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**ΔΟΙΚΗΤΙΚΟ
ΣΥΜΒΟΥΛΙΟ:**

Ι. Μπασιάκος (πρόεδρος),
Γ. Φακορέλλης (αντιπρόεδρος),
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Γ. Θεοδώρου (μέλος),
Π. Λουκοπούλου (μέλος),
Μ. Παπαγεωργίου (μέλος)

Πληροφορίες:

Γ. Φακορέλλης (σύνταξη,
επιλογή ύλης)

E-mail: yfacorel@uniwa.gr

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

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Information: Υ. Facorellis
(editor)

E-mail: yfacorel@uniwa.gr

Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Ιανουάριος 2020 -

HAPPY NEW YEAR 2020! - ΚΑΛΗ ΧΡΟΝΙΑ 2020!

Newsletter of the Hellenic Society of Archaeometry

- January 2020 -

Nr. 226

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

CITIES ON VOLCANOES11 (COV11) **CONFERENCE, VOLCANOES AND SOCIETY:** **ENVIRONMENT, HEALTH AND HAZARDS,** **MAY 23TH-27TH, 2019, HERAKLION, CRETE** **(GREECE)**

INVITATION TO PARTICIPATE

Letter(s) from the President(s)

Dear colleagues,

It is my pleasure to invite you to participate, to the COV11 Conference, headed by the Commission Cities On Volcanoes, that will be held in Heraklion, Crete (Greece), from May 23th to May 27th, 2019. IAVCEI greatly acknowledges the organizing efforts of the National and Kapodistrian University of Athens, in collaboration with the University of Crete and its Natural History Museum, to invite the international scientific community and decision makers dealing with volcanic risks to participate in this COV11 conference entitled “Volcanoes and Society: environment, health and hazards”. After several different countries (Italy, New Zealand, USA, Ecuador, Japan, Spain, Mexico, Indonesia, Chile), Greece will host for the first time this important COV Conference.

Crete island is extremely famous in the Mediterranean for its beauty, its ancient history, and its archeological remnants of the Minoan civilization. For volcanologists it is also a special site that was dramatically impacted by the around 1627 BC cataclysm of Santorini (Thera) volcano (VEI 6-7, 60 km³ of DRE magma). In addition to visiting archeological treasures, the 2020 Heraklion Conference will allow worldwide volcanologists and decision makers to exchange about the up-to-date scientific advances in understanding how volcanoes work, how forecasting their eruptions and how mitigating their environmental and societal impacts. In addition to Santorini, a few other active volcanoes of the Hellenic arc (Milos, Nisyros, Methana) are interesting targets for field excursions related to the Conference.

Therefore, IAVCEI strongly encourages your participation to the COV11 Conference in Crete in May 2020 and acknowledges the organizing efforts undertaken by our Greek colleagues and local authorities. We look forward to seeing you numerous in Heraklion!

Patrick ALLARD

IAVCEI President

President Patrick Allard
Paris University - Institut de Physique du Globe de
Paris (IPGP)
1 rue Jussieu, 75005 Paris, France

Tel.: (+33)-1 83 95 76 30 –
E-mail: pallard@ipgp.fr

Secretary General Roberto Sulpizio
Dipartimento di Scienze della Terra e Geoambientali-UNIBA
Via Orabona 4, 70125 Bari, Italy
Tel: +39 0805442589
Fax: +39 0805442625
Email: roberto.sulpizio@uniba.it

Past-President Donald B. Dingwell
Department of Earth and Environmental Sciences,
Theresienstr. 41, 80333 Munich, Germany.
Tel: +49 (0) 89 2180 4136 F
ax: +49 (0) 89 2180 4176
Email: dingwell@lmu.de

IAVCEI Home Page: URL= <http://www.iavceivolcano.org>

Dear Colleagues,

I am honored to invite you to participate in the Cities on Volcanoes11 Conference, which will take place in Heraklion city, in the island of Crete (Greece), from 23rd of May to 27th of May, 2019.

The Greek Organizers, which are the Department of Geology and Geonvironment of the National and Kapodistrian University of Athens, in collaboration with the Post Graduate Programme of «Environmental, Disaster and Crisis Management Strategies» (EDCM) and the Natural History Museum (University of Crete), with a high sense of responsibility, organize the COV11 with the title «Volcanoes and Society: environment, health and hazards» and anticipate to bring together not only scientists worldwide but also the Civil Protection authorities, concerning the volcanic risk. It will focus on multidisciplinary monitoring volcanic environments in the vicinity of cities and highly touristic areas, the ability to recognize the hazards and their impacts of people, community education, case studies and risk mitigation to reduce the impacts of volcanism and its effects on society.

We are happy that Greece, one of the most touristic places in the world, with the beautiful volcanoes of the Aegean Sea, will organize such an International Conference about volcanoes. Very interesting and exciting field trips will take place before, during and after the Conference in the islands of Santorini, Milos, Nisyros and Methana peninsula (Hellenic Volcanic Arc) as well as in Knossos Archaeological site and Priloritis UNESCO Global geopark.

Crete is a well-known island in the Mediterranean Sea, at the crossroads of three continents, due to its friendly and warm people, amazing landscapes, delicious food and famous archaeological site like Knossos. Heraklion city, the 4th biggest city in Greece

and birth city of the famous artist Domenikos Theotokopoulos, known as El Greco, has various architectural styles, rich cultural life and magnificent weather.

Santorini volcano is a unique scientific natural laboratory with a spectacular caldera. The famous Minoan Plinian eruption, took place in the Late Bronze Age and its impact was the decline of the Minoan Civilization. The last eruption of the Kameni islands occurred in 1950, at the centre of the caldera.

We will be delighted to host the participants from all over the world for a very fruitful Conference. The Greek scientific and local community, look forward to seeing you all in Heraklion.

Efthymios Lekkas
President of E.P.P.O

Dear Colleagues,

We, the National and Kapodistrian University of Athens (NKUA), in collaboration with post graduate programme of “Environmental, Disaster and Crisis Management Strategies” (EDCM) and the Natural History Museum of Crete (University of Crete), are honored to invite you to participate in the Cities on Volcanoes 11, in Heraklion, Crete, Greece.

It will be our pleasure to welcome you to Crete and give you the opportunity to visit Knossos (the largest Bronze Age archaeological site on Crete called the oldest city of Europe), and the Heraklion Archaeological Museum (one of Europe’s most important museums with archaeological finds from all over Crete, covering over 5500 years of the island’s history).

Additionally, we will organize several field trips to Methana, Milos, Santorini, Nisyros, Psiloritis UNESCO Global Geopark, etc. We strongly believe that Crete, considered as one of the top global tourist destinations, having easy access and the appropriate infrastructure, will fulfill all your expectations for a successful meeting.

Sincerely,

Paraskevi Nomikou
Assistant Professor NKUA
President of COV11

ORGANIZERS

The National and Kapodistrian University of Athens (NKUA), in collaboration with the post graduate programme of “Environmental, Disaster and Crisis Management Strategies” (EDCM), the Natural History Museum of Crete (University of Crete), the Earthquake Planning & Protection Organization (EPPO) and the Hellenic

Oceanographers' Association (HOA) are honored to work with you in the Cities on Volcanoes 11.

Please visit the site: <https://pcoconvin.eventsair.com/volcanoes11/>

**EUROPEAN ASSOCIATION OF
ARCHAEOLOGISTS CONFERENCE - 26TH
EAA ANNUAL MEETING, 26-30 AUGUST 2020,
BUDAPEST, HUNGARY**

Dear colleagues,

There'll be a couple sessions I'm co-organising at the European Association of Archaeologists conference - 26th EAA Annual Meeting in Budapest, Hungary, 26-30 August 2020 - that maybe Arch-metals list members might be interested in:

#211 "Truly interdisciplinary science! Ceramic, metal, glass, and stone provenancing studies as tools to understand the archaeology of trade and exchange" and

#262 "Modern Networks and Past Narratives: 'treasure hunting', the art market, scientific analysis, and co-operation for protection of archaeological heritage"

Full list of sessions & session abstracts are at <https://bit.ly/2EjXsHM>

The Call for Papers is open now & closes 13 February 2020. Full info here: <https://www.e-a-a.org/ea2020>

cheers,

Evelyne

Dr Evelyn Godfrey MCIfA
Director, Uffington Heritage Watch
Oxfordshire, England SN7 7SE

Follow UHW on Twitter:
Heritage-Watch @UhtWaece

WORKSHOP CHEMISTRY OF LEAD IN OIL PAINTINGS, 20-21 FEBRUARY 2020, RIJKSMUSEUM, AMSTERDAM, THE NETHERLANDS

We are pleased to announce the workshop **Chemistry of Lead in Oil Paintings** workshop which will take place at the Rijksmuseum, Amsterdam, The Netherlands, **20-21 February 2020**.

The aim of this two-day workshop is to bring together scientific experts to discuss the latest results regarding the physical and chemical processes involving lead pigments and ions in oil paint. With the workshop, we hope to encourage scientific discussion, share our (often unpublished) observations and experiences, identify key problems and formulate sound hypotheses on the behaviour of lead in oil paint in support of our collective research efforts towards the conservation of artworks.

Topics of interest include, but are not limited to:

- New clues on the composition and synthesis of historical lead-based pigments;
- The interactions on the interface between lead-based pigments and oil binder;
- The (re-)crystallization of new lead mineral compounds;
- Reactivity of lead ions in oil binding media (lead soaps, catalysis etc.).

The workshop program features a combination of lectures by key researchers in the field, and extensive discussion sessions on open questions and hypotheses that are introduced by short presentations.

Deadline for registration: January 31st, 2020

Maximum number of participants: 50

Registration fee: €100,- (€50,- for students)

More details and a link to the registration page can be found at:

<https://www.rijksmuseum.nl/nl/nu-in-het-museum/workshop-chemistry-of-lead-in-oil-paintings>

We look forward to seeing you in Amsterdam in February 2020!

Victor Gonzalez & Joen Hermans

Contact: lead-workshop2019@rijksmuseum.nl

FOOD AND DRINK IN FEASTING, 27-28TH
FEBRUARY 2020, UNIVERSITY OF
COPENHAGEN, KAREN-BLIXENS PLADS 8,
15.0.13, FOOD-CLUSTER (TORS), FACULTY
OF HUMANITIES, CALL FOR PAPERS

Food and Drink are essential to keep us alive, but they are thousand different ways to consume them. Their role in feasting is one aspect in that consumption. The choices, what is eaten and drunk, depend on cultural, social and political perspectives, and have very little to do with information about nutrition and health. So what we eat is a question of food preferences, but how we eat, with whom we eat and where we eat is also important and the different practices are dependent on –in the widest meaning- cultural parameters. Feasts play a special role in the consumption of food and drink; feasts might even be the reason why humans started to produce food. Dinners for professors, Christmas family meals, working feasts, royal inaugurations, healing parties and any other kind of feast will be the topic of the workshop. The role of food and drink in these feasts and their importance for society will be studied.

We would like to invite colleagues from history, archaeology, sociology, anthropology and language-based backgrounds to Copenhagen to present and discuss results from their recent studies of food and drink in feasting from all over the world. There will be plenty of discussion time.

The conference is organized by the Food-Cluster in ToRS (Institute of Cross-Cultural and Regional Studies) and will happen February 27/28th 2020 at the University of Copenhagen. There is no registration fee, but please note that places are limited and registration is necessary.

Abstracts of contributions should be no more than 250 words in length and must include a title, names of all authors and their affiliations, as well as contact details of the presenting author. The deadline for abstract submission is 31. December 2019. Please submit your abstract by email to food-workshop@hum.ku.dk. A homepage will follow later.

**ARCHAEOLOGY OF THE IONIAN SEA:
LANDSCAPES, SEASCAPES AND THE
CIRCULATION OF PEOPLE, GOODS AND
IDEAS (PALAEOLITHIC - BRONZE AGE), 10-
11 JANUARY 2020, LECTURE HALL OF THE
SCUOLA ARCHEOLOGICA ITALIANA DI
ATENE**

Parthenonos 14, Athens

Organising committee

Christina Souyoudzoglou-Haywood – IIHSA Director

Christina Papoulia – IIHSA Assistant Director (2016-2019) & post-doctoral fellow,
University of Crete

ioniansea2020@gmail.com

Supported by

IIHSA patrons: Prof George Huxley, Robert McCabe and the Embassy of Ireland

FRIDAY 10 January 2020

ARRIVAL & REGISTRATION (09:30 PM - 10:00 AM)

WELCOME (10:00 – 10:10 AM)

Christina Souyoudzoglou-Haywood & Christina Papoulia

KEYNOTE (10:10 – 11.00 AM)

Helen Dawson:

Comparative perspectives in Island Archaeology: A view from the Ionian Islands

PALAEOGEOGRAPHY (11:00 – 12:20 PM)

Chair: N. Galanidou

11:00-11:20 A. Vött, H. Hadler, L. Obrocki, T. Willershäuser, F. Lang, B. Eder
Palaeogeographical changes and their implications for human activities along the
coasts of the Ionian Sea since the mid-Holocene

11:20-11:40 P. Styles, G. Apostolopoulos, J. Underhill, J. Crawshaw, O. Vikatou, E.
Papafloratou

Use of geoscience to understand the palaeogeographic development of Livadi Marsh,
Paliki: implications for the detection of an ancient harbour and anthropogenic
settlement

11:40-12:00 D. Sakellariou, A. Zavitsanou, G. Rousakis, N. Galanidou
Palaeogeographic reconstruction of the northern Inner Ionian Sea Archipelago (Western
Greece) during Late Quaternary low sea level periods

12:00-12:20 Discussion

COFFEE BREAK (12:20 – 12:50 PM)

ARCHAEOLOGY Session 1 (12:50 – 14:30 PM)

Chair: K. Zachos

12:50-13:10 C. Papoulia, N. Galanidou, C. Souyoudzoglou-Haywood

Tracing Middle Palaeolithic land and sea routes in the central Ionian Sea

13:10-13:30 S. Ligkovanlis, G. Kourtessi-Philippakis

Palaeolithic peopling and settling of Zakynthos island. Interpreting the new evidence within the Western Greek and Adriatic context

13:30-13:50 N. Galanidou, O. Vikatou, M. Gatsi, A. Vasilakis, C. Morgan, J. Forsen, V. Staikou, C. Papoulia, P. Zervoudakis

Prehistoric settlement in the Inner Ionian Sea Archipelago and its Ionian Archipelago connections

13:50-14:10 C. Papoulia

Lithics as diachronic proxies for the circulation of people and ideas in the dynamic Ionian landscape

14:10-14:30 Discussion

LUNCH BREAK (14:30 – 16:30 PM)

ARCHAEOLOGY Session 2 (16:30 – 18:00 PM)

Chair: E. Yiannouli

16:30-16:50 K. Zachos, N. Galanidou

Prehistoric settlement in the Choirotrypa Cave on Lefkas

16:50-17:10 G. Stratouli, T. Bekiaris, V. Melfos

Beyond the horizon. Stone artefacts and social networks in Late Neolithic Drakaina Cave, Kefalonia Island

17:10-17:20 A. Sotiriou

Evidence of settlements on Kefalonia during the EH period. The case of Sami

17:20-17:40 G.J. van Wijngaarden, N. Pieters, C. Wiersma

The Early and Middle Bronze Age in the Ionian Sea. New evidence from the island of Zakynthos

17:40-18:00 Discussion

RECEPTION (18:00 – 20:00 PM)

Offered by the Embassy of Ireland

SATURDAY 11 January 2020

ARCHAEOLOGY Session 3 (10:00 – 11:40 PM)

Chair: G.J. van Wijngaarden

10:00-10:20 A. Vasilakis, T. Pefani

LBA Ellipsoid Megaron at Tzannata, near Poros, Kefalonia. New evidence for the LBA in Kefalonia and the Ionian Islands

10:20-10:40 O. Metaxas

Diverging trajectories within the western Mycenaean koine: the case of Kefalonia

10:40-11:00 I. Voskos

Migrants, refugees and social restructuring in Late Helladic Kefalonia

11:00-11:20 C. Souyoudzoglou-Haywood

Islands in the stream. A maritime perspective of the central Ionian Islands in the Late Bronze Age.

11:20-11:40 Discussion

COFFEE BREAK (11:40 – 12:10 PM)

ARCHAEOLOGY Session 4 (12:10 – 13:50 PM)

Chair: T.J. Papadopoulos

12:10-12:30 E. Yiannouli

‘Archaeological Shoreline Research’ on the cultural semantics of coasts: the promontory of Kapros, SE Kefalonia, in the Bronze Age

12:30-12:50 V. Lanaras

Aitolocarnania and the Ionian Sea in the Bronze Age: A history of interaction

12:50-13:10 M. Cultraro

Reconstructing paths of interregional communications: the LH IIIB-C handmade incised pottery of the Ionian Islands

13:10-13:30 F. Iacono, W. de Neef

The Ionian-Adriatic interface as a landscape of mobility

13:30-13:50 Discussion

LUNCH BREAK (13:50 – 15:30 PM)

POSTER SESSION (15:30-15:50)

- M.K. Kalisch

Climate and environment of the Ionian Islands. From the first human impact to the Protogeometric period

- C. Alberto

The rock-cut tholos tombs between Mycenaean influences and local peculiarities: the case of central-south Sicily

- T. Alusik

Health status, medicine and diet on the opposite sides of the Gulf of Corinth in the Bronze Age

- A. Karadima

Continuity in the material culture of Kefalonia: LBA and Historical Period. The case of Drakaina Cave

ARCHAEOLOGY Session 5 (15:50 – 17:30 PM)

Chair: A. Vasilakis

15:50-16:10 A. Pentedeka, C. Morgan, A. Sotiriou

Making pots in no clay's land: The communal ceramic traditions of prehistoric Ithaca

16:10-16:30 E. Giagkoudi, A. Kanta-Kitsou

Contribution to the study of Bronze Age in Corfu. The case of Ano Korakiana

16:30-16:50 T.J. Papadopoulos

The nature of warfare in Western Greece and the Ionian Islands during the Late Bronze Age

16:50-17:10 V.L. Aravantinos

Homeric questions on Late Bronze and Early Iron Age Ionian revisited

17:10-17:30 Discussion

SUMMARY & CONCLUDING REMARKS (17:30-18:00)

Coordination: C. Souyoudzoglou-Haywood

DINNER for speakers (19:00-21:00)

Christina Souyoudzoglou-Haywood, PhD, FSA

Director, Irish Institute of Hellenic Studies, <http://www.iihsa.ie> & School of Classics, University College Dublin, Director, Kephallonia Project - Livatho Valley Survey, <http://www.iihsa.ie/Kephallonia.html>

**CONFERENCE: THE DECLINE OF BRONZE
AGE CIVILISATIONS IN THE
MEDITERRANEAN: CYPRUS AND BEYOND,
17-18 JANUARY 2020, LILLA HÖRSALLEN,
HUMANISTEN, UNIVERSITY OF
GOTHENBURG, SWEDEN**

Convened by P.M. Fischer and T. Bürge

Address: Renströmsgatan 6, 412 55 Gothenburg, Sweden

Free admission / just send a message if you intend to come to Teresa.Buerge@oeaw.ac.at

