

To interested



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(Ένωση Ελλήνων Χημικών)

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# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

**- Ιανουάριος 2012 -**

**Ο Διογένης ζητούσε ελεημοσύνη από ένα άγαλμα. Όταν τον ρώτησαν γιατί κάνει κάτι τέτοιο απάντησε:**

**- Εξασκούμαι στο να μην απογοητεύομαι από την αναισθησία των ανθρώπων.**

## Newsletter of the Hellenic Society of Archaeometry

**- January 2012 -**

**Nr. 130**

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## **ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**

# **ΠΡΟΣΚΛΗΣΗ ΥΠΟΒΟΛΗΣ ΕΡΓΑΣΙΩΝ, ΔΕΥΤΕΡΟ ΔΙΕΘΝΕΣ ΣΥΜΠΟΣΙΟ, ΕΠΙΣΤΗΜΗ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑ ΣΤΑ ΟΜΗΡΙΚΑ ΈΠΗ, 30 ΑΙΩΝΕΣ ΈΜΠΝΕΥΣΗΣ ΣΕ ΚΑΘΕ ΠΕΔΙΟ ΑΝΘΡΩΠΙΝΗΣ ΓΝΩΣΗΣ ΚΑΙ ΠΟΛΙΤΙΣΜΟΥ, ΣΥΝΕΔΡΙΑΚΟ ΚΕΝΤΡΟ ΙΟΝΙΟΥ ΑΚΑΔΗΜΙΑΣ, 30 ΣΕΠΤ.–3 ΟΚΤ. 2012, ΚΕΡΚΥΡΑ**

Ως συνέχεια του επιτυχημένου πρώτου ομότιτλου Συμποσίου (Αρχαία Ολυμπία, Αύγουστος 2006), το παρόν Συμπόσιο αποβλέπει να συνενώσει ερευνητές, μελετητές και σπουδαστές από το ευρύ πεδίο των επιστημών που αναφέρονται στα Ομηρικά Έπη, σε ένα οικείο, συναδελφικό, και παραγωγικό περιβάλλον στην παρουσίαση καινούργιων ευρημάτων από την απέραντη επιστημονική και τεχνολογική γνώση που περιέχεται στα αρχαιότερα έπη του Δυτικού Κόσμου.

### **ΘΕΜΑΤΑ ΤΟΥ ΣΥΜΠΟΣΙΟΥ**

Φυσικοί, μηχανικοί και θετικοί επιστήμονες γενικά, ως επίσης και φιλόλογοι, γλωσσολόγοι, ιστορικοί της επιστήμης και της τεχνολογίας, προσκαλούνται να παρουσιάσουν εργασίες που καταδεικνύουν τη βαθιά και συνεχή επίδραση των Ομηρικών Επών στον παγκόσμιο πολιτισμό και την κουλτούρα.

Δεκτές για παρουσίαση είναι πρωτότυπες, αδημοσίευτες εργασίες πάνω σε όλες τις πλευρές των επιστημονικών θεμάτων που αναφέρονται στα Ομηρικά Έπη. Ιδιαίτερη έμφαση δίνεται στα μέρη της Οδύσσειας που αναφέρονται στην Φαιακία, η οποία, κατά τον Schliemann, είναι η νήσος Κέρκυρα, τόπος του Συμποσίου.

Ο πίνακας περιεχομένων των πρακτικών του Πρώτου Συμποσίου, που βρίσκεται στην ιστοσελίδα, είναι χρήσιμος οδηγός για πιθανά θέματα, Υλικά και Κατασκευές, Όπλα, Επικοινωνίες, Μηχανές και Τεχνητή Νοημοσύνη, Ιατρική, Γεωλογία και Γεωμηχανική, Χλωρίδα και Πανίδα, Ναυσιπλοΐα, Πολιτιστικό Περιβάλλον, Γεωγραφία κλπ.

### **ΠΡΟΕΔΡΙΑ ΤΟΥ ΣΥΜΠΟΣΙΟΥ**

Ομότιμος Καθηγητής Στέφανος Α. Παϊπέτης, Τμήμα Μηχανολόγων και Αεροναυπηγών Μηχανικών του Πανεπιστημίου Πατρών, ειδικός στα Προηγμένα Σύνθετα Υλικά, και ήδη ασχολούμενος με την αρχαία επιστήμη και τεχνολογία, ιδιαίτερα της ομηρικής εποχής και οργανωτής πλήθους επιτυχημένων σχετικών συνεδρίων επί σχετικών θεμάτων ([paipetis@mech.upatras.gr](mailto:paipetis@mech.upatras.gr)).

### **ΠΑΡΟΥΣΙΑΣΕΙΣ**

Επίσημες γλώσσες του Συμποσίου είναι αγγλικά και ελληνικά. Εργασίες στα ελληνικά πρέπει να συνοδεύονται και από την αγγλική τους μετάφραση. Χρόνος παρουσίασης είναι 15 λεπτά συν 5 για συζήτηση. Θα είναι διαθέσιμοι προβολείς διαφανειών και power-point ως και σύστημα βίντεο VHS.

#### ΠΡΑΚΤΙΚΑ

Μόνο εργασίες με ένα τουλάχιστον συγγραφέα ως εγγεγραμμένο σύνεδρο θα περιληφθούν στα Πρακτικά, τα οποία, αν οι οικονομικές συνθήκες το επιτρέψουν, θα εκδοθούν αγγλικά και ελληνικά.

#### ΟΔΗΓΙΕΣ ΠΡΟΣ ΣΥΓΓΡΑΦΕΙΣ

Για κάθε εργασία σε πρώτη φάση, υποβάλλεται περίληψη τουλάχιστον 200 λέξεων και, μετά την έγκρισή της, το πλήρες χειρόγραφο. Περίληψεις και πλήρη χειρόγραφα διαβιβάζονται μέσω ηλεκτρονικού ταχυδρομείου στην Προεδρία του Συμποσίου γραμμένα κατά προτίμηση σε μια πρόσφατη έκδοση του Microsoft Word για PC. Το τελικό κείμενο πρέπει να έχει μέγεθος 8-10 σελίδων και να είναι διαμορφωμένο κατά τις οδηγίες που δίνονται στον ιστότοπο. Πρέπει να δηλώνεται η προτίμηση για παρουσίαση προφορική ή αναρτημένη (poster), καθώς και πρόταση κατάλληλου τίτλου συνεδρίας.

#### ΠΡΟΘΕΣΜΙΕΣ

Αναγγελία Συμποσίου 1 Ιουν. 2011  
Υποβολή περιλήψεων 1 Σεπτ. 2011  
Έγκρισης περιλήψεων 30 εκ. 2011  
Υποβολή τελικού κειμένου 1 Μαρτ. 2012  
Έγκριση τελικού κειμένου  
Remission of fees

#### ΤΕΛΗ ΣΥΜΜΕΤΟΧΗΣ

Σύνεδροι: €200  
Μεταπτυχιακοί φοιτητές: €100  
Προπτυχιακοί φοιτητές: €50  
Συνοδά άτομα: €50  
Πληροφορίες για την καταβολή των τελών κλπ. λεπτομέρειες στην ιστοσελίδα του συμποσίου.

#### ΤΟΠΟΣ ΤΟΥ ΣΥΜΠΟΣΙΟΥ

Το κτίριο της Ιονίου Ακαδημίας, μια ενετική δομή σχήματος Γ, ευρισκόμενο σε ένα από τα ωραιότερα σημεία της πόλης, πρωτοχρησιμοποιήθηκε ως στρατώνας. Το 1824, κατά την αγγλική Προστασία, έγινε η έδρα της Ιονίου Ακαδημίας, του πρώτου ελληνικού Πανεπιστημίου, το οποίο, για ανεξήγητους λόγους, καταργήθηκε αμέσως μετά της Ένωση της Επτανήσου με την Ελλάδα το 1864. Σήμερα στεγάζει υπηρεσίες του Ιονίου Πανεπιστημίου και χρησιμοποιείται ως Συνεδριακό Κέντρο.

#### Η ΝΗΣΟΣ ΚΕΡΚΥΡΑ

Η νήσος Κέρκυρα, ευρισκόμενη στο Β άκρο της χώρας σε απόσταση 18 περίπου ναυτικών μιλίων από την ηπειρωτική Ελλάδα, είναι περίφημη για τις φυσικές ομορφιές και την κουλτούρα της, βλ. [www.kerkyra.gr](http://www.kerkyra.gr) και [www.corfu.gr](http://www.corfu.gr). Το τέλος Σεπτεμβρίου έχει ακόμη λιακάδα με μέση θερμοκρασία 22°C και μέση υγρασία 52% .

#### ΔΙΑΜΟΝΗ

Στην Κέρκυρα υπάρχουν ξενοδοχεία κάθε κατηγορίας σε τιμές προσιτές εκτός τουριστικής σαιζόν σε απόσταση βαδίσματος από το κέντρο της πόλης και το κτίριο της Ιονίου Ακαδημίας. Πληροφορίες στον ιστότοπο του Συμποσίου. Κρατήσεις, όχι αργότερα από τις 30 Ιουλίου 2012 στο γραφείο *Charitos Travels* στη διεύθυνση:

[mania.charitos@charitotravel.gr](mailto:mania.charitos@charitotravel.gr)

#### ΤΑΞΙΔΙ ΓΙΑ ΚΕΡΚΥΡΑ

Αεροπορικώς: Η Κέρκυρα συνδέεται με τακτικές πτήσεις προς πολλές ελληνικές και ευρωπαϊκές πόλεις. Οδικά από την Κεντρική Ευρώπη, μέσω της Α14 προς Bari, και στην Από το εσωτερικό, με αυτοκίνητο ή λεωφορείο προς Ηγουμενίτσα και προς Κέρκυρα. Από την Πάτρα (214 χλμ. Ν της Αθήνας) είτε οδικώς είτε με οχηματαγωγό κατ' ευθείαν προς Κέρκυρα.

#### ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΠΙΤΡΟΠΗ

Καθηγ. Γ. Βαρουφάκης (Ελλάς)  
Καθηγ. Γ. Βατίστας (Καναδάς)  
Καθηγ. Marco Ceccarelli (Ιταλία)  
Καθηγ. Ι. ελλής (Ελλάς)  
Καθηγ. Teun Koetsier (Ολλανδία)  
Καθηγ. Β. Κωστόπουλος (Ελλάς)  
Καθηγ. Ηλίας Μαριολάκος (Ελλάς)  
Καθηγ. Χ. Ξανθουδάκης (Ελλάς)  
Καθηγ. Α. Σ. Παϊπέτης (Ελλάς)  
Καθηγ. Σ. Παπαμαρινόπουλος (Ελλάς)  
Καθηγ. . Πολύζος (Ελλάς)  
Καθηγ. Θεοδόσιος Π. Τάσιος (Ελλάς)  
Καθηγ. Θ. Χόνδρος (Ελλάς)  
Δρ. Michael Wright (Ην. Βασίλειο)  
κ.ά

#### Οργανωτές

- Πανεπιστήμιο Πατρών
- Ιόνιο Πανεπιστήμιο
- Εταιρεία Μελέτης Αρχαίας Ελληνικής Μυθολογίας
- Ινστιτούτο Πολιτισμού και Ποιότητας Ζωής
- Εταιρεία e-RDA
- Ιόνιον Φως, Πολιτιστικό Ινστιτούτο

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- Διεθνής Ομοσπονδία για την Προαγωγή της Επιστήμης Μηχανών και Μηχανισμών

Ιστότοπος: <http://www.homst2.upatras.net>

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# **EXRS 2012 - EUROPEAN CONFERENCE** **ON X-RAY SPECTROMETRY**

## **FIRST ANNOUNCEMENT**

In 2012, the European Conference on X-Ray Spectrometry will take place in Vienna from 18th - 22nd June 2012. Vienna is one of the most popular congress cities in the world. Located in the heart of Europe, it is a cosmopolitan city of great cultural diversity, a city of 9 universities and many unique research centers and seat of many international organizations.

The 14th EXRS conference is devoted to the exchange of information and experience on the emerging and innovative techniques in the field of X-ray spectrometry and related areas. The conference will provide a framework in which scientists of various research areas will be able to convene and discuss X-ray techniques and their successful applications. A rich scientific and social program will allow experienced experts, young scientists, and industrial exhibitors to exchange views and start new collaborative projects.

If you are interested visit the conference website at <http://www.ati.ac.at/EXRS2012/> for more information.

We would also greatly appreciate it if you could download the PDF poster ([http://www.ati.ac.at/EXRS2012/pdf/exrs\\_2012\\_poster\\_20111125.pdf](http://www.ati.ac.at/EXRS2012/pdf/exrs_2012_poster_20111125.pdf)) and place it in your department.

Hope to see you next June in Vienna!

Christina Strel  
Andrzej Markowicz  
Martina Griesser  
Andreas Karydas  
Michael Mantler  
Janos Osan  
Roman Padilla  
Giancarlo Pepponi  
Manfred Schreiner  
Peter Wobrauschek

\*\*\*\*\*

Contact:

www: <http://www.ati.ac.at/EXRS2012/>

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EXRS-2012 Secretariat

Atominstut TU Wien

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1020 Wien, Austria

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**SCIENTIFIC METHODS IN CULTURAL  
HERITAGE RESEARCH, NON-  
DESTRUCTIVE IMAGING AND MICRO-  
ANALYSIS IN CULTURAL HERITAGE,  
JULY 29-AUG 3, 2012, MOUNT SNOW  
RESORT, WEST DOVER, VT**

Chair: Heinz-Eberhard Mahnke & Marco Leona  
Vice Chair: Francesca Casadio & Philippe Walter

Sessions (*discussion leaders*) with speakers (*and key words*)

- Complex materials: Case Studies from the Old and the New World (*Ernst Pernicka*) Ira Rabin (*Dead Sea scrolls*) / Jose Luis Ruvalcaba Sil (*Mesoamerican Gold Objects*)
- Structures at the nano scale (*Karen Trentelman*) Marc Walton (*Attic vases*) / Xiu Zhen Janice Li (*Toolmarks Analysis at the Atomic Scale*) / Tim Wess (*Historical Collagen*)
- Hard X-Rays: from Large Scale Facilities to Tabletop Sources (*Ercan Alp*) Eric Dooryhee (*SR X-ray Diffraction*) / Marie Jacquet (*Inverse Compton source*)
- Structures at the micro scale I: the Role of Spectroscopy (*Sandra Lopez Varela*) Costanza Miliani (*Fluorescence spectroscopy*) / Marine Cotte (*X-ray Microscopy*) / Carol Hirschmugl (*Chemical Imaging*)

Panel 1: The Role of Large Scale Facilities in Cultural Heritage studies (*Uwe Bergmann, Koen Janssens*)

- Structures at the micro scale II: from Bio-Organic Heritage to Modern Art (*Ioanna Kakoulli*)  
Catherine Higgitt (*Bio-organic in archaeology*) / Jennifer Mass (*Pigment degradation at the microscale*)
- Structures at the macro scale (*Marie-Claude Corbeil*) Robert van Langh (*Bronze Casting Technology in the Renaissance*) / Eberhard Lehmann (*Neutron versus X-ray Tomography*) / Katja Kleinert (*Neutron Autoradiography: the Art historian's Perspectives*)

Panel 2: New trends in Chemistry for Cultural Heritage Studies (*Christian Amatore*)

- Lasers: from Molecules to Macrostructure (*Y. Lawrence Yao*) Richard van Duyn (*SERS*) / Piotr Targowski (*Optical Coherence Tomography*)
- Imaging and Depth Profiling (*Hannelore Roemich*) John Delaney (*Hyperspectral Imaging*) / Margriet van Eikema Hommes (*Pigments - Paintings*) / Bernhard Bluemich (*MR Imaging*)
- Interdisciplinary Investigations in Archaeology (*Markus Reindel*) Friederike Seyfried (*Inside Egyptian artefacts*)

Poster Sessions



## **2ND INTERNATIONAL LANDSCAPE, ARCHAEOLOGY CONFERENCE 2012, BERLIN, GERMANY, 6TH–9TH JUNE 2012, SECOND CALL FOR PAPERS**

Standing in the tradition of the 1st Landscape Archaeology Conference held in Amsterdam in 2010, the LAC 2012 will provide a platform for archaeologists, geographers and researchers from neighbouring disciplines to present and discuss results in the broad field of geo- and landscape archaeology.

The scope of the conference will cover the following session themes:

- Ancient megastructures and their environment
- Landscape resilience to human impact
- Human adaptation to landscape changes
- Spatial information systems in landscape archaeology
- Theoretical concepts in landscape archaeology

For further information please visit the conference homepage:

[www.geo.fu-berlin.de/lac2012](http://www.geo.fu-berlin.de/lac2012)

### Programme

The conference will start with an opening ceremony including a keynote lecture on the evening of 6th June 2012. Afterwards, we would like to invite you to the icebreaker. On 7th and 8th June 2012 oral and poster presentations will take place.

On Saturday, 9th June 2012, field trips to various archaeological sites will give insights into early iron production in close proximity to Berlin.

### Abstract submission

Abstracts will initially be accepted for one of the conference theme sessions, with the Scientific Programme Committee reserving the right to allocate abstracts to either oral presentations or poster sessions.

Please submit your abstract (max. 250 words) by 31st December 2011 to the Organising Committee: [lac2012@geo.fu-berlin.de](mailto:lac2012@geo.fu-berlin.de). Please use the attached abstract submission form. If your abstract is accepted for an oral presentation you will receive an email requesting an extended abstract (3500 words, up to 2 figures, references) for publication in the conference proceedings in the online publication medium of the Excellence Cluster Topoi: e-topoi.

### Important Dates

- June 2011: First circular
- 31st December 2011: Deadline for abstract submission
- 30th April 2012: Deadline for registration

#### Venue

The 2nd International Landscape Archaeology Conference will take place at the Science & Conference Center of Freie Universität Berlin on 6th – 9th June 2012.

The conference language is English.

Associated with the Science & Conference Center, the Seminaris Campus Hotel provides accommodation for the participants of the conference. To get the special conference rates, please contact the Organising Committee ([lac2012@geo.fu-berlin.de](mailto:lac2012@geo.fu-berlin.de)) for further information. Check <http://www.berlin.de/international/index.en.php> to find other accommodations in Berlin.

#### Conference Fees

Early registration until 31st March 2012

Regular 150 Euro | Students 75 Euro

Regular registration until 30th April 2012 Regular 175 Euro | Students 150 Euro

#### Publications

It is planned to publish the proceedings of the conference in special issues of the journals Quaternary International and Geoarchaeology. Submitted papers will pass through the normal review process of the journals.

