of a mega-drought 4,200 years ago, was actually the culmination of processes that began much earlier," Tim Harrison said in a news release.

"The archaeological evidence does not point towards significant local effects of the climate episode, as there is no evidence of drought stress in crops," said Harrison, a professor of archaeology at the University of Toronto and director of the Tayinat Archaeological Project.

Instead, researchers found archaeological evidence of local political and spatial reconfiguration.

These novel systems of social and political organization proved unstable, with both periods culminating in collapse.

Without precise, fine-scale archaeological evidence, researchers were unable to tease out detailed changes in societal activity. As a result, archaeologists turned to shifts in climate to explain the societal collapses that marked the ends of the early and late Bronze Age.

Using radiocarbon dating, researchers created a more fine-scale timeline of societal activity at Tayinat during two periods of climate change.

"The absolute dating of these periods has been a subject of considerable debate for many years, and this study contributes a significant new dataset that helps address many of the questions," said lead study author Sturt Manning.

"The detailed chronological resolution achieved in this study allows for a more substantive interpretation of the archaeological evidence in terms of local and regional responses to proposed climate change, shedding light on how humans respond to environmental stress and variability," said Manning, a professor of classical archaeology at Cornell University.

The more robust archaeological timelines produced by Manning and company revealed a period of resettlement and heightened societal activity some 3,200 years ago, despite a period of heightened aridity.

Amidst the threat of climate change, the settlement thrived.

The settlement's restructuring wasn't a sign of collapse, the new data showed, but evidence of resilience and adaptation.

"The settlement of Tayinat may have been undertaken to maximize access to arable land, and crop evidence reveals the continued cultivation of numerous water-demanding crops, revealing a response that counters the picture of a drought-stricken region," said Harrison. "The Iron Age at Tayinat represents a significant degree of societal resilience during a period of climatic stress."

Please visit the site: https://www.upi.com/Science_News/2020/10/30/Humans-in-ancient-Turkey-adapted-to-climate-change-thrived/5171604060051/

ARCHAEOLOGISTS FINALLY PEER INSIDE EGYPTIAN MUMMIES FIRST FOUND IN 1615, BY LAURA GEGGEL

Two ancient mummies discovered in a rock-cut tomb in Egypt more than 400 years ago are finally spilling their secrets, now that scientists have CT scanned their remains, a new study finds.

Both mummies, as well as a third on display in Egypt, represent the only known surviving "stucco-shrouded portrait mummies," from Saqqara, an ancient Egyptian necropolis. Unlike other mummies, who were buried in coffins, these individuals were placed on wooden boards, wrapped in a textile and a "beautiful mummy shroud," and decorated with 3D plaster, gold and a whole-body portrait, said study lead researcher Stephanie Zesch, a physical anthropologist and Egyptologist at the German Mummy Project at Reiss Engelhorn Museum in Mannheim, Germany.

Now, CT (computed tomography) scans reveal that at least one of these three stucco-shrouded portrait mummies was buried with organs (even the brain) and that the two females were interred with beautiful necklaces, the researchers found.

The CT scans also showed that after the deaths of these individuals — a man, woman and teenage girl dating to the late Roman period (30 B.C. to A.D. 395) — their mummies were interred with artifacts likely thought useful in the afterlife, including coins that were possibly meant to pay Charon, the Roman and Greek deity thought to carry souls across the River Styx.

The CT scans also revealed several medical problems, including arthritis in the woman. "The examination of the individuals yielded that they died at rather young ages ... however, the cause of death of the individuals could not be determined," Zesch told Live Science.

The CT scan showed the beads from the necklace around the woman's neck and body. (Image credit: Zesch S, et al. PLOS One (2020); CC BY 4.0)

Long journey

Two of these mummies have traveled far and wide. In 1615, Pietro Della Valle (1586–1652), an Italian composer, took a pilgrimage to the Holy Land and ended up traveling through Egypt. He learned about two stucco-shrouded portrait mummies — a man and woman — discovered by locals in Saqqara. Della Valle acquired these mummies and brought them to Rome, making them the "earliest examples of portrait mummies to have become known in Europe," the researchers wrote in the study.

After passing through several owners, and a little worse for wear, the mummies ended up in the Dresden State Art Collections in Germany, where they were X-rayed in the late 1980s. However, the CT scan revealed much more about their insides.

For instance, the CT scan revealed that the male died between the ages of 25 and 30. He stood about 5'4" inches (164 centimeters) tall, and had two unerupted permanent teeth and several cavities. Some of his bones were broken and jumbled, probably because someone unwrapped him shortly after the mummy's discovery, the researchers wrote in the study.

While the man's brain was not preserved, there's no evidence it was removed through his nose. Nor were many embalming substances used. Instead, he was wrapped up and painted. Two metal objects found during the CT scan are likely seals from the mummification workshop that handled his remains, Zesch said. The woman's brain wasn't preserved either, but the teenager's was — it had shrunk, but the cerebrum and brainstem were still identifiable — and the teenager's other internal organs were also present.

"We are quite sure there was no removing the brain or the internal organs" from these mummies, Zesch said. "It's very probable that those mummies were only preserved because of a kind of dehydration with the use of [the desiccation mixture] natron, but there is not a huge amount of embalming liquids."

The woman, who died between the ages of 30 and 40, stood about 4'11" (151 cm) tall. She had advanced arthritis in her left knee. The teenager, who wore a hairpin, according to the CT scan, died between the ages of 17 and 19, and stood about 5'1" (156 cm) tall. She had a benign tumor in her spine known as a vertebral hemangioma, which is more common in people over 40, the researchers said.

Both women were buried with multiple necklaces. It's exciting to see these necklaces, but it's not unexpected, Zesch said. "Because of these very precious shrouds, we are sure that those individuals have to be members of the higher socioeconomic class," meaning that they could have easily afforded jewelry, Zesch said.

Zesch noted that she studied the three mummies with a multidisciplinary team from the German Mummy Project, the Dresden State Art Collections, the Institute for Mummy Studies at Eurac Research in Bolzano, Italy and the American-Egyptian Horus Study Group. Their work informed a now-live interactive exhibit of the male and female mummy in Dresden. The teenager's mummy is on display at the Museum of Egyptian Antiquities, Cairo, Egypt.

The study was published online Nov. 4 in the journal PLOS One.

Please visit the site: <https://www.livescience.com/painted-ancient-egyptian-mummies-ct-scan.html> [Go there for many pix]



RESEARCH PROJECT REVEALS THE ORIGINAL PIGMENTS OF 2,000-YEAR-OLD INSCRIPTIONS AT THE TEMPLE OF ESNA

More than 200 years after the rediscovery of an Egyptian temple, a German-Egyptian research team has uncovered the original colors of inscriptions that are around 2,000 years old. Freed from thick layers of soot and dirt, the reliefs and inscriptions can now be admired again in bright colors. The project, led by Egyptologist Professor Christian Leitz, also discovered new inscriptions that reveal the ancient Egyptian names of constellations for the first time. The restoration work is a cooperation between the Institute for Ancient Near Eastern Studies (IANES) at the University of Tübingen and the Egyptian Ministry of Tourism and Antiquities.

The temple is in Esna, 60 kilometers south of Luxor in Egypt. Only the vestibule (called the pronaos) remains, but it is complete. At 37 meters long, 20 meters wide and 15 meters high, the sandstone structure was placed in front of the actual temple building under the Roman Emperor Claudius (41-54 AD) and probably eclipsed it. The roof is supported by 24 columns, the capitals of the 18 free-standing columns are decorated with different plant motifs. "In Egyptian temple architecture this is an absolute exception," says Tübingen Egyptologist Daniel von Recklinghausen.

The work on the elaborate decorations probably took up to 200 years. The temple of Esna is famous for its astronomical ceiling and especially for the hieroglyphic inscriptions. They are considered to be the most recent coherent hieroglyphic text corpus that has been preserved today and which describes the religious ideas of the time and the cult events at the site.

Its location in the middle of the city center probably contributed to the fact that the vestibule was preserved and was not used as a quarry for building materials as other ancient edifices were during the industrialization of Egypt. Indeed, the temple had become part of the modern city. Houses and shacks were built directly against some of its walls, in other places it protruded from a mountain of rubble, as can be seen on postcards from the 19th and early 20th centuries. In the first half of the 19th century, the hall served temporarily as a warehouse for cotton.

As early as in Napoleon's time, the pronaos attracted attention in expert circles, as it was considered an ideal example of ancient Egyptian temple architecture. The real wealth, the inscriptions, was recognized by the French Egyptologist Serge Sauneron (1927-1976), who pushed ahead with the excavation of the temple and published the inscriptions in full. But without the original colors—Sauneron could not recognize them under the layers of soot and bird excrement.

Now the layers have been removed and the temple looks in part as it may have done some 2,000 years ago. In addition, it now offers new approaches for Egyptology research, says Christian Leitz, "The hieroglyphics that Sauneron explored were often only very roughly chiseled out, the details only applied by painting them in color. This means that only preliminary versions of the inscriptions had been researched. Only now

do we get a picture of the final version." In the area of the astronomical ceiling, many inscriptions were not executed in relief, but only painted in ink. "They were previously undetected under the soot and are now being exposed piece by piece. Here we have found, for example, the names of ancient Egyptian constellations, which were previously completely unknown," says Leitz.

Since 2018, the two Tübingen researchers have been working with Egyptian authorities to uncover, preserve and document the paint layers. Even during the coronavirus pandemic, the work is being continued by an Egyptian team of 15 restorers and a chief conservator from the Egyptian Ministry. At regular intervals, the results are documented photographically in documentation campaigns. At the University of Tübingen, the finds are evaluated in terms of content and made available to the public via publications. Cooperation partners on the Egyptian side are Dr. Hisham El-Leithy, Mohamed Saad, Ahmed Amin, Mustafa Ahmed, Ahmed Emam. The project is supported by the Gerda Henkel Foundation, the Ancient Egypt Foundation and the Santander Bank.

Please visit the site: <https://phys.org/news/2020-11-reveals-pigments-year-old-inscriptions-temple.html> [Go there for many pix and caps]

MONKEY BUSINESS: NEW EVIDENCE FOR AEGEAN-INDUS EXCHANGE, BY MARIE N. PAREJA

The Aegean is over 6000 kilometers from the Indus Valley. So how did these two centers of ancient civilization come into contact, and why were monkeys involved?

Archaeological evidence for long distance trade can sometimes be surprising. A recent reexamination of one of the wall paintings from the site of Akrotiri on the island of Thera shows possible connections between the Indus and the Aegean during the Bronze Age. The exchange between these regions, whether by land or by sea, was likely indirect and involved at least one—if not several—middlemen (Fig. 1). Evidence suggests that Mesopotamia is the likely intermediary, as the region's trade with both the Indus and Aegean is well documented. It also serves as the most likely place in which Aegean artists may have observed Indian monkeys.

Bronze Age Aegean monkey and ape iconography first appears during the Early Bronze Age (ca. 3100-2100 BCE) in the form of figurines, many of which double as stamp seals. Nearly all of the creatures are shown in a crouching-squat position and are drilled with a hole for suspension, perhaps from a bracelet (Fig. 2). A unique figurine sits in an upright human-like position, as though on a stool, and the bottom of the base is inscribed with a cross-and-chevron motif (Fig. 3). These figurines are only found in at the very end of the third millennium BCE.