See: http://www.fischerarchaeology.se/?page_id=2749

PROGRAM

17 January 08:00 – 09:00

Registration

09:00 – 09:10

Welcome by the Head of the Department

09:10 – 12:30

Session 1

09:10 – 09:50

The end of the Late Bronze Age in the Eastern Mediterranean (P.M. Fischer, University of Gothenburg)

09:50 – 10:30

The role of destruction in conflict and collapse: A view from Cyprus and the Levant in the Late Bronze Age (Igor Kreimerman, Heidelberg University)

10:30 – 11:00

Coffee break

11:00 – 11:40

The end of the Mycenaean Period: Collapse, decline or a bit of both (Helène Whittaker, University of Gothenburg)

11:40 – 12:20

The destruction of the Palace of Knossos and Cretan collapse (Jan Driessen, University of Louvain)

12:20 – 13:30

Lunch break

13:30 – 17:20

Session 2

13:30 – 14:10

The Levant and Cyprus at the twilight of the Late Bronze Age: A new synthesis informed by the texts found in the House of Urtēnu at Ugarit (Carole Roche-Hawley, Centre national de la recherche scientifique, Paris)

14:10 – 14:50

Results of the excavation seasons 2014–2019 at Pyla-Kokkinokremos, Cyprus: A short-lived settlement at the end of the Bronze Age (Joachim Bretschneider, University of Ghent; Jan Driessen, University of Louvain; Athanasia Kanta, Mediterranean Archaeological Society)

14:50 – 15:30

Integrating sciences and technologies at Pyla-Kokkinokremos (Sorin Hermon, The Cyprus Institute, Nicosia; Joachim Bretschneider; Jan Driessen; Athanasia Kanta)

15:30 – 16:00

Coffee break

16:00 – 16:40

Cypriot copper production, consumption and trade in the 12th century BC (Vasiliki Kassianidou, University of Cyprus)

16:40 – 17:20

Bronze Age copper production at Hala Sultan Tekke: First archaeometallurgical results (Mathias Mehofer, University of Vienna)

18:30 – 21:00

Speakers' dinner at the Ågrenska Villan

18 January 09:00 – 12:50

Session 3

09:00 – 09:40

14C-dating of the Late Bronze Age city of Hala Sultan Tekke (Eva Maria Wild, VERA, University of Vienna)

09:40 – 10:20

The LC IIC to IIIA transition at Hala Sultan Tekke: A pottery perspective (Teresa Bürge, Austrian Academy of Sciences)

10:20 – 11:00

Neutron Activation Analysis of the pottery corpus of Hala Sultan Tekke and comparison to literature data (Johannes Sterba, Technical University of Vienna)

11:00 – 11:30

Coffee break

11:30 – 12:10

Provenance analysis of ceramics and stone anchors from Hala Sultan-Tekke: Evidence for intra-island and interregional trade connections during the Late Bronze Age (Paula Waiman-Barak, University of Haifa)

12:10 – 12:50

The external contacts of Cyprus in the Late Bronze Age (Reinhard Jung, Austrian Academy of Sciences; Hans Mommsen, University of Bonn; Tatiana Pedrazzi, Consiglio Nazionale delle Ricerche)

12:50 – 14:00

Lunch break

14:00 – 17:10

Session 4

14:00 – 14:40

Cypriot pottery in Anatolia in the Late Bronze Age (Ekin Kozal, University of Freiburg)

14:40 – 15:20

Trade networks, food storage, and the response to the crisis of LBA societies: An analysis of the Levantine storage and transport containers in the 13th–11th centuries BCE (Tatiana Pedrazzi, Consiglio Nazionale delle Ricerche)

15:20 – 15:50

Coffee break

15:50 – 16:30

Animals at the decline of the Late Bronze Age in Cyprus and beyond (Laerke Recht, University of Cambridge)

16:30 – 17:10

When Cyprus turned cold: A view from the past 6000 years (David Kaniewski, Université de Toulouse, CNRS; Nick Marriner, Université de Franche-Comté; Rachid Cheddadi, Université Montpellier II; Christophe Morhange, Aix Marseille Université)

17:10 – 18:30

Closing discussion, proceedings, future activities

19:30/20:00 –

Speakers' dinner at a local restaurant

2ND SINO-HELLENIC INTERNATIONAL CONFERENCE ON GLOBAL ISSUES OF ENVIRONMENT AND CULTURE, 16-18 OCTOBER 2020, RHODES, GREECE

Conference Background

To promote mutual interest in cultural and environmental issues on a global scale, the University of the Aegean, Greece and Henan University, China as part of an MOU agreement since 2016, are announcing the SECOND jointly organised conference on issues of Environment & Culture.

The Sino-Hellenic International Conference is a series of international conferences hosted in Kaifeng and Rhodes alternatively. On 30th June 2018, the 1st Conference was held in Kaifeng, Henan University, to inaugurate the newly established Research Centre for Hellenic Civilisation. The 1st Sino-Hellenic International Conference in Kaifeng was organized by the Collaborative Innovation Center on Yellow River Civilization & Key Research Institute of Yellow River Civilization (Prof. Miao Changhong) and Sustainable Development, and the University of the Aegean ([Prof. Ioannis Liritzis](#)).

The 2nd Sino-Hellenic International Conference on Environment & Culture

The 2nd SHIC on Environment & Culture will take place in Rhodes, Greece in October 2020. The conference welcomes contribution on any topics related to the environment and cultures globally.

Proposed themes can be a trade networks across Eurasia, comparative research, including periods from prehistory to the 15th century AD. Mainly we welcome experts on cultures from all over the world.

Please visit the site: <http://huaxiahellas.com/conference-2020/>



SOCIETY FOR CYCLADIC STUDIES

Academy of Athens Prize

4TH INTERNATIONAL CYCLADOLOGICAL CONFERENCE, TENOS, 30TH SEPTEMBER- 3RD OCTOBER 2020, FIRST CIRCULAR

The Society for Cycladic Studies is a non-profit organisation established in 1958; its main work is the publication of its annual journal, “Epeteris” for Cycladic Studies, with themes and issues related to the islands of the Cyclades; twenty-one volumes of the “Epeteris” have been published from 1961 till today.

After the successful organization of three International Cycladological Conferences, the First in 1991 on Andros, the Second in 1995 on Thera, and the Third on Syros, in 2016, the proceedings of which have been published in volumes of the “Epeteris”, the Society decided to prepare the organization of the **Fourth International Cycladological Conference on Tenos, from the 30th September 2020 to the 3rd of October 2020.**

Title: The Cyclades: Cultural Heritage - Sustainability.

The proposed thematic conference sections are as follows:

- Environment, Natural and Anthropogenic (geology, geoarchaeology, flora, fauna, palaeoethnobotany, physical anthropology, nutrition, health etc.).
- Archaeology: new investigations in the Cyclades, Conservation, restoration, heritage management of ancient sites, monuments and museums
- Architecture, Land development, and traditional settlements
- History and Demographics, Society, Law: individual and collective behaviour
- Philosophy, Literature, Intellectual Life, and the Arts
- Economy, Sustainable Development, Aegean: Resources and Commercial networks
- Social Anthropology, Folk Culture,
- special studies on Tinos

The Society for Cycladic Studies, addressing the international scientific community, invites both Greek and foreign scholars to participate.

The conference is intended to address both specialists and the wider public.

Where one author proposes several papers, the Scientific Committee will decide on a selection of papers and posters to be presented in the Conference.

Official languages of the conference will be Greek and English.

Oral announcements should last no more than 15 minutes and may be accompanied by PowerPoint presentations. Poster presentations will be additionally accepted, with specific guidelines, which will be announced in the next circular.

Papers and posters must be original and they should not have been presented in other venues or published in other journals in the same specific form.

Those wishing to participate as delegates with oral announcements or poster presentations should send the completed Participation Form with the suggested title of their paper, their name and surname, their title and affiliation, and a summary of their paper (up to 300 words) by May 31, 2020 either via email in: info.ekyklamel@gmail.com or, via post to the following address : Pheron Str. 7, 10434 Athens, Greece

All the submitted papers will be peer-reviewed by a body of independent referees and by the Organizing and Scientific Committees.

After an initial evaluation of submissions, the Organizing Committee will announce, via a new circular, the final number of participants and other details about the conference. The proceedings will be published in the following “Epeteris” volume.

The deadline for the submission of final papers for publication is the 31th May 2019.

Athens, November 2019

GRADUATE ARCHAEOLOGY AT OXFORD **CONFERENCE (GAO) 2020, INNOVATIVE** **APPROACHES TO ARCHAEOLOGY, 23RD -** **25TH MARCH 2020**

Dear colleagues,

We are pleased to announce the call for papers for the **Graduate Archaeology at Oxford conference (GAO) 2020, Innovative Approaches to Archaeology** (23rd - 25th March 2020).

The GAO2020 will encompass the **current state of research in Archaeology**. With the term *innovative*, we refer to the capacity to engage with methodological approaches, theoretical paradigms, and new research to provide crucial insights in the field.

We look forward to receiving contributions on the following thematic sessions:

- Investigating Materiality and Material Interactions: Challenging Approaches and Novel Frontiers.
- Matters of Scaling in Archaeology: Local, Regional, and Global perspectives, Connectivity and Networks.
- The Archaeologies of Colonial Encounters.
- Reconstructing Ancient Landscapes: Landmarks, Soundscapes, and Skyscapes.
- New Directions in the Use of Science-based Techniques on Archaeological Materials.
- Innovative Approaches in Maritime and Underwater Archaeology: Past and Present.

The deadline for the **abstract submission** (for papers and posters) is **12th February 2020**.

For further info, contact the organisers on Gao2020@arch.ox.ac.uk or follow us on the [GAO2020 website](#) and [Facebook](#).

With warm regards,

Marcella Giobbe,
DPhil in Classical Archaeology,
University College, University of Oxford.

Marcella.Giobbe@arch.ox.ac.uk

Emanuele Prezioso,
DPhil in Archaeology,
Keble College, University of Oxford.

Emanuele.Prezioso@arch.ox.ac.uk

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

QUADRAT-FUNDED PHD OPPORTUNITIES
IN HUMAN-ENVIRONMENT DYNAMICS AT
QUEEN'S UNIVERSITY BELFAST (IN
ASSOCIATION WITH UNIVERSITY OF
ABERDEEN)

Duration 3.5 years; Application Deadline Wednesday 22nd January 2020

[Dynamics of carbon capture in Scottish and Irish peatlands over the past centuries](#)
(Supervisors Dr Maarten Blaauw and Dr Dimitri Mauquoy)

[Investigating the timing and causes of nitrogen cycle changes in Bronze Age Ireland](#)
(Supervisors Dr Gill Plunkett and Dr Kate Britton)

[Landscapes of Production: Exploring the Palaeoenvironmental Context of Stone Tool Quarrying, Manufacture, Use and Deposition on Neolithic Shetland](#) (Supervisors Dr Will Megarry and Dr James Schofield)

[Medical Geology: The Impact of the Natural Environment on Health in Past Populations from Ireland and Scotland](#) (Supervisors Prof Eileen Murphy and Dr Rebecca Crozier)

For all projects, see

<https://www.findaphd.com/phds/program/quadrat-doctoral-training-partnership/?p4257>

For further information on the QUADRAT Doctoral Training Program, please visit
<https://www.quadrat.ac.uk/>

Please forward this mail to any suitable candidates, or let me know of their details :-)

Cheers,

Maarten

Dr Maarten Blaauw
Senior Lecturer
Archaeology & Palaeoecology
School of Natural and Built Environment
Queen's University Belfast, UK
<http://www.chrono.qub.ac.uk/blaaauw>
<http://archaeology-palaeoecology-qub.com/>
tel +44 (0)28 9097 3895

SR RESEARCH ASSISTANT/SCIENTIFIC RESEARCH DEPARTMENT AT THE METROPOLITAN MUSEUM OF ART

The Metropolitan Museum of Art, one of the world's finest museums, seeks a Sr. Research Assistant in the Department of Scientific Research. This role provides scientific instrument and methodology support under the supervision of a Research Scientist. Duties will include testing, implementing, and evaluating new sample preparation methodologies and mass spectrometric (MS) analysis for the evaluation of protein-containing art related materials. Duties also include the preparation and artificial ageing of replica samples; coordination of sample collection, distribution, and analytical results from three institutions; perform and evaluate sample preparation methodologies by MS. This 9-month full time position is funded by the Richard Lounsbery Foundation.

PRIMARY RESPONSIBILITIES & DUTIES:

Assists in the evaluation of novel and established sample preparation methodologies for analysis of cultural heritage using established advanced MS analytical techniques and protocols including but not limited to proteins.

Prepare samples according to established and/or new protocols for proteomics and other -omics analyses.

Accompany samples and either perform MS analysis or alternatively work with collaborators to perform MS analysis.

Researchers, plans, conducts, and documents, the creation of replica exemplar materials as well as artificial ageing protocols, followed by characterization of the artificially aged material.

Plans, conducts, and documents the collection and dissemination of replica and authentic samples to collaborating institutions.

Manages and collects data from collaborating institutions.

Performs literature reviews of scientific and conservation publications, proposing improvements to existing protocols and procedures.

Writes progress and summary reports, standard operating procedures, and annotated bibliographies on related topics and activities.

Develops platforms and activities for public engagement, as well as writes scientific articles, papers, reports or books, as appropriate.

Other duties as assigned

REQUIREMENTS & QUALIFICATIONS:

Experience and Skills:

Strong laboratory experience in organic, biological, or biochemical chemistry (preferred).

Experience preparing protein or other materials for analysis by ELISA, LC/MS or MALDI (preferred).

Experience operating and analyzing data from at least two analytical tools. Examples

include but are not limited to optical spectroscopy, Raman or IR spectroscopy, liquid or gas chromatography, mass spectrometry, ELISA or MALDI (required).

Familiar with statistical analysis of data (preferred).

Previous museum experience (preferred).

- Proficient in Microsoft Word processing, Excel spreadsheet manipulation, and use of PowerPoint for documenting, processing, and presenting information (required).

Strong organizational skills (required).

Strong command of both written and spoken English (required).

Knowledge and Education:

- MS in chemistry, biochemistry, materials science, or biology, or BS with equivalent training and experience. (required)
- Strong general chemistry and organic chemistry lab experience. (required)
- Strong command of both written and spoken English. (required)

Please send cover letter, resume, two letters of reference, and salary history to careers@metmuseum.org with "Sr Research Assistant/Scientific Research Department" in the subject line.

The Metropolitan Museum of Art provides equal opportunity to all employees and applicants for employment without regard to race, color, religion, creed, sex, sexual orientation, national origin, ancestry, age, mental or physical disability, pregnancy, alienage or citizenship status, marital status or domestic partner status, genetic information, genetic predisposition or carrier status, gender identity, HIV status, military status and any other category protected by law in all employment decisions, including but not limited to recruitment, hiring, compensation, training and apprenticeship, promotion, upgrading, demotion, downgrading, transfer, lay-off and termination, and all other terms and conditions of employment. AmeriCorps, Peace Corps, and national service alumni encouraged to apply.

RESEARCH ASSOCIATE/SCIENTIFIC RESEARCH DEPARTMENT AT THE METROPOLITAN MUSEUM OF ART

The Metropolitan Museum of Art, one of the world's finest museums, seeks a Research Associate in the Department of Scientific Research. This role entails scientific analytical development and optimization tailored to the interrogation of complex cultural heritage materials under the supervision of a Research Scientist within the Met's Scientific Research Department. Duties will include developing, implementing, and evaluating novel mass spectrometric (MS) approaches for the study of composite samples from artworks. This is a one-year full time position funded by the Richard Lounsbery Foundation.

Primary Responsibilities and Duties:

- Assists in the development, implementation and evaluation of novel MS approaches for analysis of cultural heritage materials including but not limited to proteins, polysaccharides and lipids in collaboration with The University of Bordeaux, France.
- Researches, plans, conducts, and documents, protocol development in collaboration with The University of Bordeaux.
- Establishes and implements MS analysis protocols at the museum.
- Develops and utilizes databases and applications to streamline the documentation and dissemination of results.
- Fosters relationships with art conservators, historians and archaeologists from partner museums within an interdisciplinary research environment.
- Performs literature reviews of scientific and conservation publications, proposing improvements to existing protocols and procedures.
- Writes progress and summary reports, standard operating procedures (SOPs), and annotated bibliographies on related topics and activities.
- Develops platforms and activities for public engagement, as well as writes scientific articles, papers, reports or books, as appropriate.
- Other duties as assigned

REQUIREMENTS & QUALIFICATIONS:

Experience and Skills:

- Demonstrated expertise in mass spectrometry and advanced liquid chromatographic analytical techniques (LCMS, MALDI-MS) (required).
- Development and implementation of sample preparation, analysis methods and protocols for MS analysis of proteins, polysaccharides or lipids (omics methods) (required).
- Development and implementation of sensitive methods and protocols for the evaluation of degraded or modified proteins, polysaccharides or lipids (preferred).
- Experience in chemical interactions and/or crosslinking (preferred).
- Implementing advanced statistical analysis methods on scientific data (preferred).
- Development of process automation using modern database software and web-enabled tools (preferred).

Knowledge and Education:

- Ph.D. in chemistry, biochemistry, engineering, materials science, related disciplines or equivalent experience (required).
- Experience working in museum environments, specifically, either with or in proximity of art objects (preferred).
- Strong command of both written and spoken English (required).
- Ability to work in partnership on location at the University of Bordeaux in Bordeaux, France for up to one month. (required).

Please send cover letter, resume, two letters of reference, and salary history to careers@metmuseum.org with "Research Associate/Scientific Research Department" in the subject line.

The Metropolitan Museum of Art provides equal opportunity to all employees and applicants for employment without regard to race, color, religion, creed, sex, sexual orientation, national origin, ancestry, age, mental or physical disability, pregnancy, alienage or citizenship status, marital status or domestic partner status, genetic information, genetic predisposition or carrier status, gender identity, HIV status, military status and any other category protected by law in all employment decisions, including but not limited to recruitment, hiring, compensation, training and apprenticeship, promotion, upgrading, demotion, downgrading, transfer, lay-off and termination, and all other terms and conditions of employment. AmeriCorps, Peace Corps, and national service alumni encouraged to apply.

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

ANCIENT METALS AND METALLOGRAPHY: SUMMER SCHOOL COURSE, JULY 20TH-24TH, 2020, EAST SUSSEX COAST COLLEGE, STATION APPROACH, HASTINGS, EAST SUSSEX, UK

Summer School in Ancient Metals and Metallography

To be held at: East Sussex Coast College, Station Approach, Hastings, East Sussex, UK

July 20th-24th 2020. Course is limited to 10 participants only.

Course Aims: This five-day course will act as both an introduction and a focus of more intensive study dealing with the examination, analysis, metallographic examination and deterioration of ancient and historic metals. The course is designed to benefit conservators, scientists and archaeologists who wish to learn how to prepare metallic samples for metallographic study, learn something of the technological aspects of the working and structure of metals, and how corrosion and patination can be discussed and examined.