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# **4TH INTERNATIONAL CONFERENCE** **OF MEDITERRANEAN WORLDS** **"DOMINO EFFECTS AND** **HYBRIDIZATION OF THE** **MEDITERRANEAN", 5-7 SEPTEMBER,** **ISTANBUL (TURKEY)**

An interdisciplinary conference hosted by the Department of History, 29 Mayis University, in collaboration with The Mediterranean Seminar, University of California Santa Cruz; Bern University, Department of the History of the Art, TransMediterraneanStudies.

“The Mediterranean is not only a cultural and historical, neither a mystic and lyric space...One must chase the manifold Mediterranean paths, those of the traffics of the pilgrimage, of the extension of lives and the rivers’ courses; the borders will then become fluctuant and blurred, even concentric and coherent by drawing ideal curves like ripples in the sea”- C.Magris

There are countless discussions and publications, case studies and unresolved questions, and eventually, research projects on “histories in and the history of the Mediterranean”, which all underline the commonalities and differences between the cultures and histories of the region. One issue should be kept in mind when considering these:

It is no doubt very easy to be captivated by delightful similarities, overlooking diversity or, on the other extreme, to see insurmountable differences under the spell of modern national or global theories.

However, the Mediterranean, a place of constant flux, should be more accurately described as ‘hybrid’: Frontier societies and particularly shores share an amalgam of cosmopolitan socio-economic and political structures.

One example process that brings about hybridity is migration and its domino effect-style repercussions. Although classical historiography highlights the region as one ‘source’ for many ideas, species, social organizations and religions, it is also a perennial destination for outsiders. This can be evidenced by the salient immigrations of people from all directions towards the Middle Sea, not restricted to ‘Völkerwanderung’. One can easily describe these waves of arrivals as multiple ‘domino effects’ which had corollary effects on the region in diverse localities.

Shifts of ideas, modes of production, methodology, science, religion, language are among dynamics brought about successively by the various influxes to the region and yield hybrid outcomes. The dislocation of substances, structures, hierarchies, languages, religions and traditions in a domino effect facilitates the re-emergence of these social elements in the new location in novel and ingenious ways. In time, their imported or

suspended character takes on a more permanent and assimilated character – a hybrid is born.

Furthermore, the social transformations that follow the ending of colonial mandates, rising immigration, and economic liberalization profoundly alter existing social structures and entities. Like prolonged wars and natural disasters, colonial and post-colonial relations create long-lasting political instability or intellectual confusion, adding to the diversification of existing traditions.

Here, we would like to focus on both the source and the outcome of various fluxes, as well as the process of generation, aiming not just to detect origins or traces of separate entities but also to study the liminality of the emerging planes. Our goal is to focus on the effects of mixture upon various elements in the Mediterranean, dwelling on outcomes that are not easily labeled as one thing or other, defining the critical stages of change. This would, in a sense, be an extension of the macro-micro history dialectic and the diversity of the local regional outcomes as analyzed by Braudel, Horden-Purcell, McCormick and Wickham which retain an undoubted appeal and interest as Magris and Matijevic have often pointed out.

We hope that our rubric of ‘Mediterranean Worlds’ is broad enough to encompass the work of scholars conducting research across the whole range of elements of Mediterranean culture and history, while at the same time highlighting this year’s special topic of ‘domino effects and hybridization.’

## Deadline and Guidelines

### Guidelines

#### Abstract Submissions:

Abstracts should be no more than 300 words and should include at least 3 descriptive keywords, the presenter’s name, email address, organization, and mailing address.

#### Organized Session Submissions:

The session must have a title and description of up to 500 words and at least 3 descriptive keywords as well we’ll require each presenter’s name, email address, organization, a 300 word abstract (or biography for panel sessions) and mailing address.

Please send your abstract and session submissions to [luca.zavagno@emu.edu.tr](mailto:luca.zavagno@emu.edu.tr) or [caykent@gmail.com](mailto:caykent@gmail.com)

Deadline for submission: 27 February 2012

Notification of Acceptance will be communicated by 2 April

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**10TH MEETING OF THE**  
**INTERNATIONAL SYMPOSIUM ON**  
**ANCIENT CERAMICS (ISAC), 23-27**  
**OCTOBER 2012, JINGDEZHEN, JIANGXI**  
**PROVINCE, CHINA**

The 10th meeting of the International Symposium on Ancient Ceramics (ISAC) will be held on 23-27 October 2012 in Jingdezhen, Jiangxi province, China. The conference is organized by the Shanghai Institute of Ceramics, The Shanghai Research Society for the Science and Technology of Ancient Ceramics and the Research Institute for Ancient Ceramics at the Jingdezhen Ceramics Institute. The conference will facilitate interchange of information among researchers and specialists in ancient ceramics with visits to special facilities in Jingdezhen. The subjects of the conference are ceramic science and technology, archaeology, trade, craft, testing methods and preservation. The deadline for 1000 word abstracts, plus 3 figures and tables is 30 January 2012. A trip to Jizhou kilns will follow the conference. Contact Pamela Vandiver at [vandiver@mse.arizona.edu](mailto:vandiver@mse.arizona.edu) with questions. Email abstracts to Lu Xiaoke, at [luxiaoke@mail.sic.ac.cn](mailto:luxiaoke@mail.sic.ac.cn).

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## **INTRODUCTION TO CERAMIC PETROLOGY COURSE 2012**

In spring 2012, the Fitch Laboratory will hold a two-week postgraduate training course providing an introduction to ceramic petrology. The course, building upon the Fitch's established reputation on ceramic petrology applications and its extensive reference collections of geological and ceramic thin sections, was offered for the first time in spring 2010 after a generous grant by the Bradford McConnell Trust to build the necessary teaching infrastructure. It was then repeated in spring 2011. Its unforeseen success, reflected in the excellent field of more than eighty applicants from forty institutions across more than fifteen countries and the first-rate course assessment by the first participants, has enforced the need for its continuation.

The course is open mainly to people with no previous experience on petrology although familiarity with archaeological ceramics will be useful. It is an excellent introduction for students already (or hoping to embark) on a Master's or research degree in archaeological materials, as well as for postdoctoral researchers interested in being familiar with ceramic petrology applications. Although the focus is primarily with ceramic materials the skills learnt are applicable to the study of lithics, building materials, pigments and soils.

The course will comprise daily lectures and practicals introducing to optical polarizing light microscopy, the identification of main rock-forming minerals, the classification of rock types, the use and interpretation of geological maps and, subsequently, the analysis of ceramic thin sections to reconstruct provenance and technology. Furthermore, a field class to Aegina, including a visit to a traditional pottery workshop, will provide practical experience on prospection for pottery raw materials and sampling, as well as contemporary potting practices. In the second week, each participant will have the opportunity to undertake a case study project. A course manual will be provided for participants covering all aspects of the course and further reading.

The course co-coordinators and instructors will be **Evangelia Kiriatzi** (Director, Fitch Laboratory) and **Ruth Siddall** (Lecturer, Earth Science, UCL).

**Dates: 26 March – 06 April 2012.**

**Course Fee:** The course fee includes tuition, accommodation, fieldtrip expenses, all teaching materials, BSA membership for a month including 24 hour access to the superb library and entry to archaeological sites and museums. The fee is 900€ for shared accommodation in double rooms and 1000€ for single accommodation. Self-catering accommodation (including breakfast) will be provided at the BSA Hostel, next to the Fitch Laboratory building. Travel to and from Athens is the sole responsibility of the course participant.

The course is limited to 10 places. Post-graduate students are recommended to apply to their universities for financial support; limited funding is available for students who would otherwise be unable to attend and they should express their interest in such financial support in their application.



**Applications** should include: a brief curriculum vitae, two reference letters and a short covering letter stating the interest in ceramic petrology and reasons for wishing to do the course. Applications should be submitted to the Fitch Laboratory administrator, Ms Zoe Zgouleta via e-mail ([fsecretary@bsa.ac.uk](mailto:fsecretary@bsa.ac.uk)).

Closing date: **23 January 2012**. References must also be received by then through e-mail: it is the applicant's responsibility to ensure that references are sent. The successful candidates will hear by late February 2012.

For further information, please check the relevant sections on the British School at Athens web pages or contact either of the two course coordinators, Dr Evangelia Kiriati ( [fdirector@bsa.ac.uk](mailto:fdirector@bsa.ac.uk) ) or Dr Ruth Siddall ( [r.siddall@ucl.ac.uk](mailto:r.siddall@ucl.ac.uk) ).

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**ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –**  
**JOB VACANCIES/FELLOWSHIPS**

**FITCH LABORATORY SENIOR VISITING**  
**FELLOWSHIP 2012-2013**

Applications are invited for Senior Visiting Fellowships at the Fitch Laboratory, British School at Athens (BSA) for up to 3 months in the academic year 2012-13, for research in any of the fields in which the Laboratory is active (e.g. inorganic material analysis, geophysical prospection, zooarchaeology, archaeobotany, soil micromorphology, ethnoarchaeology, landscape archaeology, archaeology of technology; normally in the context of Aegean/Mediterranean archaeology). One or two Fellows will be appointed in each year depending on requests for the Fellowship duration. The Fellowship covers a monthly stipend (500€), BSA Hostel accommodation and airfare (up to 400€), as well as limited research expenses (up to 500€). Fellows will be required to submit a report on their research and a short general report on their time at the Laboratory to the Laboratory's Subcommittee and Director.

The Senior Visiting Fellows should be established scholars or scientists (normally at least 5 years beyond receipt of the Ph.D.). Fellowships are intended to enable scholars in post to spend a period of research leave in Greece, for example, during sabbatical. Fellows will be expected to reside at the School and base their research at the Laboratory, for a period of between 1 and 3 months, preferably during the academic year (between October and June). During this time they should conduct a programme of original research either independently or in collaboration with Laboratory staff members. Fellows are also expected to give one public lecture or an open seminar at the BSA.