From the Middle through Late Bronze Age (ca. 2100-1100 BCE), monkey iconography occurs in glyptic art. The animals appear in the familiar crouching-squat position, and they are usually found together with floral elements, baskets, and female figures (Fig. 4). Yet again we have an outlier: one seal preserves a monkey wearing a belt or halter together with a male figure among a field of plants (Fig. 5).

Nevertheless, almost all seals combine elements that are readily visible in the much larger-scale wall paintings from Knossos on Crete and Akrotiri on Thera.

From the end of the Middle Bronze Age into the beginning of the Late Bronze Age, monkeys are freed from the crouching-squat, represented with mostly blue fur, and shown in a variety of poses and contexts.

They pick crocus flowers from rocky outcrops and flower pots (Fig. 6), roam wildly through both verdant and rocky landscapes, reside outside of a temple or shrine, and they make offerings of saffron to a seated goddess (Fig. 7). When the images from wall paintings and glyptic art are considered together, they clearly depict different possible phases of a crocus ceremony that may have been performed during the Bronze Age, in which women and monkeys engage in both collecting and offering crocuses and/or saffron to a nature deity.

Scholars have traditionally attributed the appearance of monkeys in Aegean art to Egypt due to the prevalence of indigenous monkeys to Egypt and the clear and longstanding trade connections between the Aegean and Egypt since the EBA. Importantly, no monkeys or apes are indigenous to the Aegean or Near East, and so Occam's Razor

seemed to apply: the simplest solution is the most likely one, until proven otherwise. Enter an international team of primatologists specializing in Old World species, a renowned taxonomic primate illustrator, and an art historian/archaeologist.

Primatologists Tracie McKinney, Jo Setchell, Jessica Mayhew, and Ray Heaton worked together with Stephen Nash, a taxonomic illustrator, and myself, a Bronze Age Aegean specialist. We examined Aegean and select Egyptian, Near Eastern, and Mesopotamian primate imagery. Although archaeologists and art historians have reviewed this corpus of primate iconography before, they lacked the experience of intensely studying and working with live animals. They also compared these depictions only with species found in Africa.

This collaborative project is the first in which primatologists reviewed the imagery to verify the previously proposed species of monkey. Consistent with previous publications, many of the animals in Egyptian art were vervets and varieties of baboons. Although highly fragmentary, most of the monkeys in Aegean art are likely baboons, too. The monkeys that play on rocky outcrops from Room 6 of Building Complex Beta at Akrotiri (Fig. 8), however, appear less like the Egyptian vervet and much more like the langur, a species native to parts of Bhutan, Nepal, and India.

The tail position, proportions, and eyes are the most immediate indicators that they are langurs rather than vervets. Although vervets tend to carry their tails outward, with the end of the tail slanting down at the end (Fig. 9), langurs more commonly arc their tails in a characteristic C- or S-shape (Fig. 10). The general physical proportions of the animals' faces and limbs more closely resemble those of langurs than vervets, as well. Langurs are also considerably larger than cat-sized vervets.

This new identification is particularly exciting because it shows that the live monkeys were observed directly at some point, so that these physical nuances could be accurately recorded in order to create the wall painting. Notice the subtle detail of each face: even the dark facial markings are different for each preserved face! These monkeys are rendered as individuals, rather than as a copied and repeated motif that is meant to represent the idea of “monkey” (as is found in Egyptian artwork). It also means that these differences were important enough to warrant such precise rendering from life.

As no physical remains of monkeys have yet been discovered in the Aegean, it seems most likely that artists and/or travelers encountered langurs in Mesopotamia, with whom they traded by the early Late Bronze Age. After all, langurs are identified on some Mesopotamian cylinder seals, and exchange between the Indus and Mesopotamia is well documented. Longstanding relationships and exchange routes may be traced through three primary means: the movement of certain raw materials (lapis lazuli, carnelian, chalcedony, and tin, among others), textual evidence (such as late third millennium BCE story The Curse of Agade), and the transmission and translation of iconography.

The two outlier objects mentioned above help to trace the connections between the Aegean and the Indus via Mesopotamia. Notably, Mesopotamian elites imported exotic animals and flaunted their resulting menageries as a testament to access to far-flung places, the raw materials from those places, and participation in an elite identity with those who reciprocated this exchange.

The seal that shows a male figure together with a monkey (Fig. 5) may be related to a series of terracotta plaques from Mesopotamia that also show a male figure together with one or two monkeys, who even wear a leash and collar (Fig. 11). The plaques may show a travelling entertainer and his pets and/or costars. This imagery is currently thought to be imported from even farther east, from a place where monkeys are indigenous.

The lone monkey figurine that sits upright (Fig. 3), may be related to stamp seals from Bactria in Central Asia, on which monkeys, humans, and hybrid animals are shown sitting in such positions. Critically, the cross-and-chevron motif on the bottom of this stamp seal can be traced through both time and space to the Indus Valley. The motif appears incrementally earlier, the farther east it is found, from Anatolia and the Levant, to Mesopotamia, to Bactria, finally to the Indus Valley, where it appears at least as early as 3600 BCE. (Fig. 12)

Other items illustrate these connections as well, such as carnelian beads found in EBA II (ca. 27—2500 BCE) contexts at Aegina, a small island near Athens. Carnelian beads were shaped into elongated barrel forms in the Indus Valley. They then passed through Mesopotamia, where beads were cut to create several more, and some were incised with a concentric ring pattern. Some of these beads were recovered from Aegina, illustrating that the earliest of these exchange patterns date to at least the EBA, considerably earlier than the date of the langur wall painting.

Thanks in parts to monkeys and sharp-eyed artists, the Bronze Age world seems much larger and much more interconnected than we previously thought.

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Please visit the site: <http://www.asor.org/onetoday/2020/11/monkey-business> [Go there for pix, figs, caps and better format]

MONA LISA OF ANCIENT AGE’ FOUND IN OSMANIYE

A mosaic area unearthed during the excavations conducted by the Osmaniye Museum Directorate in the southern province of Osmaniye’s Kadirli district has proved a rival to the ancient city of Zeugma with its awe-striking features.

A mosaic with a female figure, which archaeologists call “Mona Lisa of the ancient age,” attracts attention with its stance, look and similarity to the world-famous Mona Lisa painting.

The mosaic area is believed to have once decorated the floor of a villa between the first and the second centuries, and the female figure is thought to have been the owner of the villa.

“We can call this mosaic the Mona Lisa of Kadirli,” said archaeologist Ümit Kayışoğlu. “This mosaic area is the only known mosaic area with human figures in Osmaniye. This is the remains of a villa built in the first and second centuries A.D.”

Stating that they have been carrying out devoted work in the mosaic area since 2015, he said, “As the Osmaniye Museum Directorate, we started many excavations when the ruins of the ancient city of Flaviapolis on which the Kadirli district was founded were declared a third-degree site in 2015.”

Describing the mosaics found, he said: “There are four different types of mosaics here. There is a lady in the middle of one of the mosaics, and we call this person Kadirli’s Mona Lisa. Because her look and stance are reminiscent of the original one.”

Please visit the site: <https://www.hurriyetaiye.com/mona-lisa-of-ancient-age-found-in-osmaniye-159902> [Go there for pict]

ANCIENT BEER IS CRAFT’S NEW FRONTIER, BY SARA TOTH

Scientists are partnering with brewers to taste test ancient recipes and sip a long-lost past.

One morning in May 2019, a crowd of journalists gathered around the Biratenu bar in Jerusalem, snapping photos as a bartender poured golden, frothy beer into plastic cups. The story of the beer was both new and very old: The yeast that fermented it came from a 3,000-year-old jug found at a nearby archaeological site.

“It’s actually a pretty good beer,” says Aren Maeir, an archaeology professor at Bar-Ilan University in Israel and the director of excavations at the site of Tell es-Safi. Scholarly, but determined that archaeology should be fun, Maeir, upon first tasting the beer, joked that as long as no one died from it, it would be a successful project.

Maeir and his colleagues found the jug at the Tell es-Safi site. Three millennia ago, the Philistines, a Mediterranean seafaring people, lived in the area and created and used such ceramic ware.

Archaeologists had assumed the jug was for beer because it had a strainer component, consisting of small holes between the container’s main compartment and its spout. This feature could have filtered out bits of grain left over from the fermentation process.

To investigate further, Maeir joined a team of biologists, other archaeologists, and a brewer who isolated yeasts from several ancient yeast colonies discovered within jugs from Tell es-Safi and three other sites in Israel that ancient Egyptians, Assyrians, Babylonians, and Persians had inhabited or controlled. They then used these microorganisms to make different types of beer and mead, a few of which they unveiled during a press conference at the Biratenu bar. The scientific team concurred that the one made with the yeast colony from the Philistine jug was the best tasting. In fact, that species of yeast is still used in commercial beer today.

These beverages were the first brews crafted from an ancient yeast colony. This feat demonstrated that the microorganisms driving fermentation had managed to reproduce and survive for thousands of years. It also settled any debate over the vessels’ purpose—confirming that the jugs with strainers once stored beer for the Philistines some three millennia ago.

People gather at the Biratenu bar in Jerusalem in 2019 to sample beers brewed with recently revived ancient yeast colonies. Aren Maeir

But this re-creation is just one among many recent archaeological projects dedicated to the study of beer. Boosted heavily by the current popularity of craft beer in many countries, the archaeology of beer is now generating surprising insights into the past all over the world.

These investigations have led to many creative collaborations. Half a world away from Maeir and his team in Israel, archaeologist Marie Hopwood, of Vancouver Island

University in Nanaimo, Canada, collaborates with Love Shack Libations brewery to re-create ancient beers based on archaeological evidence. “Beer is telling us about everything from gender roles to agriculture,” Hopwood says.

Indeed, multiple breweries are now making beer inspired by ancient beverages, often in cooperation with archaeologists who want to learn more about how people used various ingredients centuries ago. In the process, these efforts may illuminate big questions about shifts in human societies and cultures.]

Communities have been drinking beer for thousands of years for nutritional, social, medicinal, and religious reasons. During many periods of history, beer, like other alcoholic beverages, offered a safe means for staying hydrated—with just enough alcohol to kill pathogens that could be found in water.

Nearly 4,000 years ago, the Sumerian people of southern Mesopotamia wrote the “Hymn to Ninkasi,” the goddess of beer. Around the same time (about 1800 B.C.), and perhaps even 300 years before that, Egyptians painted depictions of brewing on the walls of their tombs.

But beer has been somewhat hidden in the archaeological record—particularly in comparison with wine. “There are a lot of gaps in beer history,” says Travis Rupp, a former bartender who teaches classics at the University of Colorado, Boulder, and directs research and development at the local Avery Brewing Co.

Beer has a relatively short shelf life compared with wine, so people did not trade or transport it as often, nor did they write about it as much. Beer also leaves less obvious physical traces than wine.

“Studying it often means relying on the development of science to analyze residues, something that has only become more refined in recent years,” Rupp says.