Artefacts for examination: Over the past 35 years an unrivalled collection of mounted metallographic samples has been assembled, which are studied as part of the course practical work, involving both polarized light microscopy and metallographic microscopy of both freshly polished and etched samples. These samples range from cast iron from China to wootz steel from India, bronze coinage alloys from the Roman Empire to high-tin bronze from ancient Thailand, silver alloys from the Parthian period to ancient Ecuador, gilded copper and tumbaga from Peru and Colombia, to mention only a few of the geographical areas covered by available samples. Course participants will be instructed in the use of polishing and etching in the examination of ancient metals and are encouraged to keep digital images of the samples they have prepared during the week. Students may also bring their own samples for examination if mounted and ground, or if not mounted, then one or two samples may be brought which can be mounted and prepared during the course.

Course Instructor:

Distinguished Professor Emeritus David A. Scott, Founding Director of the MA program in Archaeological and Ethnographic Conservation at UCLA, 2003- 2011, and Professor, Department of Art History. His book, *Copper and Bronze in Art: Corrosion, Colorants, Conservation* won the prize from the Association of American Publishers as the best Scholarly/Art book published in the USA in 2002. Professor Scott has published over 150 papers in the peer-reviewed literature and is an Editor for the journal: *Studies in Conservation*.

Course Schedule: The course will be held over five days from 20th-24th July 2020. The

course will be held at the Chemistry Laboratory of the East Sussex Coast College, Hastings, UK. 9.15am – 4.50pm each day.

Course Costs: The cost of the instruction for the five days will be 500 pounds sterling. This cost also includes a free copy of Dr. Scott's book: Ancient Metals: Microstructure & Metallurgy Volume I: Copper and Copper Alloys, published in 2011. For details of payment and to register for this course, please contact the course organizer and director whose email is: dascott@ucla.edu.

Course Details:

Monday:

Introduction, use of the metallurgical microscope, the mounting and polishing of samples, their preparation, use of resins, grinding and polishing. Introduction to phase diagrams and their application to ancient bronzes and copper alloys. Copper-arsenical, copper-nickel, and copper-tin alloys. Casting and working of metals and aspects of bronze casting in the ancient world. Etching of some copper alloys. Recording of samples with digital camera and case studies in the examination of a group of copper alloy plaques and a bronze figurine of the God Osiris will be discussed.

Tuesday:

Continuation of the examination of copper-tin and copper-tin-lead alloys. Ancient coinage alloys of the Roman period, examination of copper-arsenic bronzes, aspects of the corrosion of bronze and copper alloys. The Pourbaix diagram and some of its applications. The extraction of metals from their ores and some principles of the Ellingham diagram.

Wednesday:

The phase diagram for copper-silver and lead-tin alloys. Examination of silver and debased silver alloys. Surface enrichment and corrosion. Problems in the authentication of ancient silver and bronze alloys. Metallographic examination of ancient silver alloys and techniques of etching silver. Discontinuous precipitation phenomena and the age of silver alloys. Colour etching of both copper alloys and silver alloys. The Philosopher plate and the Strozzi silver basin: case studies from the J. Paul Getty Museum.

Thursday:

Mounting of samples brought by students. Examination of some ternary phase issues in relation to gold-silver-copper alloys. The corrosion of tumbaga alloys and aspects of the Pourbaix diagram. Video concerning the extraction of iron and steel. Introduction to iron and steel. The principles of corrosion and the eight types of corrosion of metals. The examination of iron from meteorites. The technology of ancient iron and steel in the West, in India and in China will be contrasted and samples illustrating these different technologies examined. The metallography of ancient iron alloys.

Friday:

Examination of course participant samples. General discussion. Gold and gold alloys: gilding: examination of gold alloys. Lecture on the technology of ancient gold alloys in South America. Continuation of laboratory work in the examination of mounted samples.

2020 CYPRUS INSTITUTE SUMMER SCHOOL **"GLASS, CERAMICS AND METALS:** **ANALYSING ARCHAEOLOGICAL** **MATERIALS", 12-19 JULY, 2020**

Dear colleagues,

The Science and Technology in Archaeology and Culture Research Center ([STARC](#)) of The Cyprus Institute, in collaboration with the Cyprus American Archaeological Research Institute (CAARI), Cambridge Archaeology and University of Leuven are delighted to announce the 2020 Cyprus Institute Summer School **"Glass, Ceramics and Metals: Analysing Archaeological Materials"** will be held 12-19 July, 2020.

The summer school is organised around an intensive series of daily lectures from leading archaeological scientists from STARC, the University of Cambridge, KU Leuven and UCL (see attachment for full daily schedule).

The Summer School will run in parallel with the excavation of the of the Bronze Age settlement of [Kissonerga Skalia](#), directed by Dr L. Crewe, Director of CAARI. Through this, the participants will be able to gain hands-on experience on various archaeological materials in addition to the lectures. The summer school will include field trips and visits to archaeological sites.

For more information on the Summer School programme and application please see attached announcement or visit: <https://promisedtwinning.cyi.ac.cy/training/summer-school-2020>.

Please forward this announcement accordingly.

Kind regards,

Yiannis Trimithiotis
PROMISED - Project Officer, STARC
The Cyprus Institute
20 Constantinou Kavafi St.
2121 Aglandjia, Cyprus

Tel.: +357 22 208 642
Fax: +357 22 208 625
e-mail: y.trimithiotis@cyi.ac.cy
web: www.cyi.ac.cy

CONSERVATION AND PHYSICOCHEMICAL STUDY OF METAL ARTIFACTS



*

Athens – Chalkis , 3 - 8 February 2020



Partners in this project: Faculty of Archaeology, Leiden University; Ephorate of Antiquities of Euboea (Chalkis); Netherlands Institute at Athens (NIA); Greek Research Center/Laboratory 'NCSR Demokritos' (Athens).

The Workshop (3 ECTS):

During one week (3-8 February 2020), a workshop for the 'CONSERVATION AND PHYSICOCHEMICAL STUDY OF METAL ARTIFACTS' will take place at Athens and Chalkis in Greece. This workshop provides an unique opportunity for BA, MA, RMA and PhD students to gain more knowledge and a hands-on experience in conservation of metal objects. Finally, a first approach of physicochemical analyses will be presented. All teaching will be in English.



Contact for information:

Workshop instructor:

Adamantia Panagopoulou

mpanagopoulou@hotmail.com

Application: www.nia.gr

Application deadline:

24 January 2020, or until the places are filled (maximum 12-15 persons).

All participants will receive: 3 ECTS, project notes, certificate & a T-shirt

By the end of the workshop the participants will:

- get knowledge on the exchange of goods and the use of metal objects;
- learn about shapes, types and technology of Byzantine metal objects & improve their knowledge on Byzantine history and archaeology in Greece;
- get acquainted with the basic methods of documentation for the conservation and restoration of Byzantine metal objects;
- learn about the necessity of physicochemical analyses on metal objects;

**ARCHAEOLOGICAL SOIL AND SEDIMENT
MICROMORPHOLOGY COURSE, JUNE 22-26,
2020, MALCOLM H. WIENER LABORATORY
FOR ARCHAEOLOGICAL SCIENCE,
AMERICAN SCHOOL OF CLASSICAL
STUDIES AT ATHENS**

Deadline: March 15, 2020

An intensive week-long course in Archaeological Micromorphology is offered by the Malcolm H. Wiener Laboratory for Archaeological Science. Dr. Panagiotis (Takis) Karkanas, Director of the Wiener Laboratory, and Dr. Paul Goldberg, Visiting Professorial Fellow at the University of Wollongong, will lead the course, which will primarily focus on deciphering site formation processes and micro-stratigraphy. Students will receive instruction in optical mineralogy, description of micromorphological thin sections, and analysis of soil fabrics and sedimentary microstructures.

Training will include the study of:

- Soils and pedogenic processes
- Natural processes in archaeological sites (e.g. water and debris flows, wind-blown sediment, standing water sediment)
- Biological sediments (e.g., dung, coprolites, guano)
- Anthropogenic processes (e.g., burning, stabling, living and constructed floors, dumping and filling, trampling, raking, building materials)
- Post-depositional alterations (e.g., chemical diagenesis, bioturbation)

A maximum of 8 students will be accepted for the course. Preference is given to advanced students with a background in geoarchaeology, and preferably some exposure to optical mineralogy as well.

Training fee is 350 euros for the entire week. Accommodation is not provided, but we will offer recommendations and assistance to course participants in order to arrange accommodation themselves.

The course will take place from June 22-26, 2020. Applications will be submitted no later than March 15, 2020 via the online application form:

<https://ascsa.submittable.com/submit/154931/archaeological-soil-and-sedimentmicromorphology-course>.

Applications will include one paragraph outlining the candidate's background and why the candidate is interested in participating in the course, a CV, and names and email

addresses of two referees. Participants who successfully complete the course of instruction will receive a certificate detailing the content of the course.

For further information or questions, please contact Dr. Panagiotis (Takis) Karkanis at tkarkanis@ascsa.edu.gr.

AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS

FOUNDED 1881 www.ascsa.edu.gr

54 Souidias Street, GR-106 76 Athens, Greece

• Telephone: +30-213-000-2400 Fax: +30-210-725-0584

6-8 Charlton Street, Princeton, NJ 08540-5232 • Telephone: 609-683-0800

INTERNET SITES

PODCAST EPISODE 1: DIGGING UP DISASTER

How did an ancient Roman harbor end up in ruins? Scientists got their answer, but solving this mystery led to a bigger question.

HOW DID AN ancient Roman harbor end up in ruins? Scientists realized the culprit was a long-forgotten natural disaster that left tell-tale geological clues -- and possibly an eyewitness account in an ancient religious text. But solving this mystery led to a bigger question:

what if it happens again?

TRANSCRIPT

PETER GWIN (HOST): Once upon a time, there was a budding archaeologist and some old, old ruins. The archaeologist is named Beverly Goodman and the ruins are a city called Caesarea, on the coast of Israel.

BEVERLY GOODMAN (ARCHAEOLOGIST): So Caesarea today, when you go there, the majority of the harbor is now underwater. And then as you go off into the deeper part of the harbor, you need to go there with scuba gear in order to see it.

GWIN: Twenty years ago, Beverly was a grad student in her 20s. She was on a team diving in the Mediterranean Sea asking pretty standard questions about the harbor at Caesarea. Basically: what happened here?

GOODMAN: The harbor definitely had signs of deterioration about 100 years after it was built. But the issue was why?

GWIN: Why did the harbor sink into the sea? Some archeologists spend their whole careers asking questions like that and never find an answer.

Not Beverly.

GOODMAN: There is a picture where I'm excavating through and I'm looking at the camera with the like, oh my gosh. And of course I'm working with my supervisor and he's going, this could be it, this could be it. And, and, you know I just remember staring at this section and thinking, wow. You know? This is what we were really looking for.

GWIN: What Beverly found didn't just change what archeologists know about this ancient city. It changed the way they think about Israel today and it may help save lives in the future.

GWIN: I'm Peter Gwin, and this is Overheard at National Geographic. A show where we eavesdrop on the wild conversations we have at Nat Geo and follow them to the edges of our big, weird, beautiful world.

This week, could a religious text hold the clues to an ancient natural disaster? And what if what happened to Caesarea, happens again? More after the break.

GWIN: So tell me about when you started digging at Caesarea.

GOODMAN: So my first experience in Caesarea was as a student. I came to get some summer credits and see some old friends and have a good time and I was –

GWIN: So you came to Caesarea to party is what you're really telling me, Beverly.

GOODMAN: Uh, Peter. My parents are gonna listen to this.

GWIN: For all those parents listening, the study abroad thing actually worked out because today Beverly is a professor at the University of Haifa in Israel and a Nat Geo explorer.

After that first trip to Caesarea in the mid-1990s, she came back as a grad student. And ever since, she's been uncovering secrets buried along the Israeli coastline.

But how Caesarea's harbor was destroyed? That eluded archeologists for a long time.

GOODMAN: It even kind of became a bit of a staff joke. You know, anytime we saw something that we didn't quite know what to, what to make of it we kind of go, oh yeah. That's probably the tsunami.

GWIN: Beverly is a geoarchaeologist. Her superpower is reading stories in underwater sediments. She and the team of underwater archaeologists would measure how thick different layers were and note when they found pottery or other signs of ancient people.

One day, they finished work and floated to the surface of the water.

GOODMAN: But the problem was we were sort of too early in the day to call it a day and to go and, you know, have a beer. Um, and we were too late in the day to really have the strength and energy to take all of the equipment and move on to our next target. So they said, you know what? Just keep digging. What'll it hurt, right?

GWIN: And that was the beginning of the end of the tsunami joke. Because that day, buried under the seafloor, Beverly found a strange layer of shells, pottery, and pebbles all mixed up in a jumbled mess.

GOODMAN: So this might not sound so exciting. I mean, we're working underwater and I'm telling you that we're finding shell. Okay. So, wow. Amazing, shocking, you know, revolutionary. Um, but what was really unique about it was that it was a very, very thick layer so it was nearly three feet thick.

And when you see something like that you have to go okay, well, why is it here? Um, when is this from? You know, are we looking at three feet that happened over ten thousand years? Or are we looking at three feet of a deposit that happened in a week? Um, you know, those are two very different things.

GWIN: They sent samples from the seafloor to a lab for dating. And when the results came back...

GOODMAN: Everything was giving us the same age and so that meant that it could be that this was all happening in a single short-term event.

GWIN: So this is a lightning strike? Harry Potter getting his lightning bolt scar for you.

GOODMAN: Oh yeah. Sometimes I do feel like I have this tsunami sign on my forehead.

GWIN: So if a tsunami did hit, what would it have washed away? There's still a place called Caesarea. Today, it's a quiet town on Israel's coast. But around the time of Jesus, it was a sparkling city where everything was brand new.

GOODMAN: You can almost imagine this kind of, like, prefab Roman city. You know, it would have felt just, you know, had the paint not yet dried and just a very, very, very new and state of the art sort of city.

GWIN: There was an outdoor theater looking out over the sea. A brand-new arena for chariot races. And a harbor that would make Caesarea the most dominant seaport in the region.

GOODMAN: The harbor itself was a completely artificial harbor and the way that they did that is by actually putting islands out from the coastline. These artificial islands made out of wooden frames that were filled with cement. So a very, very state of the art technology at its time.

GWIN: It wasn't just state-of-the-art. It was an audacious, aggressive building project. And all of it was driven by one man: King Herod.

HENRY ABRAMSON (PROFESSOR): On the one hand, Herod was an incredibly awful, devious, murderous tyrant. On the upside though, what an amazing visionary when it came to architecture and building.

GWIN: Henry Abramson is a professor of Jewish history and a dean at Touro College in Brooklyn. And he's talking about one of the most notorious villains in the New Testament. King Herod is the bad guy in a story known as the Massacre of the Innocents.

ABRAMSON: Having heard a prophecy that Jesus was born, he attempted to kill all of the children born in that year.

GWIN: Jewish tradition has stories about Herod too and they don't paint a flattering picture.

ABRAMSON: One of his wives, uh, who he was very, uh, in love with, but at the same time he felt that she was trying to betray him -- he had her murdered. But then in a fit of remorse didn't want to bury her body. So he had it preserved in a vat of honey.

GWIN: Herod and most of his subjects were Jews. But his kingdom was part of the Roman Empire and Herod wanted to show the Romans that he was one of them.

ABRAMSON: Putting up an amphitheater meant you'd have, like, gymnastics and athletics and these were things were all done by the way totally in the nude. So that was like really not something that flies very well in Jerusalem then or now. So it was like a huge statement about how it's such a great thing that Rome is now in charge of Judea and we're going to celebrate Roman culture in a very big and concrete way. Literally, right here with the architecture of Caesarea.

GWIN: Herod even named his new port city after the emperor, Caesar Augustus. And his gambit worked. Caesarea became a major Roman center in the Eastern Mediterranean. Today, the ancient city is mostly in ruins.

GOODMAN: But from the foundations it's really possible to understand what the size of the buildings were and what the styles of the buildings were. So today what they did in Caesarea is they've done a lot of reconstruction of, of the some of the larger features like the theater. So you can go and see air supply or Radiohead or the Pixies.

Um, yeah.

GWIN: Wow, the Pixies and a Roman theater is –

GOODMAN: It was awesome.

GWIN: Oh you saw it?

GOODMAN: Yeah, of course I was there!

GWIN: Do people still use the harbor that's there?

GOODMAN: Well, the harbor is a whole 'nother story.

GWIN: And that other story is not written down, even though the Romans seemed to write everything down. Beverly says there's no written record of what happened to the harbor.

So when the lab results showed something massive happened all at once, she wondered, could it really be a tsunami?

GOODMAN: So when we first got the date back, we found that it was sometime, you know, in the early second century. And so we went straight to the published Tsunami Catalog.

GWIN: The Tsunami Catalog: definitely not where you do your holiday shopping. The Tsunami Catalog is a list compiled by geologists and historians of every single known tsunami, going back thousands of years.

GOODMAN: And there was conveniently only one event that, that actually fit with the timing of the radiocarbon dates.

GWIN: In 115 AD, there was an earthquake in Turkey. Nearly two millennia later, a historian proposed that particular earthquake caused a tsunami and so he added that date to the tsunami catalog. His evidence? One murky account in an ancient Jewish text: The Talmud.

Is this correct to say that you're a scholar of the Talmud or a Talmudic scholar?

ABRAMSON: I think either of those would be fair. Um, don't call me a rabbi, though. I'm not a rabbi, just a regular guy.

GWIN: Henry Abramson is a regular guy who has also written a couple of books about the Talmud.

So for total beginners, how do you describe what exactly is the Talmud?

ABRAMSON: So the short version of what the Talmud is is it is a massive document of over 5000 pages that is the codification of literally the conversation of thousands of people over several hundred years.

GWIN: And Henry says in all of those conversations and all of those pages, the Talmud has one, single goal.

ABRAMSON: Bringing its readers closer to God in every way possible as understood by the rabbis of the ancient world. The rabbis literally talked about like how would God want us to tie our shoes. How would God want us to eat. How does God want us to conduct business, to be married, to be divorced.

GWIN: And another thing about the Talmud: it's not always straightforward. Henry says the traditional way to learn it is with a partner, arguing the exact meaning of each passage.

ABRAMSON: It's the kind of document where you are immersed in the argument and suddenly you'll hear a note in the symphony that you had never heard before. It's like, oh my gosh, there's an oboe there. That changes everything without that oboe. "How did I listen to this without the oboe?"

GWIN: So what if the oboe was a description of an ancient tsunami?

ABRAMSON: You know, the first time I heard this, I knew exactly which passage she was referring to. And I said no, you can't. This can't be your -- you can't be serious.

GWIN: So I asked Henry and Beverly, what exactly is the story in the Talmud?

ABRAMSON: For cognoscenti, this is page 59b of tractate Bava Metzia. Okay, here we go. Tanur achnai

GOODMAN: Essentially the rabbis are debating whether or not, um, a particular type of oven is kosher.

ABRAMSON: Doesn't really matter what they're arguing about but what does matter is that Rabbi Eliezer holds one opinion and all the other rabbis disagree with him.

GWIN: So the first rabbi says, if I'm right, these trees will give us a sign.

