



Επιστημονικό Σωματείο,
Έτος Ίδρυσης 1982, έδρα:
Κάνιγγος 27, 106 82 Αθήνα
(Ένωση Ελλήνων Χημικών)

**ΔΙΟΙΚΗΤΙΚΟ
ΣΥΜΒΟΥΛΙΟ:**

Ε. Φώτου-Jones (πρόεδρος),
Ι. Μπασιάκος (αντιπρόεδρος),
Ι. Καρατάσιος (γραμματέας),
Ε. Κουλουμπή (ταμίας),
Ε. Φιλίππáκη (βοηθός γραμ.),
Β. Κυλίκoγλου (μέλος),
Α. Hein (μέλος)

Πληροφορίες:

Γ. Φακορέλλης (σύνταξη,
επιλογή ύλης)

E-mail: yfacorel@teiath.gr

Scientific Association, Year
of Establishment 1982,
Headquarters: Kaniggos 27,
106 82 Athens (Association
of Greek Chemists)

BOARD:

Ε. Photos-Jones (president),
J. Bassiakos (vice-president),
J. Karatassios (secretary),
Ε. Kouloumpi (treasurer),
Ε. Philippaki (ass. secretary),
V. Kilikoglou (member),
Α. Hein (member)

Information: Y. Facorellis
(editor)

E-mail: yfacorel@teiath.gr

Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Ιούλιος 2014 -

*Οι καλοί άνθρωποι δεν χρειάζονται τους νόμους για να μάθουν πώς να ενεργούν με υπευθυνότητα.
Οι κακοί άνθρωποι ψάχνουν τους νόμους για να βρίσκουν τρόπους να κρύβονται από πίσω τους. (Πλάτων)*

Newsletter of the Hellenic Society of Archaeometry

- July 2014 -

Nr. 160

ΠΙΝΑΚΑΣ ΠΕΡΙΕΧΟΜΕΝΩΝ – TABLE OF CONTENTS

ΣΥΝΕΔΡΙΑ – CONFERENCES/WORKSHOPS

10 th North American Textile Conservation Conference: New York, New York, November 16th – 20th, 2015	page 5
19 th International Congress on Ancient Bronzes, October 13-17, 2015, J. Paul Getty Museum, Los Angeles, California	page 6
RNMH2014 International Conference, 30/11-6/12, 2014, Cultural Center of Date, Hokkaido, Japan, Second circular	page 7
Ground Stone Artifacts and Society: An international workshop on ground stone artifacts: Quarrying, production, function and exchange, University of Haifa, 5-9 July, 2015	page 10
3η Εγκύκλιος του Συνεδρίου, «Μεταλλουργία και μεταλλουργικές εγκαταστάσεις στην Πελοπόννησο», 25 Οκτωβρίου, 2014, Αποστολοπούλειο Πνευματικό Κέντρο, Τρίπολη	page 11
EXAR (European association for the advancement of archaeology by experiment) conference, 2 nd -5 th of October 2014, Mayen, Germany	page 15
9 th Aegean Analytical Chemistry Days (AACD2014), 29/9-3/10, 2014, Chios, Greece	page 16
CMA4CH, "Application of the Multivariate Analysis and Chemometrics to Environment and Cultural Heritage", 14-17 December 2014, Rome, Italy	page 17
International Conference of Computational Methods in Sciences and Engineering 2015 (ICCMSE 2015), 20-23 March 2015, Athens, Greece, Metropolitan Hotel	page 18
Metallurgy in Warfare - A Spur to Innovation and Development", HMS Annual Conference 2014, 3 rd -5 th October, Salisbury, Wiltshire	page 21
International Conference "Interdisciplinary Studies of Ancient Materials from the Mediterranean", Nicosia, 17-19 September 2014, University of Cyprus	page 23
4 th ARCH_RNT Symposium, Archaeological Research and New Technologies, October 1-3, 2014, University of the Peloponnese, Kalamata	page 35
<u>ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ – JOB VACANCIES/FELLOWSHIPS</u>	
Center for the Analysis of Archaeological Materials (Univ. of Pennsylvania) ...	page 36
DIRECTOR BRITISH SCHOOL AT ATHENS	page 38
<u>INTERNET SITES</u>	
ArcheOrient–Le Blog	page 46

Nanotechnology & chemical gels applied to paper restoration **page 47**

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

The Domestication of Equidae in Third-Millennium BCE Mesopotamia, by
Juris Zarins **page 49**

History of the Ancient Near East / Monographs XIV Paleonutrition and Food
Practices in the Ancient Near East. Towards a Multidisciplinary Approach **page 51**

International Journal of Nautical Archaeology **page 53**

Materia Magica: The Archaeology of Magic in Roman Egypt, Cyprus, and
Spain. New texts from ancient cultures Andrew T. Wilburn **page 54**

Revised estimates for the volume of the Late Bronze Age Minoan eruption,
Santorini, Greece, Journal of the Geological Society; Vol. 171, No. 4, 2014 **page 58**

ΕΙΛΗΣΕΙΣ - NEWS RELEASE

The recently discovered temple of Ptolemy II in Beni Sweif is set to rewrite the
ancient history of the area, by Nevine El-Aref **page 60**

Objects from Tutankhamun’s war chariots to be restored **page 62**

A new look at ancient Egyptian textiles, by Amandine Mérat (Curator) and
Emily Taylor (Museum Assistant), British Museum **page 63**

14th century grand hall discovered underneath the Kotel Tunnels Following 10
years of excavations, Western Wall Heritage Foundation unveils educational
center under Muslim Quarter dedicated to Jewish history, By DANIEL K.
EISENBUD **page 65**

Archaeologists at the Egyptian site of Hierakonpolis have uncovered evidence
of the ancestors of the pharaohs, by Andrew Curry **page 67**

A study describes agronomic conditions in ancient Near East 12,000 years ago **page 70**

Burial reveals complex origins of metallurgy **page 72**

Battered pot found in Cornish garage unlocks Egypt excavation secrets **page 74**

Fort found in southern Jordan housed Roman infantry unit wielded by the
Tetrarchs to vanquish the Jews, by Julia Fridman **page 76**

Ancient Love Inscriptions in Astypalea, by Evdokia Fourkioti **page 78**

Archaeologists plan to reconstruct ancient society of Burnt City **page 79**

2,300-year-old tomb with a corpse and daggers found in Sinaw **page 81**

Remains of 'End of the World' Epidemic Found in Ancient Egypt, By Owen Jarus	page 82
4,000 year old royal tomb discovered in Luxor, By Menna Zaki	page 83
Dating Hammurabi, the sixth king of Babylon, by Peter Lynch	page 85
The Kani Shaie Archaeological Project: Investigating Early Bronze Age Kurdistan, By Steve Renette, André Tomé and Ricardo Cabral	page 87
Egyptologist unravels ancient mystery	page 90
Ancient Egyptian remedies	page 92
Seafarers brought Neolithic culture to Europe, gene study indicates	page 96
Ancient remains found atop Bristol University cupboard Food offerings from a royal tomb of ancient Mesopotamia have been found on top of a cupboard in Bristol	page 98
Demolitions reveal ancient Roman theater in Aegean town	page 99
4,000-Year-Old Burial With Chariots Discovered In Georgia, By Owen Jarus ..	page 100
Man's Best Friend: Dogs in Pharaonic Egypt, by Annie Shanley	page 102
Modern Chemistry Techniques Save Ancient Art, Nanoparticles, laser cleaning, and glue-eating bacteria restore valuable frescoes and paintings, by Rachel Brazil and ChemistryWorld	page 103

ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

10TH NORTH AMERICAN TEXTILE CONSERVATION CONFERENCE: NEW YORK, NEW YORK, NOVEMBER 16TH – 20TH, 2015

The tenth biennial North American Textile Conservation Conference (NATCC) will be held in dynamic New York City and will focus on the theme of “Material in Motion.” Topics include, but are not limited to, technical analyses and descriptions, scientific and historical research, conservation treatments, and other issues.

Abstracts are due by September 1, 2014. For more information and abstract submission guidelines please visit <http://www.natconference.com>. If you have questions please email us at contact: NATCC@natconference.com.

**19TH INTERNATIONAL CONGRESS ON
ANCIENT BRONZES, OCTOBER 13-17, 2015, J.
PAUL GETTY MUSEUM, LOS ANGELES,
CALIFORNIA**

On behalf of the organizing committee, we are pleased to announce that the 19th International Congress on Ancient Bronzes will be held October 13-17, 2015 at the J. Paul Getty Museum in Los Angeles, California.

Archaeologists, art historians, conservators, curators, scientists, and students will convene at both the Getty Villa in Malibu and the Getty Center in Brentwood to investigate the artistry, craftsmanship, production, conservation, and science of ancient bronzes.

The Congress is organized to coincide with, and be energized by, the exhibition *Bronze Sculpture of the Hellenistic World* on view at the Getty Center July 28 through November 15, 2015, providing an extraordinary opportunity to see many of the best-known ancient bronzes displayed side-by-side for the first time.

The theme, a formal call for papers, and further information will be issued via email and posted on the Getty's web site: http://www.getty.edu/museum/symposia/bronze_congress.html in September 2014.

To receive future mailings and further information, please click the **subscribe** link on the Congress website.

RNMH2014 INTERNATIONAL CONFERENCE,
30/11-6/12, 2014, CULTURAL CENTER OF
DATE, HOKKAIDO, JAPAN,
SECOND CIRCULAR

Conference Schedule

November 30 (Sunday) Keynote Lectures
December 1 (Monday) Conference Sessions
December 2 (Tuesday) Conference Sessions
December 3 (Wednesday) Excursion to Nibutani Ainu village & museums
December 4 (Thursday) Conference Sessions
December 5 (Friday) Conference Sessions
December 6 (Saturday) Post-conference excursion to Shiraoi Ainu village & museum
and to Sapporo via Chitose Airport

Conference Sponsors

Ministry of Education, Culture, Sports, Science and Technology, Japan (Grant No. 1201)
Date City, Hokkaido, Japan

Conference Venue

RNMH 2014 conference will take place at the Cultural Center in the city of Date, Hokkaido, Japan.

Address: Matsugae 34-1, Date, Hokkaido 052-0012, Japan

TEL: +81-(0)142-22-1515

Registration

Everyone who wishes to participate in the conference must register for participation. Please be aware that those registered as accompanying persons cannot give a presentation by themselves only.

Registration, including payment and abstract submission, must be carried out at the following addresses. Those who have received their own ID and password can skip the step 1 procedure.

Step 1: Interim registration

<https://rnmh2014.science-server.com/registration/form.html>

Step 2: Registration

<https://rnmh2014.science-server.com/registration/form2.php>

Step 3: Abstract Submission

<https://rnmh2014.science-server.com/abstract/login.php>

Registration Fees

Participant 12,000 yen

Accompanying Person 8,000 yen

Participants will receive a collection of abstracts. They will also be provided with lunch (December 1, 2, 4, and 5) and soft drink (November 30, December 1, 2, 4, and 5) on the days of the conference. Accompanying persons will be provided lunch and soft drink on the days of the conference.

Registration may be cancelled without charge before November 14, 2014 (included). Refunds will not be available for cancellation afterward.

Call for Papers

The call for oral presentations has been closed. Proposals of poster presentations will be accepted until July 31, 2014.

All papers to be presented at the conference must have an abstract approved in advance by the Committee. The dead line for the submission of paper abstract is also July 31, 2014.

Abstract Submission

Those wishing to deliver either oral or poster presentation should submit an abstract to the above web address. The abstract should be around 1,000 words and contain no more than five figures (these may be in color).

All submitted abstracts will be evaluated. Please be aware that even if you wish to give an oral presentation, the situation might require you to give a poster session.

Welcome/ Farewell Parties

November 30: Welcome Banquet Fee: 5,400 yen

December 5: Farewell Party Fee: 3,200 yen

Conference Excursions

December 3: Excursion to Nibutani Ainu Village and Museums

Day trip by bus from Date City

Fee: 3,500 yen (transportation, admission fee, and meals)

December 6: Excursion to Shiraoi Ainu Village and Museums

Due to arrive at Sapporo (around 17:00) via Chitose Airport (around 16:00)

Fee: 4,500 yen (transportation, admission fee, and meals)

Accommodation

Toyako Manseikaku Hotel Lakeside Terrace

Address: Toyako-Onsen 21, Lake Toya Hokkaido 049-5721, Japan

TEL: +81-(0)142-73-3500

FAX: +81-(0)142-75-2271

<http://www.toyamanseikaku.jp/>

Reduced room rates are available for the conference participants. For the details of the hotel, please see [RNMH 2014 Website: http://www.rnmh2014.jp/](http://www.rnmh2014.jp/)

Participants should book their own accommodation. The Hotel Lakeside Terrace is holding rooms for RNMH 2014 Conference delegates until the 30th of September 2014 (included).

Please be aware that if you apply after this date, there may not be a room available. Bus service (free) between the hotel and the conference venue will be available in the morning and afternoon during the conference.

Important Dates (Deadlines)

Please observe the following deadlines. The call for oral presentations has been closed.

July 31, 2014:

Application for poster presentations
Submission of paper abstracts

September 30, 2014:

Application for excursions
Reservation of priority rooms at the Toyako Manseikaku Hotel Lakeside Terrace
Payment of registration, banquet, and excursion fees (oral or poster presenters)

November 14, 2014:

Payment of registration, banquet, and excursion fees (audience)

Please check the project for more details.

RNMH Project Website: <http://www.koutaigeki.org/>

RNMH 2014 Website: <http://www.rnmh2014.jp/>

All conference-related communications should be made to the following e-mail address:
sec@rnmh2014.jp

**GROUND STONE ARTIFACTS AND
SOCIETY: AN INTERNATIONAL
WORKSHOP ON GROUND STONE
ARTIFACTS: QUARRYING, PRODUCTION,
FUNCTION AND EXCHANGE, UNIVERSITY
OF HAIFA, 5-9 JULY, 2015**

We are happy to send the 2nd circular for the 'Ground Stone Artifacts and Society: An international workshop on ground stone artifacts: Quarrying, production, function and exchange'. The workshop will be held at the University of Haifa, 5-9 of July 2015). We invite submission of abstracts for papers covering all aspects of ground stone research and related topics.

Please note deadline for abstracts submission (January 31, 2015) and see the workshop webpage for further details: <http://agsr2015.haifa.ac.il/index.php?lang=en>.

3Η ΕΓΚΥΚΛΙΟΣ ΤΟΥ
ΣΥΝΕΔΡΙΟΥ, «ΜΕΤΑΛΛΟΥΡΓΙΑ ΚΑΙ
ΜΕΤΑΛΛΟΥΡΓΙΚΕΣ ΕΓΚΑΤΑΣΤΑΣΕΙΣ
ΣΤΗΝ ΠΕΛΟΠΟΝΝΗΣΟ», 25 ΟΚΤΩΒΡΙΟΥ,
2014, ΑΠΟΣΤΟΛΟΠΟΥΛΕΙΟ ΠΝΕΥΜΑΤΙΚΟ
ΚΕΝΤΡΟ, ΤΡΙΠΟΛΗ

Αγαπητοί συνάδελφοι,

Το ΑΠΣ, Ειδική Περιφερειακή Υπηρεσία του ΥΠ.ΠΟ.Α. με χωρική αρμοδιότητα την Πελοπόννησο, προχωρά στην 3^η εγκύκλιο της επιστημονικής ημερίδας, με θέμα την Μεταλλουργία και τις μεταλλουργικές εγκαταστάσεις στην Πελοπόννησο καθ' όλη την Αρχαιότητα και τους Μέσους Χρόνους.

Ερευνητές διαφόρων ειδικοτήτων, με κοινό σημείο το ενδιαφέρον και την έρευνα για την Αρχαιομεταλλουργία, θα ανακοινώσουν τα πορίσματα των ερευνών τους στην Τρίπολη, στο Αποστολοπούλειο Πνευματικό Κέντρο, το Σάββατο, 25 Οκτωβρίου του 2014. Οι ανακοινώσεις αφορούν μεταλλουργικές εγκαταστάσεις, μεταλλουργικούς κλιβάνους, χώρους εμπλουτισμού μεταλλευμάτων, άλλες υλικές μαρτυρίες της διαδικασίας καμίνευσης/εμπλουτισμού- και, ακόμη, τα πορίσματα αρχαιομετρικών ερευνών/αναλύσεων υλικών, που αξιοποιούν τεχνικές μεθόδους.

Επισυνάπτονται οι τίτλοι και οι περιλήψεις των ανακοινώσεων που κατετέθησαν μέχρι σήμερα.

ΠΕΡΙΛΗΨΕΙΣ

“Το ξεκίνημα ενός νέου αρχαιομεταλλουργικού προγράμματος για τη μελέτη των ‘χαλκών’ τριπόδων της Ολυμπίας: Αρχή με αναλύσεις στα χαλκούχα μεταλλεύματα της Ερμιονίδος”.

“Initiative to a new archaeometallurgical study of the Olympia bronze Tripods: starting from analyses of the Hermione copper-ores”

Moritz Kiderlen^{*}, Ελένη Φιλιππάκη^{}, Ιωάννης Μπασιάκος^{**}**

^{*} Humboldt University of Berlin, Germany,

^{**} Εργαστήριο Αρχαιομετρίας, ΕΚΕΦΕ ‘Δημόκριτος’

ΣΥΝΟΨΗ

Στην Ελλάδα, κατά τη διάρκεια των ιστορικών χρόνων ο χαλκός δεν έπαυσε να αποτελεί πρώτη ύλη κατασκευής μεταλλικών αντικειμένων, μολονότι χρησιμοποιείται ευρέως, ήδη, και ο σίδηρος. Πρόσφατα ξεκίνησε ένα νέο, μακράς πνοής, ερευνητικό πρόγραμμα με στόχο την κατανόηση της τεχνολογίας παραγωγής των χαλκών τριπόδων, που

αποτελούσαν αναθήματα στους Ολυμπιακούς Αγώνες, αλλά και την εύρεση της προέλευσης της χαλκούχας πρώτης ύλης που χρησιμοποιήθηκε για την παραγωγή των αντικειμένων. Σαν πρώτη προσέγγιση μελετήθηκαν και παρουσιάζονται τα κύρια γεωχημικά χαρακτηριστικά της χαλκούχας μεταλλοφορίας από την περιοχή Ερμιόνης και δίδεται έμφαση στην παρουσία και στις συγκεντρώσεις ορισμένων ασυνήθων συστατικών των μεταλλοφόρων σωμάτων, τα οποία προορίζονται να χρησιμεύσουν ως διαγνωστικά κριτήρια στις συγκρίσεις με τα συστατικά (και τα αναμενόμενα 'εγκλείσματα' -mattes) των αντικειμένων, που θα ακολουθήσουν, προκειμένου να διαλευκανθούν ζητήματα τόσο τεχνολογίας όσο και προέλευσης. Στην υλοποίηση του προγράμματος θα συμμετάσχουν και ερευνητές από το Πανεπιστήμιο της Βόννης καθώς και από το Γερμανικό Μεταλλευτικό Μουσείο του Μπόχουμ .

Όψεις του κοινωνικού μετασχηματισμού στη Νοτιοδυτική Πελοπόννησο κατά την Μυκηναϊκή εποχή, όπως αυτές αποκαλύπτονται από τη συνδυασμένη αρχαιολογική και τεχνολογική μελέτη των χαλκών τεχνέργων

Χαρίλαος Η. Τσέλιος

Διεύθυνση Εθνικού Αρχείου Μνημείων, Υπουργείο Πολιτισμού και Αθλητισμού,
Αγίων Ασωμάτων 11, 105 53 Αθήνα, email: chtselios@culture.gr

Περίληψη

Κατά τα τελευταία έτη, η τεχνολογική μελέτη – με σύγχρονες αναλυτικές τεχνικές- χαλκών τεχνέργων, τα οποία προέρχονται από μεγάλα ταφικά σύνολα της Μυκηναϊκής Πυλίας, έχει προσφέρει ουσιαστικής σημασίας δεδομένα σχετικά με την εξέλιξη του υλικού πολιτισμού στην περιοχή της Νοτιοδυτικής Πελοποννήσου κατά τη Ύστερη Εποχή του Χαλκού. Τα αναλυτικά δεδομένα που αφορούν στην εξέλιξη των κραμάτων και των τεχνικών κατασκευής χαλκών όπλων, εργαλείων και αντικειμένων καθημερινής χρήσης συνεξετάζονται με στατιστικά στοιχεία που αφορούν την τυπολογία των ευρημάτων και τα σύνολα εύρεσης από τα οποία προέρχονται. Η συνδυασμένη αρχαιολογική και τεχνολογική μελέτη, ως προτεινόμενη ολιστική μεθοδολογία προσέγγισης των αρχαίων μεταλλικών τεχνέργων, αποκαλύπτει σημαντικές όψεις του κοινωνικού μετασχηματισμού που έλαβε χώρα στην περιοχή της Πυλίας κατά την Πρώιμη Μυκηναϊκή Εποχή (17ος – 15^{ος} π.Χ. αι.), αλλά και κατά την περίοδο της ίδρυσης των μεγάλων ανακτορικών κέντρων (14^{ος} αι. π.Χ.).

Ενδείξεις μεταλλουργικής δραστηριότητας στον μυκηναϊκό οικισμό Χαλανδρίτσας νομού Αχαΐας

ΚΩΝΣΤΑΝΤΙΝΑ ΣΟΥΡΑ

Η μήτρα μεταλλουργίας που εντοπίστηκε πρόσφατα στο μυκηναϊκό οικισμό στη θέση Σταυρός Χαλανδρίτσας νομού Αχαΐας, σε συνδυασμό με σημαντικά στοιχεία που προκύπτουν από τη μελέτη των ανασκαφικών δεδομένων, αποτελούν ενδείξεις επιτόπιας μεταλλουργικής δραστηριότητας.

Γρηγορακάκης Γρηγόρης,

ΛΘ' ΕΠΚΑ

Μεταλλουργική δραστηριότητα στη Νότια Κυνουρία. Τα νέα ευρήματα.