Archaeologist Marie Hopwood and Love Shack Libations brewery in British Columbia concocted this beer, the Midas Touché, inspired by ancient Egyptian and Mesopotamian brews. Marie Hopwood

For that reason, many early investigations into ancient beer raised questions that scientists could only answer decades later. For example, in 1929, a researcher named Johannes Grüss microscopically examined the residue on an Egyptian amphora from about 2000 B.C. held by the Metropolitan Museum of Art. Images that had been uncovered by archaeologists suggested that the society created beer by letting bread sit in water and ferment.

But Grüss’ analysis, based on studying the microscopic structure of the starch granules in the amphora, indicated that the Egyptians first sprouted grains, one of the steps in the malting process, before using them for beer. In other words, the Egyptian process was more complicated than previously thought. Grüss published his results in an obscure German brewing trade magazine, and the research went largely unnoticed.

It wasn’t until the 1990s, with the advent of new technologies and methods for chemical analyses, that researchers managed to more exactly identify the microstructure and

chemical composition of residue on vessels. These advances opened the door for re-creating ancient beer—and collaborating with brewers.

In 1996, Delwen Samuel, then an archaeologist at the University of Cambridge, with partial sponsorship by Scottish and Newcastle Breweries, published the results of her research on Egyptian beer-making methods using scanning electron microscopy. Her findings confirmed Grüss' earlier discovery that this society sprouted grains for beer. The brewery then produced 1,000 bottles of Tutankhamun Ale based on the new findings.

A similar story began at the Penn Museum in Philadelphia in 1957. At that time, researchers were trying to identify yellow residue on a bronze drinking set found in a famous Turkish tomb. Scholars once widely believed that the body associated with this find belonged to the Phrygian King Midas—famous in Greek mythology for turning everything he touched into gold.

The Penn Museum team successfully set a few samples of the residue on fire, proving that they contained carbon and could have come from plant material. But the researchers couldn't say much beyond that, so they stashed away the rest of the samples in the museum's storeroom.

“Beer is telling us about everything from gender roles to agriculture,” says archaeologist Marie Hopwood.

Then, in the 1990s, Patrick McGovern, a chemist and an archaeologist at the Penn Museum and the University of Pennsylvania, reanalyzed the samples from the Midas tomb. He concluded, based on recently developed chemical analysis techniques, that the residue came from a drink made from barley, honey, and grapes, and, possibly, saffron. McGovern then worked with Delaware-based Dogfish Head Craft Ales in 1999 to create a slightly sweet beer called Midas Touch.

Being able to definitively identify ancient beers is not simply about crafting novelty drinks. Beer is essentially an alcoholic drink created by fermenting a grain, such as barley, wheat, or corn kernels.

Much like ancient evidence of bread, then, identifying ancient beers can offer clues to some of humanity's earliest farming societies.

When and why humanity began the shift from wild food-gathering to settled agriculture is a major question in archaeology because it points to the origins of revolutionary changes that shaped communities the world over. Scholars know that transition occurred independently around the same rough time period—about 12,000 years ago in certain regions.

In 2018, Stanford University researchers, led by archaeologist Li Liu, found what is so far the oldest direct evidence of brewing beer. They identified traces of fermented grains on 13,000-year-old stone mortars found in a cave on Israel's northern coast, at a site identified as a Natufian cemetery.

The location suggests the Natufians—a hunter-gatherer group that lived along the eastern Mediterranean from 15,000 to 11,000 years ago—used beer in honoring the dead. The beer's age—between 13,700 and 11,700 years old—is a surprise. The beverage is

roughly as old as the oldest Natufian bread, from between 14,600 and 11,600 years ago, discovered at a nearby site in Jordan.

Findings published last year from China suggest beer may have existed in some societies from the very first efforts to domesticate local flora. Liu and her colleagues examined vessels and residue from archaeological sites in the country's Yellow River Valley, and concluded that people used a grain-based starter, called qu, for making a beer-like drink as early as 8,000 years ago, during the early period of plant domestication in that region. Like the Natufian discovery, these vessels also came from sites that included burials, suggesting beer played a role in mourning or death rituals.

These ancient Chinese amphorae contained yeast cells and molds that may have been part of the starter for an ancient fermented beverage.

Li Liu

“We will probably never find out which was first, beer or bread,” Liu says. In fact, some scholars ascribe to a theory, first put forward in 1953, that beer—not bread—drove the advent of farming. Bread is a source of food, whereas beer's alcoholic content may point toward more social or cultural practices rather than purely nutritional purposes.

If beer predates agriculture or even bread, it provides a clue to the inner life and social complexity of pre-agrarian peoples.

“We have to acknowledge in all of this that alcohol is not just for sustenance,” Liu said. “Alcohol, or growing grain for making alcohol, indicates the presence or need for imaginative, artistic, or spiritual elements in life. These elements of the past are often hard to see in archaeology, but beer can tell us a lot about them.”

Evidence of beer found at burial sites speaks to that idea. And another powerful example comes from centuries-old Wari traditions in what is now Peru. Between about A.D. 600 and A.D. 1000, the Wari empire spanned parts of the central Andes. The Wari crafted a variety of chicha (a name for several plant-based beverages that are sometimes fermented) that they used in religious festivals and events intended to build loyalty among the leaders of allied groups or conquered peoples.

“It looks like they actually structured the expansion of their empire around places where they could get the ingredients for [their] chicha,” says archaeologist Donna Nash, of the University of North Carolina, Greensboro.

Beer's contemporary cultural cache can also explain the explosion in archaeological research into this beverage. In the 2000s and 2010s, for example, craft beer sales boomed. Industry reports note that even though the growth in this market has slowed in the last five years, craft beer sales still outpaced those of established brands in 2019.

From 2015 to 2020, craft beer revenue increased by more than 4 percent a year, according to IBISWorld.

Archaeologist Travis Rupp has helped re-create several historic libations. Here he brews molasses beer at Colonial Williamsburg in Virginia. Travis Rupp

Ryan Williams, the head of anthropology at the Field Museum in Chicago, believes that part of ancient beer's appeal is its connection to other cultures. “Recognizing that there

was also a form of identity around beer thousands of years ago is something both archaeologists and other people can relate so closely to,” he says.

Meanwhile, Hopwood, working with Vancouver Island’s Love Shack Libations brewery, sees brewing beer as a complement to her archaeological work. “Excavation work is destructive,” she notes, whereas these beer projects are creative. “We use what we learn in the field and then share experiences with people.”

And creativity is certainly a driving factor in Maeir’s work with Biratenu. “If science fiction is the mad scientist getting eaten by the monster he re-creates,” Maeir says, “this is a case where we managed to re-create the monster and drink it.”

Please visit the site: <https://www.sapiens.org/archaeology/ancient-beer/> [Go there for pix]

THE PRICE OF PURPLE - ARCHAEOLOGISTS HAVE FOUND NEW EVIDENCE OF A ROBUST DYE INDUSTRY THAT ENDURED ON THE MEDITERRANEAN COAST FOR MILLENNIA, BY SARA TOTH

Pieces of pottery stained with blue and purple dye made from murex sea snails are among the forgotten artifacts that sat in storage for about 50 years after they were excavated. They constitute the largest collection of direct evidence of Iron Age murex dyeing in the region.

Shalvi is part of an interdisciplinary project led by Gilboa. They are attempting to better understand the cultural identities, economic activities, and trade relations of the people who lived at during the Iron Age. The site was first excavated by Israeli archaeologist Joseph Elgavish in the 1960s. Amid its ruins, which include Iron Age buildings, defensive walls, and olive presses, as well as remains from the sixth through fourth centuries B.C. and from later periods, too, Elgavish collected thousands of artifacts. These include the stained pottery, weaving and spinning equipment, carved figurines, and hundreds of storage vessels. He portrayed the site as a residential Israelite city that flourished in the tenth century B.C. After sorting through the artifacts and documents, however, Shalvi and Gilboa view it differently, seeing Tel Shikmona not as a city but as an industrial site focused on the dye industry, especially between the tenth and sixth centuries B.C. Further, they believe that defining the site as exclusively Israelite does not reflect the region’s complexity. Some archaeological layers also contain evidence of the Phoenicians, whose coastal territories lay to the north of the Israelites’ settlements.

Shalvi and Gilboa believe their research may help track regional power shifts in the eighth and seventh centuries B.C., a tumultuous time during which the fearsome Neo-Assyrian Empire expanded from its base in Mesopotamia. While the Israelites fell to this new power, the Phoenicians maintained some control over their cities, colonies, trade routes, and territories, likely including Tel Shikmona. The dye industry there would have given them—or anyone else—access to a highly desirable commodity. “You can’t understand the region without understanding Tel Shikmona,” says Gilboa. “Controlling this site would have meant economic and political power.”

Meanwhile, another team from the University of Haifa, led by archaeologist Michael Eisenberg, is investigating the Roman and Byzantine areas of the site. There, over the years, archaeologists have uncovered villas, churches, and mosaics dating to the third to fifth century A.D. More recently, they have unearthed industrial pools and murex shells, tantalizing evidence that the dye industry may have been resurrected to produce brilliantly colored textiles to feed the appetite of yet another powerful empire.

Shades of purple and blue are abundant in the sea and sky of the Levant, but were uncommon in the clothing, jewelry, and art of the ancient world. “Blue is incredibly rare,” says Baruch Sterman, a physicist and cofounder of Ptil Tekhelet (“A Blue Thread”), an Israeli organization that studies and produces murex dye for modern Jewish

religious garments. He explains that, in order to appear blue to the human eye, an object must absorb red light, something few naturally occurring materials do. Among the handful of blue materials available in antiquity were stones, including lapis lazuli from what is now Afghanistan, and plants such as indigo, which grows in warm climates like India and Africa, and woad, which grows around the Mediterranean.

Ground-up lapis lazuli can be used to make paint, but not to dye textiles. And, while indigo and woad can color fabric, they eventually fade. Part of what made murex dye so valuable was that its colors remain brilliant. For example, 2,000-year-old pieces of murex-dyed wool found in caves near the Dead Sea are still vibrant today.

Please visit the site: <https://www.archaeology.org/issues/403-2011/letter-from/9133-israel-purple-dye> [Go there for the rest of the story]

WHO WERE THE ANCIENT SUMERIANS? **BY ERIC BETZ**

Sumer was humanity's first great civilization. Even in today's society you can still find traces of Sumerian inventions in agriculture, language, mathematics, religion and astronomy.

The ancient Sumerians created one of humanity's first great civilizations. Their homeland in Mesopotamia, called Sumer, emerged roughly 6,000 years ago along the floodplains between the Tigris and Euphrates rivers in present-day Iraq and Syria.

The Sumerians learned to farm on a grand scale in the so-called Fertile Crescent, a thin, crescent-shaped sliver of Mesopotamia often tied to the dawn of farming, writing, mathematics and astronomy.

And while the arid, ancient landscapes of the Middle East may not seem like the most likely location for an agricultural breakthrough, Sumer actually had a massive advantage. By settling between two large rivers, the Sumerians benefited from rich floodplain soil and ample water to irrigate crops. Their success was accelerated by Sumerian technological innovations like canals and plows. With time, Sumer got so good at growing food that they started to have enough resources left over to focus on building the cities and temples.