ABRAMSON: And as soon as he says this, this tree is uprooted and it flies a hundred meters away.

GWIN: The other rabbis say cool trick, but that's not how you win an argument. But that first rabbi -- he's not giving up. He says if I'm right and this oven is kosher, the irrigation canal will give us a sign.

ABRAMSON: And the waters in the canal began to flow backwards.

GWIN: Again, the rabbis aren't convinced and so he ups the game and says if the oven is kosher we'll get a sign from this very house that we're studying in.

ABRAMSON: And the walls of the house of study began to collapse inwards.

GWIN: Yeah. The rabbis still aren't impressed.

GOODMAN: And the rabbi council basically says...

ABRAMSON: You can't bring a proof from a carob tree or from an irrigation canal or from the walls of a building. You can't even bring a proof from a divine voice.

GOODMAN: God gave us the rules and our job is to interpret them.

ABRAMSON: You can't prove your position with a supernatural occurrence.

GWIN: So, yeah, the traditional message of this story has nothing to do with tsunamis. It's a lesson about Jewish law and how to argue. But the details: they got Beverly's attention.

GOODMAN: If you talk about trees shifting position and walls leaning in and water running the other direction, these are actually all wonderful signs of, of earthquake activity.

GWIN: There's one more detail. The Talmud says that after the argument, one of the rabbis was out at sea when he saw a huge wave.

ABRAMSON: It could be that the rabbis saw all of these things, all of these natural phenomena and when they codified the story, they folded that experience into the narrative. Not necessarily because they're trying to teach us seismic natural history. They want us learners of the Talmud to get closer to God.

GWIN: So now that you've had a little time to think about this, what do you think of her theory? As far as that this may relate to an actual, real tsunami?

ABRAMSON: Oh, I'm absolutely convinced that this passage in Bava Metziah is related to the tsunami of 115. It, it makes perfect sense. I take issue with the idea that it's "proved" by the Talmud, but it is I think a corroboration of the tsunami occurring and it certainly enriches my understanding of the Talmud. Next time I go through the whole thing I am definitely going to keep my eye out for these kinds of occurrences.

GOODMAN: I really believe that a lot of these stories... While humans are very imaginative species, we have our limitations and we certainly like to describe things that have some element of truth in them.

You know, was there a flood where Noah built a boat and went on there and took two of each? Well, unlikely. Okay. Uh, but if you look at where there times in history where villages were destroyed entirely by floods? I mean, you can imagine how that would have entered into the imagination, the experience of the people.

You know, from a deep psychological level this sort of, you know, need to understand how those things happened, why they happened and, you know, incorporating them into their, into their stories. Into their religious texts.

GWIN: When you made this connection and you presented the tsunami and the Talmud, what did other archaeologists think?

GOODMAN: Yeah, it was... Okay, I'm trying to find the right sentence here.

GWIN: Let me find the nice way to say what they actually said to me.

GOODMAN: Yeah. [laughs]

I remember one specific lecture that I gave and I described the tsunami evidence and everything that we saw. And at the end of the talk there was absolute silence and then someone raises their hand and they call on him and he says, "Who's your supervisor?"

GWIN: Ha! Oh man.

GOODMAN: Which you know was, pretty much summed up how it was received in the scientific community in the beginning.

GWIN: So they weren't just critical, they were belittling. But Beverly says, it was all valuable feedback.

GOODMAN: The good news is that when people are standing in front of you and giving you criticism or telling, you know, how your work is bollocks because you know it's this, this, and that. You know, just take detailed notes. They're saving you a lot of time.

GWIN: Because where they find holes, you find answers. Beverly set out to collect more evidence. She took more extensive samples of the rock layer all along the coastline. It all pointed to a tsunami.

GOODMAN: We don't really, truly have a litmus test where we can, you know, put a piece of paper in there and it's going to come out bright orange and say, you know, yes, this is a tsunami. All that we can do is actually try to compare it to other possible ways that that these materials would end up there. And by doing that, what ended up happening was not only did we find that first event, okay? The first event that was the initial discovery but it turned out there were more events. It wasn't the only one.

GWIN: There were more tsunamis. At least six of them recorded in rock over thousands of years. Beverly reviewed notes from previous excavations and found evidence of what the tsunamis did to people.

GOODMAN: One of the things that we found in the notes were descriptions of articulated human skeletons in non-burial contexts inside thick beds of shell. So what that means is basically your tsunami Pompeii in the sense that these were probably tsunami victims that were in the debris of the tsunami itself.

GWIN: So people died from these tsunamis. Beverly was building a pretty convincing picture: several tsunamis had pummeled Israel.

And then, something catastrophic happened that made her research seem more pressing.

GOODMAN: December 26, 2004 for me was like many people in the world. Was a terrible day.

NPR NEWS TAPE: Tidal waves crashed ashore in many Asian nations. The waves were spawned by the world's biggest earthquake in 40 years. The quake was a magnitude 9.0 and was centered off the coast of Sumatra. Thousands of people were swept away...

GWIN: That tsunami killed more than 200,000 people. By far the deadliest tsunami in recorded history.

GOODMAN: There I am watching this event on the television and I just remember thinking, wow. There is tsunami risk in the Eastern Mediterranean and nobody seems to buy it.

It's a problem that I know this and not enough other people know about it. Um, and so for me I think that was a really pivotal point where I sort of understood going after this issue of the tsunami risk on the coast of the Eastern Mediterranean was something that I really needed to follow through to the end.

GWIN: It wasn't just Beverly who gained a sense of urgency after the tsunami in 2004. It shocked countries all over the world. All of a sudden, they were reconsidering their own tsunami plans. If they even had one.

AVI SHAPIRA (GOVERNMENT COMMITTEE CHAIRMAN): I don't know if you have been to Israel, but uh, if you go in the summer on a Saturday to the beach we have several hundreds of thousands of people on the beach. It is a major issue how to evacuate them.

GWIN: In the late 2000s, Avi Shapira took over the Israeli government committee in charge of studying the risk of earthquakes and tsunamis.

Israel had had strong earthquakes in modern times, so the government knew it needed to be ready. But tsunamis?

SHAPIRA: No. No, no. We practically didn't have any clear data about the tsunami.

GWIN: In fact, Avi says he could count the tsunami experts in Israel on one hand. So....

SHAPIRA: Beverly was just the right person to approach. And uh, yeah, we squeezed a lot of information out of her brain.

GWIN: In 2014, Beverly Goodman presented her research to a gathering of emergency response officials in Israel. After she finished, Avi Shapira took the podium and his speech was loaded with Beverly's research. She was finally getting people's attention.

And Israel developed its first tsunami plan.

SHAPIRA: The first problem we had is what should we prepare for? What territory could be flooded, could be inundated? And make sure that we can evacuate the people on time from these places.

GWIN: Avi retired from the committee at the end of 2015. But the current chairman picked up right where he left off. In the past few years, Israel has rolled out evacuation drills and outreach programs.

SHAPIRA: The first target was uh, schoolchildren. If you teach them, they teach their parents. We ask the Ministry of Education to train the children what to do during a tsunami warning.

GWIN: And today, on Israel's most popular beaches, there are tsunami warning signs.

GOODMAN: I get excited all over every time I see one of these signs.

When I go down to a, to a beach that I haven't been to before and I see a sign, I take a picture I think of every single one.

To know that they're there to know that um, you know it's, it's part of a larger program to try to minimize the um, sort of damage, to minimize the sort of numbers of people that will be hurt and, and lives will be lost is just a phenomenal feeling.

GWIN: Beverly still advises the committee on questions like how far inland could a tsunami reach? They're adding more signs and working on bigger and better drills.

GOODMAN: What are the odds there'll be another tsunami? My answer is 100 percent. You know, we know from the past that tsunamis occurred.

We have the historical evidence. We have the physical evidence. There will be another tsunami. We just don't know when it's going to happen.

GWIN: Beverly hopes she never sees it. But if a tsunami does sweep in just like it did in the time of the Romans, Caesarea will be prepared.

GWIN: Seismologists say it's impossible to predict exactly when an earthquake or tsunami will happen, but we know they will happen. One scientist who studies the patterns of earthquakes and tsunamis predicts another big one could hit Indonesia not too far in the future. You can read more about that in our show notes.

Also, if you want another story about the overlap between science and religion: scientists in Israel have compared stories in the Bible with sediment from the Dead Sea. One researcher made a connection between earthquakes and a Bible story of fire and brimstone. That's also in the show notes. They're right there in your podcast app.

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ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

"2ND EDITION ADVANCES IN REMOTE SENSING FOR ARCHAEOLOGICAL HERITAGE", A SPECIAL ISSUE OF REMOTE SENSING

(ISSN 2072-4292)

This Special Issue assesses the status of remote sensing applications in archaeology and explores how their use could have a more significant impact on archaeological research and cultural heritage protection in the future. It is organized in conjunction with the Remote Sensing and Photogrammetry Society (RSPSoc) Archaeology Special Interest Group. Remote sensing and GIS have rapidly been adopted by archaeologists for several key reasons: Fast mapping of entire landscapes, analysis of large datasets, and a way of recording features in areas rendered inaccessible, for example in areas affected by current conflict, by land-use change, and in built heritage. In recent years many image interpretation-based studies, classifications and automated detection projects (and thermal imaging, photogrammetry, LiDAR, Synthetic Aperture Radar, and the relatively low-cost/open source and user-friendly structure-from-motion software packages have been applied to cultural heritage protection as well as recording and analysis. Applications have also sought to demonstrate the use of remote sensing for specific regions, sites, buildings and even objects. The value of many of the products of these analyses needs to be established more robustly, however, reflecting on the need for them to enhance our understanding of past landscapes rather than primarily acting as aesthetically-pleasing visualizations. While many archaeological projects rely exclusively on trained expertise in remote sensing, others are also making use of citizen scientists to build larger datasets. This issue will present a number of relevant remote sensing tools and case studies across a wide temporal and spatial range and assess the impact of an increasingly open-source research environment; it will also promote a discussion of how the impact of remote sensing and GIS techniques in archaeology and cultural heritage can be increased.

Dr. Christopher Brooke
Dr. Louise Rayne
Prof. Danny Donoghue
Guest Editor

Detecting and Mapping Slag Heaps at Ancient Copper Production Sites in Oman by Alexander J. Sivitskis ,Joseph W. Lehner ,Michael J. Harrower ,Ioana A. Dumitru ,Paige E. Paulsen ,Smiti Nathan ,Daniel R. Viète ,Suleiman Al-Jabri ,Barbara Helwing ,Frances Wiig ,Daniel Moraetis andBernhard Pracejus Remote Sens. 2019, 11(24), 3014; <https://doi.org/10.3390/rs11243014> -

14 Dec 2019

Abstract This study presents a new approach for detection and mapping of ancient slag heaps using 16-band multispectral satellite imagery.

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26 Oct 2019

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15 Oct 2019

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DENDROCHRONOLOGICAL EVIDENCE FOR LONG-DISTANCE TIMBER TRADING IN THE ROMAN EMPIRE

Mauro Bernabei, Jarno Bontadi, Rossella Rea, Ulf Büntgen, Willy Tegel

Abstract

An important question for our understanding of Roman history is how the Empire's economy was structured, and how long-distance trading within and between its provinces was organised and achieved. Moreover, it is still unclear whether large construction timbers, for use in Italy, came from the widespread temperate forests north of the Alps and were then transported to the sparsely-wooded Mediterranean region in the south.

Here, we present dendrochronological results from the archaeological excavation of an expensively decorated portico in the centre of Rome.

The oak trees (*Quercus* sp.), providing twenty-four well-preserved planks in waterlogged ground, had been felled between 40 and 60 CE in the Jura Mountains of north-eastern France. It is most likely that the wood was transported to the Eternal City on the Saône and Rhône rivers and then across the Mediterranean Sea. This rare dendrochronological evidence from the capital of the Roman Empire gives fresh impetus to the ongoing debate on the likelihood of transporting timber over long distances within and between Roman provinces.

This study reconstructs the administrative and logistic efforts required to transport high-quality construction timber from central Europe to Rome. It also highlights an advanced network of trade, and emphasises the enormous value of oak wood in Roman times.

Please visit the site:

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On the cover: a pendant of the medieval Preslav treasure, NE Bulgaria; photo by S. Steidl, RGZM; see the paper of Stanilov / Sengalevich in this issue.

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EΙΔΗΣΕΙΣ - NEWS RELEASE

WHY THE SEARCH FOR DARK MATTER DEPENDS ON ANCIENT SHIPWRECKS, BY ROBIN GEORGE ANDREWS

Errant particles from everyday radioactive materials are a major obstacle for particle physicists. The solution? Lead from the bottom of the sea.

In 2017, Chamkaur Ghag, a physicist at University College London, got an email from a colleague in Spain with a tempting offer. The year before, an emeritus professor at Princeton University, Frank Calaprice, had learned of old Spanish ships that had sunk off the New Jersey coast 400 or 500 years ago, while carrying a cargo of lead.

Calaprice obtained a few samples of this lead and sent it off to Spain, where a lab buried within the Pyrenees tested its radioactivity. It was low: just what Aldo Ianni, the then-director of the Canfranc Underground Laboratory, was hoping for. Now that sunken lead was being offered to any physics laboratory willing to pay 20 euros per kilogram—a fairly high price—for it.

Lead is mined and refined all over the world, but that centuries-old lead, sitting in a shipwreck, has a rare quality. Having sat deep underwater since before the United States of America was born, its natural radioactivity has decayed to a point where it's no longer spitting out particles. For particle physicists, that makes it exceptionally valuable.

“It's sort of like gold dust,” Ghag says.

Forget plutonium: Plenty of everyday objects, from ceramics and glass to metals and bananas, are radioactive, to varying degrees. Should the particles from their decay hit the detectors of particle-physics experiments, they could give scientists false positives and dig potholes on the road to scientific discovery. Even the experiments themselves, built from all kinds of metals, have lightly radioactive components.

Just a few inches of lead can shield detectors from all kinds of rogue radiation, and one of the best ways to block sneaky, unwanted particles is to surround them with lead that itself is barely radioactive. The best source of such lead just so happens to be sunken ships, some of which have been corpses near coastal waters for as long as two millennia.

Particle-physics experiments look for the most fundamental building blocks of the cosmos, including dark matter, an as-yet unseen substance that acts like glue within and between galaxies. This ancient lead, then, is helping humanity unlock the secrets of the universe—but obtaining it often presents practical and ethical uncertainties.

Shipwrecked lead belongs to a class of items known as low-background materials, which have very low levels of intrinsic radioactivity.

There is no agreed-upon standard for what constitutes a low-background material, but, based on the sensitivity to an experiment's background radiation, it's clear what level's needed, says Alan Duffy, an astrophysicist at the Swinburne University of Technology. "If you're building a Geiger counter, you need the Geiger counter to not pick up on itself," he says.

Take steel: It's an excellent shield from intruding vagabond particles—so much so that Fermilab, a particle-physics and accelerator laboratory in Illinois, has used tons of it in the past few decades to shield its own experiments, says Valerie Higgins, Fermilab's historian and archivist. That steel frequently came from decommissioned warships, many of which existed around the time of, or served in, the Second World War or the Korean War, including the Astoria, the Roanoke, the Wasp, the Philippine Sea, and the Baltimore.

The timing of those conflicts matters. At 5:29 a.m. on July 16, 1945, the first-ever nuclear-device detonation took place in the Jornada del Muerto desert, in New Mexico. The atomic age had begun, and with each subsequent nuclear fireball, more radioactive fallout was sprinkled over the world.

During the Cold War, that radioactive atmospheric contamination got effortlessly sucked into blast furnaces when steel was made, Duffy says. This infused the final product with radiation, making it unsuitable for many physics experiments.

Test-ban treaties mean the world is less artificially radioactive today, but it is still radioactive enough for particles to sneak into steel. Low-background steel can be made in a sealed environment, often at considerable cost, but otherwise the best source is decommissioned warships, built before the Trinity test created a glassy scar in New Mexico's earth. Not only is it minimally radioactive, but it's remarkably cheap.

Yet while steel serves well for all kinds of particle-physics experiments, lead reigns supreme in the search for dark matter.

Dark matter makes up 83 percent of all the stuff in the universe. That clearly makes it worth studying, but scientists can't currently detect it. In their pursuit of this inconveniently elusive substance, they've built all kinds of experiments attempting to either directly detect it or use the presence of other particles to demonstrate its existence. Many of these experiments, from the planned SuperCDMS SNOLAB in Ontario, Canada, to the up-and-running family of detectors within the Canfranc Underground Laboratory in the Pyrenees, are built deep underground—where surface radiation can't get through and interfere with their detectors.

Being sensitive souls, those detectors still need shielding from their surroundings and the environment. Each dark-matter experiment has a different tolerance for background radiation. To determine it, "you essentially build a virtual detector" to see what shielding materials might be best, Duffy says.

Sometimes a water tank or some plastic is enough to stop particles like neutrons from accidentally hitting the detector, Ghag explains. But blocking gamma rays for some experimental setups can require copper or lead.

Sunken, ancient lead is ideal, not just because its unstable lead-210 isotope would have largely decayed away over the centuries into stable lead-206; the sea has also shielded it from cosmic rays, which can kick-start a material's radioactivity. Calaprice, who helped design components of several dark-matter experiments, was after that Spanish lead off the shores of New Jersey for these reasons.

That particular load has yet to be harvested, but shopping around such finds is routine. Every now and then, Ghag explains, "some underground lab will say, 'Hey, there's an opportunity to buy a load of ancient lead—who's in?'" Then it gets auctioned off, if the submerged material can be retrieved and there's sufficient interest from various parties.

In the waters in and around Europe, low-background lead is often found in sunken ships from ancient Roman times. Originally forged into coins, construction materials, and weapons of war, it is now dredged up and sold off to, among others, particle physicists.

Some archaeologists have openly wondered whether it is worth sacrificing archaeological treasure troves in the name of science.

Starting in 2010, for instance, the Cryogenic Underground Observatory for Rare Events in Italy obtained hundreds of lead ingots to use for its experiments, all in the hope of solving the long-standing riddle of why matter, not antimatter, dominates the universe. Those ingots came from a Roman vessel off the coast of Sardinia, which sank about 2,000 years ago and has considerable archaeological value. Each of them was inscribed with stamps that reveal their manufacturing history. Although most of the 1,000 ingots extracted from the ship were left intact and made available for study at the National Archaeological Museum in Cagliari, 270 of them were melted down to be used in physics experiments.

In 2013, Elena Perez-Alvaro, then an archaeology graduate student at the University of Birmingham, took up this dilemma. It applied to all venerable underwater shipwrecks rich in low-background material, many of them time capsules of human history. The 2001 Convention on the Protection of the Underwater Cultural Heritage is meant to prevent the skeletal remains of these vessels from being picked clean. But, as Perez-Alvaro pointed out, the convention has a blind spot: Although it demands the protection of sunken sites of cultural heritage from commercial recovery, it says nothing about whether they can be salvaged for scientific use.