Φριτζήλας Σταμάτης

ΛΘ' ΕΠΚΑ

Μεγαλοπολιτικό εργαστήριο μεταλλουργίας

Στην ανακοίνωση παρουσιάζονται τα κατάλοιπα ενός μεταλλουργικού εργαστηρίου που αποκαλύφθηκε πλησίον κεντρικής αρχαίας οδού στο νότιο τμήμα της Μεγάλης Πόλης της Αρκαδίας. Λόγω των συνθηκών της σωστικής ανασκαφής ερευνήθηκε ο χυτευτικός λάκκος με τη βάση του καλουπιού όπου χύτευαν. Τη συγκριτική μελέτη βοηθούν ανάλογα ευρήματα από άλλες περιοχές του ελληνικού κόσμου. Ο χώρος όπου λειτούργησε το εργαστήριο είχε οικοδομικές φάσεις της ελληνιστικής και της ρωμαϊκής εποχής.

Η μεταλλοφορία στην περιοχή της Κυνουρίας και οι αρχαίοι οικισμοί.

Σωτήρης Ραπτόπουλος

Α.Ι.Π.Σ.

Η μεταλλοφορία στην περιοχή της Κυνουρίας, όπως προκύπτει από τα αιτήματα που υπέβαλαν κατά τα μέσα του 20^{ου} αιώνα οι ιδιωτικές εταιρείες εκμετάλλευσης, εντοπίζεται εγγύτατα σε αρχαίους οικισμούς. Διερευνάται η –πιθανή– σχέση των αρχαίων οικισμών με την εκμετάλλευση των μεταλλευτικών αποθεμάτων.

Επεξεργασία μετάλλου στο πριγκιπάτο της Αχαΐας (1205-1428). Μερικές παρατηρήσεις

Ελένη Μπαρμπαρίτσα, 26^E B.A.

Περίληψη

Η έρευνα των διαδικασιών εξόρυξης και επεξεργασίας μετάλλου στο χώρο της Πελοποννήσου κατά την ύστερη μεσαιωνική περίοδο είναι εξαιρετικά περιορισμένη. Μια πρώτη προσέγγιση συνιστά ο εντοπισμός και η καταγραφή εργαστηριακών μονάδων, που δραστηριοποιήθηκαν σε πόλεις και οικισμούς της υπαίθρου για την κάλυψη καθημερινών αναγκών σε αγροτικά εργαλεία και εξαρτήματα. Ειδικότερα στο πριγκιπάτο της Αχαΐας (1205-1428) αρχειακές μαρτυρίες για την ύπαρξη σιδηρουργείου στον εμπορικό κόμβο της Γλαρέντζας και σχετικά πρόσφατα ανασκαφικά ευρήματα από το κάστρο Χλεμούτσι, διαμορφώνουν μια γενική εικόνα για τις συνθήκες παραγωγής μεταλλικών αντικειμένων που εξυπηρετούσαν στοιχειώδεις ανάγκες. Τα δεδομένα εξετάζονται σε συνάρτηση με ανασκαφικές πληροφορίες για τη λειτουργία σιδηρουργείων ενταγμένων στον πολεοδομικό ιστό της φραγκικής Κορίνθου, που προέκυψαν από τις ανασκαφές της Αμερικανικής Αρχαιολογικής Σχολής.

Η μεταλλουργική διαδικασία της παραγωγής και επεξεργασίας χαλκού από την Πρώιμη έως την Ύστερη Εποχή στην Προϊστορική Πελοπόννησο μέσα από τα αρχαιολογικά δεδομένα . Μία πρώτη επισκόπηση.

Κωνσταντίνα Καραϊνδρου, υποψήφια διδάκτωρ στο Πανεπιστήμιο Θεσσαλίας

Περίληψη

Τα αρχαιολογικά δεδομένα για την παραγωγή και επεξεργασία του χαλκού στις προϊστορικές θέσεις της Πελοποννήσου σε σύγκριση με την μελέτη των τέχνηρων, που έχουν προέλθει από την ανασκαφική έρευνα, συμπληρώνουν καθοριστικά την εικόνα της τεχνολογίας για την παραγωγή και επεξεργασία του χαλκού στην προϊστορική Πελοπόννησο. Μέσα από τα στοιχεία των ανασκαφών παρακολουθείται η διαδικασία της παραγωγής και επεξεργασίας του μετάλλου επισημαίνοντας διαχρονικά διαφορές και ομοιότητες ανά εποχή και επιχειρείται η ανασύσταση του προϊστορικού εργαστηρίου μεταλλουργίας.

Μετά Τιμής,

Σωτήρης Ραπτόπουλος (για το Α.Ι.Π.Σ.)

τηλ. 6977 552329

**EXAR (EUROPEAN ASSOCIATION FOR THE
ADVANCEMENT OF ARCHAEOLOGY BY
EXPERIMENT) CONFERENCE, 2ND-5TH OF
OCTOBER 2014, MAYEN, GERMANY**

Dear colleagues,

This year's EXAR (European association for the advancement of archaeology by experiment) conference will be held from the **2nd-5th of October 2014**, in cooperation with the Römisch-Germanischen Zentralmuseum Mainz and the Laboratory for Experimental Archaeology in Mayen, Germany. The general topic of the conference is 'Experimental archaeology in science and education 2014'.

The registration form can be found here: <http://www.exar.org/voorbeeld-pagina/1218-2/>

In light of the recent discussions of the interpretation of the chemical and mineralogical studies of iron smelting slags, several of the authors mentioned the importance of the "human factor" in the success or failure of a smelt and the use of well-designed field experiments to test theoretical reconstructions that were based on archaeological and natural scientific investigations. I can only wholeheartedly agree with this statement! It is equally as important that the field experiments are continuously repeated so that the people (archaeologists, craftsmen or interested layperson) can gain enough experience in the technology that they are trying to duplicate, and that the process and products of the experiment are also sufficiently documented and published. Unfortunately many of these experiments remain undocumented and unpublished, and the wealth of information collected from these trials never reaches the audience that needs them most. Conferences, such as the one listed above, can provide a platform for the exchange of ideas between the scientist and scholars who have access to the archaeological material and the craftsmen/practitioners who have the practical know-how. So, please, take those old experiments out of the drawer and present your results!

Sincerely

Erica Hanning

9TH AEGEAN ANALYTICAL CHEMISTRY DAYS (AACD2014), 29/9-3/10, 2014, CHIOS, GREECE

- A Tribute to Şeref Güçer, Osman Yavuz Ataman and John Stratis -

The initial aim of the "Aegean Analytical Chemistry Days (AACD)" conferences has always been to bring together the analytical chemists from the countries surrounding Aegean Sea. Since the first event in Izmir, Turkey in 1998, many analytical chemists, and not only, from all over the world, have also attended these biennial conferences. The statistical distribution of those participated in the previous eight events showed that the AACD conferences have become an international event, widely accepted as a forum for:

- presenting new trends and developments in analytical chemistry
- discussing new applications of environmental, food and industrial analysis with a special emphasis to quality aspects
- promoting the presentation of young scientists' research
- exchanging ideas and promoting collaborations for joint research projects

The Organizing Committee of the 9th Aegean Analytical Chemistry Days (AACD2014) in collaboration with the Continuation Committee has decided to dedicate the Conference to Professors Şeref Güçer, Osman Yavuz Ataman and John Stratis for their contribution to the establishment of the Aegean meetings as International Conferences and their support to the young analytical chemists.

The 9th Aegean Analytical Chemistry Days (AACD2014) will be organized in Chios. Chios is a North Aegean island very well known for the unique mastic (<http://www.chios.com/>). The island is connected by ferryboat from Piraeas (Athens), Thessaloniki and Çeşme (Turkey) as well by airplane from Athens and Thessaloniki. There are also flights from/to Rhodes. Internationally recognized invited speakers will give Plenary and Keynote Lectures. The organizers will prepare a balanced programme with oral communications of studies of general interest and novelty and young scientists' contributions, along with thematic *poster sessions*.

Abstracts will be published in the Book of Abstracts, while full papers will be considered for publication in a special issue of the internationally renowned journal of Analytical Chemistry, *Analytical Letters*.

The organizing committee is pleased to invite you to participate in the 9th Aegean Analytical Chemistry Days and enjoy with us the stimulating scientific programme and a wonderful social programme.

Please visit the site: <http://www.chem.uoa.gr/aacd2014/>

**CMA4CH, "APPLICATION OF THE
MULTIVARIATE ANALYSIS AND
CHEMOMETRICS TO ENVIRONMENT AND
CULTURAL HERITAGE", 14-17 DECEMBER
2014, ROME, ITALY**

Dear Colleagues,

The web server of the CMA4CH meeting moves in a new address after the closure, in this month, of that one you knew.

For this reason, in contrast with what we sent before, we moved the dates of the meeting to 14-17 December 2014, and for economical reasons the location will be Rome, Italy.

www.cma4ch.org [1]

Even all the deadlines have changed but we invite you to suddenly send your abstracts because of all the problems tied to this change of location

Even for the "chemometrics course for novices", that will be held in the same dates the registration is open again.

The email instead is always this one infocma4ch@uniroma1.it

The Meeting Coordinator of
"Application of the Multivariate Analysis and Chemometrics to Environment and Cultural Heritage"
Dr. G. Visco
Rome University
La Sapienza
Italy

Links: [1] <http://webmail.teiath.gr/www.cma4ch.org>

**INTERNATIONAL CONFERENCE OF
COMPUTATIONAL METHODS IN SCIENCES
AND ENGINEERING 2015 (ICCMSE 2015), 20-
23 MARCH 2015, ATHENS, GREECE,
METROPOLITAN HOTEL**

<http://www.chandris.gr/athens/>,

URL address: <http://www.iccmse.org>

SPECIAL SESSION

Within this World event a specialized Session is planned, entitled

Advanced Computational Methods in Archaeology

**Organizer: Prof. Ioannis Liritzis, Director Laboratory of
Archaeometry, Dept of Mediterranean Studies, University of the
Aegean, Rhodes, Greece (www.liritzis.gr)**

E-mail: liritzis@rhodes.aegean.gr

Submission of extended abstracts: February 10, 2015

Notification of acceptance: March 1, 2015

Registration Deadlines: See, <http://www.iccmse.org/schedule.htm>

Abstract Format: see, <http://www.iccmse.org/abstract.htm>

PUBLICATION

Submission of the source files of camera ready extended abstracts to *American Institute of Physics (AIP Conference Proceedings)*: May 5, 2015

- Final Date.

Submission of full papers for consideration for publication in the journals:

April 5, 2015 - September 20, 2015

Selected full papers of ICCMSE 2015 will be published in:

□ *Journal of Numerical Analysis, Industrial and Applied Mathematics (JNAIAM) (ESCMSET)*, which is the official journal of European Society of Computational Methods in Sciences and Engineering

□ *Journal of Mathematical Chemistry* (Springer)

□ *Journal of Computational Methods in Sciences and Engineering* (JCMSE)

□ *Applied Mathematics & Information Sciences* (AMIS). The Appl. Math. Inf. Sci. is reviewed and indexed in the Mathematical Reviews, MathSciNet, EBESCO, AMS, and Zentralblatt fur Mathematik databases. Appl. Math. Inf. Sci. Covered by ISI Journal Citation Report (Science Citation Index). Guest Editor: Prof. Dr. Theodore E. Simos, Chairman ICCMSE.

(For more on preparation of your paper see, <http://www.iccmse.org/proceeding.htm>)

Content of the Session

From the digital point of view one of the first outcome (of the archaeological processualism) was the use of statistical processing and quantitative methods in different domains, mathematics, geography, archaeometry, anthropology, archaeology and related disciplines. The critique of subjective methodologies pointed out the need of hypertaxonomies for interpreting the past and this computing archaeology seemed a tangible and sustainable way for the processualist dream: an objective “scientific” interpretation. The interaction between real ontologies, the empirical perception of material culture (objects), and their virtual ontologies (the digital representations), creates new perspectives in the domain of data analysis, data sharing, data contextualization and cultural transmission.

The Special Session will deal with such themes and on a variety of transdisciplinary and interdisciplinary topics of Computational *archaeology* (computer-based analytical methods for the study of longterm human behaviour and behavioural evolution).

It will include geographical information systems (GIS), especially when applied to spatial analyses such as viewshed analysis and least-cost path analysis, statistical and mathematical modelling, and the computer simulation of human behaviour and behavioural evolution, scientific age calculation, classification of artifacts from qualitative or quantitative data, the application of a variety of other forms of complex and bespoke software to solve archaeological problems, such as human perception and movement within built environments using developed softwares. For example, disciplines such as computer science (e.g. advanced algorithm and software design, database design and theory), geoinformation science (spatial statistics and modeling, geographic information systems), artificial intelligence research (supervised classification, fuzzy logic), ecology (point pattern analysis), applied mathematics (graph theory, probability theory), statistics, are relevant entities to the session’s essence.

The used tools, from natural sciences may include: algebra, statistics and computer algorithms, physical instrumentation, astronomical evaluations of ancient skies, mathematical geophysics, to a) process information too voluminous or complex for purely cognitive, informal inference, and, b) provide a looping feedback for progressive development of virtual simulation of the material culture and the scientific Archaeometry methods used to decipher their internal clocks and contents (dating, characterization and provenancing, spatio-temporal simulation).

The ultimate purpose is of educational, social, museological, cultural, touristic, sustainable and scientific nature.

The session will also include relevant fields coined as archaeological informatics and artificial intelligence, virtual archaeology, cyberarchaeology.

We will welcome *Fundamental research* (theoretical ArchaeoInformatic science) on the structure, properties and possibilities of archaeological data, inference and knowledge building, that include modeling and managing fuzziness and uncertainty in archaeological data, scale effects, optimal sampling strategies and spatio-temporal effects, and, *Development of computer algorithms and software* (applied

ArchaeoInformatics archaeoinformatics science) that make this theoretical knowledge available to the user.

Fundamental research topics, are included but not limited to:

- advanced statistics in archaeology, spatial and temporal archaeological data analysis*
- bayesian analysis and advanced probability models, fuzziness and uncertainty in archaeological data*
- scale-related phenomena and scale transgressions*
- intrasite analysis (representations of stratigraphy, 3D analysis, artefact distributions)*
- landscape analysis (territorial modeling, visibility analysis)*
- optimal survey and sampling strategies*
- process-based modeling and simulation models*
- archaeological predictive modeling and heritage management applications*
- supervised and unsupervised classification and typology, artificial intelligence applications*
- digital excavations and virtual reality*
- archaeological software development, electronic data sharing and publishing,*
- The phenomenology of cyberarchaeologies and related applications at epistemological, technological and methodological level through theoretical approaches and case studies*
- The virtual ontology of archaeological information (the cybernetics of archaeology) non-predetermined conditions in the evaluation of a cyber-process in a digital-cyber domain*
- Reconstruction of the past versus simulation of the past VRML*
- Virtual Reality Modeling Language in archaeology*

The aim of this Session is to introduce the range of computational methods available to archaeologists, museologists, scientists.

The objectives are to enable one to demonstrate knowledge and understanding of, and critically evaluate, the range of computational methods available to archaeologists, and their contribution to archaeological research.

The Session will present the range of computer-based approaches to archaeological work at a variety of scales introducing multimedia, ‘Virtual Reality’, Geographic Information Systems, forms of urban analysis, data capture technologies, simulation and issues relating to digital data management and restoration.

The session is addressed to archaeologists, scientists for archaeology, museologists, cultural heritage specialists, University students (certificate of attendance for their attendance).

METALLURGY IN WARFARE - A SPUR TO INNOVATION AND DEVELOPMENT", HMS ANNUAL CONFERENCE 2014, 3RD-5TH OCTOBER, SALISBURY, WILTSHIRE

The Historical Metallurgy Society wishes to invite you to register for the annual conference. Details about the conference programme can be found in the following [PDF](#) (link:

https://www.dropbox.com/s/om9jvbud1f1c4o3/Metallurgy_in_Warfare_2014_HMSAnnualConference.pdf)

"Metallurgy in Warfare - A Spur to Innovation and Development"

HMS Annual Conference 2014

3rd to 5th October, City Hall, Malthouse Lane, Salisbury, Wiltshire, SP2 7TU

Sessions:

The conference is organised into four themed sessions:

- Ancient warfare and hand-to-hand combat
- Technology, organisation and production
- Firearms and artillery
- Modern warfare

FINAL CALL for Papers:

The committee has accepted a selection of papers with case studies that represent a diverse chronological and regional span for metallurgy in warfare. The committee wishes to make a final call for abstracts for the HMS Annual Conference 2014, "Metallurgy in Warfare - A Spur to Innovation and Development". Abstracts for oral papers should be submitted by **1st July 2014**. There will be facilities and allocated time available for poster presentations. Abstracts for poster presentations should be submitted by **15th September**. The maximum size for posters is A0 (841 x 1189mm – upright/portrait format). The conference language will be English.

The scope of the conference is not limited to any particular historical or pre-historical period. Although any relevant contribution will be considered, the organisers are particularly hoping for papers on the following themes:

- Developments in metallurgy arising from particular military needs
- Developments in weapons or military organisation arising from metallurgical innovation
- Developments in the organisation and management of metal/metal artefact production required as a result of urgent military demands

Abstracts should be:

- 250 words maximum in Word format
- include the name and affiliation of all authors (presenting author in bold)
- be emailed to HMSannualconf@hist-met.org

Location and excursions:

The 2014 annual conference is timed to coincide with commemorations of the outbreak of the First World War – “The Great War” of its generation. Salisbury has been chosen as the venue because of its convenient location for many military museums, two of them associated with weapons inconceivable without metals, the Bovington Tank Museum, and the Museum of Army Flying at Middle Wallop. Sunday 5th Oct will be available for Museum Visits. Salisbury City Hall is itself a Memorial Hall for the Second World War.

Registration and Payment:

Attendees can now register for the conference using the [booking form](#) online. Payment can also be made through the [HMS online store](#). More information about the excursions, museums and hotel reservations can be found in the online booking form.

For more information please contact:

Tom Birch birch@em.uni-frankfurt.de

Eddie Birch mejbirch@aol.com

or HMSannualconf@hist-met.org



INTERNATIONAL CONFERENCE
“INTERDISCIPLINARY STUDIES OF
ANCIENT MATERIALS FROM THE
MEDITERRANEAN”, NICOSIA, 17-19
SEPTEMBER 2014, UNIVERSITY OF CYPRUS

Dear colleagues,

I am happy to announce that the Archaeological Research Unit of the University of Cyprus is organizing an international conference entitled "[Interdisciplinary Studies of Ancient Materials from the Mediterranean](#)". It will take place at the new campus of the University of Cyprus between the 17th and the 19th of September 2014 and it will be followed by an excursion on the 20th of September.

The conference is organised in the framework of the multi-partner, European funded, Marie Curie ITN *New Archaeological Research Network for Integrating Approaches to ancient material studies (NARNIA)*, and it will host 57 oral presentations and 25 poster presentations by young researchers and experienced scholars from the Mediterranean, Europe and the United States. The thematic sessions of the conference correspond to the work areas of the NARNIA project and include:

1. The interdisciplinary study of ancient ceramics
2. Ancient and historical glass production and trade
3. Copper metallurgy across the Mediterranean
4. Interdisciplinary assessments of architectural decoration (mosaics, wall-paintings, stone buildings)
5. Dating techniques and the palaeo-environment
6. pXRF application in Archaeology

If you are interested in attending the conference, please complete and send the conference **registration** form by Wednesday, **the 30th of July 2014**. Details about registration and information about travelling to Cyprus can be found at <http://narnia-itn.eu/highlights/narnia-international-conference-interdisciplinary-studies-of-ancient-materials-from-the-mediterranean/>

All the best

Lina Kassianidou

Professor Vasiliki (Lina) Kassianidou

NARNIA Project Coordinator

Archaeological Research Unit, Department of History and Archaeology
UNIVERSITY OF CYPRUS

P.O. Box 20537. CY-1678 Nicosia, CYPRUS

tel. +357 22 893564, FAX. +357 22 22895489

Personal web page: <http://www.ucy.ac.cy/~arkasian.aspx>
NARNIA web page: <http://narnia-itn.eu/>

**INTERNATIONAL CONFERENCE
INTERDISCIPLINARY STUDIES OF ANCIENT MATERIALS FROM THE
MEDITERRANEAN**

Nicosia, 17-19 September 2014
University of Cyprus

PROGRAM

Wednesday, 17th September 2014

8:15 - 9:00 Registration
9:00 - 9:30 Welcome addresses

Session 1: The interdisciplinary study of ancient ceramics

Chair: Dr Vassilis Kilikoglou, N.C.S.R. «Demokritos», Greece

9:30 - 9:50 *Ceramic analysis and critical mass: new evidence for longevity of major pottery production centres in the Aegean*

Peter M. Day

9:50 - 10:10 *Sustainable data management in the study of ancient materials*

Anno Hein and Vassilis Kilikoglou

10:10 - 10:30 *Un-dusting the foundations of compositional analysis approaches of ceramic archaeological data*

Elisavet Charalambous*

10:30 - 10:50 *Impact resistance of archaeological ceramics: the influence of firing and temper*

Noémi S. Müller*, George Vekinis and Vassilis Kilikoglou

10:50 - 11:10 *The story of a soil that became a glaze: Chemical and macroscopic fingerprints*

Artemi Chaviara* and Eleni Aloupi

11:10 - 11:40 Coffee Break

Session 2: The interdisciplinary study of ancient ceramics

Chair: Dr Eleni Aloupi, THETIS Authentics Ltd, Greece

11:40 - 12:00 *Cooking pot fabric recipes: An interdisciplinary study of Cypriot cooking pots of the Late Bronze Age*

Maria Dikomitou-Eliadou, Artemis Georgiou and Athanasios K. Vionis

12:00 - 12:20 *Regional variation in Late Cypriot pithos production: preliminary results from the petrographic analysis*

Eleni Nodarou and Priscilla Keswani

12:20 - 12:40 *Leave no mudstone unturned: geochemical provenancing reveals potters' choices and interactions in Late Bronze Age Cyprus*

Christina Makarona*, Priscilla Keswani, Eleni Nodarou, Ariane Jacobs, Nadine Mattielli, Karin Nys and Philippe Claeys

- 12:40 - 13:00 *Mapping Early Iron Age Cypro-Phoenician networks: An optical mineralogy study of Phoenician Bichrome Ware in Cyprus*
Ayelet Gilboa and Yuval Goren
- 13:00 - 13:20 *Late Roman amphorae from Cyprus: investigating production and distribution in the eastern Mediterranean*
Anthi Kaldeli, Vassilis Kilikoglou, Anno Hein, Demetrios Michaelides and David Williams
- 13:20 - 14:20 *Lunch Break*
- 14:20 - 15:00 *Poster session I (poster nos. 1-11)*