Archaeologists walk the Sumerian city of Kish during excavations in 1932. (Credit: Matson Collection-Library of Congress Catalog/Wikimedia Commons)

Emergence of Sumerian Cities

Roughly 10,000 years ago, villages started popping up across Mesopotamia. The people who lived in the region raised animals and grew grains, even as they continued to hunt and gather. Over time, those villages expanded and their people became increasingly dependent on farming.

Archaeologists still aren't sure exactly what life was like for these early cultures. However, similarities in pottery styles and stamp seals placed on a variety of containers suggests some level of administrative control emerged between 6,000 and 7,000 years ago.

Meanwhile, people started constructing a series of temples using mud bricks at a site called Eridu. The city seems to have been founded around 5400 B.C. and it was occupied for thousands of years until it was finally abandoned for good around 600 B.C.

Eridu's status was legendary even in ancient times. Babylonians actually believed that Eridu was the oldest city on Earth, having been created by the gods themselves. That kind of reverence attracted modern researchers, too. Even before archaeologists discovered Eridu, they had read about its existence in ancient texts.

"After kinship had descended from heaven, Eridu became (the seat) of kingship," one Sumerian tablet reads.

The area around Eridu was excavated a handful of times between the mid-19th century and the mid-20th century, turning up the remains of a once-sprawling metropolis that saw successive buildings constructed on the remains of temples and other structures that had come before.

Those digs did confirm Eridu as a real and truly ancient metropolis.

At around 7,400 years old, Eridu is among humanity's oldest cities, but nowhere near the oldest. The current favorite contender for Earth's first city is Çatalhöyük, which sat just north of the commonly accepted edge of the Fertile Crescent in modern-day Turkey. Çatalhöyük was founded 9,600 years ago and also survived for millennia, disappearing just centuries before Eridu was founded.

However, Eridu was just the beginning of Sumer. The civilization quickly grew to include dozens of cities, like Ur, Kish and Uruk. As Sumerian cities exploded in size, Sumer emerged as one of the world's first great agricultural societies. In time, Eridu would fade in influence and Uruk would take on an outsized role. At its height some 4,800 years ago, Uruk was the largest city in the world. Some estimates suggest the city held as many as 80,000 people at a time when the total human population was somewhere around 15 million.

A map of the cities of ancient Sumer, which covered much of modern-day Iraq. (Credit: Wikimedia Commons)

Sumerian Technological Innovations

Innovation was one of the key factors in the Sumerians' efforts to turn the desert into an oasis. And one of their most beneficial innovations was also among the simplest: the plow.

The first plow appeared about 3500 B.C. And by 1500 B.C., the Sumerians had also invented a seeder plow, which let farmers use beasts of burden to till and plant at the same time. The devices even came with instructions, courtesy of the Sumerian Farmer's Almanac, which told farmers how to boost their crop yields thanks to tilling and irrigation.

All the efficiencies helped support a growing population, as well as a growing system of rulers and religion. And as their cities grew, so did their efforts in writing, math and religion. As far back as 5,000 years ago, the Sumerians had developed cuneiform, one of the earliest forms of writing. Sumerian inscriptions on clay and stone tracked the trade and movement of grain and other goods, recorded Sumerian history, and even included cooking recipes and pornography. Thousands of Sumerian tablets still sit awaiting translation in museums around the world. The Sumerians also invented or utilized a wide-array of other more modern seeming innovations like wheeled chariots, the 60-minute hour, and even possibly the first written work of literature — The Epic of Gilgamesh.

These proto-cuneiform tablets were discovered at the Sumerian city of Uruk. (Credit: CDLI:Wiki)

One clay tablet discovered at Eridu, as well as others found elsewhere in Sumer, also tells a flood story about a deluge that mirrors the one found in the Bible's Old Testament. Biblical historians call it "The Eridu Genesis" story. According to the tablets, it was the gods who first told humans to take up living in cities in Sumer. But eventually, the gods decided to wipe out the human race with a deluge.

According to the myth, one particular god, Enki, tipped off a Sumerian king named Ziusudra that he should build a boat to save his people.

The idea that the flood story would've been passed down from the Sumerians makes sense for other reasons, too. In modern times, Sumer has captivated everyone from archaeologists to ancient alien conspiracy theorists. But the fascination with Sumerian society goes back much further in human history. Both the Babylonian and Assyrian empires, which rose to control parts of the Middle East as Sumer faded away, continued using the Sumerian language in their religious rituals for millennia. Excavations of Babylonian homes have uncovered tablets inscribed with the Sumerian language from long after the civilization itself was gone.

And the Babylonians, who created the first star maps, seem to have inherited some of their knowledge of astronomy from the Sumerians as well. The Babylonian people had two sets of constellations — one for tracking farming dates and another to recognize the gods. The latter was passed onto us today thanks to the Greeks and formed the foundations for the 12 zodiac constellations. And the star names that they used seem to date back to the Sumerian people, implying this ancient civilization had a seriously sophisticated knowledge of much more than the Earth below their feet.

So, while the Sumerians may have disappeared thousands of years ago, their influence and intrigue has continued on into the present, shaping aspects of modern society we all take for granted today.

Please visit the site: <https://www.discovermagazine.com/planet-earth/who-were-the-ancient-sumerians-and-what-are-they-known-for>

LIFTING THE LID ON ISRAEL’S BEST ANCIENT TOILETS, BY NAAMA BARAK

From a toilet found inside an ancient temple to Roman public latrines and Ottoman-era outhouses, Israel is awash with fascinating old loos.

On Thursday, November 19, we’ll all be celebrating World Toilet Day, established by the United Nations to raise awareness of sanitation challenges across the globe.

To mark the special event, we looked at the sanitary situation in the Land of Israel these past couple of millennia and learned more about the best ancient toilets uncovered by archaeologists. What can we say — it certainly left us feeling flushed.

City of David, Jerusalem (Iron Age)

“Where do we find toilets? We find toilets in Ir David, which was the capital of the Kingdom of Judea, and obviously the wealthy population always lives in the capital,” explains archaeologist Saar Ganor from the Israel Antiquities Authority.

“It’s a phenomenon that belongs to the upper classes,” he says.

“Simple people either created toilets from materials such as wood, whose remains disappeared, or they used other ways, such as digging a hole in the ground,” he adds.

The loos that remained are made of stone and look remarkably like the ones in your home. But these toilets didn’t flush, of course.

“In these time periods, we in fact have a few examples of stones whose outline is usually square and they’re 30 to 40 centimeters tall, a sort of large cube with a hole in its center that goes all the way down. Sometimes on its front there’s a conduit that you can imagine what it was used for, or alternatively another hole. In most of them there’s this sort of chiseling in the upper part of the seat; it’s really a seat that you can sit on with a hole in the middle,” says Ganor.

“The human race obviously hasn’t changed, and has always defecated in the same way,” he notes.

Tel Lachish (Iron Age)

During the First Temple period, the city of Lachish in the Judean foothills was second only to the capital, Jerusalem. And as such, it had a wealthy and urbane population that used stone loos.

“A rather large stone was found inside the city gate of Tel Lachish, something along the lines of half a meter by half a meter, and 40 centimeters high. It too has seat-shaped chiseling on the top part and a conduit in front,” Ganor says.

To make things even more interesting, the stone was found inside the city gate's temple. In its very Holy of Holies. But how did an object as impure as a toilet find its way into such sanctity?

According to Ganor, it has to do with religious and political reform. When King Hezekiah came to the throne, he made Jerusalem the center of things, cancelling all temples and worship outside of the capital. Including the one in Lachish.

“Apparently, the way to cancel the city-gate temple was to place a toilet in the Holy of Holies so that it wouldn't be used,” he explains.

It seems the horrified locals didn't even contemplate using the brand-new loo: soil tests failed to pick up the remains of stool bacteria like the ones found around toilets in Ir David.

“They sealed up the site and it waited for 2,700 years for us to dig it up,” Ganor concludes.

Beit She'an (Roman period)

A huge public bathroom from the Roman period uncovered in Beit She'an.
Photo by Peter Gendelman/Israel Antiquities Authority

While latrines hooked up to a sanitation system were very much a high-class item in the Roman period, regular people could find them in public loos.

The biggest ones to have been discovered in Israel can be found in Beit She'an, adjacent to large public baths. And when we say big, we mean it – they comfortably seated dozens of people.

“Generally speaking, toilets were a room, usually not a small one, that had a deep channel running along its walls, which was a flushing channel that carried out all the stool and everything that was inside.

On top of it they put seats; sometimes these were regular stone seats but in quite a number of cases they were marble seats – something that looks like today's toilet seats, with a nice and orderly hole for bottoms,” says IAA archaeologist Peter Gendelman.

“In addition, there were also upper canals that were more for cleansing,” he says. In pre-toilet paper times, these loo-goers dipped a sponge tied to a stick in the freshwater to clean their behinds.

These urban public toilets attest to high-level urban planning, Gendelman explains.

“The public toilets, and also private ones, needed to be located where there was 24/7 water flow,” he says. “It required a connection to both water systems and public drainage systems.”

Caesarea (Roman period)

A few toilets from Roman-era private homes have also been uncovered, Gendelman says, most notably in palaces and public facilities in the city of Caesarea. One even had marble columns and plastered walls, but it really doesn't represent the lifestyle of the general population.

“Most people probably used chamber pots, or people who lived in rural areas must have done it outside somewhere,” he explains.

People's pee did not go to waste. It was collected for tanners, who used the ammonia found in the urine to remove hair from the hides – a practice that carried on all the way to the 19th century.

Gendelman adds that there are sources that describe how in ancient Rome, noisy carts would pass by in the early morning to collect urine, in a manner not dissimilar to modern-day garbage trucks.

“If it took place in the empire's capital then it must have also happened elsewhere,” he concludes, leading us to conjure up images of urine carts passing through the streets of Caesarea.

Septic tank, Jaffa (Ottoman period)

When it comes to the late 19th or early 20th centuries in Ottoman Palestine, archaeological finds are more difficult to, well, find.

Many buildings from that time period have been renovated and are part of contemporary ones.

And yet a few examples of old-school plumbing exist, particularly in Jaffa.

“Generally, for most people in the Land of Israel at the time, toilets were a hole outside the home, in the backyard, with a hut on top of it,” explains Yoav Arbel, an archaeologist with the IAA. “You needed to dig out the hole again or clean it every time.”

This was also the case in Jaffa, where outhouses were the standard.

“There were no sewage systems, there was nothing,” he says. “There are many testimonies about the unpleasant atmosphere that it created and the unpleasant air.”

“There were people who would just throw it out in the street, just like in the Middle Ages,” he adds.

“These were acceptable things and accordingly there were diseases.”

One particularly bad cholera epidemic struck the city in 1902. The official death toll stood at 272, but according to Arbel around 1,000 out of the city's 20,000 residents must have died from the disease, which is transmitted through the secretions of an ill person.

“This gives you an example of the situation that was created in Jaffa due to the fact that the toilets in Jaffa were in such a catastrophic and primitive state,” he says.

Some people dumped their waste in the sea, and some wealthy homes with private toilets even had sewage systems that carried it along a tunnel that crossed the street all the way to the Mediterranean.

In the late 19th century and early 20th century, homes in the less densely populated new Jaffa neighborhoods made use of then-modern septic tanks.