The Fellowship covers BSA membership and accommodation at the BSA Hostel in Athens and, if required for research purposes, also in Knossos, while accommodation is also offered to an accompanying spouse/partner, who is most welcome, at a nominal daily rate. Regrettably, children cannot be accommodated. Preference may be given to employees of UK HEIs, Museums and other such bodies.

Applications should include a covering letter (indicating the preferred length and period of stay), a Curriculum Vitae, a statement of their proposed programme of research (up to 500 words) and the names and contact details of two referees. References must also be received by the closing date through e-mail: it is the applicant's responsibility to ensure that references are sent. Applicants are advised to contact the Laboratory Director if the use of analytical facilities is necessary for the proposed research.

Applications and reference letters should be submitted by **20th January 2012** via e-mail to [school.administrator@bsa.ac.uk](mailto:school.administrator@bsa.ac.uk)

Potential applicants may contact Dr E. Kiriati, the Laboratory Director ([fldirector@bsa.ac.uk](mailto:fldirector@bsa.ac.uk)), for further information. Additional details about the School and the Laboratory can be also found at <http://www.bsa.ac.uk/>.

***ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS***  
**CHANGE OF INSTAP ADDRESSES**

INSTAP is moving. New contact information as of Monday, Dec. 12, 2011, is shown below. Please update your records.

\*\*\*\*\*

The Institute for Aegean Prehistory  
2133 Arch St., Ste. 300  
Philadelphia, PA 19103 USA  
Tel. 215-496-9914  
[instap@hotmail.com](mailto:instap@hotmail.com)

INSTAP Academic Press  
2133 Arch St., Ste. 301  
Philadelphia, PA 19103 USA  
Tel. 215-568-8041  
[instapress@hotmail.com](mailto:instapress@hotmail.com)

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## *INTERNET SITES*

# **FIFTY YEARS OF EXCAVATIONS AND RESEARCHES AT ARSLANTEPE- MALATYA (TURKEY)**

Now Playing: Streaming Conference Fifty years of Excavations and Researches at Arslantepe-Malatya (Turkey)

Please visit the site: <http://ancientworldonline.blogspot.com/2011/12/early-warning-streaming-conference.html>.

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## **PERSEPOLIS FORTIFICATION** **ARCHIVE UPLOAD TO INSCRIPTIFACT**

The InscriptiFact Team reports in an email to registered users:

"We have just uploaded 2112 new images of 229 new texts from the Persepolis Fortification Archive. Most of these images are RTI images (Reflection Transformation Imaging). The Greek, Akkadian and Old Persian tablets are now posted.

In addition, we have added the Assyrian Reliefs from the Oriental Institute, RTIs of KTU 1.18, and RTIs of objects from USC's Archaeological Research collection and the Los Angeles Unified School District's Art and Artifact Collection."

Please visit the site: <http://persepolistablets.blogspot.com/2011/12/persepolis-fortification-archive-upload.html> [Go there for other links]

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## **THE 2011 KERKENES REPORT**

The 2011 Kerkenes Report can be downloaded from the Kerkenes web page:  
<http://www.kerkenes.metu.edu.tr/kerk2/index.html>

or directly from the following link:

<http://www.kerkenes.metu.edu.tr/kerk2/17downlds/reportPdf/11kerkreng.pdf>.

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## **ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS**

### **NEW LIGHT ON THE LATE BRONZE AGE SITE OF ENKOMI IN CYPRUS**

The Late Bronze Age civilization of Cyprus owes much to Porphyrios Dikaios, who excavated at Enkomi between 1948 and 1958 on behalf of the Department of Antiquities. Two volumes of text, one of plates and another of plans and sections were published by him (Philipp von Zabern Verlag, Mainz-am Rhein) in 1969 and 1971. Since then the international archaeological community has been profiting considerably from the mine of information which is contained in this publication.

The ten campaigns of excavations carried out between 1948 and 1958 have brought to light an enormous amount of archaeological material. Some of it was not included in the final publication for various reasons, mainly because it was not treated or mended in time for publication. The present Director of the Cyprus Department of Antiquities Dr Maria Hadjicosti, who made detailed lists of it, asked Vassos Karageorghis to undertake its publication. This material, which is as important as that which was published by Dikaios, includes terracotta figurines, vases, loomweights, beads, stone objects, bronze objects, wall brackets, lamps, clay masks, a rich collection of potmasks etc, which add considerably to our knowledge of the material culture of the Late Cypriote Bronze Age. With a grant from the A. G. Leventis Foundation and the Institute for Aegean Prehistory (New York), its publication was made possible. Professor Vassos Karageorghis studied the bulk of the material and Dr Nicolle Hirschfeld has studied the potmasks, 53 of them. Every object is illustrated in colour and there are also numerous drawings.

The volume may be ordered through the A. G. Leventis Foundation, 40 Gladstonos street, 1095 Nicosia, Cyprus. Email: [leventcy@zenon.logos.cy.net](mailto:leventcy@zenon.logos.cy.net) ; fax: 22675002. Price: 20Euros, plus postages.

\*\*\*\*\*

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<http://www.ucy.ac.cy/isa/biografika/kouka.htm>

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## ARCHAEOLOGIA BULGARICA

Two issues of ArchBulg have been published. Number XV, 2011, 3 will be printed in the beginning of 2012.

There are just nine months till the 22nd Limes Congress:

[www.limes2012.naim.bg](http://www.limes2012.naim.bg)

Regards,

Lyudmil Vagalinski

editor

[www.archaeologia-bulgarica.com](http://www.archaeologia-bulgarica.com)

[www.naim.bg](http://www.naim.bg)

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## **EΙΔΗΣΕΙΣ - NEWS RELEASE**

# **FINDS IN OMAN PUSH BACK DATE OF MODERN HUMAN EXODUS OUT OF AFRICA**

Stone tool finds challenge long-held theories about early human migration out of Africa.  
Finds in Oman Push Back Date of Modern Human Exodus Out of Africa

New discoveries by an international team of archaeologists and geologists in the Dhofar Mountains of southern Oman are shedding new light on when and how archaic modern humans first migrated out of their African homeland to occupy Eurasia.

Led by Dr. Jeffrey Rose of the University of Birmingham, the team found over 100 new sites that featured "Nubian Middle Stone Age (MSA)" tools, an ancient industry known to have existed in the Nile Valley of Egypt, but never outside of Africa. According to these researchers, this provides further evidence that early humans migrated across the Red Sea region on their journey out of Africa. Says Rose, "After a decade of searching in southern Arabia for some clue that might help us understand early human expansion, at long last we've found the smoking gun of their exit from Africa. What makes this so exciting is that the answer is a scenario almost never considered."

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Nubian Type 1 core from Oman, the first time this particular stone tool technology has been found outside of Africa. Credit: Yamandu Hilbert Rose JI, Usik VI, Marks AE, Hilbert YH, Galletti CS, et al.

(2011) The Nubian Complex of Dhofar, Oman: An African Middle Stone Age Industry in Southern Arabia. PLoS ONE 6(11): e28239.  
doi:10.1371/journal.pone.0028239

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The findings challenge long-held theories about human migration and dispersal out of Africa. By using Optically Stimulated Luminescence (OSL) techniques, they were able to date one of the sites to 106,000 years ago, a time that significantly predates the 70,000 to 40,000 BP time range when geneticists have estimated that early modern humans made their exodus.

Moreover, the sites were located inland, far from the coast, inconsistent with currently accepted theories that suggest that early humans made their exit by hugging the coast of southern Arabia. Says team member and co-author Professor Emeritus Anthony Marks of Southern Methodist University, "Here we have an example of the disconnect between theoretical models versus real evidence on the ground. The coastal expansion hypothesis looks reasonable on paper, but there is simply no archaeological evidence to back it up. Genetics predict an expansion out of Africa after 70,000 thousand years ago, yet we've

seen three separate discoveries published this year with evidence for humans in Arabia thousands, if not tens of thousands of years prior to this date."

Why would these human groups move inland to occupy the unforgiving desert landscape of present-day Oman? According to scientists, the answer lies in fluctuating cycles of climatic history. These lands, 106,000 years ago, were expansive grasslands - not the dry desolation we see today. Says Rose, "For a while, South Arabia became a verdant paradise rich in resources – large game, plentiful freshwater, and high-quality flint with which to make stone tools." These early modern humans may have been primarily hunters, following game and freshwater through river networks as opposed to being fishers who progressed along the coastal areas.

How long they occupied these areas through the cycles of changing climate remains to be determined through future research.

The detailed research article is published as The Nubian Complex of Dhofar, Oman: An African Middle Stone Age Industry in Southern Arabia by Rose JI, Usik VI, Marks AE, Hilbert YH, Galletti CS, et al. (2011) in the open-access journal PLoS ONE at <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0028239>.

**Please visit the site: <http://popular-archaeology.com/issue/september-2011/article/finds-in-oman-push-back-date-of-modern-human-exodus-out-of-africa>**

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## **YALE: ART FIND IN EGYPT 15,000 YEARS OLD, BY JOHN BURGESSON**

The words "ancient Egyptian art" brings to mind the popular tomb art found in the region of the Upper Nile, created between 5000 BC and about 300 AD.