In 2015, in a paper she co-authored with Fernando Gonzalez-Zalba of the Hitachi Cambridge Laboratory, Perez-Alvaro concluded that no commercial technique can produce the quality of lead that scientists need for dark-matter experiments. Salvaging ancient lead, therefore, is worth it, in the researchers' view, but requests should be carefully analyzed on a case-by-case basis to see whether physicists really need lead instead of, say, plastic or steel.

"We have to have rules; we have to have boundaries," Perez-Alvaro, now the managing director of Licit Cultural Heritage, emphasized. "It's not just scrap people can dig up." So far, though, none of the institutions that could impose such regulations has taken up the task, says Gonzalez-Zalba.

Even if an advisory framework for the acquisition and use of ancient lead and other low-background materials does emerge, it won't necessarily regulate their extraction.

In recent years, warships from the Second World War have vanished off the coasts of Malaysia, Indonesia, and Singapore, illegally ripped apart by salvage divers. Many of these ships were war graves, containing hundreds of corpses. It is possible that some of those divers may have been searching for low-background steel. Buyers may not want to use unethically sourced low-background material, but by the time they receive it, they may have no way to ascertain its provenance.

Although nowhere near as morally repugnant as raided war graves, the origins of lead from culturally significant ancient shipwrecks may be similarly obfuscated. "I guess often, we just don't care enough to check that," Ghag says. "It is what it is. We're more concerned about the cost."

Gonzalez-Zalba explains that the Romans produced about 88,000 tons of lead each year, and many experiments require only a tiny fraction of this. Scientists, he says, are also increasingly aware of and sensitive to the ethical dilemmas surrounding the extraction of low-background materials.

Particle physicists should keep cultural heritage and the origins of their materials front of mind, Duffy says. But he emphasizes that low-background material is "certainly treated" as a precious resource and not used without consideration.

The real danger, Gonzalez-Zalba suspects, comes from the booming microelectronics industry. Microchips, found in every single computer and smartphone, tend to need low-background lead components. Although the industry could use newly produced lead, he says, manufacturers often chose ancient lead because it's an order of magnitude cheaper. "This is the application that worries me most, because it's a commercial application," Gonzalez-Zalba says. "It's not an application for the benefit of humankind."

But with careful consideration, particle physicists can strike an ethical-practical balance. Chasing down mysterious dark matter may feel like a Sisyphean undertaking right up until the moment we find it. But if and when we do, such a discovery will revolutionize our future—and it's hard to imagine many people arguing that sacrificing a segment of the past in its pursuit wasn't worthwhile.

ROBIN GEORGE ANDREWS is a volcanologist and science writer based in London.

Please visit the site: <https://www.theatlantic.com/science/archive/2019/10/search-dark-matter-depends-ancient-shipwrecks/600718/>

ANCIENT SEAWALL FIRST KNOWN DEFENCE AGAINST SEA LEVEL RISE, BY YAZ DEDOVIC

Ancient Neolithic villagers on the Carmel Coast in Israel built a seawall to protect their settlement against rising sea levels in the Mediterranean, revealing humanity's struggle against rising oceans and flooding stretches back thousands of years.

An international team of researchers from the University of Haifa, Flinders, the Israel Antiquities Authority and The Hebrew University uncovered and analysed the oldest known coastal defence system anywhere in the world, constructed by ancient settlers from boulders sourced in riverbeds from 1-2km near their village.

In a study published today in PLOS ONE, Dr Ehud Galili from the Zinman Institute of Archaeology, University of Haifa, explains that the over 100 metre long seawall proved to be a temporary reprieve and the ancient village was eventually abandoned and inundated.

This discovery provides new insights into ancient human responses to current threats posed by sea level rise.

“During the Neolithic, Mediterranean populations would have experienced a sea-level rise of 4 to 7 mm a year or approximately 12-21cm during a lifetime (up to 70 cm in a 100 years). This rate of sea-level rise means the frequency of destructive storms damaging the village would have risen significantly,” says Dr Galili.

“The environmental changes would have been noticeable to people, during the lifetime of a settlement across several centuries.

Eventually the accumulating yearly sea-level necessitated a human response involving the construction of a coastal protection wall similar to what we're seeing around the world now.

In a scenario comparable to the sinking capital of Jakarta today, ancient Tel Hreiz was built at a safe elevation of up to 3 metres above sea level but post glacial sea-level rises of up to 7mm a year posed a threat to settlers and their homes.

Flinders Coauthor Dr Jonathan Benjamin says the Tel Hreiz settlement was first recognised as a potential archaeological site in the 1960's but the relevant areas that were exposed by natural processes in 2012, revealed this previously unknown archaeological material

“There are no known or similar built structures at any of the other submerged villages in the region, making the Tel Hreiz site a unique example of this visible evidence for human response to sea-level rise in the Neolithic.”

“Modern sea-level rise has already caused lowland coastal erosion around the world. Given the size of coastal populations and settlements, the magnitude of predicted future

population displacement differs considerably to the impacts on people during the Neolithic period.”

Current estimates predict 21st century sea level rise to range from 1.7 to 3mm per year, representing a smaller change when compared to the threat experienced by the Neolithic community that built the ancient sea wall, however many of the same challenges will be posed according to the authors.

“Many of the fundamental human questions and the decision-making relating to human resilience, coastal defence, technological innovation and decisions to ultimately abandon long-standing settlements remain relevant.” says Dr Galili.

The archaeological activities were carried on behalf of the Israel Antiquities Authority from 1989 to 2017, as part of the management of the underwater cultural heritage, and on behalf of The University of Haifa from 1983-1988, and from 2017-2019. All necessary permits were obtained from the Israel Antiquities Authority for the described study, which complied with all relevant regulations. The finds are curated in the Israel Antiquities Authority storage facilities in Caesarea and Beit-Shemesh.

Please visit the site: <https://news.flinders.edu.au/blog/2019/12/19/ancient-seawall-first-known-defence-against-sea-level-rise/>

[See also <https://www.smithsonianmag.com/history/oldest-known-seawall-discovered-along-submerged-mediterranean-villages-180973819/>] [Go there for many pix]

[Go to <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222560> For PLOS ONE article, "A submerged 7000-year-old village and seawall demonstrate earliest known coastal defence against sea-level rise," by Ehud Galili, Jonathan Benjamin, Vered Eshed, Baruch Rosen, John McCarthy, Liora Kolska Horwitz]

ANCIENT MONKEY PAINTING SUGGESTS BRONZE AGE GREEKS TRAVELLED WIDELY, BY MICHAEL MARSHALL

A Bronze Age painting on a Greek island shows a monkey from thousands of kilometres away in Asia. The finding suggests that ancient cultures separated by great distances were trading and exchanging ideas.

The artwork is one of several wall paintings in a building at Akrotiri on the Greek island of Thera (Santorini) in the Aegean Sea. Akrotiri was a settlement of the Minoan civilisation in Bronze Age Greece that was buried by ash from a volcanic eruption in around 1600 BC.

Many of the paintings show monkeys, yet there were no monkeys in Greece at the time. Most of the monkeys have been identified as Egyptian species like olive baboons. This makes sense because Egypt was in contact with the Minoan civilisation, which was spread across several Aegean islands. However, others were harder to identify.

Marie Nicole Pareja at the University of Pennsylvania in Philadelphia teamed up with primatologists to re-examine the mystery monkey paintings. One stood out. “When they looked at this wall painting, they all straight away unambiguously said ‘that’s a langur’,” says Pareja.

The team has identified the monkey as a grey langur (*Semnopithecus*). As well as its distinctive fur, the monkey was depicted holding its tail in a characteristic S shape.

Grey langurs live in southern Asia in what is now Nepal, Bhutan and India – and particularly in the Indus Valley. During the Bronze Age, the region was home to the Indus Valley Civilisation, one of the most important societies of that time. Although it was past its peak, the Indus Valley Civilisation was still advanced for its time, with large cities and elaborate water supply systems.

Somehow, the artist who painted the monkey picture must have seen a grey langur. But how?

Did Minoan Greeks visit the Indus? “I wouldn’t be surprised if someday in the future we found evidence for that kind of direct contact,” says Pareja, but right now there is none. It is also possible the visit was the other way round, but again there is no evidence.

Instead, it may be that Greece and Indus were connected via Mesopotamia, another Bronze Age civilisation centred on what is now Iraq. Langurs may have been imported to Mesopotamia for menageries, where visiting Greeks saw them.

“It’s evidence of this far-reaching trade, these relationships with these far-flung areas,” says Pareja. Even in the Bronze Age, it seems there was a lot of exchange between seemingly separate civilisations.

Journal reference: Primates, DOI: 10.1007/s10329-019-00778-1

Please visit the site: <https://www.newscientist.com/article/2227146-ancient-monkey-painting-suggests-bronze-age-greeks-travelled-widely/#ixzz67timcCrJ> [Go there for pix]

TOMBS AT ANCIENT GREEK SITE WERE **GOLD-LINED CHAMBERS,** **BY NICHOLAS WADE**

The burial structures were looted during antiquity, but beads and a pendant depicting Hathor, an Egyptian goddess, suggest earlier trade links between Pylos, Greece, and Egypt.

Two large tombs have been discovered and excavated at the site of the ancient city of Pylos in southern Greece, suggesting that Pylos played a surprisingly prominent role in early Mycenaean civilization.

Although the tombs had been looted in antiquity, archaeologists reported on Tuesday that they had recovered thousands of pieces of gold foil, remnants of the sheets of gold that once lined the tomb floors and would have lent a spectacular gleam to the darkened chamber.

The larger of the two tombs is 39 feet in diameter and the smaller 28 feet. Both were originally built in a beehive shape known as a tholos but had collapsed.

Archaeologists also found beads made of amber, carnelian and malachite, and a golden pendant depicting the head of the Egyptian goddess Hathor. These items suggest that Pylos, a city with a fine port, had trading connections, previously unknown, with Egypt and the Near East around 1500 B.C.E., the time the tombs were in use.

The two new tholos tombs were discovered by Jack L. Davis and Sharon R. Stocker, a husband and wife team of archaeologists at the University of Cincinnati who have been working at the site since 1992.

In 2015 they discovered a spectacular shaft grave just outside the ancient palace of Pylos. The grave's occupant was buried with a long bronze sword and a wealth of Minoan artwork, principally seal stones, of the highest quality. They named him informally as the Griffin Warrior, after a mythical beast carved on an ivory plaque in the grave.

Both the Griffin Warrior and the two tholos tombs belong on a pottery-based time scale to a period known as Late Helladic IIA, which lasted from 1600 to 1500 B.C.E., although the exact dates are disputed. The period is of critical interest because it saw the formation of the Mycenaean civilization, which lasted from around 1600 to 1200 B.C.E., when many of its major cities were burned in an unknown catastrophe.

The era of Classical Greece did not emerge until after an ensuing dark age of some 700 years.

The later Mycenaean period is the setting for Homer's epics and such heroes as Agamemnon of Mycene. The period is called the Mycenaean because Homer portrays the city's king, Agamemnon, as leader of the Greek fleet that set out to recapture Helen of

Troy. Also, monumental architecture, including many tholos tombs, was excavated at Mycena in the 19th century.

The new finds at Pylos raise the question of whether the ancient city may have had a greater importance at the beginning of the Mycenaean period, maybe even more than Mycena. “We need to rethink the formation of Mycenaean civilization and the role that Pylos played in this development,” Dr. Stocker said.

A central feature of Mycenaean culture is that it originated from the Minoan civilization of Crete, an island south of Greece that prospered as a trading hub in the Eastern Mediterranean between the Near East and Egypt.

The fine Minoan artifacts in the Griffin Warrior’s grave could have been just loot from Crete. But Dr. Davis and Dr. Stocker believe instead that the items, even though made in Crete, were integral to the warrior’s culture. The handle of a sword in his grave looks identical to one engraved on a seal stone buried with him. This and other similarities point to the warrior’s people having understood the meaning and imagery on the Minoan objects buried with him.

From further study of these objects, the two archaeologists now believe the warrior had both military and priestly functions as did the king or “wanax” described in inscriptions from the later Mycenaean period. If so, he would have been one of the early kings of Pylos, possibly the first, and if so the leader of the first kingdom on the European mainland.

Thomas G. Palaima, an expert in Mycenaean writing at the University of Texas at Austin, said he agreed with the two archaeologists’ interpretation of the military and religious significance of the objects in the Griffin Warrior’s grave. His main reservation, he said, was whether the role of the wanax existed in this early period.

Archaeologists see the new finds at Pylos as helping to clarify the early relationship between the Minoan and Mycenaean civilizations. The elites at Pylos and Mycena were using Minoan imagery and art objects to establish their status in Greek society.

“They quickly reach agreement on what shows status — it’s weapons, big-time architecture, lots of gold, and seal stones,” said Jeremy B. Rutter, a Mycenaean archaeologist at Dartmouth College. The elites imported precious objects from Crete and copied the style of Minoan architecture in the palaces at Pylos and Mycena.

“The new findings at Pylos have been magnificent and have changed the nature of the debate,” Dr. Rutter said. “What is emerging as a result of these excavations and the thesis by Michael Nelson is that Pylos was a real powerhouse in the early Mycenaean period.” Dr. Nelson, an archaeologist at Queens College, New York, has long argued for an early Minoan influence at Pylos.

The two University of Cincinnati archaeologists have enjoyed a double measure of luck in their excavations at Pylos. They decided in 2015 to dig near the Pylos palace site in a grove of currant grapes known as the Dimopoulos Field. But the farmer who owned the field refused to sell it. They had to switch their team to what had seemed a far less

promising site. It was there, on their first day of digging, that Drs. Davis and Stocker stumbled across the grave of the Griffin Warrior.

The Dimopoulos Field became available for purchase last year after the owner died. Dr. Davis raised the large sum required with funds that had been made available by the University of Cincinnati in return for his not moving to Stanford and with a grant from the Institute for Aegean Prehistory.

Last year, Dr. Davis said: “We started the excavation and my goodness we didn’t find anything. It was getting very depressing because we’d paid a fortune for the field and I didn’t want to admit we’d made a mistake.”

When they did find the first tholos tomb, they realized to their horror that another excavator had been at work before them, using a backhoe. They were able to date this event through an unusual artifact — a chocolate croissant wrapper with an expiration date of September 2015.

The nearby Griffin Warrior grave was being excavated at this time, and presumably inspired the digging at the tholos tomb, even though plundering antiquities is a serious offense under Greek law.

Fortunately the huge stones of the tholos tomb prevented even the backhoe operator from making much progress or destroying the site’s archaeological value.

Please visit the site: <https://www.nytimes.com/2019/12/17/science/tombs-archaeology-ancient-greece.html> [Go there for pix and maps]

MYSTERY OVER 'FEMALE' REMAINS **FOUND ON MALE-ONLY GREEK** **MOUNTAIN**

Discovery of remains in all-male monastic community in northern Greece poses questions Helena Smith in Athens

Laura Wynn-Antikas specialises in bringing bones to life. Decades spent studying skeletal remains across Greece, in subterranean vaults, tombs, chapels and archaeological sites, have yielded a host of unexpected discoveries. “You never know what you are going to find,” the American-born anthropologist said. “Bones don’t lie. They will tell you how a person lived and perhaps even how they died. You go in prepared to see everything.”

But when Wynn-Antikas was called to examine bones unearthed beneath the stone floor of a Byzantine chapel in the all-male monastic republic of Mount Athos even she was surprised. Some were so small they bore little resemblance to men’s at all.

“Among them were a forearm, shinbone and sacrum that were just so different in their morphology,” added the academic. “While the others were more robust and had clearly belonged to the frames of men, these had measurements that noticeably fell in the range of a female. They were markedly different in size.”

Found embedded in the subsoil of the chapel, the bones were also clearly a secondary burial although they had been transferred from original tombs with the utmost of care. Intrigued, the monastery of Pantokrator to which the chapel of St Athanasios belongs, proposed that the samples undergo radio carbon dating.

“If we are talking about a woman, or indeed more than one woman, it will raise a lot of questions,” Wynn-Antikas said. “Starting with who could she have possibly been.”

Few are more eager to learn the truth than the monks themselves.

Women have been barred from the rugged peninsula in northern Greece since the foundation of the autonomous monastic community in the 10th century. Even female animals – with the exception of cats – are banned.

Despite the EU declaring the ban on women illegal, the measure is in place, extending up to 500 metres of Athos’s coastline. For the estimated 2,500 monks living in caves, shacks or some of the 20 monasteries dotted around the 400-square mile peninsula, the Virgin Mary is the only acceptable female presence.

“If a woman is found among the bones it will be the first known incident of a female finding her final resting place on Mount Athos,” said the architect restorer Phaidon Hadjiantoniou, who discovered the remains while conducting conservation at the chapel.

“There are times during pirate raids and hostile incursions that monks are known to have opened their doors to women but it is very rare,” he said. “There is a famous tale of a Serbian king who brought his wife to Athos but, throughout, she was carried and never allowed to step on Athonite soil. Carpets were placed in all the monastery rooms to ensure that even there she didn’t touch the ground.”

In nearly 40 years overseeing restoration works in the region, Hadjiantoniou said he has never encountered anything like it. The discovery instantly put him in “detective mode”.

“This is the first time I have ever seen bones placed under a chapel floor. I was immediately curious and got in touch with specialists including Laura. What is sure is that they wouldn’t be there if these people weren’t significant to the monastery.”

At least seven individuals were reburied in the spot, according to Wynn-Antikas, who said that, while no skulls were found in the pit, seven jawbones, or mandibles, were present. “Secondary burials, like this one, are not easy because the bones have been moved from their original burial, so information has been lost,” she noted. “But it also tells us that these people were important enough to dig up a floor in an important church and place them there. That takes a lot of effort by the living.”

Why they were moved from their original resting place remains a mystery. But what was also evident was the care with which the skeletal remains had been transferred. Smaller bones that could easily have been missed or overlooked – including three ossified thyroid cartilage – were among the fragments.

“Once we get the dating, another piece of the puzzle will have been solved,” she said. “It will be crucial in giving us information about who these people were.”

Wrapped in aluminium foil in hardboard boxes, the bones were transported to Greece’s Demokritos research centre in Athens in the autumn. They will remain there while Dr Yannis Maniatis, Greece’s foremost leader in the field of archaeological science, conducts carbon dating to determine the date of death.

The painstaking business of dating the bones involves first dissolving the inorganic parts in acid so that collagen can be extracted after which it is cleaned, combusted and converted into CO₂ and then measured either as gas or graphite.

“The entire process is likely to take three months,” Maniatis said.

“But if we can date the bones to a time relevant to events that are both specific and known then DNA testing will become necessary to confirm whether, as seems likely, a woman is among the buried.”

Please visit the site: <https://www.theguardian.com/science/2019/dec/16/possible-find-of-female-bones-in-mount-athos-raises-eyebrows>

FACTORY FOR ROMANS' FAVORITE FUNKY FISH SAUCE DISCOVERED NEAR ASHKELON, BY AMANDA BORSCHER-DAN

Although a staple of the Roman Empire, very few garum production sites or cetariae have been found in the Eastern Mediterranean

A small 1st century factory that produced fermented fish sauce — arguably the most desirable foodstuff of the Roman era — was recently uncovered during excavations near the southern coastal Israeli city of Ashkelon. It is one of the only identified industrial sites for production of the ubiquitous odorous sauce that has been found in the Eastern Mediterranean.