“These tanks were underground in the street, but the draining came from inside the house itself, like it does today,” Arbel explains.

“These were built out of stone and had an arched roof, and they’d collect the sewage from inside the homes, which would collect on the ground and then become absorbed. They hardly needed to be cleaned.”

He says the Ottoman Turks carried out many changes because of their understanding of pandemics. “There was an understanding, but to start digging up the whole city isn’t simple, not nowadays and most certainly not back then.”

Private toilets, Jaffa (Late Ottoman-early British Mandate era) A bathroom in a beautifully tiled house from the early 20th century in southern Jaffa. Photo by Yoav Arbel/Israel Antiquities Authority

When the British took over Palestine from the Turks in 1917, they brought with them new systems.

“During the Mandate everything changed, and we find sewage systems, some of which are still in use today,” Arbel says.

“In very beautiful houses from the early 20th century in southern Jaffa we found houses with colorful tiles,” he notes. “These are people with resources; each such house had a toilet system.”

Please visit the site: <https://www.israel21c.org/lifting-the-lid-on-israels-best-ancient-toilets/> [Go there for pix]

DIRTY OLD MONEY: RESEARCHERS REVEAL IRON AGE SILVER FORGERY, BY HANNAH BROWN

"It is likely they used money that was already in the area from previous periods, to which they added the copper from the Timna area."

Ancient counterfeiting is the subject of a joint study by the University of Haifa and the Hebrew University of Jerusalem that will be published in the upcoming issue of the Journal of Archaeological Science. The study found evidence of a severe shortage of silver in the Levant during the first Iron Age (between 1200-950 BCE), the period when the tribes of Israel settled in Canaan, which led to the creation of silver made with a high percentage of copper.

"The small percentage of silver in the pieces of silver, which were mixed with other substances such as arsenic that made them appear silver in color... reinforces the hypothesis that at least for part of the period, it was a deliberate forgery," the researchers said.

The current study is part of the doctoral dissertation of Tzilla Eshel under the supervision of Prof. Ayelet Gilboa, both from the University of Haifa, as well as Prof. Yigal Erel and Dr. Naama Yahalom-Mack from the Hebrew University. It examines data from sites in Beit She'an, Megiddo and Ashkelon dating to that period, and posits that the silver shortage and instability could be one of the reasons for the migration of the tribes of Israel from the Haran area to Canaan.

According to the researchers, at that time no coins had yet been minted, and trading was done using silver pieces that were not uniform, so the amount of silver in each piece was important.

As part of Eshel's doctoral dissertation and other previous studies, it has been established that silver earrings from the area from earlier periods (starting from 1900 BCE) were made of almost 100% silver, as were those from later periods. However, when the researchers examined the chemical composition of these Iron Age caches, they found that they were made of an alloy composed mainly of copper, with the copper content as high as 80% in certain pieces.

The researchers also found that substances such as arsenic were also added to these alloys, in order to give the ingot a silver color.

While the researchers said there was no conclusive evidence that this was a forgery, they feel that there was a deliberate attempt to simulate the silver color of these metal pieces.

"In addition to the fact that there was a deliberate attempt to paint the metal silver, we found that in the ancient caches the percentage of copper was higher and the amounts of arsenic were very similar from piece to piece," they wrote.

In light of the historical knowledge of the situation in the area and these new findings, the researchers estimate that the period 1200-950 BCE in the southern Levant was a time

when residents of the area could not obtain genuine silver metal. But because they needed silver for trade, they created these counterfeit pieces.

The researchers actually tried to test whether they could identify the source of the silver that was in these ingots, to gauge how small the amount of real silver actually was. A common process to do this is to perform an isotope test for lead that is in the money, a procedure that makes it possible to identify the source and the period from which it comes. Such an examination conducted by other researchers of silver production from the period led them to conclude that the source of the money is from the area of Spain.

In this study, however, the researchers found that because it is such a “dirty” alloy, the normal isotope test could not be performed.

Instead, they estimate that based on a model they performed, the copper in the alloy comes from the same period from mines in the Timna area.

“It is likely that they used money that was already in the area from previous periods, to which they added the copper from the Timna area,” they said.

Eshel writes that: “In the book of Ezekiel in Chapter 22, the prophet prophesies that he is angry with God over the children of Israel and says: ‘Son of man, the people of Israel have become dross to me; all of them are the copper, tin, iron and lead left inside a furnace.’

“The sentence itself is of course a metaphor for the relationship between God and the children of Israel,” she concludes. “But in practice, it is quite possible that it describes a reality that was familiar at the time: A silver ingot was mixed with various metals such as tin, iron and ore.”

Please visit the site: <https://www.jpost.com/israel-news/dirty-old-money-researchers-reveal-iron-age-silver-forgery-649864> [Go there for pix]

POMPEII DIG REVEALS ‘ALMOST PERFECT’ REMAINS OF A MASTER AND HIS SLAVE, BY ANGELA GIUFFRIDA

Archaeologists have unearthed two exceptionally well-preserved victims of the eruption of Vesuvius in AD79

The almost perfectly preserved remains of two men have been unearthed in an extraordinary discovery in the ancient Roman city of Pompeii.

The bodies of what are thought to be a wealthy man and his slave, believed to have died as they were fleeing the catastrophic eruption of Mount Vesuvius in AD79, were found during excavations at a villa in the outskirts of the city, Pompeii archaeological park officials said yesterday.

Massimo Osanna, the park’s director, said the find was “truly exceptional”, while culture minister Dario Franceschini said it underlined the importance of Pompeii as a place for study and research.

The two men, lying close together, are believed to have escaped the initial phase of the eruption when the city was blanketed in volcanic ash and pumice, only to then be killed by a blast that happened the following day.

Their remains, for which casts have been created, were discovered in the same location where a stable containing the remains of three harnessed horses were unearthed in 2017.

Experts said the younger man, who was probably aged between 18 and 25, had several compressed vertebrae, which led them to believe that he was a manual labourer or slave. He is thought to have been wearing a pleated tunic, possibly made of wool.

The elder man, aged between 30 and 40, had a stronger bone structure, particularly around his chest area, and was also wearing a tunic. They were found lying in what would have been the corridor of the villa.

Park officials said that further digging over the coming months might reveal where the men were heading and determine the roles they played in the elegant villa.

It is the latest in a series of fascinating discoveries that excavations at Pompeii have yielded in recent years.

The bodies of two women and three children were discovered huddled together in the room of a villa in the Regio V area in October 2018. A week before, the same villa revealed a charcoal inscription that suggested Vesuvius erupted in October AD79, and not in August of that year as previously thought.

Tourist returns stolen artefacts from Pompeii 'after suffering curse'

The remains of a man, who was also believed to have survived the first part of the explosion, were found in May 2018. His legs and torso were protruding from a large stone block but, rather than being decapitated by it, archaeologists believe he was killed by the lethal gases of the eruption's later stages. The victim, believed to have been in his mid-30s, was also found with a small sack of 20 silver and two bronze coins, the equivalent of about €500 in today's money.

The latest dig, part of a €1m project, is continuing despite the coronavirus pandemic. The park, which is currently closed to tourists, usually attracts four million people a year.

The Pompeii ruins were discovered in the 16th century, with the first excavations beginning in 1748. Over 1,500 of the estimated 2,000 victims have been found over the centuries.

Please visit the site: <https://www.theguardian.com/world/2020/nov/21/pompeii-dig-reveals-almost-perfect-remains-of-a-master-and-his-slave> [Go there for pix]

BIGGEST GODDESS STATUE OF EARLY BRONZE AGE FOUND AT CENTRAL ANATOLIA'S KÜLTEPE SITE

Turkish archaeologists have unearthed an ancient goddess statue at the Kültepe archaeological site, also known as Kanesh, in central Kayseri province. They claim it is "the biggest" statue so far from the Early Bronze Age found in Anatolia.

"We are happy to have found this 45-centimeter-tall (17-inch) artifact. It is a very special piece," said Fikri Kulakoğlu, a professor from Ankara University and head of the excavation team, in an interview with Anadolu Agency (AA) on Sunday. He said that the goddess statue will be displayed in a museum after being cleaned.

"The artifact is around 4,200 years old," he noted, adding that all of the statues, statuettes and idols found in Kültepe are figurines of women. "No idols of men have been found so far. The women statues are naked and have a decorated throne, and there are braids on their backs."

The professor said the team found around 20 new artifacts during this year's excavations, all of which are of great importance. This year's work was being carried out with a limited number of people due to the coronavirus pandemic, he added.

Excavation work started 72 years ago at the Kültepe site, located some 24 kilometers (14.9 miles) away from the Kayseri city center. The mound revealing the ruins of the first city founded by the Hittites in Anatolia contained administrative buildings, religious buildings, houses, shops and workshops. The site was added to the UNESCO World Heritage Tentative List in 2014.

Please visit the site: <https://www.dailysabah.com/arts/biggest-goddess-statue-of-early-bronze-age-found-at-central-anatolias-kultepe-site/news> [Go there for pix]

PREHISTORIC ROCK ARTISTS WERE STONED, ARCHAEOLOGISTS FINALLY PROVE

Altered states of consciousness have been posited for the artists of antiquity and finally archaeologists have found the smoking datura in California – but stress it neither proves nor disproves shamanic ritual Ruth Schuster

Were artists centuries ago stoned to the gills when painting or engraving on cave walls? The possible use of intoxicants in the artistic process during prehistory has been fiercely debated in archaeological and anthropological circles, as is the meaning of the depictions. It has never been proved one way or the other.

There could be different motives behind – and meanings ascribed to – art created in southeast Asia 60,000 years ago, the glorious animal images of paleo-Western Europe and fairly recent cave drawings in the Americas. Some may whisper of secretive shamanistic practices and maybe others were made by bored teenagers with ocher to spare. We cannot say all were driven by the same urges, but now, for the first time, researchers have proven the consumption of an intoxicant in a place where rock art was created: Pinwheel Cave, California, which had been used during the late prehistoric period and through the colonial period.

The archaeologists couldn't prove directly that the early Californians were buzzing when decorating the cave. But they could demonstrate that quids (wads of masticated plant matter like quids of chewing tobacco) rammed into crevices in the cave ceiling contained the hallucinogenic agent datura, among other things.

The quids dated to about 500 to 100 years ago. David W. Robinson of the University of Central Lancashire, England, and a large international team reported their findings in the Proceedings of the National Academy of Sciences on Tuesday.

It's impossible to know centuries after the event if the users actually chewed their quids inside the cave and then, high as a kite, stuck the masticated matter into cracks in the ceiling. But it's plausible.

The authors note at length that native Californians, such as the Chumash people (Malibu is a Chumash word), who have lived in the state for thousands of years, used hallucinogens including datura to enter trance states, irrespective of creating art. The Chinigchinich people of southern California made extensive use of datura in religious contexts, to name but two examples described in the paper.

And now there's proof of an early instance of the practice in the context of a rock art site.

In fact, it seems the intoxicant itself had been drawn in the cave. A pinwheel design drawn on the ceiling resembles *Datura wrightii*, a flower with hallucinogenic properties. The artist also seems to have drawn the hawkmoth, which is datura's primary pollinator:

the drawing has only four legs rather than six but it has appropriately buggy eyes, and also sports the telltale antennae and round body.