As ancient as those works are, they're almost contemporary compared to what a Yale University professor and a team of Belgian scientists found in Qurta, Egypt -- rock carvings dating back to between 15,000 and 23,000 years ago. They are the oldest Egyptian works of art known to exist and are among the oldest art found anywhere.

The findings were announced in the December issue of *Antiquity*, a peer-reviewed scientific journal.

These carvings are nothing like the familiar Egyptian carvings and paintings of man-beast gods, epic battles and the beauty of Nefertari.

Rather, these newly discovered works offer views of animals that the Paleolithic hunters encountered -- mostly the wild predecessors of the domestic cattle of today. Other carvings, called petroglyphs, depict hippos and gazelles. Humans are found, too, among the drawings, but usually they are shown only as stick figures.

The researchers said that the carvings have more in common with the drawings found in Lascaux, the cave in France, as opposed to the art of the Egyptian dynasties. The Lascaux cave paintings have been dated to 17,300 years ago, or about the same era as this new discovery in Egypt.

"As such, they're not considered as Egyptian art, because it predates the appearance of Egyptian culture," said Yale's Colleen Manassa, assistant professor of Egyptology. She added that it even pre-dates "by a long shot" the predynastic art that was the precursor to Egyptian art.

"There's nothing specifically Egyptian about it," Manassa said, noting its similarity to the cave paintings at Lascaux. "They're both trying to represent these animals in a very natural way."

She said that even in pre-Egyptian art, animals and other objects are depicted in a symbolic fashion. "When you see a picture of a boat in Egyptian art, the boat means something," she said. "We don't think that's the case with Paleolithic art."

The Yale professor on the discovery team was John Coleman Darnell, who has had a number of papers published on the early art of the Egyptian deserts.

"The rock art at Qurta reveals that the well-known cave art of the late Pleistocene in Europe was not an isolated phenomenon," Darnell said in a prepared statement. "This puts North Africa firmly in the world of the earliest surviving artistic tradition, and shows that tradition to have been geographically more widespread than heretofore imagined."

The Pleistocene refers to the geologic epoch from 11,700 to 2.6 million years ago, in which there were repeated glaciations in Europe and North America. It coincides closely with the Paleolithic era -- 10,000 to 2.6 million years ago, which refers to a period of human history in which humans used stone tools for the most part.

Darnell could not be reached for comment.

Manassa said that Paleolithic stone tools have been found in Egypt, but this is the first time that art from that era has been confirmed.

Researchers said the carvings were actually found by a Canadian team in the early 1960s, but they were not researched or dated at that point. This latest research took place in 2008, and was not announced until the article appeared in the Antiquities journal. He was with a team from the Royal Museums of Art and History in Brussels, Belgium.

The age of the art was determined using a technique called optically stimulated luminescence, or OSL dating. It is useful in situations, such as this, in which the date of minerals, rather than organic material, must be determined, scientists say.

Reach John Burgeson at 203-330-6403 or at [jburgeson@ctpost.com](mailto:jburgeson@ctpost.com). Follow [twitter.com/johnburgeson](https://twitter.com/johnburgeson).

**Please visit the site: <http://www.ctpost.com/news/article/Yale-Art-find-in-Egypt-15-000-years-old-2307625.php>**

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## **(MINOAN) "CALENDAR HOUSE" NOTES** **ON RELEVANT FINDINGS**

As you may know, the recent work *Calendar House: Clues to Minoan Time from Knossos Labyrinth* (available at <http://ancientlights.org>) presents evidences of an 8 and 1/2-year lunar/solar cycle anchored, like the Knossos throne, throne room and its eastern anteroom doorways, to Winter Solstice and Summer Solstice. While many artifacts suggest multiple Minoan calendric ways, this cycle appears to have been central. When this calendric period is doubled---for doubling and doubled pairs are signs of significance in Minoan remains---we find that cycle flanked at both ends by a 6-month period in which a Saros eclipse (with its 18+-years cycle) can be expected. And so I thought some might be interested to know about some new independent scholarship whose findings are congruent with the above.

Florence and Kenneth Wood have published *Homer's Secret Odyssey* (2011: Gloucestershire UK, History Press)---a line-by-line analysis of Homer's complete story of Odysseus' travels, from the day he leaves home for The Trojan War to his return. When every lunar/solar reference in the poems is studied chronologically, the documented result happens to be the same doubled 8 and 1/2-year cycle (and Odysseus' story culminates in that final "extra" Saros eclipse period).

Meanwhile, speaking to the long "Dark" periods between Minoans and Classical times, there is a great deal of iconographic similarity between Minoan and Cyprian forms documented from sites such as Myrtou-Pigadhes (and in Yasur-Landau's 2011 *Philistines*), while L.E. Stager's *Ashkelon* (2008: Vol. 1: 268, Fig. 15-33-3) presents early Philistine vessels (circa 1175-1150 BCE) whose "decorations" include carefully-painted 8-point crosses in spiral-wheel motifs which are both doubled and flanked by amorphous dark forms---suggestive of the same conceived relation between the above lunar/solar cycle and that of Saros eclipses. Also, Malcolm Cross has published *The Creativity of Crete: City-States and the Foundation of the Modern World* (2011: Oxford, Signal Books), and his findings articulate a great deal about the still-sophisticated cultural and sociopolitical continuities that informed Cretan societies over post-Minoan centuries. Not least in many communities was a law-based imposition of time-limits and a "rotation" or "alternation" system against political entrenchment, a tradition that *House* argues was based in Minoan calendrics. The complexity and wealth we see in Dr. Agelarakis' digs at Eleutherna/Orthi Petra give physical forms to Cross' historical findings---and it seems that amid great changes, there was enough stability and cultural memory in Crete to have allowed a useful, traditional lunar/solar calendar to survive.

In these same periods Cross also locates an inscription from Itanos that refers to some kind of "heliotropion" or calendric device for tracking Winter Solstice. That common calendric anchoring-day is also a concern of the later Antikythera Mechanism (circa 200-100 BCE), and Cross wonders whether the Mechanism may have originated or been in Crete before it was lost aboard a Roman ship loaded with plunder. As the "Coda" to *Calendar House* details on all these

subjects (<http://ancientlights.org/CalendarHouse/chcoda.html>), the Mechanism's form and functions are visibly similar to those of Bronze Age Minoan calendric patterns.

When many kinds of independent research begin to reflect common elements, it's not unreasonable to think that something of substance is in their midst. Contaminated amateur that I am, I welcome discussion on the long-mysterious points where Minoan and post-Minoan calendrics, religion and politics centrally converged.

Happy Winter Solstice and New Year to all.

Dr. Jack Dempsey

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AncientLights.org  
Jackdempseywriter.wordpress.com  
Writeandspeakpowerfulengish.com

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## **OVERLOOKED RELICS MAY HELP UNEARTH DEAD SEA SCROLLS' AUTHORS STUDY OF GARMENTS FOUND WITH SCROLLS IN QUMRAN CAVES SEEMS TO SUPPORT CONTESTED THEORY OF SEPARATIST ESSENE AUTHORSHIP, BY NIR HASSON**

When the Dead Sea Scrolls were discovered in caves in the Judean Desert, tattered pieces of fabric were found with them, sometimes wrapping them and sometimes stuffed into the jars in which they were found. Scholars, focusing on the scrolls, arguably the most important archaeological discovery of the 20th century, ascribed little importance to the fabric.

But in recent years, Dr. Orit Shamir of the Israel Antiquities Authority and Naama Sukenik (a relative of Eliezer Sukenik, who identified the scrolls ) of Bar-Ilan University have shone their scholarly spotlight on the crumbling cloth.

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Soon to be published in the prestigious Dead Sea Discoveries journal, their conclusions will likely not put to rest the heated debate over the identity of the people who wrote the scrolls. But scholars who surmise that the ancient volumes were written by a separatist sect will find in the research support for their position.

Shamir, conservator of organic materials in the Antiquities Authority, is in charge of a small, crowded, humidity-controlled storeroom in Jerusalem's Har Hotzvim industrial zone, filled with organic materials discovered in various digs.

"I always say that I did my doctorate on rags," Shamir says, laughing. She studied weaving for two years, even weaving fabric on a model of a Second Temple period wooden loom that she built herself.

Among the finds in the storeroom are a number of boxes containing small, torn pieces of cream-colored linen from Qumran.

Shamir and Sukenik found that these fabrics are different from any others found in excavations from the same period. Both Jews and Romans wore mainly woolen garments Shamir says, and so wool is the fabric mainly found at archaeological sites. Most of the clothing also featured a dark red pattern described both in Talmudic and non-Jewish sources.



But pieces of cloth from Qumran are completely different. They are all made of linen rather than wool and are devoid of decoration. They were also bleached, apparently by soaking them in bicarbonate of soda produced from plants, which Shamir says was both costly and labor-intensive.

Shamir says that linen, which was more expensive than wool, was worn as a manifestation of religious observance. According to Shamir, both Romans and Jews wore white "to stand out and convey modesty."

The researchers believe that after the fabrics were too tattered for further use as clothing, they were used to wrap the scrolls.

The fact that the inhabitants of Qumran wore white dovetails perfectly with a description by the ancient historian Josephus that acolytes of the Essene sect wore white. He mentions elsewhere that these garments were linen.

The conclusions support the view of one scholarly camp that believes that the Dead Sea Scrolls were written by the Essenes, who concealed them at the site. But another camp, considered more radical, believes they were written in Jerusalem by the Sadducees, a religious faction that eventually died out.