“We have something really unusual here,” Israel Antiquities Authority archaeologist Dr. Tali Erickson-Gini told The Times of Israel on Monday when the find was announced.

While the idea of fermented fish sauce or garum may not spark salivation in modern palates, the slimy stuff was considered one of the most delicious flavors of the Roman Empire. According to Erickson-Gini, the precious goop added both salty and savory flavors to food and was used in the vast majority of recipes known from the era.

“I think of it as a condiment, but it went well beyond that,” Erickson-Gini said. “It’s hard for us to imagine. It was far more common than ketchup.”

At the 2,000-year-old site, located two kilometers (a mile and a quarter) northwest of the city of Ashkelon, Erickson-Gini’s team uncovered several installations that, when taken together, left the archaeologist with little doubt that she was looking at a rare Holy Land garum production center, or cetaria, she said. Though there are few examples in the eastern Mediterranean, she said that in the Iberian Peninsula, specifically Malaga, there are several installations that mirror what she has uncovered in Ashkelon.

The Ashkelon site was excavated ahead of the construction of an Eco-Sport Park. Local pupils and youth aided in the excavation, which was underwritten by the Municipality of Ashkelon and the Ashkelon Economic Co.

In addition to evidence of fish pools, the team uncovered giant plastered vats, jars used for storing liquid, and what appears to be a large receptacle to hold the strained goopy substance.

While fish pools have been found elsewhere in the region, there is only one other identified location in Israel that may possibly have produced the garum, at Dor, said Erickson-Gini. According to what has so far been excavated, the Ashkelon site was not a major factory, and was possibly largely for local use.

The paucity of production sites had always surprised and puzzled the archaeologist, she said. Throughout the Empire, the sauce graced the tables of the Roman world’s rich and famous, as well as the troughs of commoners.

“What interests me is the fact that this product was very, very popular in the Roman and Byzantine period. As popular as it was, you’d expect to find a lot of installations. I’m shocked we haven’t found more of them in excavations,” she said.

Roman historian Pliny the Elder mentions the sauce throughout his “Natural History,” both as a foodstuff and as medicine. According to a recent National Geographic article on garum, Pliny “extols garum as a cure for dysentery and an effective treatment for dog bites. Pliny also recommended it for earaches, and believed that consuming African snails marinated in garum would ward off stomach troubles.”

The National Geographic article states that the sauce was considered so essential to the Roman diet “that a huge network of trade routes grew up to move the prized relish from fishery to plate. Like many delicacies today, the finest garum could sell for astronomical sums.”

Even in the storerooms of 1st century BCE King Herod’s isolated Masada palace, a rare labeled amphorae of garum was found that was possibly imported from Andalusia.

The secret’s in the sauce

The production of the malodorous sauce must have been a stomach-roiling business. In later periods, due to its powerful reek, laws were legislated that the prized fermented fish “ketchup” must be produced outside of urban centers.

To accomplish its pungent putrefaction, the craftsman would place whole small fish such as sardines or anchovies, or chopped up larger fish such as tuna or mackerel, at the base of a jar and pour on top of it spices and salt, followed by another fish layer, etc. According to Erickson-Gini, the recipe’s ratio called for five parts fish to one part salt.

A lively video, “Garum, Rome’s Favorite Condiment (Ancient Cooking),” on the Invicta History YouTube channel, said the concoction inside a closed jar would bake in the hot Mediterranean sun for a week as the fish deteriorated, but was saved from rot by the salt. It was then opened and stirred for another 20 days or more (Erickson-Gini suggested up to three months).

The resultant “puree of fish goop” was strained through a basket, and the strained liquid is the garum. Other, more solid leftovers could be made into a different sauce or lesser-regarded fish paste called allec.

There are several types of garum, and even a strictly kosher version called garum castimonarium that was guaranteed to be made from kosher fish, not shellfish.

Foodie fashion fades

The height of the garum fad was circa the 2nd century CE, but its use is recorded even much later.

According to an IAA press release, the Ashkelon production site was abandoned and industry in the area turned to viticulture.

Erickson-Gini said that even during the time of the garum production, there is evidence of wine presses and storage jars located only meters away. Later, circa 5th century in the Byzantine period a thriving monastic community produced wine.

Although there are scant artifacts from the central elaborately decorated church, three winepresses were built nearby, as well as a large kiln complex that would have produced jars to export the wine all over the Byzantine Empire. “Jars were found as far as England and Germany and Yemen,” said Erickson-Gini.

Later, the site was abandoned in circa the 7th century after the Islamic conquest. According to Erickson-Gini and evidence she found in refuse pits containing the bones of large pack animals, “nomadic families, probably residing in tents, dismantled the structures and sold the different parts for building material elsewhere.”

Please visit the site: <https://www.timesofisrael.com/factory-for-romans-favorite-funky-fish-sauce-discovered-near-ashkelon/> [Go there for pix]

MYTHICAL BEINGS MAY BE EARLIEST IMAGINATIVE CAVE ART BY HUMANS, BY BECKY FERREIRA

The paintings on an Indonesian island are at least 43,900 years old and depict humanoid figures with animal-like features in a hunting scene.

In December 2017, Hamrullah, an archaeologist on an Indonesian government survey, was exploring a cave system in Sulawesi, a large island in central Indonesia. He noticed a tantalizing opening in the ceiling above him. A skilled spelunker, Hamrullah (who only uses one name, like many Indonesians) climbed through the gap into an uncharted chamber. There, he laid eyes on a painting that is upending our understanding of prehistoric humans.

The dramatic panel of art, dating back at least 43,900 years, is “the oldest pictorial record of storytelling and the earliest figurative artwork in the world,” a group of scientists said in a paper published Wednesday in *Nature*, although additional research will be needed to confirm the age of every character in the painting.

In the story told in the scene, eight figures approach wild pigs and anoas (dwarf buffaloes native to Sulawesi). For whoever painted these figures, they represented much more than ordinary human hunters. One appears to have a large beak while another has an appendage resembling a tail. In the language of archaeology, these are therianthropes, or characters that embody a mix of human and animal characteristics.

Given that these extraordinary characters are wielding thin objects that might represent ropes or spears, the painting may be an artistic demonstration of a game drive, a hunting strategy that involves guiding animals toward an ambush.

The otherworldly nature of the therianthropes also raises the possibility that they are mythical beings, or manifestations of “animal spirit helpers” that are common in shamanic beliefs, according to the study.

“This scene may not be a depiction of an actual hunting scene but could be about animistic beliefs and the relationship between people and animals, or even a shamanic ritual,” said Sue O’Connor, an archaeologist at Australian National University who was not involved in the study.

These interpretations are speculative, however, and the original inspiration for the painting, as well as its significance to the humans who created it, is likely to remain a mystery.

The rock art predates the next oldest representation of a character with a mix of human and animal figures, found in a cave in Germany, by about 4,000 years. It is also more than 20,000 years older than a hunting scene on the walls of France’s Lascaux Cave.

Adam Brumm, an archaeologist at Griffith University in Australia and one of the study's authors, said his team was "completely blown away" by the painting.

"We had never seen anything even remotely like this before in the hundreds of cave art sites we'd documented" on this Indonesian island, Dr. Brumm said.

"I immediately knew it was special and that it would be a very important site to understand the cognitive evolution of our species," said Maxime Aubert, a co-author also at Griffith.

The scene is inside the Maros-Pangkep limestone cave system on the island's southwestern end, which has been a hot spot for archaeologists since the 1950s. Local people in the region were likely aware of the paintings long before that time, however. A modern custom of marking wooden posts with a handprint may even have "some connection with local observations of prehistoric hand stencils in nearby caves," Dr. Brumm said.

The scientists determined the painting's age by performing uranium-series dating on "cave popcorn," or mineral deposits that hang over three of the animal motifs in the scene. That gave it an age of at least 43,900 years old, and possibly older.

"This finding is very significant because it was previously thought that figurative painting dated to a time shortly after modern humans arrived in Europe, perhaps circa 40,000 years ago, but this result shows it has an origin outside Europe," said Alistair Pike, an archaeologist at the University of Southampton in England, who was not involved in the study.

However, Dr. Pike considered it "very premature" to claim that the scene represents the earliest example of such storytelling, because only the animals in the scene have been definitively dated. It's possible that the therianthropes, a vital part of the narrative, were added later.

Dr. Aubert said his team thinks the therianthropes were likely painted at the same time as the animal motifs because "they are of the same tone of red and are in a similar state of preservation."

Very little is known about the people who originally decorated the walls of Maros-Pangkep in red pigment, in part because none of their skeletal remains have been found in the caves. They may have been related to a group of modern humans that migrated to Australia more than 50,000 years ago.

Despite these unresolved mysteries, it is now abundantly clear that these humans were storytellers whose abstract paintings shed light into the origins of human cognition and spirituality.

"Images of therianthropes often have complex meanings in modern religions and folklore," said Dr. Brumm, who gave the examples of werewolves and the animal-headed deities of ancient Egypt.

“While we can’t know if this was the case in Sulawesi at least 44,000 years ago, we can point to these enigmatic images of therianthropes as the world’s earliest known evidence for our ability to conceive of the existence of supernatural beings,” he said, which is “a cornerstone of religious belief and experience.”

Shigeru Miyagawa, a linguist at the Massachusetts Institute of Technology who was not involved in the study, suggested that the painting could have implications for understanding humanity’s “unique capacity to communicate using intricate language.”

“It also hints at high order cognitive processes such as language and elaborate artwork emerging fairly recently in evolution,” Dr. Miyagawa said.

The painting has galvanized archaeologists to continue mapping the vast, unexplored reaches of the Maros-Pangkep caves, where the art is fading, “at an alarming rate” for unknown reasons, Dr. Aubert said.

These imaginative landscapes adorned Sulawesi’s caves for 44 millennia, but they could vanish soon after they were rediscovered.

At this point, they are the only link to this early culture that dreamed up fantastic beings and visualized the thrill of the chase — two activities that still preoccupy humans today.

“We also need to understand why it is deteriorating so rapidly and maybe we will find ways to save it,” Dr. Aubert said.

Please visit the site: <https://www.nytimes.com/2019/12/11/science/cave-art-indonesia.html> Go there for pix]

ANCIENT INSCRIPTIONS SHOW LIFE ONCE FLOURISHED IN JORDAN'S 'BLACK DESERT', BY OWEN JARUS

Thousands of inscriptions and petroglyphs dating back around 2,000 years have been discovered in the Jebel Qurma region of Jordan's Black Desert. They tell of a time when the now-desolate landscape was teeming with life.

"Nowadays, the Jebel Qurma area, and the Black Desert in general, is a highly inhospitable area, very arid and difficult to cross," said Peter Akkermans, a professor at Leiden University in the Netherlands who leads the Jebel Qurma Archaeological Landscape Project. Photos the team took of the modern-day landscape show little water, vegetation or wildlife.

The inscriptions are written in Safaitic, an alphabetic script used by people who lived in parts of Syria, Jordan and Arabia in ancient times. Research is ongoing, but the archaeologists say their finds indicate that around 2,000 years ago, Jebel Qurma had trees, wildlife and a sizable human population. [See Images of the Petroglyphs in the Black Desert]

When life flourished

"There are literally many thousands of Safaitic inscriptions and petroglyphs in the Jebel Qurma region, which suggests that people intensively used the area," Akkermans said.

The petroglyphs, or rock art, show images of lions, gazelles, horses and large birds that may be ostriches. The inscriptions found near these petroglyphs tend to be very short. "Most of the texts are simply names, like 'so-and-so, the son of so-and-so,'" Akkermans said.

Some texts contain information on what people were doing, with a few hinting that the people who inhabited Jebel Qurma had conflicts with the Nabataeans, a people who built the ancient city of Petra. "I am on the lookout for the Nabataeans," one inscription reads.

Other inscriptions tell of the challenges and setbacks encountered by the people who lived at Jebel Qurma. "May there be strength against hunger," one inscription reads, while another was written by a man who said he was "distracted over his beloved."

Specialists are currently analyzing the texts and petroglyphs to gain a better understanding of what they mean and why they were created.

"The precise reason for producing rock art — inscriptions and/or representations — is still unclear and open to discussion. What was the message which the producers of the rock art tried to convey?"

Akkermans said.

How a lush land became desolate

In addition to the inscriptions and petroglyphs, archaeologists found the remains of camps, shelters and tombs used by the people of Jebel Qurma. Archaeologists believe that around 2,000 years ago, the people who lived in the region were nomadic.

The team is looking for more evidence of what the environment was like in ancient times and how the landscape became the desolate place it is today.

"Our excavation at one site revealed masses of charcoal from the third century A.D., which appeared to represent several taxa [groups] of trees, which needed water year-round," Akkermans said. "Hence, the conditions in at least the third century A.D. may have been quite different from today. This is certainly something I wish to explore in the next field seasons, by coring for pollen."

A report describing the finds was published recently in the American Journal of Archaeology.

Please visit the site: <https://www.livescience.com/56943-photos-jordan-black-desert-rock-art.html> [See also <https://www.livescience.com/56943-photos-jordan-black-desert-rock-art.html> and <https://www.csmonitor.com/Science/2019/1127/In-Jordan-s-desert-ancient-rock-art-finds-modern-defenders>, with many pix]

BEYOND PETRA - AFTER THE FAMOUS CITY WAS DESERTED, A SMALL VILLAGE THRIVED IN ITS SHADOW, BY SARAH TOTH STUB

For more than two millennia, travelers, merchants, and scholars have been awed as they walked through a gorge in the desert of western Jordan to find themselves in a city carved almost entirely from red sandstone. Named Petra, meaning “rock,” by the Roman emperor Trajan in the second century A.D., the earliest city at the site dates to the second century B.C. At that time, the Nabataeans, a Semitic people whose origins are unclear, began building their grand capital, which, according to an inscription found there, they called Raqmu. The Nabataeans controlled the regional trade in gold, spices, and other luxury goods, which were transported between Gaza, with its access to the Mediterranean—and thus to the rich markets of Greece and Rome—and places as distant as India and China. Raqmu’s art, architecture, and lifestyle reflected the myriad cultural influences garnered from the Nabataeans’ trading relationships with the Persian, Greek, Roman, and Egyptian worlds. The city featured posh hilltop villas similar to those built by King Herod the Great of Judea, depictions of Greco-Roman deities such as Dionysus and Aphrodite, and stone columns topped with carved human heads, a tradition rooted in Middle Kingdom Egypt of the second millennium B.C. In an area with limited rainfall, the Nabataeans’ complex and difficult-to-maintain water management system spurred the city’s construction and its thriving local agricultural economy.

Although Raqmu’s reliance on its water system later proved to be one cause of its undoing, for several hundred years, the water supply supported fruit orchards and olive groves in the city center. The suburban areas were even more lush. An ancient settlement just east of Petra’s grand entrance, in what is now called Wadi Musa, had ready access to spring water and was home to dozens of olive trees and olive presses. Since the 1970s, archaeologists have discovered more than 30 rock-cut wine presses in Baydha, a settlement three miles north of Petra’s center. This evidence of intensive viniculture starting in the first century B.C., when the Nabataeans began to adopt cultural practices from the Greek world, including the consumption of wine, was an early indication that Baydha, although smaller and less architecturally magnificent than central Petra, was nevertheless an important part of the city’s history.

The Nabataean Kingdom, which controlled an area from the Arabian peninsula to Damascus, was at its height in A.D. 106, when Trajan (r. A.D. 98–117) annexed Petra. The era’s textual sources are mainly silent on the subject, but most scholars agree that the emperor likely encountered little resistance, and he soon made the area part of the new province of Arabia. Initially, Petra continued to benefit from trade under the Romans, the profits of which paid for urban improvement projects such as renovation of a public park and pool complex and construction of watchtowers. An increased number of farming terraces from that time indicate that the city’s residents also expanded their agricultural production, which helped support Petra’s growing population. In the mid-second century A.D., according to contemporaneous documents found in a cave on the western shore of the Dead Sea, the city was prominent enough to warrant visits from the provincial

governor. But the main sources of Petra's wealth and success would soon come to an end.

By the third century A.D., a shift in trade routes made the city obsolete, and references to it nearly cease in the historical record.

The road from Petra to Gaza had fallen out of use, and historical sources, such as the writings of the historian Eusebius of Caesarea and accounts by Christian pilgrims, indicate that more goods from Asia and India were making their way west via southern sea routes or by a northern route through what is now Syria. At the same time, the demand for exotic eastern goods such as spices and perfumes plummeted as the Roman Empire experienced political turmoil and economic challenges brought on by numerous invasions and military engagements. Excavations at Petra have shown that there was a sharp decline in the number of ceramic vessels used to store cosmetic oils perfumed with ingredients from the East, a once-booming industry that had endured since Petra's founding. Financial setbacks such as this, along with an A.D. 363 earthquake referred to in a letter written by a bishop of Jerusalem and widely visible in the site's collapsed and damaged structures, led scholars to consider this period, for all intents and purposes, the end of Petra.

Archaeologists have excavated at Petra since the late nineteenth century, concentrating mostly on the rock-carved Nabataean tombs and shrines, and have paid less attention to other periods within the city or to its outskirts. "This has led to the narrative that Petra was abandoned after the Nabataeans," explains archaeologist Micaela Sinibaldi, an honorary research fellow at Cardiff University. "But we now know that this is just not true. The later periods of Petra have simply been overlooked." In fact, the full trajectory of the region's cultural and religious history, from paganism to Christianity to Islam, is evident in the areas surrounding Petra.

Since 2014, Sinibaldi has directed the Islamic Baydha and Late Petra Projects. "It's exciting because there is so much to discover about the later periods of Petra," she says. "In Baydha, especially, there is the most significant and, at the same time, accessible evidence we have available for the Islamic period in the entire Petra region."

Because there is scarce evidence of a human presence in Petra after the sixth century A.D., the hinterlands have emerged as the key place to find out about these later centuries. "Baydha is a relatively small place, but it includes, for the most part, all the archaeological periods present in Petra and its environs," Sinibaldi says. "Not very much was written in the historical accounts, but we do have the chance to make up for this with archaeology. It's a matter of reconstructing several pages of history that we are missing."

The settlement of Baydha includes Siq al-Barid, nicknamed "Little Petra," a gorge filled with Nabataean carved tombs, dwellings, and dining areas similar to those found in the center of Petra. In the 1950s, British archaeologist Diana Kirkbride-Helbaek was among the first researchers to raise scholars' interest in non-Nabataean settlement in and around the city. "By way of a change from things Nabataean, I used to explore the region on my free days looking for flint sites," Kirkbride-Helbaek wrote in a 1968 article in the journal *Antiquity*. With the help of local Bedouin, she excavated Neolithic Baydha, where people settled more than 9,000 years ago. She found that they lived in a village of stone houses, cultivated grains such as wild wheat and barley, collected wild pistachio nuts, and raised goats. Kirkbride-Helbaek also studied some of the Nabataean remains and concluded that during their time the area had served as a sort of residential suburb and caravan station.