The cave also contains ephemeral red paintings such as a circular figure, fragments, and there may be red dots on the cave ceiling.

That's it for the art.

The notion that rock art was produced in altered states of consciousness is one theory. The association of art with shamanism is a separate theory. The archaeologist David Whitley wrote that while Native Californian rock art was created by different social groups for different purposes, the ethnographic record indicates that it depicts visions experienced by shamans in trance – and even rock-art selfies of the shamans themselves during otherworldly experiences.

Whitley adds that the hallucinations weren't necessarily ecstatic: some could have been horrible. Bad trips aren't the province of hippies.

Acknowledging Whitley's major contribution, the authors of the new paper point out a snag: his theory suggests that the rock art sites were controlled by the shamans who jealously protected access, yet most of the rock art sites in southern California were used by the people, in the public domain

“Recent analyses also suggest that the pictographs [in southern California, not in Pinwheel Cave] were probably not self-depictions of shamans in trance but, instead, stock iconographic images drawing upon mythology and the personifying of insects, animals, plant, and astronomical elements such as the sun,” they write. And in our cave, there is the pretty datura flower, which looks sort of like a pinwheel as it unfurls, hence the name of the cave.

It is that very flower picture, outlined in red, that suggests to the authors of the new paper that while the cave users may have been fried, they weren't drawing fabulous supernatural visions.

The nature of the art calls into question various assumptions about rock art under the influence, the authors say – in other words, they aren't sold on the theory that the inhabitants were chewing datura in order to get high, experience visions and draw them.

Lead author Robinson stresses that they are NOT saying the art was NOT associated with shamanic practices. “That terminology is very broad and depending upon how you look at that, you could make a case one way or the other,” he tells Haaretz. “But what we are inferring is that the images were not the product of images seen in trance, but are images of the plant causing those trances, as well as possibly its primary pollinator. Equally, the evidence suggests that this trance experience was not a private one of the lone male shaman at his private vision quest site, but were group events performed in the context of a community site. The art thus served to codify the trance experience for the betterment of society, rather than simply reflect the idiosyncratic experience of a single shaman.”

Praising the paper for its thoroughness, Prof. Ran Barkai of Tel Aviv University, who had not been involved in the research, agrees that the painting looks like the datura flower.

“They provide direct categorical evidence that the plant was used in this cave for the purpose of achieving altered states of consciousness,” Barkai tells Haaretz – and if anything, he feels they strengthen the case for associating consciousness-changing substances with cave art. There is no reason, he points out, to assume that the artist who created the flower and hawkmoth weren’t under the influence – and since the cave had been used for multiple purposes, one of them could have been entering into altered consciousness.

Living the cave life

By the way, datura could be consumed in various forms: concocting a potion, roasting the roots, eating the pretty flowers and seeds, applying to open wounds, or chewing, which is at least one way it was used in Pinwheel Cave – in quids. Analysis deduced that each quid contained one dose of hallucinogenic alkaloids, which would be obtained by chewing the thing or even sucking at it. Presumably the quids were utilized inside the cave, then jammed into cavities in the ceiling. The archaeologists identified 56 such quids, but note evidence suggesting there had been many additional ones.

The inhabitants were definitely using the cave for group activities, according to the archaeological evidence. “The evidence from the site clearly shows that they spent significant amounts of their time in the cave directly under the art: manufacturing tools, preparing, cooking and eating food, perhaps using the site for storage,” Robinson explains. “The evidence includes projectile point making (arrowheads) and groundstone material (food implements), which indicate both men and women doing ordinary work in the cave.

While it is likely the cave and nearby bedrock mortar complex was used by multiple family groups, it was not the primary village. It was a seasonally occupied site, used as a base for hunting-and-gathering activities in the local environment.

The main village sites were located lower down in the canyons, a day’s hike away, Robinson adds.

Ergo, whatever else it indicated, the datura use didn’t mean the site was off-limits to all but shamans. Perhaps, the authors suggest, the painting of the flower served to express knowledge about the datura plant in preparation for a communal experience.

In one ceiling crevice, the researchers found no less than 10 quids – theoretically representing 10 individuals. Could it be the remains of a group initiation ceremony, for instance? Ethnographic evidence suggests that indigenous initiates were given a datura potion to drink, not a quid to chew, the authors say, adding that the locals could have had their own version of initiation rites. Also, they point out that the flower picture had been touched up from time to time – kept fresh, as it were. It wasn’t a single artist’s vision caused by a dip into datura.

Please visit the site: <https://www.haaretz.com/archaeology/.premium-prehistoric-rock-artists-were-stoned-archaeologists-finally-prove-1.9324280>

HOW ARCHAEOLOGISTS ARE USING DEEP LEARNING TO DIG DEEPER TRAWLING ANCIENT HISTORY WITH NEURAL NETS, BY ZACH ZORICH

Finding the tomb of an ancient king full of golden artifacts, weapons and elaborate clothing seems like any archaeologist's fantasy. But searching for them, Gino Caspari can tell you, is incredibly tedious.

Dr. Caspari, a research archaeologist with the Swiss National Science Foundation, studies the ancient Scythians, a nomadic culture whose horse-riding warriors terrorized the plains of Asia 3,000 years ago.

The tombs of Scythian royalty contained much of the fabulous wealth they had looted from their neighbors. From the moment the bodies were interred, these tombs were popular targets for robbers; Dr. Caspari estimates that more than 90 percent of them have been destroyed.

He suspects that thousands of tombs are spread across the Eurasian steppes, which extend for millions of square miles. He had spent hours mapping burials using Google Earth images of territory in what is now Russia, Mongolia and Western China's Xinjiang province. "It's essentially a stupid task," Dr. Caspari said. "And that's not what a well-educated scholar should be doing."

As it turned out, a neighbor of Dr. Caspari's in the International House, in the Morningside Heights neighborhood of Manhattan, had a solution. The neighbor, Pablo Crespo, at the time a graduate student in economics at City University of New York who was working with artificial intelligence to estimate volatility in commodity prices, told Dr. Caspari that what he needed was a convolutional neural network to search his satellite images for him. The two bonded over a shared academic philosophy, of making their work openly available for the benefit of the greater scholarly community, and a love of heavy metal music. Over beers in the International House bar, they began a collaboration that put them at the forefront of a new type of archaeological analysis.

A convolutional neural network, or C.N.N., is a type of artificial intelligence that is designed to analyze information that can be processed as a grid; it is especially well suited to analyzing photographs and other images. The network sees an image as a grid of pixels. The C.N.N. that Dr. Crespo designed starts by giving each pixel a rating based on how red it is, then another for green and for blue. After rating each pixel according to a variety of additional parameters, the network begins to analyze small groups of pixels, then successively larger ones, looking for matches or near-matches to the data it has been trained to spot.

Working in their spare time, the two researchers ran 1,212 satellite images through the network for months, asking it to look for circular stone tombs and to overlook other circular, tomblike things such as piles of construction debris and irrigation ponds.

At first they worked with images that spanned roughly 2,000 square miles. They used three-quarters of the imagery to train the network to understand what a Scythian tomb looks like, correcting the system when it missed a known tomb or highlighted a nonexistent one. They used the rest of the imagery to test the system. The network correctly identified known tombs 98 percent of the time.

Creating the network was simple, Dr. Crespo said. He wrote it in less than a month using the programming language Python and at no cost, not including the price of the beers. Dr. Caspari hopes that their creation will give archaeologists a way to find new tombs and to identify important sites so that they can be protected from looters.

Other convolutional neural networks are beginning to automate a variety of repetitive tasks that are usually foisted on to graduate students. And they are opening new windows on to the past. Some of the jobs that these networks are inheriting include classifying pottery fragments, locating shipwrecks in sonar images and finding human bones that are for sale, illegally, on the internet.

“Netflix is using this kind of technique to show you recommendations,” Dr. Crespo, now a senior data scientist for Etsy, said. “Why shouldn’t we use it for something like saving human history?”

Gabriele Gattiglia and Francesca Anichini, both archaeologists at the University of Pisa in Italy, excavate Roman Empire-era sites, which entails analyzing thousands of broken bits of pottery. In Roman culture nearly every type of container, including cooking vessels and the amphoras used for shipping goods around the Mediterranean, was made of clay, so pottery analysis is essential for understanding Roman life.

The task involves comparing pottery sherds to pictures in printed catalogs. Dr. Gattiglia and Dr. Anichini estimate that only 20 percent of their time is spent excavating sites; the rest is spent analyzing pottery, a job for which they are not paid. “We started dreaming about some magic tool to recognize pottery on an excavation,” Dr. Gattiglia said.

That dream became the ArchAIDE project, a digital tool that will allow archaeologists to photograph a piece of pottery in the field and have it identified by convolutional neural networks. The project, which received financing from the European Union’s Horizon 2020 research and innovation program, now involves researchers from across Europe, as well as a team of computer scientists from Tel Aviv University in Israel who designed the C.N.N.s.

The project involved digitizing many of the paper catalogs and using them to train a neural network to recognize different types of pottery vessels. A second network was trained to recognize the profiles of pottery sherds. So far, ArchAIDE can identify only a few specific pottery types, but as more researchers add their collections to the database the number of types is expected to grow.

“I dream of a catalog of all types of ceramics,” Dr. Anichini said. “I don’t know if it is possible to complete in this lifetime.”

Saving time is one of the biggest advantages of using convolutional neural networks. In marine archaeology, ship time is expensive, and divers cannot spend too much time

underwater without risking serious pressure-related injuries. Chris Clark, an engineer at Harvey Mudd College in Claremont, Calif., is addressing both problems by using an underwater robot to make sonar scans of the seafloor, then using a convolutional neural network to search the images for shipwrecks and other sites. In recent years he has been working with Timmy Gambin, an archaeologist at the University of Malta, to search the floor of the Mediterranean Sea around the island of Malta.

Their system got off to a rough start: On one of its first voyages, they ran their robot into a shipwreck and had to send a diver down to retrieve it. Things improved from there. In 2017, the network identified what turned out to be the wreck of a World War II-era dive bomber off the coast of Malta. Dr. Clark and Dr. Gambin are now working on another site that was identified by the network, but did not want to discuss the details until the research has gone through peer-review.

Shawn Graham, a professor of digital humanities at Carleton University in Ottawa, uses a convolutional neural network called Inception 3.0, designed by Google, to search the internet for images related to the buying and selling of human bones. The United States and many other countries have laws requiring that human bones held in museum collections be returned to their descendants. But there are also bones being held by people who have skirted these laws. Dr. Graham said he had even seen online videos of people digging up graves to feed this market.

“These folks who are being bought and sold never consented to this,” Dr. Graham said. “This does continued violence to the communities from which these ancestors have been removed. As archaeologists, we should be trying to stop this.”

He made some alterations to Inception 3.0 so that it could recognize photographs of human bones. The system had already been trained to recognize objects in millions of photographs, but none of those objects were bones; he has since trained his version on more than 80,000 images of human bones. He is now working with a group called Countering Crime Online, which is using neural networks to track down images related to the illegal ivory trade and sex trafficking.

Dr. Crespo and Dr. Caspari said that the social sciences and humanities could benefit by incorporating the tools of information technology into their work. Their convolutional neural network was easy to use and freely available for anyone to modify to suit their own research needs. In the end, they said, scientific advances come down to two things.