Session 3: Ancient and historical glass production and trade

Chair: Prof. Thilo Rehren, University College London Qatar

- 15:00 - 15:20 *A spatial analysis of the socio-economics of the production of luxury goods at Amarna*
Anna Kathrin Hodgkinson
- 15:20 - 15:40 *Glass production in the Neo-Assyrian empire*
Katharina Schmidt
- 15:40 - 16:00 *A Ptolemaic glass head in the Metropolitan Museum of Art (MMA 1973.118.176)*
Sara E. Cole
- 16:00 - 16:20 *“Fruits seem more beautiful than they actually are if they are floating in a glass bowl” (Plinius) - Egyptian glass of the first millennium AD: an archaeological and scientific approach*
Daniela Rosenow
- 16:20 - 16:50 Coffee Break**

Session 4: Ancient and historical glass production and trade

Chair: Prof. Karin Nys, Vrije Universiteit Brussel, Belgium

- 16:50 - 17:10 *Shedding light onto Cypriot glass industry: Consumption and distribution patterns*
Andrea Ceglia*, Peter Cosyns, Wendy Meulebroeck, Karin Nys, Herman Terryn and Hugo Thienpont
- 17:10 - 17:30 *Composition, distribution, and use of glass in the 6th century AD in the Lower Danube region: recognizing changes – understanding the change*
Anastasia Cholakova*
- 17:30 - 17:50 *From the Mediterranean to the Libyan Sahara. Chemical analyses of Garamantian glass*
Chloë N. Duckworth and David J. Mattingly
- 20:30 *Conference dinner*

18th September 2014

- 8:50 - 9:00 *Opening addresses*

Session 5: Copper metallurgy across the Mediterranean

Chair: Dr George Pappasavvas, University of Cyprus, Cyprus

- 9:00 - 9:20 *Metal production on the south coast of Late Bronze Age Cyprus*
Lente Van Brempt*

- 9:20 - 9:40 *Examining the Late Bronze Age and Iron Age metallurgical ceramics from the workshops of Kition*
Dimitris Ioannidis*
- 9:40 - 10:00 *A diachronic study of Cypriot copper alloy artefacts*
Andreas Charalambous*
- 10:00 - 10:20 *An interdisciplinary study of a new slag heap from Skouriotissa dating to the first millennium BC*
Vasiliki Kassianidou, Erez Ben Yosef, Thomas Levy, Ron Schaar, Lisa Tauxe and Brita Lorenzen
- 10:20 - 10:40 *An archaeomagnetic study of major slag deposits in the central Timna valley*
Ilana Peters, Erez Ben-Yosef and Lisa Tauxe
- 10:40 - 11:00 *Optically Stimulated Luminescence (OSL) of Timna mines: A method for dating ancient mining activity*
Craig Smitheram, Erez Ben-Yosef, Naomi Porat and Galina Faershtein
- 11:00 - 11:30 Coffee break**

Session 6: Dating techniques and the palaeo-environment

Chair: Dr Ioannis Bassiakos, N.C.S.R. «Demokritos», Greece

- 11:30 - 11:50 *Site formation processes and use of space at the PPNA village of Ayios Tychonas- Klimonas in Cyprus. The micromorphology of mudbrick materials construction, a geoarchaeological approach*
Pantelitsa Mylona
- 11:50 - 12:10 *Geoarchaeology or how to set the archaeological story straight*
Annita Antoniadou
- 12:10 - 12:30 *Luminescence dating and the palaeoenvironment in SE Cyprus*
Evangelos Tsakalos*
- 12:30 - 12:50 *Luminescence dating and the palaeo-environment in SW Peloponnesus*
Ioannis Christodoulakis*
- 12:50 - 13:10 *Luminescence chronology of Quaternary coastal deposits of North Evoikos Gulf (Central Greece)*
Maria Kazantzaki and Ioannis Bassiakos, Theodora Rondoyanni, Evangelos Tsakalos* and Ioannis Christodoulakis*
- 13:10 - 14:10 Lunch break**
- 14:10 - 14:50 Poster session II** (poster nos. 12-25)

Session 7: The interdisciplinary study of ancient ceramics

Chair: Dr Maria Dikomitou-Eliadou, University of Cyprus, Cyprus

- 14:50 - 15:10 *Exploring pottery technological variability and its significance during the Final Neolithic-Early Bronze Age transition at Phaistos, Crete*
Roberta Mentessana*, Peter M. Day, Vassilis Kilikoglou and Simona Todaro
- 15:10 - 15:30 *Production, exchange and consumption of pottery from LH IIIB to LH IIIC early periods in the Saronic Gulf*
William Gilstrap* and Peter M. Day
- 15:30 - 15:50 *An interdisciplinary and integrative study of ancient ceramics: Aegean transport stirrup jars*

Halford Haskell

15:50 - 16:10 *Ceramic workshops in BA mainland Greece: a preliminary study of the archaeological record*

Anastasia Portari

16:10 - 16:40 Coffee break

Session 8: The interdisciplinary study of ancient ceramics

Chair: Dr Peter M. Day, University of Sheffield, UK

16:40 - 17:00 *Chemical and petrographic interactions: a micro-scale investigation into local production on Bronze Age Kythera*

Evangelia Kiriati and Myrto Georgakopoulou

17:00 - 17:20 *Re-examining the late Neolithic-early Bronze Age transition in Lower Nubia (Egypt) through integrated ceramic petrography and technology studies*

John Gait

17:20 - 17:40 *An interdisciplinary study of 8th-7th c. BC transport amphorae: new light on early Greek commerce*

Maria Roumbou, Evangelia Kiriati, Xenia Charalambidou, Noémi S. Müller*, Antonis Kotsonas and Manthos Bessios

17:40 - 18:00 *Petrographical and geochemical characterizations of the Late Antiquity unguentarium from the archaeological site of Tripolis, Denizli (southwestern Turkey)*

Bariş Semiz and Duman Bahadır

19th September 2014

8:50 - 9:00 Opening addresses

Session 9: pXRF application in Archaeology

Chair: Dr Roger Doonan, University of Sheffield, UK

9:00 - 9:20 *Scientific studies and the archaeological process: The implications of science in the field*

Louis Olivier Lortie, Derek Pitman and Roger Doonan

9:20 - 9:40 *Writing artefact biographies: The contribution of high frequency non-destructive HHpXRF analyses*

Lenore Thompson and Roger Doonan

9:40 - 10:00 *New methods and technology for space exploration: The use of HHpXRF geochemical data in technological studies*

Benoit Proulx and Roger Doonan

10:00 - 10:20 *pXRF analysis of flint tools changing through time in a single Neolithic neighbourhood*

Kathleen Bennallack

10:20 - 10:40 *Iron Age silver hoards from Southern Phoenicia: surface analysis using pXRF*

Eshel Tzilla, Ayelet Gilboa, Sarel Shalev and Naama Yahalom-Mack

10:40 - 11:10 *Coffee break*

Session 10: Interdisciplinary assessments of architectural decoration

Chair: Prof. Demetrios Michaelides, University of Cyprus, Cyprus

- 11:10 - 11:30 *Coloured materials used in Elephantine: evolution and permanence from Old Kingdom till Roman Period*
Sandrine Pagès-Camagna and Dietrich Raue
- 11:30 - 11:50 *Pigments and colorants. An inside look at the painted decoration of the Macedonian funerary monuments*
Lydia Avlonitou*
- 11:50 - 12:10 *Technology of the Early Christian wall mosaics of Cyprus*
Olivier Bonnerot*
- 12:10 - 12:30 *An archaeometric investigation on glass mosaic tesserae from Delos, Greece*
Francesca Licenziati*
- 12:30 - 12:50 *State of conservation of the architectural structures and mortars characterization of the Castle of Azraq, Jordan*
Marta Tenconi* and Fadi Bala'awi
- 12:50 - 13:10 *The technology of structures in Cyprus during LBA and possible historical implications*
Konstantinos Giannakos
- 13:10 - 14:30 Lunch break**

Session 11: Copper metallurgy across the Mediterranean

Chair: Prof. Marcos Martín-Torres, University College London, UK

- 14:30 - 14:50 *Copper metallurgy of the Early Bronze Age in Thassos, North Aegean*
Nerantzis Nerantzis, Ioannis Bassiakos and Stratis Papadopoulos
- 14:50 - 15:10 *A new approach for investigating the role of metals in Late Bronze Age societies on Crete*
Lena Hakulin
- 15:10 - 15:30 *Seeing the forest for the trees: assessing technological variability in ancient metallurgical crucible assemblages*
Frederik Rademakers* and Thilo Rehren
- 15:30 - 15:50 *Some aspects of copper production in antiquity considering the furnace types and production techniques*
Damir Rumenjak
- 15:50 - 16:10 *Egyptian bronzeworking practices in Late Bronze Age Canaan*
Naama Yahalom-Mack
- 16:10 - 16:30 Coffee break**

Session 12: Copper metallurgy across the Mediterranean

Chair: Prof. Vasiliki Kassianidou, University of Cyprus, Cyprus

- 16:30 - 16:50 *The transition from bronze to iron; a view from a smith's hoard from Early Iron Age Megiddo*
Adi Eliyahu-Behar
- 16:50 - 17:10 *Votive bronzes in Late Period Egypt: where did the raw metals come from?*
Aurelia Masson-Berghoff
- 17:10 - 17:30 *Copper in the pre-Islamic Sahara – a Mediterranean provenance?*
Aurélie Cuénod and David J. Mattingly

- 17:30 - 17:50 *Copper-alloy consumption in a Tyrrhenian medieval town: the case of Leopoli-Cencelle (Italy)*
Mainardo Gaudenzi Asinelli* and Marcos Martín-Torres
- 17:50 - 18:00** **Closing Remarks**

20th September 2014

Conference excursion

List of poster presentations

• The interdisciplinary study of ancient ceramics

1. *Eretrian ceramic products through time: Investigating the early history of a Greek metropolis*

Xenia Charalambidou, Evangelia Kiriati, Noémi S. Müller*, Myrto Georgakopoulou, Sylvie Müller Çelka, Tobias Krapf

2. *Moulding expressions of culture: A technological and compositional study of the Hellenistic and Roman terracotta figurines from the House of Orpheus in Nea Paphos, Cyprus*

Maria Dikomitou-Eliadou, Giorgos Papantoniou, Vassilis Kilikoglou, Eleni Aloupi, and Demetrios Michaelides

3. *Carpe diem. Towards the development of an on-site restoring laboratory. A case-study from Erimi-Laonin tou Porakou*

Giulia Dionisio and Luca Bombardieri

4. *A diachronic study of pottery production and supply at the Bronze Age town of Palaikastro, East Crete*

John Gait, Evangelia Kiriati, Noémi S. Müller* and Carl Knappett

5. *Organic residue analysis of pottery from the dye workshop at Alatsomouri-Pefka, Crete*

Andrew J. Koh, Philip P. Betancourt, Marie Nicole Pareja, Thomas M. Brogan and Vili Apostolakou

6. *A diachronic investigation of 'local' pottery production and supply at the sanctuary of Zeus, Mount Lykaion, Arcadia-Peloponnese*

Georgia Kordatzaki, Evangelia Kiriati, Noémi S. Müller*, Mary E. Voyatzis, David G. Romano, Susan Petrakis, Jeannette Forsén, Gullog Nordquist, Emilio Rodríguez-Alvarez, Sarah Linn

7. *Amphorae production in Early Hellenistic Mesambria Pontica*

Totko Stoyanov

8. *Archaeological and archaeometric data about the Moschos' production of roof-tiles and architectural terracotta on the west Pontic coast*

Daniela Stoyanova

9. *Organic residue analysis of Roman amphorae excavated in Beirut, Lebanon*

Marshall Woodworth

10. *Pottery production and exchange at the Heraion, Samos, during the late third millennium BC: first steps in the study of technology and provenance*
Sergios Menelaou, Ourania Kouka and Peter M. Day

11. *Integrating chemical data of archaeological ceramics into existing databases: the new WD-XRF facility at the Fitch Laboratory of the British School at Athens*
Noémi S. Müller*, Anno Hein, Myrto Georgakopoulou, Evangelia Kiriati, Vassilis Kilikoglou

• **Ancient and historical glass production and trade**

12. *Analysis of faience beads from Early Bronze Age contexts at Tell es-Safi/Gath, southern Levant*
Adi Eliyahu-Behar

13. *Reusing, repairing, remelting: Reconsidering ancient glass recycling and what that means for material analyses*
Victoria A. Sainsbury

14. *Compositional Analysis of Late Bronze Age glass from Pherai in Thessaly*
Melina Smirniou, Polyxeni Arachoviti, Eleni Asderaki-Tzoumerkioti

• **Copper metallurgy across the Mediterranean**

15. *Metal workshops at the settlement of Kastro-Palaia, Volos, Greece : Tin bronze versus arsenical copper*
Eleni Asderaki-Tzoumerkioti and Evangelia Skafida

16. *The Early-Middle Bronze age basalt anvils of Pyrgos/Mavroraki. Their use, context and related tools*
Maria Rosaria Belgiorno

17. *Greek coinage in context: the characterisation and provenance of silver from Greek colonies in the Western Mediterranean 5th-3rd centuries BCE*
Thomas Edward Birch, Fleur Kemmers, Sabine Klein and Michael Seitz, Heidi Höfer

18. *Study of metals found in Cova des Pas (Minorca, Spain)*
Bartomeu Lluï Estarellas and Laura Perelló Mateo

19. *Precious metals in the eastern Mediterranean as a measure of changing economic and political realities*
Amir Golani

20. *Deteriorating effects of the metal threads on embroideries. Technical and analytical study on archaeological textiles*
Mohamed Marouf

21. *Metallographic characterization of two ancient Roman copper-based metal fragments*
Olga Papadopoulou and Panayiota Vassiliou

22. *The Cleveland Apollo: Recent research revelations*
Colleen Snyder

• **Interdisciplinary assessments of architectural decoration**

23. *Towards an ancient technological heritage in theatre: exploring links between Abydos Mysteries (Egypt) and the Great Dionysia (Greece)*
Santos Gláucio Machado

24. *Rusafa-Sergiupolis/Rusafat-Hisham, Syria. The Decoration Systems of Churches and Palaces in the Late-Antique and Early-Islamic Periods, 5th to 9th Century C .E.: Material, Technology and Design*
Ines Oberhollenzer

• **pXRF application in Archaeology**

25. *AR.CHIMIN.: A multidisciplinary project for the study of the ancient mining heritage*
Luisa Dallai and Alessandro Donati

Organising committee

Prof. Vasiliki Kassianidou (NARNIA project coordinator)
Archaeological Research Unit, University of Cyprus
&
Dr Maria Dikomitou-Eliadou (NARNIA project manager)
Archaeological Research Unit, University of Cyprus

Scientific Committee

Dr Eleni Aloupi, Thetis Authentics Ltd, Greece
Dr Fadi Balaawi, Hashemite University, Jordan
Dr Yannis Bassiakos, N.C.S.R. «Demokritos», Greece
Dr Peter Day, University of Sheffield, UK
Dr Maria Dikomitou-Eliadou, University of Cyprus, Cyprus
Dr Roger Doonan, University of Sheffield, UK
Dr Demetrios Eliades, G.M. EuroCy Innovations Ltd, Cyprus
Prof. Anne-Marie Guimier-Sorbets, Universite Paris-Ouest, France
Prof. Vasiliki Kassianidou, University of Cyprus, Cyprus
Dr Vassilis Kilikoglou, N.C.S.R. «Demokritos», Greece
Prof. Marcos Martín-Torres, University College London, UK
Prof. Demetrios Michaelides, University of Cyprus, Cyprus
Mr George Milis, G.M. EuroCy Innovations Ltd, Cyprus
Prof. Karin Nys, Vrije Universiteit Brussel, Belgium
Dr George Papasavvas, University of Cyprus, Cyprus
Prof. Thilo Rehren, University College London Qatar, Qatar

List of participants

Aloupi Eleni, Thetis Authentics Ltd, Greece
Antoniadou Annita, Queen's University Belfast, UK
Apostolakou Vili, 24th Ephorate of Prehistoric and Classical Antiquities, Greece
Arachoviti Polyxeni, 13th Ephorate of Prehistoric and Classical Antiquities, Greece
Asderaki-Tzoumerkioti Eleni, University College London Qatar, Qatar
Asinelli* Mainardo Gaudenzi, University College London, UK

Avlonitou Lydia*, Université Paris Ouest, France
Bahadır Duman, Pamukkale University, Turkey
Bala'awi Fadi, Hashemite University, Jordan
Bassiakos Ioannis, N.C.S.R. «Demokritos», Greece
Belgiorno Maria Rosaria, Istituto per le Tecnologie Applicate ai Beni Culturali-CNR, Italy
Ben Yosef Erez, Tel Aviv University, Israel
Bennallack Kathleen, University of California, USA
Bessios Manthos, 27th Ephorate of Prehistoric and Classical Antiquities, Greece
Betancourt Philip P., Temple University, USA
Birch Thomas Edward, Goethe-Universität, Germany
Bombardieri Luca, Università di Torino, Italy
Bonnerot Olivier*, University of Cyprus, Cyprus
Brogan Thomas M., INSTAP Study Center for East Crete, Greece
Ceglia Andrea*, Vrije Universiteit Brussel, Belgium
Charalambidou Xenia, British School at Athens, Greece
Charalambous Andreas*, University of Cyprus, Cyprus
Charalambous Elisavet*, G.M. EuroCy Innovations Ltd, Cyprus
Chaviara Artemi*, Thetis Authentics Ltd, Greece
Cholakova Anastasia*, University College London, UK
Christodoulakis Ioannis*, N.C.S.R. «Demokritos», Greece
Claeys Philippe, Vrije Universiteit Brussel, Belgium
Cole Sara E., Yale University, USA
Cosyns Peter, Vrije Universiteit Brussel, Belgium
Cuénod Aurélie, University of Leicester, UK
Dallai Luisa, University of Siena, Italy
Day Peter M., University of Sheffield, UK
Dikomitou-Eliadou Maria, University of Cyprus, Cyprus
Dionisio Giulia, Università di Firenze, Italy
Donati Alessandro, University of Siena, Italy
Doonan Roger, University of Sheffield, UK
Duckworth Chloë N., University of Leicester, UK
Eliades Demetrios, G.M. EuroCy Innovations Ltd, Cyprus
Eliyahu-Behar Adi, Bar-Ilan University and Weizmann Institute of Science, Israel
Faershtein Galina, Geological Survey of Israel, Israel
Forsén Jeannette, University of Gothenburg, Sweden
Gait John, British School at Athens, Greece
Georgakopoulou Myrto, University College London Qatar, Qatar
Georgiou Artemis, University of Cyprus, Cyprus
Giannakos Konstantinos, University of Thessaly, Greece
Gilboa Ayelet, University of Haifa, Israel
Gilstrap William*, University of Sheffield, UK
Gláucio Machado Santos, Federal University of Bahia, Brazil
Golani Amir, Israel Antiquities Authority, Israel
Goren Yuval, University of Haifa, Israel
Guimier-Sorbets Anne-Marie, Université Paris Ouest, France
Hakulin Lena, University of Helsinki, Finland
Haskell Halford, Southwestern University, USA
Hein Anno, N.C.S.R. «Demokritos», Greece
Hodgkinson Anna Kathrin, University of Liverpool, UK

Höfer Heidi, Goethe-Universität, Germany
Ioannidis Dimitris*, University of Cyprus, Cyprus
Jacobs Ariane, Vrije Universiteit Brussel, Belgium
Kaldeli Anthi, Department of Antiquities, Cyprus
Kassianidou Vasiliki, University of Cyprus, Cyprus
Kazantzaki Maria, National Technical University of Athens, Greece
Kemmers Fleur, Goethe-Universität, Germany
Keswani Priscilla, Independent Researcher
Kilikoglou Vassilis, N.C.S.R. «Demokritos», Greece
Kiriati Evangelia, British School at Athens, Greece
Klein Sabine, Goethe-Universität, Germany
Knappett Carl, University of Toronto, Canada
Koh Andrew J., Brandeis University, USA
Kordatzaki Georgia, British School at Athens, Greece
Kotsonas Antonis, University of Edinburgh, UK
Kouka Ourania, University of Cyprus, Cyprus
Krapf Tobias, University of Basel, Switzerland
Levy Thomas, University of California San Diego, USA
Licenziati Francesca*, Université Paris Ouest, France
Linn Sarah, University of Pennsylvania, USA
Llull Estarellas Bartomeu, Universitat de les Illes Balears, Spain
Lorensen Brita, University of Cornell, USA
Lortie Louis Olivier, University of Sheffield, UK
Makarona Christina*, Vrije Universiteit Brussel, Belgium
Marouf Mohamed, Sohag University, Egypt
Martinón-Torres Marcos, University College London, UK
Masson-Berghoff Aurelia, British Museum, UK
Mattielli Nadine, Vrije Universiteit Brussel, Belgium
Mattingly David J., University of Leicester, UK
Menelaou Sergios, University of Sheffield, UK
Mentesana Roberta*, University of Sheffield, UK
Meulebroeck Wendy, Vrije Universiteit Brussel, Belgium
Michaelides Demetrios, University of Cyprus, Cyprus
Milis George, G.M. EuroCy Innovations Ltd, Cyprus
Müller Noémi S. *, British School at Athens, Greece
Müller Çelka Sylvie, CNRS-Université Lyon, France
Mylona Pantelitsa, Muséum National d'Histoire Naturelle, France
Nerantzis Nerantzis, 31st Ephorate of Prehistoric and Classical Antiquities, Greece
Nodarou Eleni, INSTAP Study Center for East Crete, Greece
Nordquist Gullog, University of Uppsala, Sweden
Nys Karin, Vrije Universiteit Brussel, Belgium
Oberhollenzer Ines, German Archaeological Institute, Greece
Pagès-Camagna Sandrine, Centre de Recherche et de Restauration des Musées de France, France
Papadopoulos Stratis, IH' Ephorate of Prehistoric and Classical Antiquities, Greece
Papadopoulou Olga, National Technical University of Athens, Greece
Papantoniou Giorgos, Trinity College Dublin, Ireland
Papasavvas George, University of Cyprus, Cyprus
Pareja Marie Nicole, Temple University, USA
Perelló Mateo Laura, Universitat de les Illes Balears, Spain

Peters Ilana, Tel Aviv University, Israel
Petrakis Susan, Albuquerque, USA
Pitman Derek, University of Sheffield, UK
Porat Naomi, Geological Survey of Israel, Israel
Portari Anastasia, University of Thessaly, Greece
Proulx Benoit, University of Sheffield, UK
Rademakers Frederik*, University College London, UK
Raue Dietrich, Universität Leipzig, Germany
Rehren Thilo, University College London Qatar, Qatar
Rodriguez-Alvarez Emilio, University of Arizona, USA
Romano David G., University of Arizona, USA
Rondoyanni Theodora, National Technical University of Athens, Greece
Rosenow Daniela, University College London, UK
Roumbou Maria, Harokopio University of Athens and British School at Athens, Greece
Rumenjak Damir, Ministry of Environmental and Nature Protection, Croatia
Sainsbury Victoria A., University of Oxford, UK
Schaar Ron, University of California San Diego, USA
Schmidt Katharina, Ludwig-Maximilians-Universität München, Germany
Seitz Michael, Goethe-Universität, Germany
Semiz Barış, Pamukkale University, Turkey
Shalev Sariel, University of Haifa, Israel
Skafida Evangelia, IG' Ephorate of Prehistoric and Classical Antiquities, Greece
Smirniou Melina, University College London Qatar, Qatar
Smitheram Craig, Tel Aviv University, Israel
Snyder Colleen, Cleveland Museum of Art, USA
Stoyanov Totko, University of Sofia, Bulgaria
Stoyanova Daniela, University of Sofia, Bulgaria
Tauxe Lisa, University of California San Diego, USA
Tenconi Marta*, Hashemite University, Jordan
Terry Herman, Vrije Universiteit Brussel, Belgium
Thienpont Hugo, Vrije Universiteit Brussel, Belgium
Thompson Lenore, University of Sheffield, UK
Todaro Simona, Università di Catania, Italy
Tsakalos Evangelos*, N.C.S.R. «Demokritos», Greece
Tzilla Eshel, University of Haifa, Israel
Van Brempt Lente*, University of Cyprus, Cyprus
Vassiliou Panayiota, National Technical University of Athens, Greece
Vekinis George, N.C.S.R. «Demokritos», Greece
Vionis Athanasios K., University of Cyprus, Cyprus
Voyatzis Mary E., University of Arizona, USA
Williams David, University of Southampton, UK
Woodworth Marshall, University of Oxford, UK
Yahalom-Mack Naama, Hebrew University of Jerusalem and Weizmann Institute of Science, Israel

For registration or more information, please visit the NARNIA project website at www.narnia-itn.eu

4TH ARCH RNT SYMPOSIUM,
ARCHAEOLOGICAL RESEARCH AND NEW
TECHNOLOGIES, OCTOBER 1-3, 2014,
UNIVERSITY OF THE PELOPONNESE,
KALAMATA

Dear Colleagues

This is a reminder regarding the 4th ARCH_RNT Symposium, Archaeological Research and New Technologies scheduled for October 1-3, 2014 at the University of the Peloponnese, Kalamata containing updated information.