Shamir and Sukenik are in no hurry to tie their research to either school of thought, but it is hard to ignore the fact that it supports the theory that community of anchorites lived at Qumran and wrapped their sacred scrolls in the remnants of their garments, hiding them in the caves for generations.

Shamir points out the great similarity between the archaeological finds at the site and descriptions of the sect. Qumran is also unusual in that no evidence of weaving, traditional women's work, was found there, which Shamir says also supports that a sect in which no women were present lived at Qumran.

Four pieces of fabric stand out among the hundreds in the study. They bore a single blue thread, woven in a square. Shamir, like the late scholar of the Judean Desert and Masada, Yigael Yadin, believes this fabric was not in secondary use, but was made to wrap and protect the scrolls, and the single blue thread was made to represent the Temple.

**Please visit the site: <http://www.haaretz.com/jewish-world/overlooked-relics-may-help-unearth-dead-sea-scrolls-authors-1.398126>**

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# **THE SECRETS OF ANCIENT ROME’S BUILDINGS - WHAT IS IT ABOUT ROMAN CONCRETE THAT KEEPS THE PANTHEON AND THE COLOSSEUM STILL STANDING? BY ERIN WAYMAN**

The Romans started making concrete more than 2,000 years ago, but it wasn’t quite like today’s concrete. They had a different formula, which resulted in a substance that was not as strong as the modern product. Yet structures like the Pantheon and the Colosseum have survived for centuries, often with little to no maintenance.

Geologists, archaeologists and engineers are studying the properties of ancient Roman concrete to solve the mystery of its longevity.

“Roman concrete is . . . considerably weaker than modern concretes.

It’s approximately ten times weaker,” says Renato Perucchio, a mechanical engineer at the University of Rochester in New York. “What this material is assumed to have is phenomenal resistance over time.”

That resistance, or durability against the elements, may be due to one of the concrete’s key ingredients: volcanic ash. Modern concrete is a mix of a lime-based cement, water, sand and so-called aggregates such as fine gravel. The formula for Roman concrete also starts with limestone: builders burned it to produce quicklime and then added water to create a paste. Next they mixed in volcanic ash—usually three parts volcanic ash to one part lime, according to the writings of Vitruvius, a first-century B.C. architect and engineer. The volcanic ash reacted with the lime paste to create a durable mortar that was combined with fist-size chunks of bricks or volcanic rocks called tuff, and then packed into place to form structures like walls or vaults.

By the beginning of the second century B.C., the Romans were already using this concrete in large-scale construction projects, suggesting their experimentation with the building material began even earlier.

Other ancient societies such as the Greeks probably also used lime-based mortars (in ancient China, sticky rice was added for increased strength). But combining a mortar with an aggregate like brick to make concrete was likely a Roman invention, Perucchio says.

In the earliest concretes, Romans mined ash from a variety of ancient volcanic deposits. But builders got picky around the time Augustus became the first Roman emperor, in 27 B.C. At that time, Augustus initiated an extensive citywide program to repair old monuments and erect new ones, and builders exclusively used volcanic ash from a deposit called Pozzolane Rosse, an ash flow that erupted 456,000 years ago from the Alban Hills volcano, 12 miles southeast of Rome.

“Emperor Augustus was the driving force behind the systemization, standardization of mortar mixes with Pozzolane Rosse,” says Marie Jackson, a geologist and research engineer at the University of California at Berkeley. Roman builders likely favored the ash deposit because of the durability of concrete made with it, she adds. “This was the secret to concretes that were very well bonded, coherent, robust materials.”

Jackson and her colleagues have been studying the chemical composition of concretes made with Pozzolane Rosse. The ash’s unique mix of minerals appears to have helped the concrete withstand chemical decay and damage.

The Romans favored another specific volcanic ash when making concrete harbor structures that were submerged in the salty waters of the Mediterranean. Pulvis Puteolanus was mined from deposits near the Bay of Naples. “The Romans shipped thousands and thousands of tons of that volcanic ash around the Mediterranean to build harbors from the coast of Italy to Israel to Alexandria in Egypt to Pompeiopolis in Turkey,” Jackson says.

Seawater is very damaging to modern concrete. But in Roman concrete, the Pulvis Puteolanus “actually plays a role in mitigating deterioration when water percolates through it,” Jackson says.

Although the exact mechanism is unknown, it appears that chemical reactions among the lime paste, volcanic ash and seawater created microscopic structures within the concrete that trapped molecules like chlorides and sulfates that harm concrete today.

Despite the success of Roman concrete, the use of the material disappeared along with the Roman Empire. Concrete structures were seldom built during the Middle Ages, suggesting volcanic ash wasn’t the only secret to the durability of Roman concrete, Perucchio says.

“These really large projects could only be done with the appropriate bureaucracy, with the proper organization that the Roman Empire would provide.”

Erin Wayman is an assistant editor at Smithsonian and writes the Hominid Hunting blog.

Please visit the site: <http://www.smithsonianmag.com/history-archaeology/The-Secrets-of-Ancient-Romes-Buildings.html>

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## **CORES REVEAL WHEN DEAD SEA 'DIED', BY JONATHAN AMOS**

Aragonite and gypsum deposits at the edge of the Dead Sea record the region's climate history Continue reading the main story

Sediments drilled from beneath the Dead Sea reveal that this most remarkable of water bodies all but disappeared 120,000 years ago.

It is a discovery of high concern say scientists because it demonstrates just how dry the Middle East can become during Earth's warm phases.

In such ancient times, few if any humans were living around the Dead Sea.

Today, its feed waters are intercepted by large populations and the lake level is declining rapidly.

"The reason the Dead Sea is going down is because virtually all of the fresh water flowing into it is being taken by the countries around it," said Steve Goldstein, a geochemist at Columbia University's Lamont-Doherty Earth Observatory, US.

"But we now know that in a previous warm period, the water that people are using today and are relying upon stopped flowing all by itself. That has important implications for people today because global climate models are predicting that this region in particular is going to become more arid in the future," he told BBC News.

Prof Goldstein has been presenting the results of the drilling work here at the 2011 American Geophysical Union (AGU) Fall Meeting, the largest annual gathering of Earth scientists.

The Dead Sea is an extraordinary place. The surface of the inland waterway sits at the lowest land point on the planet, more than 400m below sea level.

Its hyper-salty waters descend in places a further 300m. And below the lake bed is layer upon layer of sediments that record the Dead Sea's history and the climate conditions that have prevailed in the region over hundreds of thousands of years.

A consortium of investigators from Israel, the US, Germany, Japan, Switzerland and Norway drilled two cores into the Dead Sea's bed in late 2010. One of them was centred close to the very deepest part of the lake.

At 235m down, the consortium hit a layer of small, rounded pebbles - what the team believes are the deposits of an ancient beach. Given the location of the core, this would suggest the Dead Sea had a complete, or near, dry-down at some point in the past.

Formal dating of the core sediments has not yet been completed, but their pattern leads the team to conclude that the dry-down occurred in the Eemian.

This was a stage in Earth history when global temperatures were as warm, if not slightly warmer, than they are today.

The modern day Middle East is preventing water getting into the Dead Sea. The surrounding countries are using it for agriculture. Fertiliser and salt manufacturing are also having an impact. Since 1997, the lake's surface has fallen more than 10m.

"Lake dry-down happened 120,000 years ago without any human intervention," said Prof Emi Ito, from the University of Minnesota, Minneapolis. "We're helping the lake level go down much sooner; and there are political implications of this lake drying down because water is what causes a lot of wars and I'll just leave it at that."

Prof Zvi Ben-Avraham, of the Minerva Dead Sea Research Centre, Tel Aviv University, added: "The drilling actually... it gives us perspective. Look what went on in 200,000 years; look how the area can be dry and look at the way it can be recovered. We have to get ready for the future."

Past research has shown very clearly how the size of the Dead Sea has fluctuated with the coming and going of ice ages.

During the interglacials (warm periods), the lake shrank; and during glacials (cold phases), the lake grew. And it was in the midst of the last ice age some 25,000 years ago that the Dead Sea reached its maximum extent, with the then water surface standing an astonishing 260m above where it is today.

This giant palaeo-lake, referred to by scientists as Lake Lisan, would have inundated the whole Dead Sea valley, even encompassing the Sea of Galilee to the north.

The core contains rounded pebbles that the team interprets as an ancient beach deposit

The consortium has traced these changes in the laminated sediments that line the surrounding cliffs and hills.

It is possible to see exquisite, alternating bands of light (aragonite) and dark (marl) material in the exposed rock.

The light layers are calcium carbonate precipitated out of the water in warm summer months. The dark bands are winter silts washed into the Dead Sea by storms.

But it is also possible to find layers of calcium sulphate (gypsum) and even salt, which relate to extended periods of dry weather when feed waters to the Dead Sea have not kept pace with evaporation.

"All these deposits from the last ice age are sitting at the edge of the lake, and we've been studying them for 20 years," said Prof Goldstein.

"They're beautifully exposed, but... as soon as we have a warm age, like we have today and like we had before the last ice age, the lake is lower and we have no exposures we can use. The only way we can get to those time periods is to have a deep drill core," he told BBC News.

Please visit the site: <http://www.bbc.co.uk/news/science-environment-15938294>

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## **JARS OF PLENTY, ANCIENT GREEK TRADING VESSELS CARRIED MUCH MORE THAN WINE, BY SUSAN GAIDOS**

Curvy jars called amphorae (a version from fifth century Greece shown) were often used as storage and trading vessels, as well as for decoration. Ashmolean Museum, Univ. of Oxford, The Bridgeman Art Library International

Wine flowed freely from ancient Greece during its golden age, but new work suggests nuts and various herbs were also in demand.