“Innovation really happens at the intersections of established fields,” Dr. Caspari said. Dr. Crespo added: “Have a beer with your neighbor every once in a while.”

Please visit the site: <https://www.nytimes.com/2020/11/24/science/artificial-intelligence-archaeology-cnn.html> [Go there for pix]

OLIVE OIL FACTORY AT KHIRBET UM AL-GHOZLAN, JORDAN

In this blog post, curator Jamie Fraser and scientist Caroline Cartwright run you through the archaeology and science involved in tracking down an ancient olive oil factory, and explain how the process of making modern olive oil would be familiar to people in the past.

Jamie Fraser, Curator for the Ancient Levant and Anatolia and Caroline Cartwright, Senior Research Scientist

When I (Ed. Jamie) first visited the archaeological site of Khirbet Um al-Ghozlan in the north of Jordan, I dismissed it as nothing more than an ancient farming village. Arabic for the ‘Ruins of the Mother of the Gazelles’, the site sits on a small knoll above the steep-sided Wadi (Valley) Rayyan. The slopes are covered in oak forests, wild flowers and olive groves. You can see west to the Jordan Rift Valley (200m below sea level) and east to the Transjordan plateau (rising 1400m above sea level in the distance). The view is spectacular.

Archaeologists would normally classify the site as a rural farming village because of its size. Only one acre (0.4ha) in area, Khirbet Um al-Ghozlan could easily fit into the Great Court at the British Museum and still leave room for the coffee shops. It was also occupied in a time of urban collapse, at the end of the Early Bronze Age (2600–2000 BC). During this period, people in the southern Levant (modern-day Jordan, Israel and the Occupied Palestinian Territories) abandoned their cities and dispersed into small, rural communities. “Nothing special”, I mused as I walked back to the car, “at least the view was nice”.

So imagine my surprise when I stumbled across a constructed line of massive stone boulders hidden by the long grass. With mounting excitement I followed them around the entire knoll, slowly realising they formed a monumental enclosure wall protecting the site. This didn’t make sense: in the Bronze Age world, walls were built to fortify large urban centres, not tiny rural hamlets. What had motivated people 4,500 years ago to defend such a remote site?

An ancient olive oil factory

Back at the British Museum I sought out Dr Caroline Cartwright in her microscopy lab in the Department of Scientific Research. As an archaeobotanist, Caroline has spent decades studying the relationship between people and their environment by analysing ancient plant remains. She was the perfect person to discuss one possible explanation for the site’s mysterious defensive wall- that it protected a Bronze Age olive oil factory.

The key, I suggested, lay in the site’s upland location. The well-drained slopes of the Wadi Rayyan are ideal for cultivating olive trees, especially compared to the flood-prone Jordan Valley floor where their woody roots tend to rot. If Khirbet Um al-Ghozlan served as an olive oil factory and storehouse, then maybe ancient farmers enclosed it to protect their seasonal stockpiles of olive oil – one of the most precious commodities in the Bronze Age. “Don’t think of it like a permanent settlement behind a formal fortification

wall”, I said, bouncing on my stool, “more like a bank-vault in the landscape, where people stashed their olive oil during the month-long harvest”.

Caroline raised an eyebrow, agreed it was a reasonable idea, then responded with sharp scientific acumen: “but where’s the evidence? We need archaeological data to prove it”.

We needed to dig. And so, with permission from the Jordanian Department of Antiquities, a joint team from the British Museum/University of Sydney undertook excavations at Khirbet Um al-Ghozlan in March 2017 and November 2019. Three Jordanian archaeologists joined us from the Department of Antiquities, and we employed ten men from the local village to help.

The origins of olive oil

The story of olive oil starts around 6000 BC, when people in the eastern Mediterranean learned how to extract oil from the bitter fruit growing on wild olive trees. By 5000 BC, people were cultivating domestic trees in orchards. Olive oil quickly transformed the way people lived: it was burned as fuel in lamps; it helped preserve food longer, especially dairy products such as yoghurt and cheese; and it enabled a broad cuisine to flourish, providing the foundations of what we know today as the ‘Mediterranean diet’.

The Middle East soon developed an international oil economy – albeit one based on the olive. The first cities in the southern Levant emerged between 3700–3000 BC, partly driven by trade with Egypt, where olive oil was prized as one of seven ‘sacred oils’ for embalming the dead. However, this fledgling urban experiment soon faltered and collapsed, possibly when Egyptian merchants shifted the oil trade north to ports in Syria and Lebanon. The southern cities were gradually abandoned and people disbursed into the countryside. This so-called ‘Dark Age’ marks the end of the Early Bronze Age (2600–2000 BC). It is to this period of urban recession that Khirbet Um al-Ghozlan dates.

Producing modern olive oil

To test our hypothesis we needed to understand what the signatures of olive oil production would look like as archaeological remains.

Although modern olive presses are mechanised, the stages involved in harvesting the fruit and extracting the oil have remained largely unchanged over the last 8,000 years. To learn more, we returned to Jordan in late 2019 to observe the annual harvest.

Harvesting

The harvest occurs every October to November, usually after the first autumn rains have washed the summer dust from the ripening fruit.

Farmers shake or rake the branches causing the fruit to fall onto sheets below. Groups of people remove twigs and leaves before gathering the olives in sacks.

Crushing

The sacks are taken to local olive factories that contain the pressing equipment. The fruit is emptied into a large basin and crushed by rotating mill-stones into a tapenade-like

paste. A worker presses the paste onto circular fibrous mats, which are stacked high like pancakes onto a trolley ready to be pressed.

Pressing

Traditional olive presses used stone weights or screwed vices to apply pressure to the mats. Today, the stacked mats are pressed in a motorised steel vice, forcing the oil to exude in golden rivulets, which are drained into barrels or tins. Once the pressing is complete, the olive paste is scraped from the mats and collected for fertiliser or fuel.

Storing

As oil collected from non-mechanised presses contains a significant proportion of water, oil was traditionally stored for several weeks in jars or vats in cool, dark storehouses to allow the oil and water to separate. The lighter oil was then scooped or decanted away. The process was complete.

Producing ancient olive oil

If our hypothesis was correct, then excavations at Khirbet Um al-Ghozlan should yield archaeological evidence illustrating all stages of this process. The site did not disappoint. Strikingly, the monumental enclosure wall appears to have protected only two or three buildings, each containing several stone bins and storage installations. Were these compounds the storehouses used to cache oil jars accumulated throughout the harvest? Clues lay in the materials they contained.

Harvesting

The most compelling evidence lay in the charred remains of ancient plant remains – known as the archaeobotanical record. Tiny fragments of charcoal found in the soil represent the remains of wood that people brought to the site to burn as fuel. Using a scanning electron microscope, Caroline identified the original tree species of each sample by examining its anatomical structure from different angles. We know from other excavations that people in Bronze Age farming villages typically burned a variety of wood species gathered from around the site. Not so at Khirbet Um al-Ghozlan. “It’s quite extraordinary”, Caroline observed, “every single sample is olive wood. They weren’t burning anything else.”

This pattern suggests that, like farmers today, Bronze Age people pruned their olive trees as part of the harvest and stockpiled the wood for fuel. The picture became clearer when Caroline discovered fragments of small shoots and suckers, usually removed during pruning to shape the tree.

Scanning electron microscope image of olive wood. Image by C R Cartwright. Scanning electron microscope image of an olive sucker.

Image by C R Cartwright. Scanning electron microscope image of a crushed fragment of an olive stone. Image by C R Cartwright.

This inference tallied neatly with the discovery of several beautiful flint blades that may be the remains of ancient pruning saws. Known as Canaanite blades, these tools are about as long as your hand, from the base of your palm to the top of your middle finger – the perfect length for pruning slender olive branches. Each blade is serrated on both sides and notched at one end where they were hafted to a handle.

Crushing

But the smoking gun was Caroline's discovery of minuscule fragments of crushed olive stones, known in Arabic as jift. These fragments are unambiguous by-products of olive oil production that prove olives had been crushed for oil at Khirbet Um al-Ghozlan. The fact they were charred indicates that, once pressed, the jift had been collected and burned as fuel, just as people burn jift as fuel today. Several limestone mortars excavated in and around the storehouses were probably used to crush the olives into paste.

Pressing

The crushed paste was probably pressed in one of six olive presses found hewn into the limestone bedrock nearby. Each comprised a rectangular basin into which mats laden with the crushed olive paste was pressed under heavy stones. The oil would flow through a circular channel into a storage jar nestled into a collection tank below.

Storing

The storage compounds themselves contained at least 23 storage jars lined up in several rooms. Although broken, Jordanian conservator Naif Zaban at The American Center of Research in Amman has been slowly restoring these jars to their original form. Remarkably, 83% of all pottery sherds were from storage jars. This is a strikingly high proportion, as we would normally expect other types of domestic vessels to be well represented, including cooking pots, bowls and jugs. We hope to analyse these jars for organic residues: if we can detect lipids associated with vegetable fats, then the jars probably contained olive oil – stayed tuned for updates! Although this last piece of the puzzle is still being researched, the evidence overwhelming points to a site for specialised industrial production rather than a typical farming village. Together, the plant remains, storage jars, olive presses and stone tools all support the theory that the site was used for the seasonal production of olive oil.

Olive oil and the city

Perhaps the best analogy for understanding the site is the olive oil factories scattered through the hills of Jordan today. For 11 months of the year, these isolated structures are locked-up, silent and dark, their pressing equipment stored under plastic. Then, in mid-October, their doors are opened, their lights switched on, and they become some of the most dynamic places in the country, as farmers bring their olives to be pressed. The key question for us is where the people who visited Khirbet Um al-Ghozlan came from. Did they live in nearby villages, or did they venture to the uplands seasonally, from larger settlements on the Jordan Valley floor?

The storehouses at Khirbet Um al-Ghozlan attest the timelessness of the olive oil industry. The sounds of the olive harvest have echoed through the hills for millennia, and

genetic studies indicate that trees cultivated today are the descendants of those harvested in the Bronze Age. The modern olive harvest would certainly be familiar to someone from antiquity – a fixed point in an eternal agricultural cycle.

From the earliest Neolithic villages to the modern international economy, we cannot understand the development of cultures in Jordan without understanding the role of olive oil. The excavations at Khirbet Um al-Ghozlan help articulate the close relationship between olive oil and the rise and fall of early urban societies. The site illuminates how a resilient olive industry maintained strong economic sinews during a period of urban collapse at the end of the third millennium BC. Indeed, many archaeologists believe it helped promote the recovery of urban societies in the early second millennium BC.

This rejuvenated civilisation would come to be known as the ‘Canaanites’. Although later biblical texts would describe the Canaanites as occupants of a ‘land of milk and honey’, this sobriquet overlooks one of the most significant and enduring aspects of the region – that it was a land of olive oil as well.

You can hear Jamie talk about the excavations as part of the July edition of the British Museum’s podcast series at <https://podcasts.apple.com/gb/podcast/museum-podcast-16-ice-cream-olive-oil-phrygian-sibyl/id1147175428?i=1000481156033>

You can read more about the project in online reports for the Palestine Exploration Fund and the American Schools of Research: <http://www.asor.org/news/2020/04/fellowship-report-fraser>.