You may submit your abstract at ARCH_RNT@uop.gr. Please provide us also with your preferences regarding accomodation (optional).

The registration (and optionally, accomodation) fees can be payed upon your arrival at the registration desk.

On behalf of the Organizing Committee

N. Zacharias

Associate Professor Nikos Zacharias

Laboratory of Archaeometry, Director

<http://kalamata.uop.gr/~archaeolab/index.html>

Department of History, Archaeology and Cultural Resources Management

University of Peloponnese

24 100 Kalamata, Greece

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS
CENTER FOR THE ANALYSIS OF
ARCHAEOLOGICAL MATERIALS
(UNIV. OF PENNSYLVANIA)

The University of Pennsylvania Museum of Archaeology and Anthropology (Penn Museum) and the School of Arts and Sciences are seeking a Teaching Specialist, with combined teaching and laboratory experience for its new Center for the Analysis of Archaeological Materials (CAAM).

CAAM is a joint endeavor of the Penn Museum and the University of Pennsylvania's School of Arts and Sciences, and will support teaching and mentoring of students from their first steps to their becoming independent as researchers. CAAM is envisioned as consisting of teaching and research specialties in archaeobotany, archaeometallurgy, archaeozoology, ceramics, conservation, digital archaeology, human skeletal analysis, and lithics. Several of these specialties will have dedicated Teaching Specialists within CAAM.

The appointment is at the rank of Lecturer A in the School of Arts and Sciences, and will report to the CAAM Laboratory Coordinator with oversight from the Faculty Steering Committee. The teaching Specialist will teach or co-teach one course per semester; train and supervise students in their respective technical area; support Penn Museum archaeological projects; publish and/or assist in publication of relevant research; and monitor and maintain their respective lab equipment.

Minimum: BA/BS, with a PhD highly preferred in one or more archaeological laboratory specialties from archaeobotany, archaeometallurgy, archaeozoology, and digital archaeology, with preference given to those specializing in archaeozoology, plus 3-5 years of related work experience or equivalent combination of education and experience; broad knowledge of archaeological material culture and a record of involvement in archaeological research projects; teaching and mentoring experience. Computer literacy, organizational skills, and attention to detail, multi-tasking, and collaborative abilities. Ability to travel as may be required.

Candidates are to apply online at: <http://facultysearches.provost.upenn.edu/postings/236>

[2]. Include a cover letter, curriculum vitae, and the contact information for three individuals who will be asked by the University to submit a letter of recommendation. Review of applications will begin on July 1 and will continue until the position is filled.

The Museum of Archaeology and the School of Arts and Sciences are strongly committed to Penn's Action Plan for Faculty Diversity and Excellence and to establishing a diverse faculty (for more information see: <http://www.upenn.edu/almanac/volumes/v58/n02/diversityplan.html>)

[3]. The University of Pennsylvania is an EOE.
Minorities/Women/Individuals with disabilities/Protected Veterans are encouraged to apply.

Links:

- [1] <https://facultysearches.provost.upenn.edu/postings/252>
 - [2] <http://facultysearches.provost.upenn.edu/postings/236>
 - [3] <http://www.upenn.edu/almanac/volumes/v58/n02/diversityplan.html>
-

DIRECTOR BRITISH SCHOOL AT ATHENS

The British School at Athens wishes to appoint a Director, to take up office in succession to Professor Catherine Morgan OBE from 1 October 2015, when she will move to All Souls College, Oxford, as Senior Research Fellow. The School is seeking an established scholar in any field of Hellenic studies, with the energy and vision to

the British Academy's network of overseas research institutes, the School exists to promote research of international excellence in all disciplines pertaining to Greek lands, from antiquity to modern times.

The post is full-time and residential. Subject to contract, the expectation is that in the normal course of events the Director would serve a term of at least five years.

The Directorship may be held on secondment from a UK University or similar institution.

The Director is the chief executive, responsible to the London-based Council for all aspects of the management of an institution operating between Britain and Greece for the benefit of the wider UK academic community. As Director, you will

- Develop and coordinate the research strategy of the School, maintaining and enhancing its wide disciplinary range, and facilitating and supporting the research projects sponsored by the School
- Develop and foster the academic life of the School
- Conduct your own programme of research and publication
- Lead the support team in Athens, and maintain appropriate administrative and financial structures within the School
- Represent and promote the School in Greece, particularly with the Archaeological Service, the other foreign Schools, and other academic institutions

Your qualifications:

- A record of distinction and achievement in research and publication in any of the disciplines covered by the School's remit
- Experience of management and a familiarity with strategic planning in an academic or similar institution, and knowledge of the UK Higher Education sector
- A strong track record in raising external funding
- An ability to engage with people at all levels
- Experience of Greece, and a good working knowledge of the Greek language or a plan for acquiring this level of command before taking up post.

Full particulars, including details of how you should apply, will be found on the School's website, www.bsa.ac.uk. Informal enquiries may be made to the Chairman of the School, Professor Malcolm Schofield (ms10001@cam.ac.uk).

Closing date for applications: Friday 19 September 2014

Planned interview date: Thursday 23 October 2014

Nominations are also invited, and should be sent in confidence to the Chairman. In choosing the Director, Council is not restricted to those who apply or are nominated.