It was not until the 1990s, however, that the narrative of Petra's post-Nabataean abandonment first started to be questioned, as archaeologists began to find later remains in both the city center and the surrounding areas. It had long been known that in the fourth century A.D., when the Byzantine, or Eastern Roman, Empire controlled the region, the city's water management system fell into disrepair, explains Megan Perry, an anthropologist at East Carolina University and codirector of the North Ridge Project in Petra. This, along with the earthquake in the fourth century and another in the sixth, likely spurred many people to relocate to the countryside in search of easier access to water and richer soil. "The city became much less habitable," Perry says. "But people didn't disappear, they just gradually moved." The people in the area were likely descendants of the Nabataeans who had been living there for generations. In fact, at least through the sixth century, much of the population kept their Semitic Nabataean names, despite the fact that the language they used was Greek, says archaeologist Laila Nehmé of the French National Center for Scientific Research. "People and languages don't go away just because power changes," she says.

Under the Byzantine rulers, some inhabitants of Petra and its environs adopted Christianity, which had become the preferred, state-supported religion, despite their location far from the center of power in Constantinople. In the 1990s, Patricia Maynor Bikai, then assistant director the American Center of Oriental Research in Jordan, excavated three churches dating to the fifth and sixth centuries on a slope overlooking Petra's main thoroughfare, as well as a bishop's residence and a three-room building used for baptisms. Archaeologists have also found that, although the fourth-century earthquake destroyed many Nabataean shrines, some remained in use throughout the Byzantine period, evidence that Christianity had not completely replaced earlier religions. Even more evidence of post-Nabataean Petra began to emerge when Bikai carried out a survey of Baydha in the 2000s. She found that, in the fifth century, one of the Nabataean rock-cut communal halls had been transformed into a church with an apse, and a bishop's chair had been carved into the rock wall. Bikai also discovered two mosques, thus far the only ones to have been found in this region, and about 100 dwellings that she suspected were from the Islamic period.

"We had no idea they were there," Bikai says. "It shows you don't get a complete picture of what Petra was without exploring outside the city center."

When the population of Petra and the surrounding region adopted Islam on a large scale is an open question. Arabic texts from the 630s refer to Muslim armies from the Arabian Peninsula arriving in the cities of Aqaba and Udrh, but do not contain any discussion of nearby Petra.

"Either the armies didn't take Petra because it was naturally protected," says Nehmé, "or they didn't think it was worth it."

The earliest direct signs of Islam in Petra are seventh- and eighth-century Arabic inscriptions asking Allah for forgiveness.

According to Zeyad al-Salameen, an archaeologist at Al-Hussein Bin Talal University, these inscriptions are similar in both language and script to other Islamic invocations from the period. While some of the local population continued to practice Christianity, how the rest adopted or viewed Islam is debated, with few archaeological findings and almost no textual references to help clarify the process. The absence of references to Petra in the historical record seems to indicate that the area was not especially important

to most pre-twelfth-century Islamic rulers, who were based in far-off places such as Damascus, Baghdad, and North Africa. “Petra was on the fringes of Islamic areas of power,” Sinibaldi says. “Islamization there was gradual, and at least until the end of the twelfth century, the area was largely Christian.”

In addition to the paucity of historical records, for about 500 years, from the seventh through twelfth centuries, scant archaeological evidence of how people lived has been found in Petra or in nearby settlements such as Baydha. But Sinibaldi’s work comparing pottery sherds found in Baydha and Petra to those from better-dated excavations in the region revealed that there was not a significant gap in habitation throughout the region. The fertile soil, especially outside the city center, would have kept people living and farming there, she says. The Petra Valley was never completely abandoned, and, because there were rock-cut Nabataean structures available to use, the inhabitants weren’t required to build new dwellings.

The textual record picks up only slightly in the early twelfth century. Accounts include the Latin writings of the priest Fulcher of Chartres concerning European Crusader armies trying to gain a foothold in the Petra area as a means to control some regional trade and pilgrimage routes. The writings of Fulcher and others, including the medieval chronicler and archbishop William of Tyre, refer to the thriving local agriculture, especially in Wadi Musa, which they identify as the largest settlement in the area. Although the Crusaders built three forts in the area, which are still standing today, their occupation of Petra was over by the twelfth century. “Petra is more or less forgotten in the Islamic period,” Nehme says. For this reason, Sinibaldi was intrigued by the Islamic-period village and mosques that Bikai had discovered.

At first, the dating of the mosques and surrounding homes was uncertain. But then, Sinibaldi’s team discovered a fourteenth-century Egyptian coin in a tabun, or domed oven, that dated one of the houses to the period when the Mamluks, who were originally Turkish military slaves, ruled much of the Middle East from their seat in Cairo. They also had a base at nearby Shobak Castle, which had been built by the Crusaders. Each mosque was built on the foundation of a Nabataean residential building with a dirt floor, stone arch, and wooden roof.

The highest-quality stones from earlier Nabataean buildings were used for the mihrab, or prayer niche. Each structure could have held about 40 or 50 people, suggesting to Sinibaldi that, assuming most grown men attended prayers, about 400 people lived in the village at the time.

At some point, an earthquake demolished the building. “I think the later mosque may actually be a replacement for the first, destroyed mosque,” Sinibaldi says. Inside the second mosque, she found traces of the people who once prayed there, including an oil lamp, an earring, a ring, and a board game that resembles tic-tac-toe. Because her team did not find any pottery, coins, or other precisely datable artifacts inside either mosque, Sinibaldi hopes that radiocarbon dating of juniper wood used to build the roof will help confirm their construction dates. Although the glory of the Nabataean Kingdom and of Roman Petra had long ago faded, and this stretch of desert highlands was no longer part of the lucrative global trade routes that had once enriched it, the construction of the mosques provides clear evidence that the region was still populated, and that it had undergone at least a partial religious and cultural transformation to Islam.

Sinibaldi attributes the increased population of Baydha during the Mamluk period to the rise in popularity of nearby Islamic pilgrimage routes. The Mamluks, and later the Ottomans, promoted pilgrimages not only to the holy city of Mecca, but also to burial sites of prophets and saints, she explains. And it was Baydha that profited as a result of this practice. Baydha was only about a day's walk from Shobak, an important stop for both merchants and pilgrims on the route to Mecca from Egypt and the Mediterranean. It was also just three miles from Jabal Haroun, a mountaintop revered as the resting place of the prophet Aaron, who is mentioned in both the Hebrew Bible and the Koran. "Baydha was a relatively well-connected place," says archaeologist Alex Knodell of Carleton College, former field director of the Brown University Petra Archaeological Project, whose extensive survey uncovered a large amount of ceramic evidence from the late Islamic era there. Sinibaldi's team has excavated one of the Mamluk-period houses in the village. Most of the excavated houses' courtyards contain dome-shaped stone tabun ovens, which also closely resemble those used in modern times. "What is most striking," Sinibaldi says, "is that the building style doesn't differ much from what we see today in this region."

Baydha ultimately outlasted the grand city of Petra, surviving into the Middle Ages and beyond. People built their houses and mosques in Baydha, rather than among the captivating red and pink rock-carved Nabataean buildings in Petra, mainly because access to water was so much easier. The same soil that absorbed the rains coming down the Shara Mountains that attracted people there 9,000 years ago continued to sustain Baydha long after Petra's water systems had failed and people were gone. "There's a lot of history in this small place," Sinibaldi says. "It's important to understand that history is not just made in big centers."

Sara Toth Stub is a journalist living in Jerusalem

Please visit the site: <https://www.archaeology.org/issues/360-1911/letter-from/8076-jordan-petra-hinterland>

IRON AGE TOMBS DISCOVERED IN OMAN

In Oman's Al Sharqiyah Governorate archaeologists found an Iron Age settlement and 45 tombs.

In collaboration with Germany's Heidelberg University, the Oman Ministry of Heritage and Culture founded a project to study the Iron Age settlements in North Al Sharqiyah. The ministry has said that the tombs are "very well maintained" and cover an area of 50-80 square metre area.

These tombstones are about 700 meters from a settlement that the team believes to have been the home of people who worked in copper mining since the early Iron Age.

A new archaeological site containing a burial consisting of 45 tombs and a settlement dating back to the beginning of the Iron Age has been discovered in North Al Sharqiyah

Copper mining was thought to take place during the Iron Age and continued until the early Islamic era.

"It is the most preserved sites of its components, where stone buildings and tombs resembling huts are retained by nature for more than 3,000 years, and reflect the method of burial," the Ministry of Heritage and Culture said.

"It features the social status of the deceased through the length of the tomb and archaeological artefacts buried with him."

Al Sharqiyah site is one of many archaeological finds discovered in Oman over the past decade. Many were discovered by a team from the archaeology department at Sultan Qaboos University, which works with the Ministry of Heritage and Culture to find, protect and preserve sites of interest.

Oman's ancient sites have also been recognised by the UN. In 1988, Bat, Al Khutm and Al Ayn were certified as World Heritage Sites.

The three ancient settlements in Al Dhahira Governorate of north-west Oman are the most complete of their kind from the Iron Age.

In January 2018, the largest trove of Iron Age weapons in the region was discovered at Mudhmar East. It contained more than 3,000 arrows, daggers and axes.

Please visit the site: <https://www.archaeology-world.com/new-archaeological-site-discovered-in-oman/>

DEAD SEA JAR LID FOUND TO HOLD DECOMPOSED PAPYRUS

An ancient residue in a clay jar lid, originating from the area where the Dead Sea Scrolls were found, was found to contain decomposed papyrus. Numerous cylindrical jars and lids were found in caves close to the ancient site of Qumran, west of the Dead Sea, but these were largely broken and empty, and their association with scrolls has been doubted. The discovery of decomposed papyrus in one of the lids adds to the evidence that scrolls were once placed in them, even though no scroll fragments have survived.

Dr Dennis Mizzi, Head Department of Oriental Studies, announced the findings on 24 November 2019, on behalf of an international team of researchers, at the American Schools of Oriental Research and Society of Biblical Literature Annual Meetings in San Diego.

The jar was bought in 1963 by Scrolls scholar John Allegro and he thought that the hardened residue was 'bat dung'. The jar lid is now in a private collection.

A sample was sent for testing at Quest laboratories, at the University of Reading, UK, and the tests have concluded that the unknown material derives from a member of the sedge (Cyperaceae) family, such as the papyrus sedge, which is not local to the Dead Sea area, and therefore 'probably comes from one or more degraded papyrus scrolls'. The new results probably indicate that a jar in a Qumran cave fell over and its papyrus contents spilled into the detached lid, then decomposed over the centuries.

In their paper the researchers note that while the precise location where the jar was found cannot be determined exactly, its form is the same as other Qumran jars and lids, which are of a class not found anywhere else.

The researchers' work further supports the hypothesis believed by many scholars that many other Qumran caves contained scrolls.

The substance was analysed as an initiative of the Leverhulme-funded 'Network for the Study of Dispersed Qumran Cave Artefacts and Archival Sources' (DQCAAS), a collaboration between Prof. Joan Taylor (King's College London), Dr Dennis Mizzi (University of Malta), and Prof. Marcello Fidanio (Università della Svizzera italiana). The scientific analysis was led by Dr Kamal Badreshany (University of Durham).

[URL and credit for the picture accompanying the University of Malta's release.]
https://www.um.edu.mt/_data/assets/image/0006/417309/varieties/banner.jpg

Please visit the site: <https://dqcaas.com/2019/11/24/dead-sea-jar-lid-found-to-hold-decomposed-papyrus/>

CHESS PIECE FOUND IN JORDAN MAY BE WORLD'S OLDEST, BY BOB YIRKA

John Oleson with the University of Victoria has reported that a small object found in Jordan made of sandstone might be the oldest chess piece ever found. In his presentation at the American Schools of Oriental Research this past week, he spoke about the object and what it might represent.

Historians believe the game of chess originated in India approximately 1,500 years ago, though it is also believed that its name, rules and piece names have changed over time. Since its invention, the game has spread around the world. In his abstract for the conference, Oleson notes that references to chess playing in the Islamic world go as far back as the seventh century AD, and it was apparently a very popular pastime.

In his presentation, Oleson described the two-pronged object carved from sandstone that has been dated (using context) to approximately 1,300 years ago. The object, found in 1991, is otherwise rectangular in shape. Oleson claims it looks very much like other early Islamic chess pieces—specifically, a rook (castle). He points out that other objects identified as rooks in Jordan and the Near East, whether wood, stone or ivory, are nearly identical to the sandstone object. In modern chess games, the piece resembles a medieval tower—it moves horizontally or vertically through any number of unoccupied squares. In earlier times, the rook was fashioned to look like a dual-horse chariot, which may account for the two-pronged look of early Islamic figures.

The sandstone rook was found at a site called Humayma, which Oleson notes was along the busy Via Nova Traiana—a trade route between Asia and the Near and Middle East. It appears likely that the game of chess made its way to the Middle and Near East along the route. Humayma was a trading outpost run by the Abbasid family. Oleson notes that the family kept up with what was going on in Iraq and Syria. Taken together, the evidence suggests that the rook is possibly the earliest evidence of such a chess piece design, and possibly the oldest example of any type of chess piece. More work is required to verify that the stone object is, indeed, a chess piece before it can be designated as such.

Please visit the site: <https://phys.org/news/2019-11-chess-piece-jordan-world-oldest.html>

HERE COME THE SUNDIALS! PROF UNCOVERS EIGHT ‘HIDDEN’ SUNDIALS IN ANCIENT MOSAICS

A university professor studying ancient mosaics has discovered eight previously unknown sundials in the designs, taking the total number known number to 15.

Professor Marek T. Olszewski from the University of Warsaw was re-examining a number of mosaics dating back to the 2nd century AD when he made his startling discovery.

One of the mosaics from the 6th century AD which was discovered by the Gate of Damascus in Jerusalem, Olszewski noticed that between a richly dressed women, a mysterious object is visible, which scientists at the beginning of the 20th century described as an oil lamp or column.

Olszewski said: "After careful analysis and comparison with a sundial discovered during excavations, I came to the conclusion that this mosaic and other ones similar to it depict sundials."

Another sundial "tracked" by the Polish researcher is located in a wall mosaic in Santa Cecilia in Trastevere church in Rome. This mosaic was created during the time of Pope Paschal I (817-824).

Prof. Olszewski also noticed a previously unknown sundial in the Madaba Map - a huge floor mosaic, which is currently stored in the church of St. George in Madaba, Jordan. It shows a map of the Middle East from the Byzantine period. This is the oldest cartographic depiction of the Holy Land, including Jerusalem and dates back to the 6th century AD.

Yet another depiction of a sundial comes from Tarsus (Mersin) in Turkey, where a figural mosaic (ca. 2nd-3rd century AD) shows a sundial on a column and a crow sitting on it. A man tries to scare off the bird by throwing a pouch at it (crow was a symbol of a bad omen).

Sundials were often used in ancient times to determine time. They indicated time with a shadow cast by a stationary pointer (gnomon) on a dial with hour markers. They belong to the oldest scientific and measuring instruments. The oldest ones are from ancient Egypt. In the Mediterranean zone in ancient times they were placed in both public and private places.

Please visit the site:

<http://scienceinpoland.pap.pl/en/news/news%2C79958%2Chere-come-sundials-prof-uncovers-eight-hidden-sundials-ancient-mosaics.html>

TOMBS AT ANCIENT GREEK SITE WERE **GOLD-LINED CHAMBERS,** **BY NICHOLAS WADE**

The burial structures were looted during antiquity, but beads and a pendant depicting Hathor, an Egyptian goddess, suggest earlier trade links between Pylos, Greece, and Egypt.

Two large tombs have been discovered and excavated at the site of the ancient city of Pylos in southern Greece, suggesting that Pylos played a surprisingly prominent role in early Mycenaean civilization.

Although the tombs had been looted in antiquity, archaeologists reported on Tuesday that they had recovered thousands of pieces of gold foil, remnants of the sheets of gold that once lined the tomb floors and would have lent a spectacular gleam to the darkened chamber.

The larger of the two tombs is 39 feet in diameter and the smaller 28 feet. Both were originally built in a beehive shape known as a tholos but had collapsed.

Archaeologists also found beads made of amber, carnelian and malachite, and a golden pendant depicting the head of the Egyptian goddess Hathor. These items suggest that Pylos, a city with a fine port, had trading connections, previously unknown, with Egypt and the Near East around 1500 B.C.E., the time the tombs were in use.

The two new tholos tombs were discovered by Jack L. Davis and Sharon R. Stocker, a husband and wife team of archaeologists at the University of Cincinnati who have been working at the site since 1992.

In 2015 they discovered a spectacular shaft grave just outside the ancient palace of Pylos. The grave's occupant was buried with a long bronze sword and a wealth of Minoan artwork, principally seal stones, of the highest quality. They named him informally as the Griffin Warrior, after a mythical beast carved on an ivory plaque in the grave.

Both the Griffin Warrior and the two tholos tombs belong on a pottery-based time scale to a period known as Late Helladic IIA, which lasted from 1600 to 1500 B.C.E., although the exact dates are disputed. The period is of critical interest because it saw the formation of the Mycenaean civilization, which lasted from around 1600 to 1200 B.C.E., when many of its major cities were burned in an unknown catastrophe.

The era of Classical Greece did not emerge until after an ensuing dark age of some 700 years.

The later Mycenaean period is the setting for Homer's epics and such heroes as Agamemnon of Mycenae. The period is called the Mycenaean because Homer portrays the city's king, Agamemnon, as leader of the Greek fleet that set out to recapture Helen of

Troy. Also, monumental architecture, including many tholos tombs, was excavated at Mycena in the 19th century.

The new finds at Pylos raise the question of whether the ancient city may have had a greater importance at the beginning of the Mycenaean period, maybe even more than Mycena. “We need to rethink the formation of Mycenaean civilization and the role that Pylos played in this development,” Dr. Stocker said.

A central feature of Mycenaean culture is that it originated from the Minoan civilization of Crete, an island south of Greece that prospered as a trading hub in the Eastern Mediterranean between the Near East and Egypt.

The fine Minoan artifacts in the Griffin Warrior’s grave could have been just loot from Crete. But Dr. Davis and Dr. Stocker believe instead that the items, even though made in Crete, were integral to the warrior’s culture. The handle of a sword in his grave looks identical to one engraved on a seal stone buried with him. This and other similarities point to the warrior’s people having understood the meaning and imagery on the Minoan objects buried with him.

From further study of these objects, the two archaeologists now believe the warrior had both military and priestly functions as did the king or “wanax” described in inscriptions from the later Mycenaean period. If so, he would have been one of the early kings of Pylos, possibly the first, and if so the leader of the first kingdom on the European mainland.

The current Dimopoulos Field, showing the Tholos Tomb VI, center, and the Tholos Tomb VII at right. Credit...Arthur Stephens, via the Department of Classics, University of Cincinnati.

Thomas G. Palaima, an expert in Mycenaean writing at the University of Texas at Austin, said he agreed with the two archaeologists’ interpretation of the military and religious significance of the objects in the Griffin Warrior’s grave. His main reservation, he said, was whether the role of the wanax existed in this early period.

Archaeologists see the new finds at Pylos as helping to clarify the early relationship between the Minoan and Mycenaean civilizations. The elites at Pylos and Mycena were using Minoan imagery and art objects to establish their status in Greek society.