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Please visit the site: <https://blog.britishmuseum.org/discovering-a-4500-year-old-olive-oil-factory-in-jordan/> [Go there for pix and caps]

12 'ALTAR STONES'; CARVINGS OF WORSHIPERS AND A STRIKING EYE, BY SUE SURKES

Ancient rock etchings on remote Negev plateau evoke the Bible, draw new interest As Mount Karkom attracts increasing visitors, archaeologists try to protect a prehistoric art-filled site that a top researcher claims is Mount Sinai, complete with ‘burning bush’

Superimposed onto the barren landscape of the Negev desert is a sweeping canvas of human history, culture and worship — if you know where to look.

One of the best places to find such a panorama is Mount Karkom (named for a desert crocus), which lies tucked away in a remote corner of the southwestern Negev, close to the border with Egypt’s Sinai Peninsula.

Sitting 847 meters (2,780 feet) above sea level, it is surrounded by dry riverbeds and topped with a desolate plateau strewn with pieces of a particularly high quality dark brown flint.

It is hard to imagine why anyone would want to visit, let alone live near, this bleak place.

But visit and live they did — over much of the last mind-boggling 400,000 years.

That far back, according to paleoclimatologists, the Negev was greener. Those living on Mount Karkom would have looked down onto extensive open forest, much as Mufasa did in the opening sequence of “The Lion King.” Flint tools bear testament to hunting that went on in these valleys until 17,000 years ago.

The Italian-born Jewish archaeologist Prof. Emmanuel Anati first set foot on Mount Karkom in 1954, when he ascended, by donkey, what was known to the local Bedouin as Jebel Ideid — the Mountain of Holy Days.

He found a vast open-air museum of rock engravings, or petroglyphs, he told The Times of Israel recently, and stones organized in a way that suggested cultic behavior.

Anati returned to Italy, then came back to Israel in 1980 to resume his fieldwork for a fortnight each year with other archaeologists, until just over a decade ago.

He has researched rock engravings all over the world and served as the founding president of the International Scientific Committee on Rock Art, which advises the International Council on Monuments and Sites and UNESCO, the cultural agency of the United Nations, on the subject.

Now aged 90, he is spending time in the Negev town of Mitzpe Ramon, where he keeps a home, and is trying to drum up interest and funds for a big museum to house his numerous Israeli finds.

According to his 2001 English-language book “The Riddle of Mount Sinai” (which is out of print, but is available in full on his website), Anati found more than 300 Paleolithic (early Stone Age) sites, along with tools, on the mountain — testament to some of the earliest hunting clans who lived in simple huts and survived by hunting and gathering.

He also mapped 1,000 rocks bearing an astonishing 40,000 rock engravings, some as old as 7,000 years, along with altars, standing stones, stone circles, shrines and burial mounds.

Aerial surveys in the 1990s enabled him to document and add the remains of more than 100 geoglyphs, some 20 of which are recognizable, to the list of wonders. These are organizations of stones that can only be seen as coherent forms from the sky (think Peru’s Nazca lines) and include images of four-legged animals, some of which, according to Anati, have long been extinct.

Such rock engravings carved, and often overcarved, into chalky white limestone covered with a dark brown patina have been mapped in their thousands in other Negev sites.

But as the Israel Antiquities’ Authority’s head of research Dr. Gideon Avni confirms, Mount Karkom is one of the biggest and most beautiful.

Depictions on the rock engravings range from animals and hunters to footprints — a sign of veneration since late Stone Age times — to portrayals of people praying with their arms stretched toward the sky.

There are abstract shapes (to us, at least) and even figures that look like aliens.

There are also inscriptions in many tongues, stretching from the Hellenistic and Roman (including Nabatean) periods to the Byzantine and Islamic eras.

The ibex, a symbol of resurrection?

More than half the images are of the adult male Nubian ibex, a species of goat with horns, according to Dr. Uzi Avner of the Dead Sea and Arava Science Center.

These are often engraved with a hunter and a canine predator. Here, the animal stands; there, it’s upside down. Sometimes it appears with the moon or the stars.

Avner has suggested that the ibex may represent a cycle of life and death, possibly a dying and resurrected god that is related to rainfall, the fertility of the soil, animals and humans. Other images relate to the changing of seasons.

Archaeologist Lior Schwimer of the Israel Nature and Parks Authority has noted that a striking image of an eye is completely shaded by an adjacent rock on just one day — December 21, the winter solstice.

Anati was particularly fascinated by images that seemed to conjure up biblical tales; for example, a serpent and staff carved into a standing stone with its echoes of the staff that turned into a snake when Moses threw it onto the ground in Exodus 4:2-3.

He interpreted another image, which was divided into 10 sections, as a depiction of the two tablets of stone inscribed with the Ten Commandments that Moses received on Mount Sinai.

And he connected a third engraving, found close to a water hole, with Deuteronomy 8:14-15, in which God commands the Israelites not to forget He who “led you through the vast and terrible wilderness infested with poisonous snakes and scorpions, and the saraf [a poisonous lizard], where there was no water, who brought thee water from the hard rock.”

Also intriguing for Anati was a site discovered in 1983 at the foot of the mountain that comprises 12 pillars.

For him, it brought to mind Exodus 24:4, which describes how Moses “rose early in the morning and built an altar at the foot of the mountain, and put up twelve pillars, for the twelve tribes of Israel.”

Mapping stone engravings for 12 years and counting Shwimer, who directs the Israel Nature and Parks Authority’s guiding center at Mitzpe Ramon, has been mapping stone engravings in the Negev for 12 years and still isn’t finished.

He is also involved, together with archaeologist Davida Eisenberg-Degen, in a project being run by Ben-Gurion University’s Ifat Shapira and Yuval Goren to scientifically date the engravings by calculating the amount of manganese present. Their research will be published next year.

It is the manganese, iron and clay that give the rocks their dark brown patina. When first etched, the images would have revealed the white chalk underneath, but over the centuries the patina has returned, eventually obliterating the image entirely.

The system the researchers are developing will give scientific underpinning to the dating methods used so far — comparisons of patina (the darker, the older), with other pieces of knowledge. Camels, for example, were only domesticated in the Negev in the 10th century BCE, so they figure camelid images cannot be from any earlier.

More remote, yet more accessible

Mount Karkom’s remoteness has only increased since the army closed Route 10 along the Israeli-Egyptian border to civilian traffic several years ago, save for certain holidays if the security situation permits.

Our trip, from Mitzpe Ramon, took three bumpy hours, most of it along gravel plains and dried riverbeds in a sturdy 4×4.

Since the 1980s, the mountain has formed part of the massive 1.5 million dunam (370,000 acre) Negev Highlands Nature Reserve. Used by the Israel Defense Forces for training during the week, it is open on weekends. Together with Anati, the INPA marked out several paths in the 1990s some distance from the antiquities, possibly to protect them from independent visitors.

But, said Shwimer, who estimated that 10,000 to 15,000 people now visit the site annually, times have changed. Today, anyone with a 4×4 — and numbers are growing — can use Google Earth or a variety of navigation apps to reach the plateau’s riches.

Three years ago, Shwimer received complaints about damage. People were scratching names into the rocks, clambering over them to have their photographs taken, or rearranging important stones.

He documented the damage, consulted and then devised a plan to bring the paths closer to selected groups of rocks, some of which will be roped off, so that they can be seen from afar but touching is discouraged. Explanatory signs — most earmarked for the campsite below the mountain — are at the editing and design stages.

The Mount Sinai controversy

The increasing number of visitors is partly thanks to Anati’s announcement in 1983 that if Mount Sinai were real, the compilers of the biblical narrative had Mount Karkom in mind. Since the Byzantine era, however, Christian pilgrims have associated Jebel Musa in the Sinai desert with the giving of the Torah. Other candidates have also been put forward by a variety of sources.

Part of Anati’s justification was the biblical assertion that it was “11 days journey from Horeb [another name for Mount Sinai], by the way of Mount Seir, to Kadesh Barnea” (Deuteronomy 1:2).

Anati identified Mount Seir (meaning “hairy”) as Jabel ‘Urayf an Naqah in Egypt, and calculated that it took 11 days to walk from Mount Karkom via Jabel ‘Urayf an Naqah to Egypt’s Ein Kudeirat, which is widely accepted to be Kadesh Barnea.

His theory was roundly rejected, not least because the mountain was in use for ritual activity from 4000 to 2000 BCE but not during the 13th century BCE, commonly associated with the Exodus period.

Not that that has stopped increasing numbers of Christians from visiting to hold prayer services, nor thousands of Israelis from coming on weekends around the winter solstice to watch the so-called “Burning Bush” seen by Moses on Horeb in the Book of Exodus — a hole in the rock that takes on a particular golden glow when the sun goes down. The phenomenon of light was discovered by tour guide Yigal Granot and its connection with the Burning Bush was suggested by another guide, Dr Haim Berger.

Anati told The Times of Israel that the “mentality in archaeology in Israel is 100 years old” and limited to “describing and dating, without looking at the content.”

But the IAA’s Gideon Avni, while recognizing Anati’s world expertise in rock engravings, said that while there were clear signs of ritual behavior on Mount Karkom, they were similar to those found in many other places and cultures and there was no scientific proof that it is unique.

“People were discussing where Mount Sinai was in the 19th century,” Avni said. “But given the difficulties of dating and big debates about the authenticity of Bible stories, nobody in Israel, except Anati, is trying to find the physical locations anymore.”

Please visit the site: <https://www.timesofisrael.com/ancient-rock-etchings-on-remote-negev-plateau-evoke-the-bible-draw-new-interest/> [Go there for pix]

NEW KARAHANTEPE SETTLEMENT MAY BE OLDER THAN GÖBEKLITEPE

Excavation work at settlements in the archaeological site of Karahantepe, located in Turkey's southeastern Şanlıurfa province, continues diligently. According to the latest data from the archaeological teams at the site, a new settlement that may be older than the prehistoric site of Göbeklitepe – which is crowned the world's first temple and "zero point" of history – will be unearthed soon.

The surface survey works at Karahantepe, which is an alternative site nearby for tourists visiting Göbeklitepe, started in 1997. As part of the search, some T-shaped obelisks were detected that resembled the ones bearing wild animal figures in Göbeklitepe. Following the discovery, the first excavations in the region started with permission obtained from the Ministry of Culture and Tourism's General Directorate of Cultural Heritage and Museums. The excavations have uncovered 250 obelisks featuring animal figures to date.

Speaking at the 10th International Resort Tourism Congress on Thursday, Culture and Tourism Minister Mehmet Nuri Ersoy said that an intensive and rapid excavation program continues in Karahantepe. Ersoy said the teams will uncover a settlement that belongs to the Neolithic period, according to the first studies, in their next work.

"Göbeklitepe has a history of 12,000 years. Our new settlement in Karahantepe will be older. The comprehensive works will be sustained in the site under the supervision of professor Necmi Karul, the head of the excavation team, next year. We will probably have a new discovery that will make an overwhelming impression on the world again after Göbeklitepe," he said.

Please visit the site: <https://www.dailysabah.com/arts/new-karahantepe-settlement-may-be-older-than-gobeklitepe/news>