The British School at Athens is an employer committed to equal opportunities.

~~~~~

### **Director of the British School at Athens – Further Particulars THE SCHOOL**

The British School at Athens is an educational not-for-profit charity founded in 1886, and one of seventeen such foreign institutions in Athens. From its earliest years it has been engaged in study of all aspects of the Hellenic world, from prehistoric times through the Classical, Hellenistic, Roman, Byzantine and Ottoman periods to the present. It now forms part of the British Academy's network of Sponsored Institutes and Societies (BASIS), which sustains and supports British research overseas. The School exists to promote research of international excellence in all disciplines pertaining to Greek lands, and in all periods to modern times. The School does this through:

- a programme of research undertaken independently or in collaboration with UK-based and other overseas institutions
- an academic programme of seminars, lectures, and conferences
- its internationally renowned library
- the work of the Fitch Laboratory in science-based archaeological research across the Mediterranean
- supporting the work of individual researchers from the UK and elsewhere, including applications for study and fieldwork permits, advice on the development of research programmes, accommodation and facilities in Athens and Knossos, and provision of online services
- making their work known through the publication of its journals and monograph series
- promoting the use of its archival, laboratory, and museum collections by the scholarly community worldwide
- providing funding (including studentships and visiting fellowships) for research in Greece, and for Greek researchers to visit the UK
- providing internships and training courses for undergraduates, postgraduates, and schoolteachers

The School's *Annual Report 2012-2013*, *Corporate Plan* and *Strategic Plan for Research 2011-2015* are posted on [www.bsa.ac.uk](http://www.bsa.ac.uk), where its governance arrangements may also be accessed.

#### **Size and Scope**

The School is an institute for advanced research and a registered UK charity (no. 208673). It maintains a world class library, archive, laboratory for archaeological science, hostel and offices in Athens; a smaller hostel, library and museum for study purposes in Knossos; and an office in London. It has five full-time academic staff (including the Director and the Assistant Director, Dr Chryssanthi Papadopoulou), two research fellows, four full-time and one part-time administrative/secretarial staff, an IT officer, three full-time library/archival staff, a part-time technician and five full-time and two part-time domestic staff ([http://kleio.10080/doc\\_store/FrontOffice/FRO2014\\_25.pdf](http://kleio.10080/doc_store/FrontOffice/FRO2014_25.pdf)). The academic staff, the

research fellows, the IT Officer, and the Archivist are all actively engaged in research, and all staff are actively encouraged to undertake professional development. In addition, the School is supported by researchactive non-executive staff in the UK, in particular the Chairman of Council (Professor Malcolm Schofield) and the Honorary Treasurer (Dr Carol Bell), as well as a part-time London secretary. It offers two full studentships and several smaller bursaries for scholars every year. The School has 687 subscribers in all categories, and over 170 members, i.e. established and post-graduate scholars or scientists who use its facilities for study purposes every year. In addition around 1,300 researchers, who are not members, are given rights to use the library each year. It is supported by a Friends organisation, which engages in a range of activities involving the wider public in the work of the School in both Greece and Britain, through lectures, excursions, and other activities, and whose fundraising efforts have helped the School in various ways, including notably the expansion and resourcing of the Library. The School is financed by a grant from the British Academy, donations and legacies, and annual subscription fees, with an annual turnover in the region of £1.5m. Active fund-raising activity is necessary for the operation of individual projects.

### **Infrastructure and Facilities**

The School's principal research infrastructure consists of its *Library*, its *Museum*, its *Fitch Laboratory* and its facilities at *Knossos*.

The *Library* in Athens contains over 70,000 monographs, 1,300 periodical titles and 2,000 maps, and has space for 50 readers. It is staffed by two full-time librarians (Mrs Penny Wilson-Zarganis and Ms Sandra Pepelasis) with the help of a student library assistant. Members have 24-hour access. While providing a broad, research-level coverage of Greek archaeology of all periods, it specialises in the fields of Aegean prehistory, ancient art and epigraphy, and Byzantine and modern Greek studies; it also houses historical collections (such as George Finlay's library) and a particularly good collection of Greek and Balkan journals.

Its collections are complemented by those of the other foreign schools and institutes in Athens with whom we have reciprocal arrangements giving access to a unique collection of more than 450,000 titles on Hellenic Studies. We have particularly strong links with the neighbouring Blegen and Gennadius libraries of the American School, with whom we share a common online library catalogue (AMBROSIA, **American British Online Search in Athens**).

The School's *Archive* (Archivist Ms Amalia Kakissis) contains records of the School's field projects going back to 1886; material from the Byzantine Research Fund, ca 1895-1936 (ca. 6,500 unique plans, drawings and photographs of Byzantine architecture - some of buildings now destroyed); the George Finlay papers, including journals from the Greek War of Independence; travel notebooks (Gell, Stuart); personal papers of leading Hellenists (e.g. John Pendlebury); the Noel Baker family papers; ethnographic records and a large collection of glass negatives. The archivist is responsible for public access to the collection, and has secured outside funding in support of projects to conserve, electronically catalogue and digitise images from selected collections.

The *Marc and Ismene Fitch Laboratory of Archaeological Science*, founded in 1974, was the first of its kind in Greece. It specialises principally in the analysis of inorganic materials (mainly pottery, as well as metals, wall paintings, glass) and in geophysical



prospection, specialisms which are complementary to the neighbouring Wiener Laboratory of the American School of Classical Studies in Athens. It maintains facilities for petrological analysis of pottery (facilities for thin section preparation and 2 research polarising microscopes coupled with digital photography system) and a WD-XRF instrument for chemical analysis. It houses comparative collections of over 10,000 archaeological samples and over 3,000 geological samples. For the needs of geophysical prospection it has a magnetometer and a resistivity meter. It also maintains a reference collection of animal bones and seeds with ample space for storing archaeological material, and is able to offer annually a bursary on bioarchaeology and a senior visiting fellowship. It is staffed by its Director (Dr Evangelia Kiriatzi), a senior research officer (Dr Noémi Müller), a full-time administrator, and a part-time thin-section technician. Currently the laboratory also hosts a research fellow and project-related research assistants. The Fitch plays a full part in the School's postgraduate teaching activities, currently staging an annual short course on ceramic petrology.

*Knossos* has been a highly productive centre of research for the British School at Athens since 1900, when Sir Arthur Evans and David Hogarth, then School Director, began systematic excavations there. It remains a powerhouse of research, both in the field and in the study of excavated material, under the aegis of the BSA. The *Knossos Research Centre* is focused upon the Stratigraphical Museum (a study centre and finds archive for all British fieldwork at Knossos since the time of Evans, and for several other School projects focused elsewhere in Crete) and has a self-catering hostel (the Taverna) and library, open year round.

Its Library has a good collection of books and off prints (especially about Crete), and full access to e-resources via AMBROSIA. The Library is also used by local researchers, members of the Archaeological Service, the University of Crete, and other institutions. The Taverna, which has 10 beds, serves principally as a base for those studying in the Stratigraphical Museum or the Herakleion Museum. Knossos is fully integrated into the School's IT network. There is a resident Curator (Dr Matthew Haysom) and a small domestic staff.

In addition, the School's administrative and academic staff (principally the Administrator, Mrs Tania Gerousi) makes use of the School's wide-ranging connections to help individual scholars with permit applications.

The research infrastructure is underpinned by the IT network, maintained by the IT Officer (Dr Jean-Sébastien Gros). His role includes both the integration of IT into research strategies and outcomes, and the development of web-based digital resources for researchers and the wider community.

### **Dissemination and Publication of Research**

The BSA maintains a policy of publishing the results of its own research, particularly in the fields of archaeology, epigraphy and history. The School's *Annual* (running since 1895 and now published by CUP) is devoted to publishing the work of the School, which comprises articles written by its officers and other members, the work of the Fitch, and preliminary reports on fieldwork. The School also compiles an annual account of archaeological fieldwork in Greece, *Archaeology in Greece*, which is published online ([chronique.efa.gr](http://chronique.efa.gr), in collaboration with the École française d'Athènes) and in a print digest in collaboration with the Society for the Promotion of Hellenic Studies as part of *Archaeological Reports*. Major research sponsored by the School is published in its two

publication series, *British School at Athens Studies in Greek Antiquity* (with CUP) and *British School at Athens Modern Greek and Byzantine Studies* (with Ashgate). In addition, it publishes an in-house series of *Supplementary Volumes* which are principally (but not exclusively) final reports on major archaeological fieldwork projects. The School recognises its role in conserving and facilitating access to the archives (in all media) produced by major excavations, surveys or other studies. To this end we are active in cataloguing and digitizing our archive, and in making it available via the School website.

## **THE DIRECTOR**

### **The post**

The post is full-time and residential. Subject to contract, the expectation is that in the normal course of events the Director would serve a term of at least five years.

The Directorship may be held on secondment from a UK University or similar institution.

### **Role and duties**

The role and principal duties of the Director are set out in the School's Statutes, as follows:

34. The Director is the principal executive officer and principal accounting officer of the School, and is in charge of the School in Greece. The Upper House shall be the Director's residence during his/her term of office. The Director may absent himself/herself from Greece for short periods for research or School business, and in addition is entitled to annual leave.

35. The Director reports to the Council.

36. The Director's duties and responsibilities shall be:

- i) to advise the Council and its delegated bodies on the strategy of the School, and to implement the strategy approved by the Council;
- ii) to recommend to the Council and its delegated bodies plans and policies, and to implement the plans and policies approved by the Council;
- iii) to advise the Hon. Treasurer on the budget and other financial matters, and to implement in Greece the budget approved by Council;
- iv) to represent the School in all its relations with the Greek State, Greek entities of public law, and third parties as appropriate; and to ensure that the School respects Greek law and regulation in its activities;
- v) to develop and foster the academic life of the School, and to maintain academic standards;
- vi) to report regularly to the Council on the School's activities, including the academic life of the School, the library, premises and finances, and all other matters affecting the interests of the School;
- vii) to appoint domestic staff in Greece and participate in the appointments made by Council;
- viii) to ensure and oversee the appraisal of all School staff;
- ix) to advise Council on appointments of Officers of the School; or to make such appointments when delegated the authority to do so by Council;
- x) to admit suitably qualified persons to the Library as Readers;
- xi) to conduct his or her own programme of research;

xii) to appoint when absent from Greece the Assistant Director, the Fitch Laboratory Director, the Knossos Curator or other person approved by the Chairman to be in charge of the School. When absent from Athens, yet within Greece, the Director may exercise his/her discretion to appoint one of these persons in that capacity.

xiii) such other duties as may be appropriate to further or represent the interests of the School, such as holding office in the Friends of the British School.

37. The Director as the principal executive officer and principal accounting officer of the School shall represent same in all its relations with the Greek State, Greek Entities of Public law, the Greek archaeological authorities and any third parties whatsoever. The Director is empowered, in his/her capacity as representative of the School, to purchase in its name and on its behalf immovables situated in Greece, to transfer such immovables to the Greek State as required by the appropriate legislation, and also to accept in the School's name and on its behalf the donation to same of any immovables situated in Greece. More specifically, to sign before any Greek Notary Public the Deed of Purchase or of Sale or the Deed of Acceptance of the Donation, as the case may be, under any terms and conditions documents, petitions, notices or declarations required for this purpose under Greek law, including affidavits foreseen by Laws 820/1978, 1249/1982, 1337/1983, 1599/1986 and by articles 72 of Law 129/1989. To make any declarations, admissions, recognitions and waivers, involving the loss of rights and the undertaking of obligations including the waiver of all rights and actions at law to dispute, dissolve or annul the Deed of Purchase or the Deed of Donation and to waive all rights and actions arising from articles 178, 179 and 388 of the Greek Civil Code. To do and execute any other acts required in order to fulfil the above mandates. To appoint other attorneys or representatives with the same or lesser powers and to revoke same. Among other duties is that of acting as Co-Editor of the School's *Annual*, overseeing the production of data and its incorporation within *Archaeology in Greece Online* and (in consultation with the Editor) "Archaeology in Greece" in *Archaeological Reports*, and acting as series editor for *BSA Studies in Greek Antiquity* and *BSA Modern Greek and Byzantine Studies*. Council appoints a number of committees, on some of which the Director serves *ex officio*, with oversight of all major areas of the School's activities, including responsibility for management of the School's financial and other assets and for ensuring compliance with UK legislation and similar requirements. The Director maintains close contact with the Chair of Council over day-to-day affairs in Athens.

### **Qualifications**

The Director will have a record of distinction and achievement in research and publication in any of the disciplines covered by the School's remit; experience of management and a familiarity with strategic planning in an academic or similar institution, and knowledge of the UK Higher Education sector; a strong track record in raising external funding; an ability to engage with people at all levels; experience of Greece, and a good working knowledge of the Greek language or a plan for acquiring this level of command before taking up post.

### **Hours of Work**

The appointment is full time. There are no conditions relating to hours and times of work, but it is expected that such hours and days will be worked as are reasonably necessary for the proper performance of the duties attached to the Directorship. Times of work should be agreed between the Director and the Chairman of Council.

### **Outside Work**

Paid or unpaid work outside the BSA should not be undertaken without obtaining the permission of the School's Council.

### **Annual Leave**

The Director is entitled to 30 working days of paid holiday in each complete year of employment by the School. In addition, there is an entitlement to Greek public holidays. Unused holiday entitlement may not be carried forward from one year to another. The holiday year is the twelve months ending 30 September. Pay in lieu of unused holiday is not available.

### **Sabbatical Study Leave with Pay**

The Director will not normally be entitled to sabbatical study leave during the period of tenure.

### **Performance Appraisal**

A performance appraisal discussion will be conducted annually with the Chairman of the School (or, in his or her absence, any appropriate senior academic Council member that the Council of the School may appoint). This discussion will encompass a review of the previous year's achievements and challenges (based on a short written submission by the Director) and will aim to define broad objectives for the medium term. Upon completion of the review, and the agreement of its outcome by both parties, a recommendation will be made to Council with regard to any change in grading of the Director. After Council has approved such a recommendation, then if the position of Director is held on secondment, the Chairman will inform the UK employer of the Council's decision.

### **Salary**

Salary will be at an appropriate point (to be negotiated) within the range of UK non-clinical professorial salaries, and will be subject to Greek income tax. The Director will be remunerated directly by the School. A Director seconded by a home institution will remain employed by that home institution. If that institution were a UK university which wished to include the Director's research publications in any future REF exercise (or similar initiative) that is initiated after tenure of the position has begun, the BSA would be prepared to discuss the financial terms under which this could take place with the institution at the appropriate time.

### **Pension**

If the Director is a member of USS, continuation in membership of this pension scheme is possible. If not, the BSA will offer a range of alternative options for pension provision, depending on individual circumstances.

### **Allowances and Benefits**

The School shall pay for the following allowances and benefits:

- Medical insurance (BUPA Classic Scheme or similar) for the Director and family members living with the Director in Athens.
- Air fares (to and from the UK) for the Director and such family members, once annually for leave and to and from Greece at the beginning and end of contract.
- Property and contents insurance at the Upper House.
- An entertainment allowance of £1250 per annum. In addition the School shall pay the cost of parties held for School purposes at the Upper House.

- Removal expenses incurred at the start and finish of the contract, quotations for which should be agreed in advance with the Hon. Treasurer and for which receipts should be provided.
- The cost of mobile telephone calls on School business.

### **Health Assessment**

The appointment will be conditional upon a health assessment. At any time during the period of tenure, the School may request that the Director be the subject of a further health assessment by a medical practitioner nominated by the School, the results of which may be disclosed to the School.

The School shall administer any notification and certification of illness or injury to the Director's home institution if any on his or her behalf in the event that the Director is unable to do so.

### **APPLICATION PROCEDURE**

Applications including a curriculum vitae, a statement of the candidate's qualifications and experience relevant to the post and their vision for the BSA, together with the names and email addresses of three referees, should be sent by email by **Friday 19 September 2014** to [school.administrator@bsa.ac.uk](mailto:school.administrator@bsa.ac.uk), for the attention of The Chair of the Search Committee, British School at Athens.

Referees should be asked to write **directly** to the Administrator to reach the School by the closing date. Interviews will take place in London on **Thursday 23 October 2014**.

All data supplied by applicants will be used only for the purposes of determining their suitability for the post and will be held in accordance with the principles of the Data Protection Act 1998.

The British School at Athens is an employer committed to equal opportunities.

---

## *INTERNET SITES*

### **ARCHEORIENT-LE BLOG**

ArcheOrient–Le Blog (<http://archeorient.hypotheses.org/>) is run by members of the Archéorient research unit (<http://www.archeorient.mom.fr/>), which depends on the French National Center of Scientific Research (CNRS - UMR 5133) and Lyon 2 University.

It is based at the Maison de l’Orient et de la Méditerranée in Lyon.

It aims to promote scientific exchanges and give greater visibility to the work of advanced students and scholars in the field of environmental and social archaeology of the Middle East, the Caucasus and the Eastern Mediterranean.

Posts are published weekly all year round except in August. To submit a post please send texts up to 10000 characters in English or French to [archeorient.blog@mom.fr](mailto:archeorient.blog@mom.fr) (texts in doc or rtf format, a few illustrations with captions, no footnotes, bibliographical references in Harvard system, 5-10 keywords).

\*\*\*\*\*

Archéorient (UMR 5133 du CNRS)  
Maison de l’Orient et de la Méditerranée 7, rue Raulin  
69365 Lyon cedex 7  
04 72 71 58 43

\*\*\*\*\*

---

---

## **NANOTECHNOLOGY & CHEMICAL GELS** **APPLIED TO PAPER RESTORATION**

The restoration department of books and documents of the *Instituto del Patrimonio Cultural de España* ([IPCE](#)) is studying nanoparticles and chemical gels in the context of a vast European research project ([Nano for Art](#)) which has a trajectory of three years. This investigation seems to open the door to much more effective future working methods, easier and safer. And at last newest technology is applied to paper restoration, and not only painting or sculpture (with all my love for these two!). The greater porosity of cellulose and graphic supports in general (compared to stone or painting layers) shows the different needs of our discipline, which may not always benefit from technological advances on paintings and sculptures. At the documents and books department of IPCE they study these specificities to implement them on documentary heritage.

### **Nanotechnology**

Nanoparticles are those of [nano](#) magnitude ( $10^{-9}$ ) i.e. sooooooo very small particles. The same mass of any “nano” product has globally greater surface than the same amount of the regular product, in which particles are larger but less numerous. This makes nanoparticles more reactive, as there is more contact surface and fewer unreacted product. Then with fewer amount, we get the same effect that could be obtained with the same product with higher scale particles. In practice, and greatly simplifying the talk that gave us Emma Sanchez at the Institute, the main advantages of nanoparticles are: An equivalent concentration of the same chemical (calcium hydroxide, for example) penetrates much more easily among the paper fibres so that the chemical not only interacts more homogeneous and thorough with them, but lowers the probability of creating whitish areas on the paper surface, or may just not take place at all. And that is especially interesting in its application to deacidification, which often blurs the intensity of black or brown inks. But, above all, because the further the product penetrates into the document, the more complete is the deacidifying effect. When the particle diameter is smaller, it fits in narrower spaces among the fibre weft and so its effect is deeper throughout the paper.

I am struck by a solution of calcium hydroxide in water that rather than staying in the bottom of the bottle as a sediment, remains permanently as a homogeneous aqueous dispersion, never precipitating. Emma also tells us how this research has opened her eyes about the deacidification process, as we usually apply it without much variations, but there are really lots of variables that should be considered: the natural recess suffered by the initial pH increase after a few days, the thickness and type of paper, among many others.

### **Chemical semi-interpenetrated (IPN) hydrogels**

If the benefits of nanotechnology have immediately convinced me, the promising chances of chemical gels leave me speechless: I want to apply them NOW! When will we be able to buy them, Emma? That will still take a long way... she says, but studies are certainly very promising. Physical gels are formed by a thickener (agar, Klucel, Carbopol, Methylcellulose... the ones we know) and a vehicle (water or any other solvent, or mixture of them). The grid is formed by monomers or polymers linked to the vehicle by weak bonds.

- Physical gel = Thickener + vehicle (weak bonds)
- Chemical gel = Semi-interpenetrated grid (covalent bonds)

Chemical gels differ from physical on the bonding, which is covalent type. Covalent bonds are much stronger than the hydrogen ones. They are not faded by pH or temperature changes nor other conditioning to which physical gels are subjected. “Interpenetrated” because there are two independent polymer reticulum (hence semi) but intertwined. One is formed by the vehicle (same as physical gels), and the second one is synthesized by the solvent in presence of the first. And what does this mean? First of all that we can work with them in a wide variety of conditions, but, the most interesting to me is that it doesn’t wet. Water retained (when this is the vehicle, that could be other: ethanol, acetone, isooctane...) does not escape from the mesh of the gel: stays there. The concentration is stable because of the strong covalent bonding, and does not migrate to the support in which it is applied. Can you imagine? At last real possibility to apply a gel on a gouache, parchment manuscript or even an illuminated capital letter? Possibilities are endless! Because, let’s be honest, doing this with physical gels carries important risks, as part of the vehicle can wet the support, even when working extremely carefully. But that isn’t so with chemical hydrogels: they moisturize the substrate such that the hydrophilic dirt migrates to the gel, but without thereby creating damp stains, since the vehicle is always retained in the gel. The example they show us on a parchment is clearly effective, because the action of the gel does not exceed an inch on the area in which it was applied.

We can give it the exact desired shape with absolute certainty that it will only act there. Just as humectant method it is already extremely useful: A wrinkled parchment has been completely hydrated remaining dry to touch. And let’s not limit to water: I’m dying to apply it in scotch tapes and greasy stains without all the trappings... Hopefully the project continues delving into the paper section and soon we will be able to use them!

Please visit the site: <http://ritaudina.com/en/2014/06/24/nanotechnology-chemical-gels-applied-to-paper-restoration/>

---



## ***ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS***

# **THE DOMESTICATION OF EQUIDAE IN THIRD-MILLENNIUM BCE MESOPOTAMIA, BY JURIS ZARINS**

CDL Press is pleased to announce the availability of Cornell University Studies in Assyriology and Sumerology, vol. 24 David I. Owen, Editor-in-chief

The Domestication of Equidae in Third-Millennium BCE Mesopotamia by Juris Zarins  
Pp. xi + 432. ISBN 978-1934309-513 Price \$90

To order: [www.cdlpress.com](http://www.cdlpress.com); email: [cdlpress@erols.com](mailto:cdlpress@erols.com); fax:2534845542  
mail: POB 34454 Bethesda MD 20827

It has been forty years since the first edition of this book, as an Oriental Institute doctoral dissertation, was completed. Now, in a fully revised and much expanded study, CUSAS 24 presents a comprehensive discussion of the philological, historical, and archaeological evidence for the range of equidae known now from much of Western Asia after a century of intense study and excavation. It provides a unique perspective from the viewpoint of a field archaeologist on the complex issues associated with the physical study of the remains of equidae and their associated terminology in cuneiform sources. The author has integrated diverse and recently excavated data, which reflect a wide geographical and chronological range, with cuneiform sources to create a synthesis that will serve as a basis for all future research on the subject. The volume includes numerous illustrations, photos, and charts that enhance the presentation of the data. The volume will be of interest to archaeologists, anthropologists, Assyriologists and to all those interested in the role of equidae in the early history of Mesopotamia and Western Asia.

### **TOC**

|                                                                                    |     |
|------------------------------------------------------------------------------------|-----|
| I. The Paleozoological Evidence for Equidae in Mesopotamia and Southwest Asia .... | 11  |
| 1.0 New Data .....                                                                 | 11  |
| 1.1 Introduction .....                                                             | 11  |
| 1.2 The Relationship of Humans to Equidae in the Wild .....                        | 13  |
| 1.3 Criteria for Skeletal Identification .....                                     | 17  |
| 1.4 Early Holocene Distribution of Equidae in Southwest Asia .....                 | 32  |
| 1.5 Identification of Domestic Equidae Based on Skeletal Evidence .....            | 41  |
| 1.6 The Case for Domesticated Equidae in Southwest Asia and Mesopotamia .....      | 47  |
| 1.7 Domesticated Equidae in Northeast Africa .....                                 | 75  |
| 1.8 <i>Equus caballus</i> .....                                                    | 83  |
| 1.9 Hybrids                                                                        |     |