“They quickly reach agreement on what shows status — it’s weapons, big-time architecture, lots of gold, and seal stones,” said Jeremy B. Rutter, a Mycenaean archaeologist at Dartmouth College. The elites imported precious objects from Crete and copied the style of Minoan architecture in the palaces at Pylos and Mycena.

“The new findings at Pylos have been magnificent and have changed the nature of the debate,” Dr. Rutter said. “What is emerging as a result of these excavations and the thesis by Michael Nelson is that Pylos was a real powerhouse in the early Mycenaean period.” Dr. Nelson, an archaeologist at Queens College, New York, has long argued for an early Minoan influence at Pylos.

The two University of Cincinnati archaeologists have enjoyed a double measure of luck in their excavations at Pylos. They decided in 2015 to dig near the Pylos palace site in a grove of currant grapes known as the Dimopoulos Field. But the farmer who owned the field refused to sell it. They had to switch their team to what had seemed a far less promising site. It was there, on their first day of digging, that Drs. Davis and Stocker stumbled across the grave of the Griffin Warrior.

The Dimopoulos Field became available for purchase last year after the owner died. Dr. Davis raised the large sum required with funds that had been made available by the University of Cincinnati in return for his not moving to Stanford and with a grant from the Institute for Aegean Prehistory.

Last year, Dr. Davis said: “We started the excavation and my goodness we didn’t find anything. It was getting very depressing because we’d paid a fortune for the field and I didn’t want to admit we’d made a mistake.”

When they did find the first tholos tomb, they realized to their horror that another excavator had been at work before them, using a backhoe. They were able to date this event through an unusual artifact — a chocolate croissant wrapper with an expiration date of September 2015.

The nearby Griffin Warrior grave was being excavated at this time, and presumably inspired the digging at the tholos tomb, even though plundering antiquities is a serious offense under Greek law.

Fortunately the huge stones of the tholos tomb prevented even the backhoe operator from making much progress or destroying the site’s archaeological value.

Please visit the site: <https://www.nytimes.com/2019/12/17/science/tombs-archaeology-ancient-greece.html>

WHOLE NUCLEAR FAMILY FOUND IN ANCIENT PHOENICIAN TOMB IN ISRAEL, BY PHILIPPE BOHSTROM

The remains of what seems to be a cherished child buried with its unadorned parents in Achziv 2,800 years ago indicate they lived well and died a century before the Assyrians arrived

A 2,800-year-old grave of what seems to be a nuclear family, a child buried with its parents, has been discovered in the Phoenician port city of Achziv. The child had been interred wearing a necklace made of precious beads made of gold, silver, agate, amber and carnelian.

Together with the family's remains, the archaeologists also found a bronze bowl and seven intact decorated vessels. The quality of the child's necklace and the elaborate nature of the vessels indicate that the family was well off, the archaeologists suggest.

The Old Testament never actually mentions Phoenicians. The only reference to them in ancient sources is in ancient Greek writings, referring to merchants living along the coast of modern-day Lebanon and the northern coast of Israel.

In other words, the "Phoenicians" mentioned by the ancient Greeks were apparently part of the people the biblical authors called Canaanites, or descended from the Canaanites in terms of archaeology, religion and language. There was not much setting these Phoenicians apart from other local Semitic cultures.

Achziv is located near the Lebanese border on the northern coastal plain of today's Israel. It was a bustling port-city from the mid-16th century B.C.E. to the sixth century B.C.E., the Bronze and Iron ages.

When the family was alive, the town was Canaanite/Phoenician, which was the dominant culture along Mediterranean coasts.

The main port city along the coast of what is today Israel was Acre.

However, the family's home town of Achziv seems to have been important enough to arise anew every time it was destroyed.

That seems to have been quite often given the incessant power struggles in the region.

According to the Old Testament, Achziv belonged to the territory of Asher. The tribe's inheritance, according to that verse:

"...went on to Ebron, Rehob, Hammon, and Kanah, as far as Greater Sidon.

The border then turned back toward Ramah as far as the fortified city of Tyre, turned toward Hosah, and came out at the Sea in the region of Achziv, Ummah, Aphek, and Rehob." (Joshua 19:28-30)

Not that the Asherites managed to expel the resident pagans (Judges 1:31): “Neither did Asher drive out the inhabitants of Accho, nor the inhabitants of Zidon, nor of Ahlab, nor of Achzib...”

Achziv has been under archaeological exploration of a sort for at least a century. In 1921 the department of Antiquities of Mandatory Palestine learned of illegal excavations, whether by well-meaning amateurs or robbers offering the antiquities for sale in nearby Nahariya. The city’s first rigorous scientific investigation was conducted by Emanuel Ben-Dor in the 1940s, on behalf of the Department of Antiquities in Israel.

The most recent international expedition, directed by Yifat Thareani of the Nelson Glueck School of Biblical Archaeology at the Hebrew Union College in Jerusalem, and Michael Jasmin and Philippe Abrahams of Lyon University in cooperation with the French Office of Foreign Affairs, has been excavating there since 2014.

Buried together

The grave was discovered in the summer of 2017 when the archaeologists stumbled upon two huge limestone slabs leaning toward west, about 50 centimeters underground. Each was delimited by two standing stones, one to the north and to the south.

Removing the slabs revealed a rectangular feature built of field-stones, exposing the layout of a so-called cist-grave. Its structure is typical of a Near Eastern cist grave, meaning a grave dug in the ground typically surrounded by stones, and sealed by two slabs.

Such graves may contain one or multiple bodies, Thareani explains.

Inside this one were the bones of three people: a child aged between three to five buried with the necklace of precious beads, and two adults, a woman and a man in fetal position. The child’s remains had become heaped and its burial position could not be reconstructed. The putative family’s burial is dated to the ninth century B.C.E.

Based on the necklace and the vessels, including the largest Phoenician amphora of its kind discovered to this date in Israel, the excavators think the individuals were a high-status family.

A wealthy family’s tomb fits the archaeological picture of Achziv as a thriving community over the centuries with several distinguished families, which by the way had four cemeteries in ancient times. In the 1960s, several cist graves were uncovered, one with two bodies buried with cylinder seals, bronze bowls, a bronze double axe, lance heads, and an ivory bowl with lion couchant. Other graves contained pottery, figurines, scarabs, and bronze and silver jewelry, also pointing to wealth.

Some of the graves in Achziv have tombstones engraved with the deceased’s name and in one case his profession, a metal worker. In another case, the name of the deceased appeared on the shoulder of a jar: “Adonimelekh”.

Rising from the ashes

The prosperity of some residents notwithstanding, Achziv was as said destroyed time and again over the ages. One such occasion was in the Middle Bronze Age, roughly 1,550 B.C.E.: the port-city's earthen walls were breached and the town was sacked. Though the evidence shows layers featuring ash and burning, it is not clear from the archeological record how devastating the attack was.

In any case, the city rose again in the 11th century B.C.E., during the early Iron Age, which lasted from 3,000 years ago to about 1,800 years ago, depending who you ask and served as an important Phoenician anchorage.

Come the 8th century B.C.E., Achziv and Acre were among the fortified cities ruled by the Phoenician king Luli that surrendered to the Assyrian king Sennacherib as he rolled over the Levant in 701 B.C.E.

(The family in the newly discovered grave apparently lived more than a century before the Assyrian conquest.)

Other excavations of Achziv over the years found an elaborate fortification system from an earlier time, the Middle Bronze Age; public buildings; and also homes that range over thousands of years, from the Bronze Age through to the Crusader period.

In 2015 the excavators found what may be the only known mold for a supposed death mask, of a man, in what seems to have been a cultic building from the ninth century B.C.E. in the city's south. The building, of which remained two mud-brick walls and three white plastered stairs that may have led to a second story, also contained several intact vessels, including a carinated bowl, chalices, a cooking pot, a storage jar, a lamp, and a goblet of burnished clay, as well as burnt animal bones. The archaeologists suspect it served a cultic function.

Masks that are believed to be associated with death in some form have been found throughout the sphere of Phoenician influence, including in the cemeteries of Achziv. But nothing like this mold has ever been found before, Thareani says.

Its hollowed-out features still show five chains of curly braided hair, eyebrows, almond-shaped eyes, high cheekbones, mouth and ears, and a prominent nose. Male masks had painted-on beards. With the aid of Andre Veiner of the Conservation department in the Israel Museum, Jerusalem, several masks were made using the ancient mold. "It enabled us to meet a young Phoenician man in person," Thareani quips.

Six other anthropomorphic clay masks were found by previous expeditions in the graveyards in Achziv: four female and two male in form. The masks, and the unique mold, are smaller than a human face, begging speculation as to how they were used. Some were colored with red wash or red slip and the hair and beard were painted on, in black.

"It is very possible that several aspects of their religion were connected to masks. Obviously they were use in connection with mortuary practices and added in the tomb to join the dead in the otherworld," says Jasmin, though the precise uses of the mask, by whom (a priest?) and how (on a pole ?) and when (during cultic dances, mortuary processions?) remain obscure, he adds.

It was while trying to better understand the apparently cultic area that the archaeologists stumbled upon the tomb containing the nuclear family, dating to around 800 B.C.E., when Achziv was at its peak and some 100 years before the city surrendered to Sennacherib's army.

In 701 B.C.E. Sennacherib reduced Achziv to smoldering ruins. It did arise again, renamed Accipu in the Assyrian texts.

About 2,700 years ago, Assyria itself would decline, possibly due to protracted drought combined with overcrowding. And for its part, Achziv exists to this very day, having weathered the armies of Romans, the Byzantines, the Crusaders and the Arabs. But it never would regain its lofty status of the Iron Age.

Please visit the site: <https://www.haaretz.com/archaeology/.premium.MAGAZINE-tomb-of-phoenician-father-mother-and-child-found-in-israel-1.8315668> [Go there for pix]

DID UNDERSEA VOLCANOES HASTEN FALL OF EASTERN ROME AND PAVE WAY FOR RISE OF ISLAM?

BY JULIE CELESTIAL

Researchers presented underwater volcanism as a new interpretation of why the sky mysteriously went dark for over a year beginning 536 A.D., with some parts of Europe and Asia seeing the Sun for only about four hours a day and accounts saying the Sun gave no more light than the Moon for 18 months. The dimming led to catastrophic global cooling, famine, and civil upheavals in Medieval times.

“People thought it was the end of the world,” said Dallas Abbott who studies paleoclimate and extraterrestrial impacts at Columbia University’s Lamont-Doherty Earth Observatory.

536 A.D. was also one of the worst periods to be alive, according to Harvard University medieval historian Michael McCormick, who is not part of the study.

“And it came about during this year that a most dread portent took place,” wrote Byzantine historian Procopius. “For the sun gave forth its light without brightness, like the moon, during the whole year.”

This period of darkness and cooling marked the beginning of a longer upheaval period as trees struggled to grow from 536 to 555 A.D., indicating that the dimming was extensive, and experts have no idea exactly why.

Abbott and her colleague John Barron from the US Geological Survey presented their analysis in a poster at the meeting of the American Geophysical Union.

Their study of a Greenland ice core pointed to underwater eruptions that carried sediments and marine microorganisms into the atmosphere, which helped dim the sunlight.

Volcanic eruptions are known to spew sulfur and other particles into the atmosphere that can block out sunlight. However, geological records only showed big eruptions in 536 and 541 A.D., which are not sufficient in explaining the nine-year downward spike in tree growth.

Moreover, it would require a lot of sulfur and ash to darken the sky, and some of that material should be present in rock layers and ice cores.

However, “the amount of sulfate that was deposited wasn’t as much as in other eruptions where they experience a similar amount of dimming,” Abbott explained.

Number of fossils from tropical areas deposited in the Greenland ice during the 6th century (blue line). Sulfate levels in the ice core (black line). Image credit: Dallas Abbott/LDEO.

The researchers examined ice layers from an ice core named GISP2 that were laid down between 532 and 542 A.D and measured the chemistry of the meltwater. They also extracted microscopic fossils.

“We found by far the most low-latitude microfossils that anybody’s ever found in an ice core,” said Abbott.

The researchers were only able to identify one high-latitude species that were believed to be blown into the atmosphere by underwater volcanic eruptions near the equator.

These submarine eruptions around 536 and 538 A.D. would have vaporized seawater with the rising steam carrying calcium-laden sediments and microscopic sea creatures into the atmosphere.

Some of the particles would have eventually settled in the Arctic.

Equatorial volcanic eruptions can affect the entire planet. Once the white sediments and microorganisms were in the atmosphere, it would have been very good at reflecting sunlight back into space. These are also difficult to detect in sediment records.

There is a chance that space rocks hitting near the equator could have thrown the sediments and microfossils into the air, but the ice core chemistry and lack of cosmic dust in the layers make this less likely.

“If there were impact events, they would have to be relatively small.”

Abbott and her team said they would like to study another Greenland ice core next to see whether they can replicate the surprising findings.

A young blood with an old soul, Julie Celestial is fascinated with skies, stars, and every speck of dust in the universe. You can contact her at julie@watchers.news.

Original Study

“New ice core evidence for a volcanic cause of the A.D. 536 dust veil”
– Larsen et al. – Nature:

Abstract

New and well-dated evidence of sulphate deposits in Greenland and Antarctic ice cores indicate a substantial and extensive atmospheric acidic dust veil at A.D. 533–534 ± 2 years. This was likely produced by a large explosive, near equatorial volcanic eruption, causing widespread dimming and contributing to the abrupt cooling across much of the Northern Hemisphere known from historical records and tree-ring data to have occurred in A.D. 536. Tree-ring data suggest that this was the most severe and protracted short-term cold episode across the Northern Hemisphere in the last two millennia, even surpassing the severity of the cold period following the Tambora eruption in 1815.

Please visit the site: <https://www.juancole.com/2019/12/undersea-volcanoes-eastern.html> [Go there for pix]

HOW TO EAT DINNER LIKE THE LAST **CITIZENS OF POMPEII,** **BY MEARA SHARMA**

The chef Heston Blumenthal's latest exploration of historical appetites is a menu inspired by the final meals prepared in the doomed Roman city.

In A.D. 79, a baker in the Roman town of Pompeii placed some loaves of bread in his oven. While they were baking, Mount Vesuvius erupted, raining down layers of hot ash and stone that would both extinguish life from the town and enshrine its final moments. In excavations some two millennia later, the loaves finally came out of the oven — carbonized, but with their shape and texture intact. And on a blustery evening last week, a recreation of those loaves graced a banquet at the Ashmolean Museum in Oxford, England, where the British chef Heston Blumenthal staged a meal inspired by the cuisine of Pompeii.

The idea for Blumenthal's dinner emerged from an exhibition at the Ashmolean, titled "Last Supper in Pompeii" and on display until January 12. Before the meal, guests toured the show, a thrilling exposition of the Roman appetite, much of which was immortalized by the eruption. Excavated frescoes depict wealthy denizens reclining before multicourse meals — they tended to eat small-plates-style, just like today's gourmands. One fish-filled panel celebrates the sea's bounty, and on display too are salvaged bottles of garum, a fermented fish sauce that the Romans poured on everything. Research has also revealed strange delicacies — such as dormouse, which would have been stuffed with pork and served as a starter — as well as the remnants of Mediterranean diet stalwarts: olives, nuts, figs, dates, lentils. A curator described a jug of 2,000-year-old-olive oil — which still smells like olives — as "the closest thing we have to a portal to the ancient world."

That idea appealed to Blumenthal, whose culinary philosophy revolves around nostalgia and the potency of history. His three-Michelin-starred restaurant in Berkshire, The Fat Duck, is designed to evoke memories of childhood, and his London location, Dinner by Heston, takes cues from 14th-century tastes. For the Pompeii menu, he and Ashley Palmer-Watts, the executive chef of Dinner by Heston, drew on the carbonized food remains on display at the museum and the recipes gathered in the first-century Roman cookbook known as Apicius, indulging in a bit of time travel as well as innovating upon the ethos of the ancients. "This isn't slavishly following Roman recipes," said Blumenthal. "The past is a jumping-off point."

Come dinnertime, guests gathered around a large horseshoe-shaped table in the Ashmolean's rooftop restaurant. Alongside the blackened bread, made with Puglian burnt wheat, heritage spelt and activated charcoal (for color), the meal began with a shimmering, lava-esque lump of butter infused with squid ink, prawns and ponzu. "It's the Bay of Naples in butter," said Paul Roberts, the curator of the Ashmolean exhibition, recalling a childhood visit to the ancient city. "And it tastes like a gulp of the sea." Next, in keeping with the Pompeian penchant for seafood, was a briny dish of pickled mussels sitting in a lovage froth and seasoned with mussel cream and garum. Then, a riff on

Roman staples — roast duck and turnips — finished with Pompeian red wine (which the town once produced and exported in abundance).

Finally, dessert was a rich, goaty libum, a kind of sacrificial cheesecake the Romans would offer to household gods.

The evening's menu, which will be available at Dinner by Heston from January through March, is the first in a series of what the chef calls "last suppers" — the team is also planning to tackle the Titanic's final night and Napoleon's ultimate meal. For Blumenthal, honing in on specific historical moments doesn't just provide fodder for an unusual menu; it's also an opportunity for some narrative fantasy, and to create what he calls a "multisensory" experience for diners. As the meal unfolded, Blumenthal discussed his kaleidoscopic array of influences, from quantum physics and mindfulness to the pliable properties of cheese (a Comté made with bacteria from Blumenthal's nostrils and pubic hair was on display at the Victoria & Albert museum earlier this year). Taste, he ventured, is more slippery than we might think, and inextricably bound up with what we're seeing, hearing and thinking. At one point, he took my notebook and wrote the word "wine" in big bubble letters. "Have some of your wine," he proposed. I sipped from my glass. I thought it tasted smooth, soft. Then he wrote "wine" again, this time in sharp, spiky letters, and took a sip of his own.

"Bitter, right?"

The Romans, too, were multisensory gastronomists; to them, eating and drinking was inseparable from life itself. "The Latin word for dinner party is convivium," Roberts noted. "Meaning: living together." At the same time, the Romans often alluded to death in their art and literature; its inevitability served to heighten the pleasures of this world (even if their notions of the afterlife also involved teeming banquets). In one striking mosaic uncovered at Pompeii and now on display at the Ashmolean, a smiling skeleton carries two jugs of wine, a sly reminder to seize the day.

The Pompeii artifacts — whether an ornate wine goblet, delicately carved bone toothpicks, or a pile of petrified grapes — are imbued with a particular pathos, beautifully preserved as a result of tragedy. Blumenthal's meal summoned a similarly eerie poignancy as we feasted on these refined, fanciful renderings of dishes rooted in the residue of a lost city. But perhaps celebration is always rimmed with portent — then as much as now. Outside, it was wet and windy, the sky thick with dark clouds. As the storm descended, the diners began to recline, and the wine flowed.

A version of this article appears in print on Dec. 29, 2019, Section ST, Page 3 of the New York edition with the headline: Dining Way Out; A Taste of Old Pompeii.

Please visit the site: <https://www.nytimes.com/2019/12/23/t-magazine/heston-blumenthal-pompeii-dinner.html>