With the help of DNA analysis, scientists are getting a present-day look at centuries-old trade in the Mediterranean. Such studies may help debunk some long-held assumptions, namely that the bulk of Greek commerce revolved around wine.

During the fifth through third centuries B.C., the Mediterranean and Black seas were major thoroughfares for ships loaded with thousands of curvaceous jars known as amphorae, thought from their shape to contain a drink made from fermented grape juice.

But only recently have researchers peered through the lens of 21st century genetics to identify the actual remnants of the jars' long-disappeared cargo. Analyses of DNA fragments from the interior of nine jars from Mediterranean shipwrecks now reveal various combinations of olive, ginger, walnut and herbs in the rosemary family, along with the expected grapes.

The findings, reported in an upcoming *Journal of Archaeological Science*, suggest that the ancient Greeks produced and traded a wide range of foods. The economy of the time was much more sophisticated than previously thought, says Brendan Foley, an archaeologist at Woods Hole Oceanographic Institution, who coauthored the work with biologist Maria Hansson of Lund University in Sweden and colleagues at the Hellenic Ministry of Culture and Tourism.

Some of the jars selected for the study had been stored on shelves for nearly two decades, suggesting that DNA buried within the amphora walls remains viable long after the jars are brought up from underwater.

“That opens the possibility that many of the artifacts that are in museum storehouses or other collections may still contain information about their original contents,” Foley says.

With such information, scientists could reconstruct a more accurate picture of the crops being grown and the products changing hands when the world's first complex economies were getting under way, possibly gaining clues to the agriculture, technologies, art and geopolitics that played into daily life.

Crimes and clues

A period of rapid expansion and population growth throughout the Mediterranean began around the fifth century B.C. Classical Greece was transformed from a simple peasant society to a sophisticated civilization, and Greek merchants began using currency. Instead of swapping for goods in kind, merchants were paid for their products and services with small coins of silver, gold or an alloy of the two, electrum.

To determine what was being traded for those coins, scientists look to artifacts, including amphorae still neatly packed aboard sunken merchant ships or strewn across the Mediterranean seabed.

Foley, who has recovered dozens of such containers in his deep-sea explorations, says that different civilizations from different locations and times established their own style of making amphorae.

The Greek versions, with their long narrow necks and handles on either side, were assumed to be ideal cargo containers for wine and olive oil.

When Foley surveyed the scientific literature, he found 27 articles in peer-reviewed journals that directly spoke of amphora contents from Greece's golden age. In the articles, 95 percent of the 5,860 Greek amphorae were described as wine vessels.

The finding raised a red flag, he says. "To me, it didn't seem reasonable to assume that 95 percent of all trade goods in these jars were one commodity."

To find out what was carried inside the jars, he turned to Hansson, who suggested searching for DNA evidence. Though some archaeologists had flirted with the idea of collecting DNA samples from the jars in the early 1990s, those researchers had little success.

Hansson says that the tools of the trade have improved dramatically since then, making today's DNA analysis much cheaper and friendlier to use. Researchers also have access to databases of DNA information on many of the world's plant species, making it possible to identify a specific food item or crop.

By drawing on these databases, Hansson identified short segments of DNA that show up in plants and might have been used as food, flavorings or preservatives in ancient Greece. She then synthesized small molecules, called primers, to bind to any such fragments remaining in the jar. A second round of primers targeted specific types of plants.

DNA samples were first collected by scraping the ceramic inside the jar with a steel tool. The scientists used this method to look inside two empty amphorae that Foley had recovered from a 2,400-year-old shipwreck off the coast of the Greek island Chios. The findings, reported in 2008 in the *Journal of Archaeological Science*, showed that one of the amphorae held an olive product, probably olive oil, flavored with oregano. The other jar probably carried wine because it appeared to contain fragments of DNA from terebinth, a plant used to preserve wine.

Looking for ways to extract genetic material without causing damage to the artifacts, Foley and Hansson continued to perfect their method.



They considered pouring a buffer solution into a jar and sloshing it around to draw out the DNA fragments. After realizing that the dry jar would absorb all the buffer material, the team turned to the Massachusetts State Police crime lab.

A forensics expert there suggested a solution: taking swabs specifically designed to pick up trace samples of DNA and saturating the swabs with the buffer solution before rubbing them along the inside of the jar.

The approach worked better than the original scraping method, allowing the scientists to get more detailed information on the contents the jars carried over their lifetimes. Five of the nine jars contained grape DNA, and all of the jars contained DNA from at least one other plant species, the researchers report in their upcoming paper.

A fuller picture

But the method is not perfect. One problem is that the fragments that remain in the jars are short and not well preserved, says Hansson.

Many samples contain strings of only 70 to 100 base pairs, the chemical units that make up DNA. That's enough genetic information to tell whether a specific container carried olives or grapes, for example, but not enough to identify among herbs of the same family.

The process also may not work on items that have been exposed to sunlight or have undergone extensive cleaning, Foley says.

Conservators often bathe artifacts found on land in acid, which would destroy genetic information carried within the ceramic.

Artifacts coming out of shipwrecks may also be subjected to a long rinsing process to flush out salt, believed to break up a jar and cause it to crumble to dust. To see if such rinses also wash away DNA, Foley and Hansson are preparing another round of studies. By swabbing the vessels throughout the rinsing process to extract any DNA inside, the team hopes to record if and when the genetic information degrades.

Still, the noninvasive technique provides a way to look at large numbers of archeological artifacts in ways that were previously not possible, Foley says.

“It means that we can take the most sensitive and valuable archaeological artifacts and apply this technique to extract information from these things,” he says.

Mark Lawall, a specialist in ancient Mediterranean trade at the University of Manitoba in Winnipeg, Canada, says with only a limited number of jars analyzed so far, it has yet to be seen how much the DNA will add to what is already known about ancient trade.

“Historians were absolutely right to assume that most amphoras contained wine or oil,” he says. “Nothing in the article disproves that.”

To get a fuller picture of what was being traded, DNA data would have to be combined with other information about a ship and its contents, Lawall says. Analyzing a much larger number of jars from a single documented wreck, for example, might reveal what percentage of the cargo was wine.

Foley and his colleagues plan to take on such studies. As word of the DNA findings has spread throughout the archaeological community, other scientists are inquiring about the technique to see what their vessels were carrying. Already, nearly 100 swabs from various teams line Hansson's freezer awaiting their chance at analysis.

“Eventually when we find the right artifacts, we can find out what the ancients were using for preservatives, cosmetics and medicines,” Foley says. “We’re going to get the first real look at all of these aspects of this critically important period when the modern world was launched.”

**Please visit the site:**

[http://www.sciencenews.org/view/feature/id/336620/title/Jars\\_of\\_Plenty](http://www.sciencenews.org/view/feature/id/336620/title/Jars_of_Plenty)

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## **THE DISAPPEARANCE OF THE ELEPHANT CAUSED THE RISE OF MODERN MAN**

Dietary change led to the appearance of modern humans in the Middle East 400,000 years ago, say TAU researchers

Elephants have long been known to be part of the Homo erectus diet. But the significance of this specific food source, in relation to both the survival of Homo erectus and the evolution of modern humans, has never been understood — until now.

When Tel Aviv University researchers Dr. Ran Barkai, Miki Ben-Dor, and Prof. Avi Gopher of TAU's Department of Archaeology and Ancient Near Eastern Studies examined the published data describing animal bones associated with Homo erectus at the Acheulian site of Gesher Benot Ya'akov in Israel, they found that elephant bones made up only two to three percent the total. But these low numbers are misleading, they say. While the six-ton animal may have only been represented by a tiny percentage of bones at the site, it actually provided as much as 60 percent of animal-sourced calories.

The elephant, a huge package of food that is easy to hunt, disappeared from the Middle East 400,000 years ago — an event that must have imposed considerable nutritional stress on Homo erectus. Working with Prof. Israel Hershkovitz of TAU's Sackler Faculty of Medicine, the researchers connected this evidence about diet with other cultural and anatomical clues and concluded that the new hominids recently discovered at Qesem Cave in Israel — who had to be more agile and knowledgeable to satisfy their dietary needs with smaller and faster prey — took over the Middle Eastern landscape and eventually replaced Homo erectus.

The findings, which have been reported in the journal PLoS One, suggest that the disappearance of elephants 400,000 years ago was the reason that modern humans first appeared in the Middle East. In Africa, elephants disappeared from archaeological sites and Homo sapiens emerged much later — only 200,000 years ago.

### The perfect food package

Unlike other primates, humans' ability to extract energy from plant fiber and convert protein to energy is limited. So in the absence of fire for cooking, the Homo erectus diet could only consist of a finite amount of plant and protein and would have needed to be supplemented by animal fat. For this reason, elephants were the ultimate prize in hunting — slower than other sources of prey and large enough to feed groups, the giant animals had an ideal fat-to-protein ratio that remained constant regardless of the season. In short, says Ben-Dor, they were the ideal food package for Homo erectus.

When elephants began to die out, Homo erectus "needed to hunt many smaller, more evasive animals. Energy requirements increased, but with plant and protein intake limited, the source had to come from fat. He had to become calculated about hunting,"

Ben-Dor says, noting that this change is evident in the physical appearance of modern humans, lighter than Homo erectus and with larger brains.