| II. Artistic Representations of Equidae in Mesopotamia and Southwest Asia .....    | 93  |
| 2.1 Introduction .....                                                             | 97  |
| 2.2 Equid Representations Prior to the Late Uruk Period .....                      | 97  |
| 2.3 Artistic Material from the Late Uruk and Jemdet Nasr Periods .....             | 105 |

|                                                                                                                  |     |
|------------------------------------------------------------------------------------------------------------------|-----|
| 2.4 Artistic Material from Pre-Dynastic and Early Dynastic Egypt and the Levant ...                              | 108 |
| 2.5 Artistic Material from the ED I–II Periods .....                                                             | 111 |
| 2.6 Artistic Material from the ED III Period .....                                                               | 121 |
| 2.7 Artistic Material from the OAk Period .....                                                                  | 141 |
| 2.8 Artistic Material from the Ur III Period .....                                                               | 144 |
| 2.9 Early Second Millennium BCE Artistic Pieces .....                                                            | 147 |
| 2.10 A Concluding Remark                                                                                         |     |
| <br>                                                                                                             |     |
| III. The Cuneiform Evidence for Domesticated Equidae in Mesopotamia Primarily from<br>the Third Millennium ..... | 149 |
| 3.0 The Cuneiform Record .....                                                                                   | 149 |
| 3.1 Introduction .....                                                                                           | 149 |
| 3.2 General Problems of Translation .....                                                                        | 150 |
| 3.3 Basic Cuneiform Equid Signs .....                                                                            | 151 |
| 3.4 The Equid Sign in the Lexical Sources .....                                                                  | 157 |
| 3.5 Suggested Meanings .....                                                                                     | 159 |
| 3.6 Definition of the Equid Species Encountered in the Third-Millennium BCE Texts                                | 161 |
| 3.7 Classification of Mesopotamian Equids in the Third Millennium BCE .....                                      | 176 |
| 3.8 Employment of Equids in Mesopotamia in the Third Millennium BCE .....                                        | 188 |
| 3.9 Equid Products Utilized in the Third Millennium BCE in Mesopotamia .....                                     | 220 |
| 3.10 Mesopotamian Feeding Practices of Equidae in the Third Millennium BCE .....                                 | 222 |
| 3.11 Personnel Directly Associated with Equids in the Third Millennium BCE .....                                 | 230 |
| 3.12 Population Estimates of Equids for Selected Units and Periods                                               |     |
| <br>                                                                                                             |     |
| Appendix: Selected Cuneiform Texts .....                                                                         | 259 |
| I. Late Uruk Texts .....                                                                                         | 259 |
| II. Jemdet Nasr-Period Texts .....                                                                               | 260 |
| III. Early Dynastic IIIA Period Texts .....                                                                      | 262 |
| IV. Old Akkadian Period Texts .....                                                                              | 271 |
| V. Ur III Texts .....                                                                                            | 279 |
| VI. Isin-Larsa and Old Babylonian Texts                                                                          |     |

---

# **HISTORY OF THE ANCIENT NEAR EAST / MONOGRAPHS XIV PALEONUTRITION AND FOOD PRACTICES IN THE ANCIENT NEAR EAST. TOWARDS A MULTIDISCIPLINARY APPROACH**

Edited by Lucio Milano in cooperation with Francesca Bertoldi Published by: ©  
S.A.R.G.O.N. Editrice e Libreria, Via Induno 18b, I-35134 Padova

Distributed by:

Casalini Libri S.p.A., Via Faentina 169/15, I-50010 Caldine (FI)

(Italy) [www.casalini.it](http://www.casalini.it)

Arbor Sapientiae s.r.l., via Bernardo Barbiellini Amidei 80, I-00168 Roma (Italy)

[www.arborsapientiae.com](http://www.arborsapientiae.com) Eisenbrauns, POB 275, Winona Lake, IN 46590-0275 (USA)

<https://www.eisenbrauns.com> iv + 437 pages, 249 B&W figs.

Euros 70,00

\*\*\*\*\*

## **Table of Contents**

Lucio Milano, Introduction

Approaching Food from a Bio-archaeological Perspective

George Willcox, Food in the Early Neolithic of the Near East  
Theya Molleson, Craftsmen for Food Production: The Human Bone Evidence for Methods of Food Processing at Abu Hureyra  
Michael Schultz, Thiede H. Schmidt-Schultz, The Role of Deficiency Diseases in Infancy and Childhood of Bronze Age Populations  
Holger Schutkowski, Michael P. Richards, Diet and Subsistence during the Middle Bronze Age at Sidon, Lebanon. First Isotopic Evidence of Coastal Levantine Food Ways  
Arkadiusz Soltysiak, Frequency of Dental Caries as A Proxy Indicator of Mobility: The Case of the Khabur Basin Human Populations

## **Case Studies**

Mersin-Yumuktepe

Isabella Caneva, Food as Material Culture at Prehistoric Mersin  
Girolamo Fiorentino, Milena Primavera, Valentina Caracuta, Archaeobotanical Analysis at Mersin-Yumuktepe: Food Habits from Neolithic to Medieval Period  
Claudia Minniti, The Role of Animals in the Economy of South-Eastern Anatolia: Food and Commensalism at Mersin-Yumuktepe (Turkey)  
Gianni Siracusano, Subsistence Economy in Southern Anatolia and in the Upper Euphrates Region

Tell Beydar / Nabada

Elena Rova, Tannurs, Tannur Concentrations and Centralised Bread Production at Tell Beydar and Elsewhere: An Overview  
Luca Marigliano, Plastered Basins for Food

Processing? Some Examples from Upper Mesopotamia for A Basic Typology and Functional Interpretation Bea De Cupere, Consumption Refuse, Carcasses and Ritual Deposits at Tell Beydar (Northeastern Syria) Francesca Bertoldi, Emiliano Carnieri, Fulvio Bartoli, Lucio Milano, Paleonutritional Evidence from Tell Beydar: The Human Sample and the Historical Sources

Tell Mishrife / Qatna

Daniele Morandi Bonacossi, Early Bronze Age Crops and Storage Techniques at Mishrifeh, Central-Western Syria Alessandro Canci, Fulvio Bartoli, Teeth, Bones and Diet in Human Remains from Qatna

Food for Travelling: Investigating Travel Provisions in the Ancient Near East

Gebhard Selz, Feeding the Travellers: On Early Dynastic Travel, Travel Networks and Travel Provisions in the Frame of Third Millennium Mesopotamia Lucio Milano, Eating on the Road: Travel Provisions in the Ebla Archives Francesco Pomponio, L'alimentazione dei "messaggeri" in periodo neo-sumerico Cécile Michel, Se restaurer en voyage en haute Mésopotamie et Anatolie au début du IIe millénaire av. J.-C. Paola Corò, Food for the Humans and Food for the Gods: : šidit ilānī and šidītu

Food Economy, Technology and Symbolism

Hagan Brunke, On the Role of Fruit and Vegetables as Food in the Ur III Period

Bianca Maria Zonta, Food and Death at the Ur Royal Cemetery

Nicoletta Bellotto, Names Indicating Bread in the Ritual Texts from Emar

Simonetta Ponchia, Management of Food Resources in the Neo-Assyrian Empire: Data and Problems

Frederick Mario Fales, Monica Rigo, Everyday Life and Food Practices in Assyrian Military Encampments

## **INTERNATIONAL JOURNAL OF NAUTICAL ARCHAEOLOGY**

Among the articles are:

The Conception of Hull Shape by Shell-builders in the Ancient Mediterranean Juan-Pablo Olaberria

A Needle Assemblage from a Roman Shipwreck off the Israeli Coast Baruch Rosen and Ehud Galili

A Late Roman Quay in the River Meuse near Cuijk, Netherlands P. A. Seinen and J. A. van den Besselaar

A New Type of Construction Evidenced by Ship 17 of Thonis-Heracleion Alexander Belov

Morgawr: an experimental Bronze Age-type sewn-plank craft based on the Ferriby boats Robert Van de Noort, Brian Cumby, Lucy Blue, Anthony Harding, Linda Hurcombe, Tom Monrad Hansen, Andy Wetherelt, Jenny Wittamore and Andy Wyke

**Please visit the site:**

<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291095-9270/earlyview?campaign=wolearlyview> [Go there for abstracts and purchasable access]

---

## **MATERIA MAGICA: THE ARCHAEOLOGY OF MAGIC IN ROMAN EGYPT, CYPRUS, AND SPAIN. NEW TEXTS FROM ANCIENT CULTURES ANDREW T. WILBURN**

Ann Arbor: University of Michigan Press, 2012. Pp. xvi, 342; 18 p. of plates. ISBN 9780472117796. \$80.00.

Reviewed by Pauline Ripat, University of Winnipeg ([p.ripat@uwinnipeg.ca](mailto:p.ripat@uwinnipeg.ca))

Literary descriptions of witches' activities and the recipes contained within handbooks such as the Greek Magical Papyri (PGM) suggest that in the ancient mind, undertaking magic required the right "stuff", the right place, and the right time, in addition to the right words and actions. This is ubiquitously recognized in modern scholarship.

However, in the pursuit of practices that might be termed "magic", words (and to a lesser extent, actions) have garnered more interest than the physical constellations that were surely also of supreme importance to the ancient practitioner. Modern interest in the diagnostic potential of formulas has furthermore encouraged consideration of evidence within a panhellenic or empire-wide framework.<sup>1</sup> In contrast, Wilburn's work (which is based on his dissertation) seeks to put the material aspects at center stage in order to illuminate ancient magical practice as it was undertaken on a local level. The book is divided into six chapters that are followed by two appendices and 25 plates (photographs, maps, and site plans).

At its core are three case studies of materials from three locations: Karanis in Egypt, Amathous in Cyprus, and Empúries in Spain.

The book opens with an anecdotal introduction describing the value of the archaeological context for the interpretation of one of the so-called "Sethian" curse tablets from Rome. Wilburn then proceeds to lay out his formal methodology in two chapters ("Finding Magic in the Archaeological Record" and "Materia Magica"). Looking for archaeological evidence of magic requires a clear sense of what one is looking for. Unlike investigations of magic in text and literature, the characteristics of magic here must be identifiable in the physical record. Wilburn provides a working definition of "magic" that he notes is not intended to be universal (pp. 15-16): (1) "magic" involves ritual including objects, action, and words; (2) it may borrow from religious tradition; (3) it is undertaken for private or personal reasons although possibly within a public context. Discussion turns to the usefulness and limits of textual comparanda. The ubiquity of magic in literature is not reflected in the physical record, perhaps because of preference for materials prone to decomposition and the desirability of secrecy, and instructions in handbooks and rituals undertaken in fact do not mirror each other precisely. Focus on the physical record allows for unique and enlightening emphasis to fall upon critical moments in an object's "biography", particularly the point when it may have been purposefully and ritually removed from further use, and the context of discovery (e.g., mortuary) is a critical consideration in the identification of purposeful deposition.

From here, Wilburn, guided by literary evidence and magical recipes, provides exhaustive discussion of the specific kinds of artifacts whose nature identify them as "potentially magical" (p. 55) when discovered in significant contexts: objects inscribed

with significant words or symbols; images or figurines; organic matter including body parts; and household objects, such as pins, that could figure in magical ritual.

With the framework established, Wilburn proceeds to his three case studies, each in its own chapter. Chapter Three (“Identifying the Remains of Magic in the Village of Karanis”), along with its two associated appendices, mainly considers two previously published individual artifacts (a papyrus amulet against fever and an ostrakon that appears to contain part of a recipe for a magical spell),<sup>2</sup> an assemblage comprising a doll and three hairpins found beneath the floor of a house (the focus of a previous article by Wilburn),<sup>3</sup> and one previously unpublished, sizable group of 84 bones (animal, save 3 human skull bones) painted with squiggles, stripes, or dots. Wilburn describes the physical nature and findspots of each, and assesses them in the light of recipes from the PGM. He concludes that the amulet provides more evidence for Christians at Karanis in the fourth century CE; the ostrakon represents a magical attempt to invoke the protective powers of Horus over grain storage; the sub-floor assemblage is the remains of an erotic spell; and the bones may point to divinatory practice, malevolent magic, or protective rites for domesticated animals. Consideration of the possible social identities of the creators and manipulators of the artifacts under discussion finishes off the chapter.

The next chapter (“Practitioners and Craft and Amathous, Cyprus”) turns to a cache of over 200 tablets of lead and 30 of selenite, each inscribed with a curse, found in a deep shaft beneath a layer of human bones in the ancient town of Amathous. Of these, only 16 of the lead tablets and six of the selenite have been published, but Wilburn, depending upon the authority of David Jordan (p. 187 with references), suggests that these are likely to be formulaically representative of the remainder. The published tablets indicate that in the main, only three different formulas were used, albeit by a number of different hands. A number of discussions and conclusions fan off from these observations. After detailing the stratigraphy of the shaft and textual contents and peculiarities of the published tablets, Wilburn suggests that these tablets fit most comfortably into Hendrik Versnel’s “border area” between binding spell and prayer for justice; they perhaps reflect the presence of a collective of ritual specialists focused on a temple or shrine that served the personal religious needs of the local population; and two tablets, DT 25 and 26, cursing a man named Theodoros who has been interpreted since the tablets’ first publication to be the provincial governor, point to resistance against Roman authority.

Attention turns to Hispania Citerior for the final case study (“Three Curses from Empúries and Their Social Implications”). Wilburn considers three previously published, first century CE curse tablets that were discovered with human remains in three separate cinerary urns (cremations 21, 22, and 23) within the same enclosure at the Ballesta necropolis.<sup>4</sup> He argues that the tablets were deposited at the same time as the remains, a practice that was perhaps not the norm, but which was not unheard of elsewhere. The tablets themselves target members of the Roman administration, possibly stemming from redistribution of land (pp. 237-238), and “should be viewed as resistance to imperial control” (p. 246). The likelihood that their deposition was relatively public may point to feelings of justified indignation on the part of their creators and perhaps also that a certain degree of communal knowledge was the motor that made magic “work”.

The final chapter (“The Archaeology of Magic”) reiterates the problems encountered when looking for evidence of magical practice in the physical record. These range from the difficulty of escaping Malinowski’s “coefficient of weirdness” as an identifying

feature, despite the recognition that “weirdness” is culturally specific, to the lack of sound record-keeping habits until relatively recently. It recaps recurrent themes such as the nature of “private” when it comes to magical acts, the possible identity of ritual specialists, and the role that texts might have played in the transformation of local heterogeneity of practice to widespread homogeneity in the second century CE.

Wilburn’s research is admirably comprehensive, but his argument is not always tight. Most problematic is not his definition of “magic” (although individual readers may disagree with it), but rather its lack of clear deployment in the process of detection. Wilburn’s aim is not to interrogate the validity of the category of “magic”, nor does he attempt to; his aim is instead to discuss its manifestations.

However, the identification of an object as the residue of magical ritual is less often based on the explicit invocation of the three criteria Wilburn has set himself in Chapter One than on similarities offered by textual evidence that is itself generally accepted to be “magical” (see especially pp. 169-170, where Wilburn doubts that his three criteria are sufficient and dependence upon text is therefore necessary).<sup>5</sup> Indeed, despite frequent assertions of the potential of material remains to illuminate understanding of ritual and social setting, the physical context, although described meticulously, frequently yields to textual comparanda, even to the point that the treatment of material context can sometimes seem selective. For example, the beads and two ostraka (p. 132) discovered alongside the doll and pins that form a focus of Chapter Three receive remarkably little attention – perhaps because they, unlike the doll and the pins, do not present easy comparisons with magical recipes. Therefore, when Wilburn asserts that “[t]he study of local forms of magic in antiquity must struggle constantly with the tension between our expectations of what magic should look like and the reality of magical practice in a specific community or village, which could be vastly different” (p. 256), the statement seems unwittingly self-censuring, despite his splendidly detailed discussion of the differences between text and hard evidence. The result for the reader is that the theoretical structure of his discussion can strike as elusive or internally contradictory, and his findings are somewhat less revelatory than might have been hoped, or less disruptive to established lines of thinking than might have been expected.

At the same time, there is much to appreciate about Wilburn’s work.

Questions he raises, for example, about the relationship of curse tablet deposition to funerary ritual over time and in different places are interesting and speak to the potential that studies of local ritual practice have to expand our understanding of obligation and power relations within the family and community. The employment of physical and textual evidence to attempt to investigate the identity of ritual specialists is suggestive. Wilburn’s knowledge of scholarship bearing on the objects he treats is extensive and well documented, and he provides an excellent resource for anyone interested not only in the particular objects he discusses but in the kinds of objects he discusses. At the same time, he adopts some points of cultural comparison (for example, evidence of “conjure” in North America, p. 36) that are refreshingly novel in current scholarship. It of course goes without saying that the publication of the bones from Karanis, complete with several plates of images, is very valuable. For all of these reasons, this book is a useful addition to the current complement of scholarship on the perpetually contested subject of “magic”.

---

**Notes:**



1. E.g. H. S. Versnel (2010) “Prayers for Justice East and West: New Finds and Publications since 1990.” In *Magical Practice in the Latin West*. Edited by R. Gordon and F. Marco Simón. Leiden and Boston: Brill, 275-354. For encouragement to consider the local, see R. Gordon and F. Marco Simón (2010) “Introduction.” In *Magical Practice in the Latin West*. Edited by R. Gordon and F. Marco Simón. Leiden and Boston: Brill, 29.
2. Fever amulet: W. Brashear *P.Mich.* XVIII 768; ostracon: H.C. Youtie (1976) “Ostraca from Karanis.” *ZPE* 16: 274.
3. A. T. Wilburn (2007) “Excavating Love Magic and Roman Karanis.” In *New Archaeological and Papyrological Researches on the Fayyum*. Edited by M. Capasso and P. Davoli. Galatina (Lecce): Congedo, 355-70.
4. Recently also treated by F. Marco Simón (2010) “Execrating the Roman Power: Three defixiones from Emporiae (Ampurias).” In *Magical Practice in the Latin West*. Edited by R. Gordon and F. Marco Simón. Leiden and Boston: Brill, 399-423.
5. See J. Webster (2008) “Less Beloved. Roman Archaeology, Slavery, and the Failure to Compare.” *Archaeological Dialogues* 15.2:103-23 for an interesting discussion of the relationship between artifact and text and for methodological contrast.

Please visit the site: <http://bmcr.brynmawr.edu/2014/2014-06-36.html>

---

**REVISED ESTIMATES FOR THE VOLUME**  
**OF THE LATE BRONZE AGE MINOAN**  
**ERUPTION, SANTORINI, GREECE, JOURNAL**  
**OF THE GEOLOGICAL SOCIETY; VOL. 171,**  
**NO. 4, 2014**

The attached abstract is exciting news, from a paper just published (Journal of the Geological Society; Vol. 171, No. 4, 2014). Most of us who have studied the LBA eruption have acknowledged this, but lacked the data to substantiate it. New geophysical mapping of the caldera by the University of Athens and the Hellenic Center of Marine Research provided the data needed (we made the same claim some years ago at a Chapman Conference of the Am. Geophysical Union, but lacked that data to substantiate our claim). These authors used that data, combined with additional factors from mapping on Thera, to recalculate the explosivity of the LBA event. DRE is a technique to calculate the volume of tephra ejecta that corrects for void volumes of vesicles in pyroclastic particles, which enters into the calculation if a simple ejecta volume is calculated. Volcanologists rank eruptions on their ejecta volume as a proxy for eruption explosivity.

Revised estimates for the volume of the Late Bronze Age Minoan eruption, Santorini, Greece

E. N. Johnston<sup>1,\*</sup>, R. S. J. Sparks<sup>1</sup>, J. C. Phillips<sup>1</sup> and S. Carey<sup>2</sup>

. <sup>1</sup>School of Earth Sciences, University of Bristol, Queens Road, Bristol BS8 1RJ, UK

. <sup>2</sup>Graduate School of Oceanography, University of Rhode Island, Narragansett, RI, 02882, USA

. ↵\* (e-mail: [glxej@bristol.ac.uk](mailto:glxej@bristol.ac.uk))

. Scientific editing by Tyrone Rooney.

**Abstract**

The Late Bronze Age ‘Minoan’ eruption of Santorini, Greece occurred from within an existing caldera. Low-temperature pyroclastic flow emplacement on shallow slopes outside the caldera can only be consistent with the caldera being filled with eruption products that are not preserved. Field observations and seismic reflection surveys suggest that this missing material has been downfaulted. The volume of the caldera infill is estimated as 18–26 km<sup>3</sup> dense rock equivalent (DRE), increasing the total of the Minoan eruption deposits to 78–86 km<sup>3</sup> DRE and making it the largest known Holocene eruption. This study highlights a general mechanism whereby caldera eruption volumes could be significantly underestimated.

\*\*\*\*\*

Floyd W. McCoy

Professor in Geology, Geophysics & Oceanography

University of Hawaii - Windward

Graduate Faculty, Geology & Geophysics

University of Hawaii - Manoa

<http://www.wcc.hawaii.edu/facstaff/mccoys-f>

\*\*\*\*\*



## **EΙΔΗΣΕΙΣ - NEWS RELEASE**

# **THE RECENTLY DISCOVERED TEMPLE OF PTOLEMY II IN BENI SWEIF IS SET TO REWRITE THE ANCIENT HISTORY OF THE AREA, BY NEVINE EL-AREF**

Late last week, Egyptian excavators working at the Gabal Al-Nour archaeological site in Beni Sweif stumbled upon what is believed to be the first ever temple to be found dating from the reign of the Pharaoh Ptolemy II (282-246 BC).

The temple is a two-storey building made of sandstone 25 metres in height and 16.5 metres wide. The excavators have unearthed the temple's first floor and part of the ground floor, the rest being still buried in sand.

Mansour Breik, head of the Central Administration of Middle Egypt Antiquities, told Al-Ahram Weekly that only two metres of the temple had been unearthed but that it was in a very good state of preservation. The temple's ground floor consisted of several rooms that had not yet been excavated, he said.

The eastern wall of the temple had been revealed, showing it to be decorated with engravings featuring Ptolemy II wearing a white crown and presenting offerings to the goddess Isis who was worshipped in the temple with the Nile god Hapy.

A collection of sandstone blocks engraved with Ptolemy II's cartouche has also been found, along with clay pots and a large limestone head of a cobra. Breik said that he expected the excavations would soon lead to the western wall of the temple, which may be engraved with the provinces of Lower and Upper Egypt.

"It is a very important discovery that could rewrite the ancient history of Beni Sweif and that of Ptolemy II's reign. We know little about this although he ruled Egypt for 32 years," Breik told the Weekly.

He said that the newly discovered temple was the first ever monument from the reign of Ptolemy II to be found in Beni Sweif. The 20 architectural monuments from his reign that have been found are spread across different provinces, such as Fayoum, Dendara and Kom Ombo, but never Beni Sweif. Most of these monuments consist of rooms and a portico but never a complete temple.

"This temple is the first to be uncovered from the reign of Ptolemy II," Breik said, adding that early studies carried out on the hieroglyphic texts engraved on the wall of the temple had revealed that it was dedicated to Isis, also known as the "Lady of Mora".

This meant that the ancient city of Mora could be the same as the modern one of Beni Sweif, he said. The city had been important during the reign of Ptolemy II because Isis was an important deity in the Ptolemaic era. Mora had emerged as an urban centre during this period, having never been mentioned in the ancient Egyptian period.

The temple seems to have been reused or transformed into a basilica during the Byzantine era, said Breik, adding that Byzantine mud bricks had been found in different parts of the temple.

Breik said that the one-feddan area of Gabal Al-Nour where the temple is located was an important archaeological site but that it had not previously had any monuments. The site had been excavated during the 1980s, he said, and a collection of Ptolemaic coffins found there were now exhibited at the Beni Sweif Museum.

No further excavations had been carried out until a month ago, when the ministry of antiquities started a survey of the site. The temple was then uncovered, and it is the first and only exposed monument to be found at the site.

Breik said that other structures could be uncovered soon. A Google Earth survey had revealed the existence of a road connecting the temple to the Nile, for example. He added that the discovery of the temple would add another tourist attraction to Beni Sweif, in addition to the Wadi Sannur Cave. This was created by groundwater percolating through the Eocene limestone of the Galala Plateau and contains important geological formations. The Cave covers some 700 m, and is 15m high. It is important for researchers conducting comparative studies of ancient environmental conditions.

When water penetrates downwards, excess calcium carbonate is deposited on the roof and floor of the Cave forming spectacular stalactites and stalagmites of various forms. When light is shown on them they glitter.

Minister of Antiquities Mohamed Ibrahim said that the temple could have been built on the remains of an ancient Egyptian temple as the goddess Isis was an ancient Egyptian deity whose divinity lasted into the Ptolemaic era.

He said that funds would be provided for the mission to continue its work at the site.

**Please visit the site: <http://weekly.ahram.org.eg/News/6316/47/Ptolemy-in-Beni-Sweif.aspx>**

## **OBJECTS FROM TUTANKHAMUN'S WAR CHARIOTS TO BE RESTORED**

The tomb of Tutankhamun was discovered by Howard Carter in 1922, but even now some of the amazing treasures it held are unknown to most of us. Decorated gold leaf-on-leather objects forms one such group which is currently undergoing restoration by an Egyptian-German team at the Egyptian Museum in Cairo.

The objects, which have never been adequately studied, were part of Tutankhamun's war chariots, the trappings of the horses and the sheaths of weapons. Although they are not presently in good condition it is clear that they possess an unusual beauty.

### **Cultural interconnections**

The designs encompass a combination of Egyptian and Levantine motifs which illustrates the political and cultural interconnections between Egypt and the city-states of the Levant in the 14th century BCE.

A team of restoration specialists and archaeologists from the Egyptian Museum Cairo, the Römisch-Germanisches Zentralmuseum Mainz (the leading German Institution for scientific restoration), the Institute of Near Eastern Archaeology of the University of Tübingen (which excavated and studied similar objects at the site of ancient Qatna in Syria) and the German Archaeological Institute Cairo have now embarked on a project to carry out a full archaeological and technological analysis of the artefact group.

### **Specialised training**

Thanks to funding provided by the Federal Republic of Germany, a specialised restoration lab has been set up at the Egyptian Museum in Cairo. To support professional development, scholarships are being offered to Egyptian restorers to receive specialised training at the Römisch-Germanisches Zentralmuseum in Mainz, Germany.

The project will be conducted over three years, after which there will be a public exhibition of the objects in the Egyptian Museum.

**Please visit the site:**

**<http://www.pasthorizonspr.com/index.php/archives/06/2014/objects-from-tutankhamuns-war-chariots-to-be-restored>**

---

## **A NEW LOOK AT ANCIENT EGYPTIAN TEXTILES, BY AMANDINE MÉRAT (CURATOR) AND EMILY TAYLOR (MUSEUM ASSISTANT), BRITISH MUSEUM**

We have recently taken the opportunity to audit, document and re-house the textiles dating to the 1st millennium BC – around 1,800 in number – that are looked after by the Department of Ancient Egypt and Sudan (AES). The main aims of this project are the re-organisation and distribution of the Roman, Byzantine and early Islamic textiles into a coherent and accessible storage system, along with the improvement of their documentation by adding photographs, technical analysis, iconographic and cultural information.