To confirm these findings, the researchers compared archaeological evidence from two sites in Israel: Gesher B'not Yaakov, dating back nearly 800,000 years and associated with Homo erectus; and Qesem Cave, dated 400,000 to 200,000 years ago. Gesher B'not Yaakov contains elephant bones, but at Qesem Cave, which is bereft of elephant bones, the researchers discovered signs of post-erectus hominins, with blades and sophisticated behaviors such as food sharing and the habitual use of fire.

#### Evolution in the Middle East

Modern humans evolved in Africa 200,000 years ago, says Dr. Barkai, and the ruling paradigm is that this was their first worldwide appearance. Archaeological records tell us that elephants in Africa disappeared alongside the Acheulian culture with the emergence of modern humans there. Though elephants can be found today in Africa, few species survived and no evidence of the animal can be found in archaeological sites after 200,000 years ago. The similarity to the circumstances of the Middle East 400,000 years ago is no coincidence, claim the researchers. Not only do their findings on elephants and the Homo erectus diet give a long-awaited explanation for the evolution of modern humans, but they also call what scientists know about the "birth-place" of modern man into question.

Evidence from the Qesem Cave corroborates this revolutionary timeline. Findings from the site dated from as long as 400,000 years ago, clearly indicate the presence of new and innovative human behavior and a new human type. This sets the stage for a new understanding of the human story, says Prof. Gopher.

**Please visit the site: <http://www.aftau.org/site/News2?page=NewsArticle&id=15665>**

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## **PRELIMINARY WORK TO UNEARTH ANCIENT CITY OF ISOS BEGINS**

A team of archeologists has begun working on examining the site of the ancient city of Isos in southern Turkey by making use of ground-based sensors to visualize the underground features of the city's structures, the district governor has said.

İskender Yönden, the district governor of Erzin, Hatay province, announced on Monday that a team of four archeologists got to work at the reported site of the ancient city of Isos, which has been underground for some 500 years in the southern province of Hatay, as part of the work of unearthing the ancient city. Yönden said the excavations will continue after the archeologists find out more about the site of the city by looking at the processed imagery from the sensors.

Approximately five months ago, excavations at the site where Isos is believed to be revealed ruins of baths and some Artemis mosaics. Hoping there are more mosaics or other materials that are valuable to shed light on the history of the city, archeologist Ömer Çelik, who is leading the excavation, requested a share of the provincial budget from Hatay Governor Celalettin Lekesiz to examine the site in more detail in order to conduct the excavation fastidiously and not miss any important details in the excavation area.

After obtaining TL 50,000 from the governor, Çelik filed a request with the Erzin district governor to survey the area and its underground features.

Erzin District Governor Yönden announced that they have arranged for a team of four archeologists to start their work on Monday. Yönden said the team is expected to finish its work in a week's time.

Speaking to the Cihan news agency, Çelik said: “While we were excavating in the area, we first discovered ruins of an ancient bath. Then we discovered mosaics in the bath tiles, which led us to think that there might be more mosaics or other kinds of stone that could give us clues about the time it was built or used.” Çelik added that they expect the discovery to reveal more about the history of Isos.

Once a significant trading city, Isos dates back to the year 2500 B.C. The area where the city was located was once part of the Byzantine, late Hittite, Persian and Ottoman civilizations.

Archaeologists believe there are more remnants of the ancient city of Isos, which they hope to reveal in due time.

**Please visit the site: <http://www.todayszaman.com/news-265720-preliminary-work-to-unearth-ancient-city-of-isos-begins.html>**

## **ENIGMATIC STANDING STELE OF AL-RAJAJIL, CLUSTERS OF THREE-METER HIGH FINGERS, ABOVE LEFT AND RIGHT, OF STONE STAND OUTSIDE SAKAKA, BY ROGER HARRISON**

On a lonely exposed hillside a few kilometers outside the capital of Al-Jouf province, Sakkaka, stand clusters of three-meter high fingers of stone.

Etched with ancient Thamudic graffiti, these monuments to a long extinct culture have maintained their lonely vigil for six millennia. Many have fallen over and others lean at bizarre random angles.

Al-Rajajil (“the men”), the sandstone stele weighing up to five tons each, is popularly called Saudi Arabia’s Stonehenge. They are possibly the oldest human monuments on the peninsula.

Some time in the Chalcolithic, or Copper Age, people living in the area where Al-Jouf is today laboriously erected 54 groups of rudely trimmed stone pillars. Each group contains two to 19 pillars.

At ground level there is no immediately obvious placement of the groups. However, aerial images suggest a rough alignment to sunrise and sunset. There is no positive answer to the question why they are there. An archaeological dig over 30 years ago at the base of one set of pillars failed to turn up any bones or votive offerings, suggesting that religious motives were not the reason.

Political or astronomical reasons are a possibility, though not proven. It is possible that is a landmark for a trade route.

Al-Jouf was a significant stopover point on the trade route from Yemen to Mesopotamia. One trade route, the oldest land route in recorded history, ran from Yemen and parallel to the Red Sea coast through Madinah, Al-‘Ula and Madaen Salih. It turned northeast to Al-Jouf and then north toward Damascus and Turkey.

The Arabian Peninsula and Saudi Arabia in particular has hugely rich archaeological wealth. Much can be definitively written into history, but the standing stele of Al-Rajajil remains an enigma.

Please visit the site: <http://arabnews.com/lifestyle/travel/article547489.ece> [Go there for an interesting picture]

## **TWO ARCHAEOLOGICAL SITES SURVEYED ON MOUNT ARARAT**

Harvard University educated archaeologist and director of the Paleontological Research Corporation, Dr. Joel Klenck, surveyed and completed a preliminary analysis of two sites on Mount Ararat in Turkey discovered by a Kurdish guide, Ahmet Ertugrul. “The research areas are noteworthy”, states Klenck, “and comprise a large wood structure and cave with an archaeological assemblage that appears to be mostly from the Late Epipaleolithic Period.” These assemblages at other sites in the Near East have calibrated radiocarbon dates between 13,100 and 9,600 B.C. Located at elevations above 4,200 meters on Mount Ararat and covered by layers of ice and stones, he states: “The wood structure shows various states of preservation and exhibits a wide array of plant materials including structures made of cypress and one room with a floor covered by chickpea seeds.” Klenck additionally notes, “I was most impressed by the artifactual assemblage, particularly four stone bowls, grinding or hammer stones, lithic cores and debitage.”

It also appears that the wood construction was visited in later periods. Ceramic bowls from Chalcolithic (5,800-3,000 B.C.) and Bronze Age (3,000-1,200 B.C.) periods were placed in or near the structure. He adds, “These artifacts most likely represent brief visits to the site during later periods since these bowls differ from the Epipaleolithic remains that comprise most of the assemblage.”

Klenck reports, “The surface scatter of the wood above the large structure is 121.1 meters in length and 23.8 meters in width. The construction is at least 5.2 meters deep and several measurements of the exterior walls exhibit angles moving inward toward the base of the edifice. Also, there are stair-like features that descend through the middle of the multi-storied structure and mortise-and-tenon construction.” He notes, “The structure is buried under tons of stones and ice and most of the edifice remains unexplored.”

He also notes a nearby cave that was covered by soil, ice and stones exhibits artifacts similar to those in the large wood structure. Klenck states the cave site possesses botanical remains, flax fibers and cord, pieces of fabric, bone tools, wood artifacts, and vessels made of an organic material. He adds, “In the cave, all the bowls are made of an organic material, perhaps animal stomachs, and the flaps are folded over wood or bone collars.”

“These sites are important to archaeologists and conservators,” states Klenck, “particularly with regard to the preservation of wood and plant materials and the examination of architectural features.” The discoveries on Mount Ararat coincide with academic discussions on the transition between the Pleistocene and Holocene epochs during the Younger Dryas stadial (10,900-9,500 B.C.). Klenck concludes: “The Ararat sites are very special because of their preservation and unique insight into the prehistoric past.”

Please visit the site: [http://www.artdaily.org/index.asp?int\\_sec=2&int\\_new=52602](http://www.artdaily.org/index.asp?int_sec=2&int_new=52602)

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## **HULL OF ANCIENT SHIP REVEALED**

Antiquities Department, archaeologists, Cyprus, excavation, mazotos, shipwreck

THE Department of Antiquities has completed a second season of excavations of the Mazotos shipwreck.

The team continued the systematic excavation of a trench, first opened in 2010, at the southern part of the assemblage, which the archaeologists have taken to be the bow of the ancient ship.

Meanwhile, transport amphorae recovered at the site came from the island of Chios in the Aegean. One amphora from Cos was also found outside the main assemblage and it may have been part of the crew's provisions.

Parts of two anchor stocks were also excavated which, added to the one found last year, provide valuable information on the sailing equipment of ancient ships.

The keel and part of the wooden hull of the ship were also unveiled, proving that a considerable part of the ancient ship is still lying under the main concentration of the amphorae.

All recovered materials were transported to the special lab for underwater finds at the Larnaca District Museum, where they will remain for desalination and conservation.

Many students from the University of Cyprus took part in the project. Apart from the archaeological excavation, they were also trained in ancient sailing during a seminar organised in collaboration with the Kyrenia-Chrysocava Foundation, on the 'Kyrenia-Liberty' ship. The ship sailed from the Evangelos Florakis Naval Base in Mari, where it was moored, to the Mazotos shipwreck area.

During the trip, the Kyrenia-Liberty crew, under Captain Giorgos Paphitis, taught the basic principles of ancient sailing.

Divers and archaeologists came from 16 different countries.

Please visit the site: <http://www.cyprus-mail.com/antiquities-department/hull-ancient-ship-revealed/20111224>

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