As in many museums today, the British Museum's Egyptian textiles collection is mostly composed of fragmentary pieces, acquired through excavation and purchase in the late 19th and early 20th century. At that time, decorative elements considered as spectacular or aesthetically pleasing were often cut out from large pieces when discovered, as only the most vibrant and colourful pieces were wanted by European collectors. However, this meant that they were also cut off from their archaeological contexts. It was for this reason that, with the exception of two great sets of textiles from excavations at Qasr Ibrim and Wadi Sarga, we decided to reorder the Museum's collection not by provenance or date – as these are rarely known – but by technique. Indeed, a close visual examination of technique, and drawing on knowledge of their cultural background, allows us to determine the possible original function of many of the textiles, essentially fragments of garments and home furnishing originating from burial contexts.

We began our audit by classifying the textiles by their primary weaving technique – tapestry, brocade, embroidery etc. This process helped us to work out how much storage space was required for each group, taking into account the fragility of the textiles, but also the need for easy access and the possibility of new items joining the collection at a later date. Each primary group was then sub-divided, on the basis of shape or iconography of the textiles.

Drawer by drawer, the technical and iconographic analyses for each textile were completed by Amandine Merat, the curator responsible for the project. Some pieces had already been studied by Hero Granger-Taylor in the 1990s; in those cases, her detailed notes were checked and annotated where necessary. However, a great majority of the textiles had never been analysed before. For these, the fibres were identified, measurements were taken, techniques carefully analysed and a complete description of the piece and its iconography was made. Original function of the textiles and dating were re-attributed where necessary.

Once the technical information was recorded, the textiles were photographed by Emily Taylor. A general shot of front and back was taken, an arrow included to indicate the direction of the warp of the fabric. Detailed macro shots were then taken to record any small details or highlight interesting elements of design, use or technique.

The textiles were then re-housed in acid free tissue, and melinex sleeves where possible, and then placed on Correx boards within their storage drawers to enable ease of handling.

All relevant information was recorded in a spreadsheet by our volunteer Ruiha Smalley, before being standardised and uploaded into the British Museum's collection database, through which it will soon be available to the public via the collection online.

Please visit the site: <http://blog.britishmuseum.org/2014/06/02/a-new-look-at-ancient-egyptian-textiles/>

---



**14<sup>TH</sup> CENTURY GRAND HALL DISCOVERED  
UNDERNEATH THE KOTEL TUNNELS  
FOLLOWING 10 YEARS OF EXCAVATIONS,  
WESTERN WALL HERITAGE FOUNDATION  
UNVEILS EDUCATIONAL CENTER UNDER  
MUSLIM QUARTER DEDICATED TO  
JEWISH HISTORY, BY DANIEL K. EISENBUD**

Funded entirely by Jewish Ukrainian billionaire Zvi Hirsch (Gennady) Bogolyubov, the Western Wall Heritage Foundation unveiled on Sunday a fully excavated grand hall from the 14th century in the Western Wall Tunnels that took 10 years to restore.

The hall, which has been converted into an educational center, took millions of dollars and close oversight by the Israel Antiquities Authority to complete.

According to the IAA, the excavation focused on five separate areas below the Ohel Itzhak Synagogue, which extended into spaces beneath the homes of Palestinians living east and south of the synagogue.

“The IAA unearthed an area that includes several structures, among them the continuation of the 14th century Hammam al-Ein, a wide domed area from the same period, and remains dating back as far as the 1st century CE,” an IAA official said.

“Although the majority of the finds are undoubtedly from the Mamluk period, identified with Muslim rule in Jerusalem, the educational visitors’ center will address the genealogy of the Jewish nation and its connection to Jerusalem.”

Bogolyubov, an industrialist and leading philanthropist originally from Dnepropetrovsk, Ukraine, currently based in London, paid an estimated \$20 million to excavate the site, as well as the four others.

Since acquiring his fortune in the late 90s, the billionaire has supported a number of major Ukrainian, Israeli and British Jewish charities, including the construction of the largest Jewish Center in the world, located in Ukraine.

Asked why he donated the estimated the millions needed to excavate and restore the underground areas, Bogolyubov cited his love and patriotism to Israel.

“I did this because of my strong belief that Jews all over world can feel safe because of the State of Israel,” he said at a gala unveiling, featuring a band and catered meal for hundreds. “Everyone must contribute what they can – some contribute by joining the army, some by national service, I did what I can do.”

According to the IAA, the hall, adorned with highly stylized arches which stand on broad, tall stone pillars, was first detected underground adjacent to the Western Wall

Plaza. The structure reveals a window to aqueducts from the early 14th century, located on top of artifacts from various other periods through history.

“On the side of the structure, a staircase from the Herodian period, a section of a Roman road, and even a bathing house from the Mamluk period can all be found,” the official said. “There can be no doubt that this hall represents the wide range of history to be found between the stones of the Jerusalem.”

Please visit the site: <http://www.jpost.com/Article.aspx?id=355027> [Go there for pix]

---

## **ARCHAEOLOGISTS AT THE EGYPTIAN SITE OF HIERAKONPOLIS HAVE UNCOVERED EVIDENCE OF THE ANCESTORS OF THE PHARAOHS, BY ANDREW CURRY**

A recently discovered tomb at a key Egyptian settlement has yielded the largest trove of artifacts ever found in a tomb there—including a young man's burned and scattered bones—and is shedding new light on the ancestors of the pharaohs.

Part of a cemetery complex that predates the formation of the ancient Egyptian state, the find is one of the richest "predynastic" burials archaeologists have ever seen.

The tomb, at the site known as Hierakonpolis, yielded 54 objects, including combs, spearheads, arrowheads, and a figurine made of hippopotamus ivory. Arrayed around the tomb are dozens more burials, including possible human sacrifices and exotic animals.

The latest find, announced earlier this month, is adding to the remarkable story coming out of the Hierakonpolis cemetery, which has been under investigation since 1979.

"It demonstrates the importance of this cemetery, with its high-status burials," says Boston University archaeologist Kathryn Bard. "They have some very interesting secondary burials of humans and animals and wooden structures that are unique to Hierakonpolis."

Hierakonpolis, located on the Nile River about 300 miles (500 kilometers) south of Cairo, was the most important settlement in Egypt's predynastic period, a five-century stretch that began around 3,500 B.C. and preceded the formation of the ancient Egyptian state.

The finds at Hierakonpolis show that the roots of ancient Egyptian civilization stretched back centuries. There are clear signs of social divisions, with elite tombs that are richer and larger than others. "There must have been a whole dynasty of predynastic kings," says Renee Friedman, a British Museum archaeologist who is director of the expedition.

The Hierakonpolis elite erected elaborate wooden structures over their tombs, parts of which have been preserved for more than 6,000 years by the dry climate. Their graves were surrounded by retainers, wild animals, and other accoutrements for their journey into the afterlife, foreshadowings of the mighty civilization that followed.

### **Human Sacrifices, Posthumous Desecration**

The man buried in what's known at Hierakonpolis as Tomb 72 was between 17 and 20 years old when he died. His high status in life is reflected in the deadly ceremony that must have accompanied his death: He was buried with at least 20 people.

"It's unlikely their deaths were natural," Friedman says. Analysis of their skeletons suggests most were well nourished and unusually tall for the time, between five feet eight and five feet ten. Two of them were dwarfs, which were a fascination for ancient Egyptians.

Because the tomb hadn't been disturbed for many millennia, Friedman's team was able to reconstruct a shocking act of desecration that took place there.

The occupant's skeleton had been scattered, and the tomb's wood posts show evidence of fire damage. Friedman thinks the grave had been violated soon after the owner's death, and the body and the wooden structure over the tomb deliberately set on fire.

The many grave goods left inside indicate that the grave robbers' goal wasn't loot, but some sort of postmortem vengeance. "The owner of the tomb had been yanked out, while the other objects had been left alone," Friedman says. "That's not plundering—this was an act of aggression. The point wasn't to take goodies, it was to destroy this person."

The destruction may have had something to do with political and social changes Friedman says rocked the Egyptian world not long after the man in Tomb 72 died. "There are no more elite burials, and the middle class seems to be getting richer," Friedman says. "There's a real change in the status quo. There must have been some kind of revolution."

Could the destruction of Tomb 72 and its owner have been an early form of class warfare? "Maybe this is about anger at those who have kept you down," Friedman suggests. "Is there something going on where the elite at Hierakonpolis are being called to book?"

Others are more cautious. The evidence for social upheaval is limited, and Bard says it's a stretch to even call the man buried in the tomb a king.

With no inscriptions or other written evidence in the tomb, "no one knows his exact political role, other than that he was a very high-status person," she cautions. "There's no way you can attribute a political role to a prehistoric burial."

### **Exotic Animals and Animal Carvings**

Along with the human sacrifices, a menagerie of animals surrounded the tomb.

Archaeologists found the bones of a leopard, an ostrich, a hartebeest, six baboons, nine goats, and ten dogs with leather leashes. In past years, nearby tombs have yielded hippos, an elephant, and falcons.

"Animals represent chaotic forces, and chaotic forces have to be brought under control," says Stan Hendrickx, an archaeologist at the University of Hasselt in Belgium. "That's what a ruler has to do—it's a display of power."

Because modern-day looters overlooked the burial, archaeologists were able to recover many of Tomb 72's grave goods.

The most dramatic artifact is a figurine carved from hippopotamus ivory. A foot (32 centimeters) long, it was carved from a single, tremendous hippo tooth. Its face has a pointed beard and big ears, and it resembles burial masks found elsewhere in the sprawling cemetery and temple complex.

"Whether the kings are depicting themselves or showing themselves as gods, whatever the statue shows and the masks show are the same entity," Friedman says.

Another evocative object found in the tomb: a comb with a hippopotamus decoration. The hippo—a symbol of power—was carefully marked with a burning stick. "We think it was a way of symbolically killing it so it couldn't come back to life and run around in the tomb," Friedman says.

### **More Finds to Come?**

Though the role of the men buried in the Hierakonpolis cemetery is the source of debate, later Egyptian kings considered them important. Four centuries later, Friedman says, some of Egypt's earliest rulers returned to Hierakonpolis and restored the damaged tombs.

Later rulers may have valued the cemetery as proof of some connection to their deep past. "That's amazing, that these were apparently maintained centuries later," says Hendrickx. "Egypt is a civilization where tradition is extremely important, and they want to keep up with this tradition."

When she returns to Hierakonpolis next winter, Friedman hopes to uncover the rest of the tomb complex. "We want to find out the full extent of the people and animals he took with him," she says. "Eventually we hope to explore the whole cemetery."

That is, if there's anything left: Most of the site was plundered in the last century, and since the Arab Spring in 2011, the chaos in Egypt has made the situation even worse. Armed guards police Hierakonpolis, but looting remains a constant, and growing, threat.

"It was the worst year to find something good," Friedman says. "I'm very much in fear of what condition the cemetery will be in when we return. It's a very difficult time in Egypt right now."

**Please visit the site: <http://tinyurl.com/mgq7ccj> [Go there for pix]**

---

## **A STUDY DESCRIBES AGRONOMIC CONDITIONS IN ANCIENT NEAR EAST 12,000 YEARS AGO**

A study co-headed by Josep Lluís Araus, professor from the University of Barcelona (UB), Juan Pedro Ferrio, Ramón y Cajal researcher at Agrotecnio of the University of Lleida (UdL), and Jordi Voltas, professor from Agrotecnio, describes the characteristics of agriculture at its beginnings by comparing kernel and wood samples from ancient Near East sites —the birthplace of Western agriculture— with present samples. It is the first time that direct evidences enable to know humidity and fertility conditions of crops, as well as the process of cereal domestication developed by humans from the Neolithic (12,000 years ago) to early Roman times (around 2,000 years ago).

The study has been published in the journal Nature Communications.

Researchers Ramon Buxó, archaeologist and director of the Archaeological Museum of Catalonia-Girona, and Mònica Aguilera, UdL researcher who is now working at the Paris Natural History Museum, participated in the study too.

Researchers used crop physiology techniques to analyse archaeobotanical remains. In total, they analysed 367 kernels —for instance, barley and wheat—, and 362 wood samples obtained in eleven archaeological sites from Upper Mesopotamia, which includes present south-eastern Turkey and northern Siria, to the Near East. Studied kernels belong to present crops of wheat and barley species that are similar to the archaeological remains found in the region.

### **Progressive domestication**

Researchers compared the size of kernel remains with present samples to determine the evolution of crop domestication. “The methodology used to date does not reproduce real size; it measures width and long of charred kernels”, explains Josep Lluís Araus, professor from the Department of Plant Biology of UB. “We have reconstructed cereal kernel weight —adds the expert— and seen that it increased for a longer period of time than it was thought, probably during several millenniums”. According to the researcher, the initial selection of kernel was “unconscious”, in other words, first farmers selected the biggest kernels, so size increased progressively.

### **Wetter and more fertile soils**

Sample analysis of carbon and nitrogen isotope compositions —a technique used in crop physiology and improvement— was a key factor to describe the conditions of the area. On one hand, “Carbon isotope composition enables to evaluate water availability for crops. It reached its maximum level 9,000 years ago, and then it decreased progressively until the beginning of our times”, points out Araus. In any case, researchers have not found conclusive evidences about the use of irrigation as a common practice. “This information together with cereal kernel weight allows assessing the productivity of ancient crops”, highlights Josep Lluís Araus.

On the other hand, nitrogen isotope composition provides information about soil's organic matter and fertility. Juan Pedro Ferrio (Agrotecnio-UdL) affirms that “although they were dryland crops, it can be affirmed that nitrogen was much more available than today:

undoubtedly, soils were much more fertile than nowadays”. Moreover, it can be observed a progressive decrease of soil fertility, probably due to over-exploitation or the use of less fertile soils, but also to more extreme climate conditions.

These data enable to describe more precisely agronomic conditions and the evolution of human populations linked to agricultural practices. “The study relates conditions like water availability or soil fertility to crops yield”, states Josep Lluís Araus. Past yields, compared with average calorie needs of one person, enable, for example, to have a rough idea of the crop area needed to feed the population. “This information —adds Araus— can be used to know more precisely the borders of past settlements and the evolution of human communities. The aim is to include all this information in models in order to better understand the past”, concludes the researcher.

The study is co-headed by the University of Barcelona and the University of Lleida, together with the Archaeological Museum of Catalonia.

**Please visit the site:**

[http://www.ub.edu/web/ub/en/menu\\_eines/noticies/2014/05/068.html](http://www.ub.edu/web/ub/en/menu_eines/noticies/2014/05/068.html) [Go there for pict]

---

## **BURIAL REVEALS COMPLEX ORIGINS OF METALLURGY**

The origin of metallurgy in the ancient Near East is well attested in the southern Levant, with rich assemblages of copper artefacts from the Nahal Mishmar cave and the unique gold rings of the Nahal Qanah cave, confirming this as the main centre during the second half of the 5th millennium CalBC. However many important questions about Chalcolithic metallurgy in the southern Levant remain unanswered, such as, where do the materials used in the processes come from, where were the final goods produced, and what were the dynamics of production?

New questions continue to arise as recent discoveries force previous interpretations to be reconsidered.

### **Middle Chalcolithic phase**

Tel Tsaf is an archaeological site south-east of Beit She'an, and in 2004–2007 a large excavation project was conducted by Yosef Garfinkel of the Hebrew University of Jerusalem. Tel Tsaf is dated to ca. 5100–4600 CalBC, sometimes called the Middle Chalcolithic, a little-known period in the archaeology of the Levant, post-dating the Wadi Rabah phase and pre-dating the Ghassulian Chalcolithic phase.

The complex mud-brick architectural settings include courtyard buildings combining rectilinear, rounded rooms and grain silos, as well as a large number of cooking facilities. Four burials were uncovered, two of which were found inside grain silos. The silos uncovered in courtyard structures reached a storage capacity estimated at 15–30 tons of grain, far beyond the yearly needs of a family; a clear indication of the accumulation of surpluses on a scale unprecedented in the ancient Near East.

Tel Tsaf contained a rich assemblage of over 2,500 beads made of ostrich egg-shell, obsidian items originating in Anatolia or Armenia, four Ubaid pottery shards imported from either north Syria or Mesopotamia and a Nilotic shell from Egypt. These finds exhibit connections of unexpected distance and diversity.

### **A small find with greater implications**

A paper presented in the Open Access journal PLOSone examines the chemical composition of the tiny copper awl and reviews its context for the first time.

The object was found in the grave of an articulated skeleton of an adult female who was approximately 40 years old. It is described as an elongated pin made of cast copper, with a rounded cross-section. It is 41 mm long with a maximum diameter (near the base and at the middle of its length) of 5 mm. The diameter near its tip is 1 mm. The colour of its exterior is green due to oxidization and corrosion, while the core is reddish. The narrower tip bears signs of rotational movement and remains of a wooden handle were noted on the base at the opposite end, suggesting its use as an awl. Unfortunately this artefact was completely corroded, so it was impossible to examine the structure of the metal and production technique, however, the composition was possible using Niton ED-XRF analysis.



### **High status trading family**

The results indicate that it was made from a natural tin-copper and brought from a distant source, probably the Caucasus, and transported to the Jordan Valley via long-distance exchange networks, which also brought obsidian, groundstone items and other goods from Armenia, Anatolia and Syria through the Levantine Corridor. This infers a high status on the occupants of Courtyard Building I; a family or selected group within the community that quite possibly controlled local cultivation and storage of grain as well as long-distance trade.

### **More Information**

Garfinkel Y, Klimscha F, Shalev S, Rosenberg D (2014) The Beginning of Metallurgy in the Southern Levant: A Late 6th Millennium CalBC Copper Awl from Tel Tsaf, Israel. PLoS ONE 9(3): e92591.

doi:10.1371/journal.pone.0092591

Garfinkel, Yosef; David Ben-Shlomo, Tali Kuperman (2009). “Large-scale storage of grain surplus in the sixth millennium BC: the silos of Tel Tsaf”. *Antiquity* 83 (320): 309–326.

Garfinkel, Yosef; David Ben-Shlomo, M. Freikman and A. Vered (2007).

“Tel Tsaf: the 2004–2006 Excavation Seasons”. *Israel Exploration Journal* 57: 1–33.

**Please visit the site:**

<http://www.pasthorizonspr.com/index.php/archives/05/2014/burial-reveals-complex-origins-of-metallurgy>

---

## **BATTERED POT FOUND IN CORNISH GARAGE UNLOCKS EGYPT EXCAVATION SECRETS**

Pot sheds light on the work of archeologist Flinders Petrie whose finds scattered across the world in the late 19th century Maev Kennedy

Little ancient Egyptian pot found in a garage in Cornwall, being conserved by the Petrie for display with other objects excavated from the same grave. Photograph: Christian Sinibaldi for the Guardian

A battered pot found in a garage in Cornwall, broken in antiquity and broken again and mended with superglue some 5,500 years later, was treasure – but the scruffy little cardboard label it held is now unlocking a lost history of finds from excavations in Egypt scattered across the world in the late 19th century.

The pot came with an odd family legend that back in the 1950s it was accepted in lieu of a fare by a taxi driver in High Wycombe. Alice Stevenson, curator at the Petrie Museum in London, which among its 80,000 objects has the original excavation records and hundreds of pieces from the same Egyptian cemetery, believes the story is true and may even have identified the mysterious passenger.

"I got the email from them on my second week in this job," Stevenson said. "I could hardly believe what they'd found. I literally jumped up and down in excitement. The pot is wonderful, a rare find indeed. The label is absolutely fantastic."

When Guy Funnell and Amanda Hawkins found the pot while clearing a garage stacked with his father's possessions, they made the connection with a BBC documentary they had recently seen, *The Man Who Discovered Egypt*, about the archaeologist Flinders Petrie.

Petrie's meticulous records and scientifically based excavations in the region transformed archaeology, and he created a timeline still in use today through sorting thousands of pots by date, enabling tombs, temples and entire towns to be dated from the fragments of broken pottery on the sites.

The little black and red pot was one of the few occasions when he was not only completely wrong, but admitted that, mortifyingly, a French rival was right.

Petrie, like his 19th-century contemporaries, sent back tons of material from Egypt to universities and museums funding his excavations, and later sold a huge collection that became the basis of the Petrie Museum – the most difficult to find in London, "temporarily" housed in an old stables on the UCL Bloomsbury campus alleyway since the 1950s, but with the finest collection of material from the region outside Egypt.

It was known that he gave pieces to individuals, at a time when a visit to a celebrity archaeologist's dig was the highlight of any tourist or VIP trip down the Nile. The little

label proves this was done on a systematic basis not previously guessed at. It is a neat commercially printed card, with an Egyptianate border, boasting that the "Libyan Pottery" from 3,000 BC was discovered by Prof WM Flinders Petrie in 1894-5. The card was clearly one of many, but pot, card, and excavation record are linked by the faintly pencilled number 1754.

"There were obviously many such cards, but I have never seen or heard of one before – there must be more out there, which would help us trace the distribution of this material through museums and private collections," Stevenson said.

The pot is now being conserved for display at the museum, on loan for a year. Funnell dimly remembers it in childhood, and his mother remembered the story that his grandfather, Charles Funnell, was given it to settle not just one but several unpaid taxi fares.

Stevenson believes the mystery customer may have been a curator at the Ashmolean Museum in Oxford, Joseph Grafton Milne, who died in 1951, but was recorded as visiting Petrie in Egypt in the 1890s. The link between the distinctive pots: the Ashmolean has a bowl from Milne's collection from the same grave as Funnell's pot, and she thinks it is probable Milne obtained both from Petrie.

The Petrie has some tiny shells, pierced as beads, and a piece of rock crystal from the same grave, but the records show many more pots came from the same grave, and thousands from the cemetery, and the card may help to trace them.

Petrie was wrong about the pots: they were Egyptian, not Libyan. He was fooled because their distinctive black fire-scorched rims were so different from the others he found. However, a French scholar, Jacques de Morgan, established that they were Egyptian but pre-Dynastic, 600 years older than Petrie first believed.

"It was one of the few occasions when Petrie was not only wrong, but admitted it publicly," Stevenson said, "a very unusual occurrence."

After conservation work, the treasure from the Cornish garage will go on display next month, a scruffy star of the museum's Festival of Pots.

**Please visit the site: <http://www.theguardian.com/science/2014/may/26/pot-found-cornwall-garage-reveals-egypt-excavation-history>**

---

## **FORT FOUND IN SOUTHERN JORDAN HOUSED ROMAN INFANTRY UNIT WIELDED BY THE TETRARCHS TO VANQUISH THE JEWS, BY JULIA FRIDMAN**

Four years after starting to dig up an ancient Roman outpost in southern Jordan, a team of archaeologists from Tennessee found a unique, and well-preserved, inscription on a rock - revealing that the site is the previously unknown base of a Roman infantry unit involved in crushing the Bar-Kochba rebellion.

The outpost, 'Ayn Gharandal, lies beneath the dunes around 70 km north of present-day Aqaba, the Jordanian resort city on the Red Sea, and 40 km southwest of the ancient Nabataean city of Petra. Its location near a spring-fed oasis between these two famous cities made it an important point along an ancient trade route between the Middle East and the furthest reaches of Rome's empire.

Evidence of stops on this trade route can be seen throughout Israel's Negev desert, in the ruins of ancient towns and way-stations, surrounded with the ubiquitous smooth, rusty-orange colored Nabatean pottery sherds. The 'Ayn Gharandal excavation is being directed by Robert Darby, lecturer in art history and Erin Darby, assistant professor at the Department of Religious Studies, both at the in University of Tennessee Knoxville.

The inscription, Latin with traces of red paint, was on the collapsed gate of the Roman fort that the team uncovered. The block was also decorated with laurel branches and a wreath, common symbols of victory in Roman art.

The directors describe finding the more than 500-pound stone as "quite a thing to witness". So was the discovery of the inscription on the rock, it seems. It took a lot of effort to lift the thing and while about it, since it was covered in sand, one of the workers started brushing the rock with his hand, ignoring the director telling him to cut it out before he could cause damage. But the imprudent act uncovered writing on the slab that caused a sensation throughout the camp.

### **A dream find**

"This is the type of find archaeologists dream of making - a monumental inscription," Erin Darby says. "This inscription allows us to fill in some gaps in Roman history. Findings like this don't happen often."

In fact very few Late Roman building inscriptions have been found at forts in the region, and this is the only one uncovered through archaeological excavation.

Several ancient structures, including a well-preserved Roman bathhouse, have been found at 'Ayn Gharandal. However, the site is dominated by a Late Roman fort about 40 by 40 square meters in area.

It is similar to other Late Roman military sites in the region and fits in perfectly with Rome's imperial presence in the Near East in the late 3rd to early 4th centuries, with the reign of the emperor Diocletian and his three co-rulers, known as the Tetrarchy. However, the ruler who actually wielded the infantry unit against the Jewish rebels was Hadrian, who ruled the Roman Empire from A.D. 117 to 138.

Their activities were documented by ancient authors such as Eusebius of Caesarea, Ammianus Marcellinus, and John Malalas, all of which spoke of the Late Roman armies' building activity in the East. But this one was unique its dedicatory rock.

The inscription says that the fort was dedicated to four co-ruling Roman emperors: Diocletian, Maximian, Galerius, and Constantius I, the Tetrarchs, who ruled between 293 and 305 A.D.

It also reveals that the infantry unit stationed at the fort was the Cohors II Galatarum, or the Second Cohort of Galatians. It had been established by the emperor Trajan, and is known to have been instrumental to Rome's victory in the Jewish Wars and in crushing Bar Kochba's rebellion.

Ancient sources place the unit at a site called "Arieldela," whose location had remained a mystery until this discovery.

### **Suppressing the revolt**

“Roman military documents from this region suggest that the Cohors II Galatarum was originally brought to Israel to help suppress the second-century Jewish uprising known as the Bar Kochba Revolt,” says Robert Darby. “The inscription indicates that this garrison remained in the area and was subsequently transferred to the outer frontier of the empire, located in what is now modern Jordan.”

The inscription has been removed from the site for conservation at the American Center of Oriental Research in Amman, Jordan, and the excavated areas have been backfilled. It will be unveiled to the public this upcoming June in Jordan.

**Please visit the site: <http://www.haaretz.com/archaeology/.premium-1.595959>**

---

## **ANCIENT LOVE INSCRIPTIONS IN ASTYPALEA, BY EVDOKIA FOURKIOTI**

The concept of love during the ancient Greek times isn't that different from nowadays. The only change is the way people used to express their feelings. A lovestruck person today may use graffiti to express passion for his beloved, while ancient Greeks inscribed love messages on stones.

According to Ethnos, ancient love inscriptions dating back to the early 6th and the late 5th centuries B.C., were recently discovered in Astypalea.

Spirals, shapes of ships, tools in triangular shapes were mostly drawn by the Neolithic inhabitants of Astypalea.

One of the first findings of the Professor of Prehistoric Archaeology, Andreas Vlachopoulos, was rock paintings located in Vathi at the Pargos Peninsula and date back to 4th-3rd millennium B.C.

In 2013, more unexpected findings were discovered, which present an aspect of privacy of the ancient Greek inhabitants in the early 6th and late 5th centuries B.C. The Secretary General of the Archaeological Society, Vasilios Petrakos, made extensive reference to two love inscriptions that were discovered which depict two phalluses from the right angle.

**Please visit the site:** <http://greece.greekreporter.com/2014/06/04/ancient-love-inscriptions-in-astypalea/>

---

## **ARCHAEOLOGISTS PLAN TO RECONSTRUCT ANCIENT SOCIETY OF BURNT CITY**

An archaeological team, which will be led by Seyyed Mansur Sajjadi, plans to reconstruct the ancient society of the 5200-year-old Burnt City during the new excavation season at the site located in southeastern Iran.

“Following 22 excavation seasons previously conducted at the Burnt City [by Iranian teams] and nine other excavation seasons that Italian archaeological teams carried out carefully and comprehensively, our team, as the inheritor of all the valuable data from excavations by the Italian teams, must conduct this new season of excavation with great care and precision,” Sajjadi told the Persian service of CHN on Monday

The anthropological studies in the Burnt City have been highly regarded since 1997, when the first Iranian team began an excavation season at the site, he added.

“In addition, paleopathologic studies (the study of ancient diseases), which had never before been done by any Iranian team, began at the site,” he added.

He said that interdisciplinary teams, including medical experts, will accompany the archaeologists during the excavation, which will begin in October.

Several trenches will be dug in the two areas, which are intended to help the team achieve the main aim of the excavation, Sajjadi stated.

He added that a group of experts from the Tehran University of Medical Sciences will join the team to sample 400 of the 1200 skeletons, which were unearthed at the site during the previous excavation seasons.

According to Sajjadi, this part of the study will shed light on the diseases common in the ancient society.

Located 57 kilometers from the Iranian town of Zabol in Sistan-Baluchestan Province, the Burnt City was excavated for the first time by the Istituto Italiano per l’Africa e l’Oriente (IsIAO) team led by Maurizio Tosi in 1967. The team conducted nine seasons of excavations until 1978.

After a 19-year hiatus, a team led by Sajjadi began studies on the Burnt City and conducted 22 seasons of excavations at the site.

A 10-centimeter ruler with an accuracy of half a millimeter, an artificial eyeball, an earthenware bowl bearing the world’s oldest example of animation and many other artifacts have been discovered among the ruins of the city in the course of the 22 seasons of archaeological excavations conducted by Iranian teams.

In September 2013, Iran submitted documentation on the Burnt City to UNESCO to register the site on its World Heritage List

Please visit the site: <http://tehrantimes.com/arts-and-culture/116186-archaeologists-plan-to-reconstruct-ancient-society-of-burnt-city>

---

---



## **2,300-YEAR-OLD TOMB WITH A CORPSE AND DAGGERS FOUND IN SINAW**

Excavations at several archeological and monumental cemeteries in Al Oyoon area in the Wilayat of Sinaw date back to various eras, said the Ministry of Culture and Heritage. A number of articles were found in the area, and they are currently under documentation and study. However, they are initial findings of these excavations as they are located on the track of Duqm-Mahut and Sinaw project implemented by the Ministry of Transport and Communications.

Giving details of the findings, Sultan Saif al Bakri, Head of Excavation and Archeological Studies Department, pointed out that survey carried out in coordination and cooperation with the Ministry of Transport and Communications have brought up a discovery of hundreds of cemeteries spread across a distance of 100 km.

Excavation results show that these tombs belong to two periods. The first group belong to the third millennium BC, while the second belong to the first millennium BC. These tombs embrace archeological discoveries such as potteries and soft rock vessels. Al Bakri added that a man's corpse was found dated 2,300 years ago, died in his fifties and buried with his weapons. Additionally, two slaughtered camels were buried in two holes nearby his tomb and fenced by stones.

On the left side of the corpse, an 88-cm sword, two daggers and a wool hat were found. It is expected that these findings belong to the Indian civilisation which later spread across adjacent civilisations.

The Ministry of Heritage and Culture will carry restorations works on these findings and acquisitions and rebuild a model of this rare tomb in the National Museum which will be opened by the end of this month.

Additional archeological studies and surveys will be conducted in Sinaw as part of the Ministry's intention to document all archeological and monumental evidences and conserve them for the future.

Please visit the site: <http://main.omanobserver.om/?p=87080> [See also <http://www.m.muscatdaily.com/Archive/Oman/2-300-years-old-grave-in-Sinaw-could-be-Oman-s-biggest-archaeological-find-37sy>]

---

## **REMAINS OF 'END OF THE WORLD' EPIDEMIC FOUND IN ANCIENT EGYPT, BY OWEN JARUS**

Archaeologists have uncovered the remains of an epidemic in Egypt so terrible that one ancient writer believed the world was coming to an end.

Working at the Funerary Complex of Harwa and Akhimenru in the west bank of the ancient city of Thebes (modern-day Luxor) in Egypt, the team of the Italian Archaeological Mission to Luxor (MAIL) found bodies covered with a thick layer of lime (historically used as a disinfectant). The researchers also found three kilns where the lime was produced, as well as a giant bonfire containing human remains, where many of the plague victims were incinerated.

Pottery remains found in the kilns allowed researchers to date the grisly operation to the third century A.D., a time when a series of epidemics now dubbed the "Plague of Cyprian" ravaged the Roman Empire, which included Egypt. Saint Cyprian was a bishop of Carthage (a city in Tunisia) who described the plague as signaling the end of the world.

Please visit the site: <http://www.livescience.com/46335-remains-of-ancient-egypt-epidemic-found.html> [Go there for pix]

---

## **4,000 YEAR OLD ROYAL TOMB** **DISCOVERED IN LUXOR, BY MENNA ZAKI**

The Spanish expedition in collaboration with the Ministry of Antiquities has made a new discovery in Upper Egypt

A handout picture released on June 9, 2014, by Egypt's Ministry of Antiquities shows the inner chambers of a more than 4,000 year old pharaonic tomb discovered by Spanish archeologists and believed to belong to an important leader from the eleventh dynasty in the ancient city of Luxor, the antiquities ministry said.

Spanish archaeologists, in collaboration with the Ministry of Antiquities, have discovered a new tomb in Luxor dating back to the era of the 11th dynasty (2046 BC – 1991 BC), Minister of Antiquities Mohamed Ibrahim announced in an official statement on Monday.

The minister pointed out that the discovery belongs to one of the high-ranking statesmen and officials that used to live during the time of the 11th dynasty.

According to AFP, the tomb was discovered during the excavations done by the Spanish archaeologists in Abu Deraa. Ali Al- Asfar, an official in the ministry, said that the tomb contained pottery and utensils that were used during the 17th dynasty as well, which suggests that the tomb was reused in that period.

Head of the Spanish expedition, Jose Galan, said that the discovery proves the presence of numerous tombs that belong to the 11th dynasty in the Abu Deraa region in Luxor. He added that this discovery provides new insights into the dynasty that ruled Luxor, which was the capital of ancient Egypt, called "Thebes".

Galan pointed out that a tomb that belonged to the same dynasty was discovered five years ago in the same region. That tomb contained a well preserved mummy with arrows and arches, which are now displayed in Luxor's museum.

According to Abdel-Hakim Karar, director of Upper Egypt Antiquities, the discovery of the tomb was by "coincidence" during the excavations in the 17th dynasty Djehuty tomb, where the expedition found two chambers, one of them leading to a passageway to the newly found tomb.

He added that the design and size of the passageway suggested that this discovery belongs to the 11th dynasty.

Karar noted that there probably more discoveries will be made that belong to the 11th dynasty.

Earlier in June, Ibrahim announced the discovery of a new tomb in the area of Koba El-Hawa in southern Aswan. The tomb contained nine mummies who belonged to the Late Period (664 BCE- 332 BCE). A wooden coffin of a preserved mummy, which is believed to be a person who lived during the same era, was discovered as well in the same area.

Please visit the site: <http://www.dailynewsegypt.com/2014/06/15/4000-year-old-royal-tomb-discovered-luxor/>

---

---

## **DATING HAMMURABI, THE SIXTH KING OF BABYLON, BY PETER LYNCH**

The Greek geometer Pythagoras, whose theorem is familiar to every student of mathematics, lived about 500 BC but the theorem was known to the Babylonians much earlier.

The Babylonians used a numbering system based on 60. We find a residue of this in our own measurement of time and of angles. They also invented the place value system, where a numerical symbol has different meanings in different positions.

We know of the ancient Middle East mainly through a vast collection of clay tablets with cuneiform inscriptions. Cuneiform is one of the earliest writing systems, with wedge-shaped marks made by a stylus in the soft clay, which is then baked dry. Laws, letters, accounts, stories and mathematics were all impressed on clay tablets.

Irish clergyman Edward Hincks, a fellow of Trinity College and member of the Royal Irish Academy, carried out one of the earliest decipherments of cuneiform. He studied a tablet now in the British Museum, and determined that it listed specific dates on which Venus appeared as a morning or evening star. The dates were in the Assyrian lunar calendar and their precise interpretation was uncertain.

### **The Reign of Hammurabi**

The Code of Hammurabi is among the first written legal systems in history. Hammurabi, the sixth king of Babylon, flourished in the 18th century before Christ, but the exact dates of his reign are uncertain: estimates extend over more than two centuries.

In a recent discourse at the Royal Irish Academy, Prof Werner Nahm revisited some century-old scholarship and found that the date when Hammurabi first reigned could be fixed, by known astronomical events, to one of four years. Nahm, director of the school of theoretical physics of the Dublin Institute for Advanced Studies, is also expert in reading and interpreting ancient cuneiform script.

Nahm examined digitally enhanced images of a newly found tablet now in Ankara and was able to establish the first year of Ammizaduqa, the great-great-grandson of Hammurabi. A reference to a solar eclipse in the Assyrian year 127, when Puzur-Ishtar was governor, enabled him to establish the dates for Hammurabi precisely. There were 195 years between the solar eclipse and the first year of Ammizaduqa. Genealogical records then showed the beginning of Hammurabi's reign to be 1784 BC.

Pinning down dates like this is important. Potentially grave consequences of the changing climate loom before us. Such changes, both short and long-term, have occurred before. The Mesopotamian civilisation declined after Hammurabi, and many cities were abandoned.

Babylon itself lay in ruin for some time. While military decline was one factor, there were others. The simultaneous collapse of the Egyptian civilisation, a thousand miles away, lends support to a major perturbation of the climate.

The inscription on one tablet describes a period when Venus, which should have been prominent, was unobserved. This may well have been due to the obscuring effect of volcanic dust. Volcanic events are known to cause crop failure and famine for a year or more.

Evidence of a climate downturn about the year 1627 BC is found in the tree rings of Irish bog oak, analysed by Mike Baillie of Queen's University Belfast. A possible link to the eruption of Santorini, which wiped out the Minoan Empire in Crete, is intriguing but, to date, unproven.

Peter Lynch is professor of meteorology at University College Dublin.  
He blogs at [thatsmaths.com](http://thatsmaths.com)

**Please visit the site: <http://www.irishtimes.com/news/science/dating-hammurabi-the-sixth-king-of-babylon-1.1836796>**

---

**THE KANI SHAIE ARCHAEOLOGICAL  
PROJECT: INVESTIGATING EARLY  
BRONZE AGE KURDISTAN,  
BY STEVE RENETTE, ANDRÉ TOMÉ AND  
RICARDO CABRAL**

Abstract: During the first season of excavations in September 2013, the Kani Shaie Archaeological Project (KSAP) explored the history of occupation at Kani Shaie in the Bazyan Valley in Iraqi Kurdistan. In this short report, the directors of KSAP describe the preliminary results of the first systematic investigation in the region of a center dating to the late fourth and early third millennium B.C.E.

Throughout the twentieth century, archaeologists have focused their attention on the southern Mesopotamian plains of Iraq, largely neglecting the mountainous northern part of the country. As a result, the region east of the Tigris River is largely terra incognita for ancient Near Eastern history. This situation is about to change dramatically with an explosion of archaeological fieldwork projects in Iraqi Kurdistan, which has been a safe, prosperous and very welcoming haven after the dramatic developments that have upset Syria and most of Iraq.

In 2012, we formed the Kani Shaie Archaeological Project with the goal to study the history of human settlement in the Bazyan Valley, on the road between Kirkuk and Sulaimaniyah. In its first phase, the project focuses on stratigraphical excavations at the site of Kani Shaie. This site is centrally located within the Bazyan Valley and is the largest, most visible ancient settlement. Nevertheless, its still very modest size (ca. 2 ha and 11 m high) provides the opportunity to quickly gain insights into to the region's history and development of material culture.

As a result of the first season of fieldwork in September 2013, we now know that Kani Shaie was a local center within the Bazyan Valley during the fourth and third millennium B.C.E. By the end of its lifespan the site became too high and small, causing the population to shift occupation elsewhere within the valley. Two thousand years later, when the Parthian Empire held sway over the region, a small village grew at the base of the valley's oldest center. The attractive location, close to several springs, attracted people once again during the early Islamic period, when villagers used the high mound as a burial ground for their deceased. To this day the site is a social focal point of the valley. The name of the site, Kani Shaie, roughly means "the spring where people dance," referring to the joyful activities that take place in this idyllic, lush place.

The first inhabitants of Kani Shaie lived about 6,500 years ago, during the so-called Ubaid period. At this time, the fertile mountainous valleys of the Zagros Mountains and its hilly piedmont were dotted with numerous villages. During the next thousand years, Kani Shaie developed into a local center within the Bazyan Valley, probably due to its central location. By the second half of the fourth millennium B.C.E., Kani Shaie was a node in a network that spanned the entire Near East. The pottery used by the inhabitants

at this time is indistinguishable from ceramics used at similar sites in Turkey, Syria, Iran and south Iraq.

This phenomenon is often called the “Uruk expansion,” which refers to the theory that southern Mesopotamian city-states—Uruk being the largest one—established colonies far along major trade routes to gain access to raw materials. The closest and most famous site of this nature is Godin Tepe—across the border in Iran—with which Kani Shaie appears to have many similarities. However, even though Kani Shaie is located on a route that connects the northern Tigris region with the Zagros Mountains, the valley is situated off the major trade routes for southern Mesopotamia and away from valuable raw materials.

An important research goal for future seasons of fieldwork will be to address the importance of Kani Shaie during the Uruk period and how it was connected with sites throughout the Near East.

A major find during last year’s excavations might offer a clue to this conundrum. Associated with a large, burnt layer that seals the Uruk period occupation at the site, we found a clay tablet with a numerical mark and sealed several times with the same cylinder seal. The scene depicted on this seal impression is unusual, but perhaps at home in this region. It shows a man sending off a boat carrying five horned animals, possibly mountain goats. Could this indicate that an important economic role of the region was the supply of animals to the Mesopotamian plains downstream? If so, Kani Shaie might have functioned as the administrative center for these activities.

Around 3,200 B.C.E., the beginning of the Early Bronze Age in the region, the site was burnt down, either by accident or violently. Soon after this destruction, the top of the site was leveled and a new kind of settlement, with a very different set of material culture, began.

This period following the Uruk period and into the early third millennium B.C.E. is one of the least understood in the history of the ancient Near East, and Kani Shaie is the first site in the region dating to this period to be excavated systematically.

Survey projects in the region have had a difficult time recognizing sites belonging to the beginning of the Early Bronze Age—so much so that some have even suggested a possible abandonment of the region.

This impression is certainly a result of a lack of research, which the Kani Shaie Archaeological Project aims to amend.

From the preliminary results of excavations in 2013, it seems that Kani Shaie had become an agricultural village after the destruction of the Uruk period center. The settlement appears to have consisted of small-scale architecture, continuously built and rebuilt for several centuries. Nevertheless, the site continued its role as administrative center, attested by the presence of two cylinder seal impressions. One of these seal impressions is part of a tradition widely in use all across the Zagros Piedmont, while the other seems to be of a local style and was impressed on a large jar.

Kani Shaie also remained in contact with distant regions. During the early third millennium B.C.E., different distinct painted ceramic traditions emerged tied to specific regions. At Kani Shaie several of these traditions have been found together alongside an



unknown local style, consisting of bowls painted with large spirals. At this point it is unclear whether these different kinds of ceramics were imported at the site or if the inhabitants of Kani Shaie participated in the different traditions surrounding them.

While there is some indication that the site continued to be in use until the end of the third millennium B.C.E., settlement gradually moved away from Kani Shaie, allowing the growth of new centers elsewhere in the area. Nevertheless, throughout its history the site remained central to life in the Bazyan Valley, sometimes in the form of villages at its base or at other times as a clearly visible focal point and a social gathering place.

The late fourth and early third millennium B.C.E. is the advent of Near Eastern history, with developments that would lead to the formation of polities and ethnic groups that appear in historical sources centuries later. When the Akkadian king Naram-Sin marched on the Zagros, he defeated the Lullubi. In its turn, the Akkadian Empire was brought to its knees by the Gutti who came down from the Zagros Mountains. And the powerful kings of Ur, Isin and Larsa had to compete with the king of Simurru for control over the Zagros Piedmont. New research in Iraqi Kurdistan can finally tell the stories from the perspective of the Zagros peoples, and the Kani Shaie Archaeological Project aims to shed light on the developments that lead to their rise to prominence.

In September 2014 we will return to the site with a larger team to address the questions raised by the first excavations last year.

Through a research program that makes full use of archaeological tools at our disposal, such as archaeobotanical studies, scientific analysis of the ceramics, osteological analysis of the human remains and detailed radiocarbon dates, we hope to provide valuable new insights about poorly understood periods in a region rarely studied before.

**Please visit the site: <http://www.biblicalarchaeology.org/daily/ancient-cultures/ancient-near-eastern-world/kani-shaie-archaeological-project/>**

---

## **EGYPTOLOGIST UNRAVELS ANCIENT MYSTERY**

It is one of the greatest archaeological mysteries of all times: the disappearance of a Persian army of 50,000 men in the Egyptian desert around 524 BC. Leiden University Professor Olaf Kaper unearthed a cover-up affair and solved the riddle.

### **Herodotus**

It must have been a sand storm, writes the Greek historian Herodotus.

He tells the story of the Persian King Cambyses, who entered the Egyptian desert near Luxor (then Thebes) with 50,000 men. The troops supposedly never returned; they were swallowed by a sand dune. A fantastic tale that was long the subject of many debates.

### **Long quest**

Egyptologist Olaf Kaper never believed it: 'Since the 19th century, people have been looking for this army: amateurs, but also professional archaeologists. Some expect to find somewhere under the ground an entire army, fully equipped. However, experience has long shown that you cannot die from a sand storm, let alone have an entire army disappear.'

### **Petubastis III**

Kaper is now putting forward an entirely different explanation. He argues that the army did not disappear, but was defeated. 'My research shows that the army was not simply passing through the desert; its final destination was the Dachla Oasis. This was the location of the troops of the Egyptian rebel leader Petubastis III. He ultimately ambushed the army of Cambyses, and in this way managed from his base in the oasis to reconquer a large part of Egypt, after which he let himself be crowned Pharaoh in the capital, Memphis.'

### **Spin doctor**

The fact that the fate of the army of Cambyses remained unclear for such a long time is probably due to the Persian King Darius I, who ended the Egyptian revolt with much bloodshed two years after Cambyses' defeat. Like a true spin doctor, he attributed the shameful defeat of his predecessor to natural elements. Thanks to this effective manipulation, 75 years after the events, all Herodotus could do was take note of the sand storm story.

### **Pieces of the puzzle**

Kaper made this discovery accidentally; he was not looking for it actively. In collaboration with New York University and the University of Lecce, he was involved for the last ten years in excavations in Amheida, in the Dachla Oasis. Earlier this year, he deciphered the full list of titles of Petubastis III on ancient temple blocks.

'That's when the puzzle pieces fell into place', says the Egyptologist. 'The temple blocks indicate that this must have been a stronghold at the start of the Persian period. Once we combined this with the limited information we had about Petubastis III, the excavation site and the story of Herodotus, we were able to reconstruct what happened.'

The discovery will be announced on Thursday at an international conference. Kaper: 'I expect there to be a great deal of interest in the subject. I look forward to the discussions that will follow.'

**Story Source:**

The above story is based on materials provided by Leiden University.

Note: Materials may be edited for content and length.

**Please visit the site:**

<http://www.sciencedaily.com/releases/2014/06/140619095824.htm> [See also  
<http://phys.org/news/2014-06-egyptologist-unravels-ancient-mystery.html#jCp>]

---

## **ANCIENT EGYPTIAN REMEDIES**

Does modern medicine have anything to learn from the medicine of the ancient Egyptians, asks Mai Samih

The ancient Egyptians, who embalmed their deceased so carefully, must have had a profound knowledge of anatomy. This is shown in tomb reliefs depicting surgeons dealing with patients and in famous medical texts such as those in the ancient Egyptian Ebers and Edwin Smith papyri.

The ancient Greek historian Herodotus who visited Egypt around 440 BCE wrote extensively of his observations of ancient Egyptian medical practices. The Roman writer Pliny the Elder also wrote favourably of them in his historical works. The ancient Greek fathers of medicine, Hippocrates, Herophilos, Erasistratus and later Galen, all studied at the temple of Amenhotep in Egypt and acknowledged the contributions of the ancient Egyptians to Greek medicine.

In his book *Life of the Ancient Egyptians*, author Eugen Strouhal quotes Herodotus describing Egyptian doctors by saying that “the practice of medicine is so divided among them that each physician treats one disease and no more. There are plenty of physicians everywhere; some are eye doctors, some deal with the heart, others with the teeth or the belly, and some with hidden maladies.”

Belgian Scholar Frans Jonckheere writes that there were 82 kinds of doctors known by name in ancient Egypt. No female nurses existed to help these doctors, but there were male nurses, dressers, masseurs, and lay therapists there for help. Czech physician Vincenc Strouhal wrote that the most advanced branch of medicine in ancient Egypt was surgery.

According to Alaaeddin Shaheen, a professor of archaeology at Cairo University, ancient Egyptian doctors were known around the ancient world for their skills. An inscription on the walls of the tomb of the New Kingdom scribe Nebamun in Thebes depicts a foreigner visiting an Egyptian doctor, for example, and descending from a boat as a nurse gives him a glass of medicine. The profession, according to Strouhal, was linked to the ancient Egyptian priesthood.

Strouhal added that the remains of a sanatorium have been found in the grounds of the Temple of Hathor at Dendera, where patients stayed isolated in small rooms to pray, meditate, and benefit from healing sleep during which truths would be revealed to them in dreams. The use of bathing pools fed from the Temple’s sacred lake was also part of the cure.

There was a complex hierarchy among doctors. Besides ordinary doctors, there were also senior doctors, inspectors, overseers, masters of physicians, and the chief of physicians of the south and the north, something like today’s minister of health. There were also specialties: for example, the Sixth Dynasty court physician and high priest Pepyankh, known as Iry, was not only the “doctor to the pharaoh’s belly,” but also his eye doctor.

Egyptologist Bassam Al-Shamaa divides the medical profession in ancient Egypt into two categories: traditional-folkloric and professional. He also says that the ancient Egyptians had the world's first female doctor. According to an inscription on the false door of an Old Kingdom tomb on the Giza Plateau of a Fifth Dynasty dignitary Akhethetep, his mother, Peseshet, was the head of the court doctors and thus the first well-attested female doctor in history.

“This proves that women also practiced medicine and were given titles to do so,” Al-Shamaa said. Another example of a famous doctor is Imhotep, also the engineer who designed the Djoser Step Pyramids at the Saqqara Necropolis. In many cases, doctors in ancient Egypt were given the status of priests. According to Strouhal, the gods associated with healing were Amun, Thoth, Min, Horus, Isis, and Serapis.

The ancient Egyptians had an advanced medical system, Shaheen said, adding that Herodotus had commented on the high number of ancient Egyptian doctors by saying that “among every two Egyptians there is a doctor.” From papyri like the Carlsberg, Chester, Kahn and Ebers papyri, a picture can be built up of the way the ancient Egyptians dealt with diseases, dividing them into curable and incurable ones.

The ancient Egyptians also had three branches of medicine, human, veterinary, and psychological, he said.

According to Strouhal, the Ebers papyrus has 700 prescriptions for different diseases while the Hearst papyrus is a memorandum of a practicing doctor that includes remedies he had compiled from other works including the Ebers papyrus. The Edwin Smith papyrus shows profound empirical knowledge of different types of injuries and how to treat them. Other medical documents from ancient Egypt include the great Berlin papyrus, the London papyrus, the Chester Beatty papyrus (number 6), the Carlsberg papyrus (number 8) and the Kahun papyrus.

Many of these are copies of Old Kingdom treatises made during the Middle and New Kingdoms.

The Egyptian Museum in Cairo's Tahrir Square contains examples of the medical implements used by doctors in ancient Egypt, as well as of the procedures they conducted on patients. These tools, Shaheen said, included forceps and scissors, and similar objects can be seen abroad, for example in the Brooklyn Museum in the United States. The Kom Ombo Temple in Aswan also contains important illustrations of the surgical instruments used by the ancient Egyptians.

Al-Shamaa adds that some of the instruments in the Kom Ombo illustrations are very much like the ones used by surgeons today. This is shown in the saw, the bifurcated sharp hook, scoop probe, crania clasp (used for making holes in the scalp and proof that the ancient Egyptians practiced some kind of brain surgery), tooth forceps, shears, sponges, scalpels, cauterising tools, cupping vessels, specula, mortars, needles and a copper pin with a loop head.

According to Shaheen, some medical practices in ancient Egypt can still be traced in folk medicine today, notably the cures for stomach aches and bodily deformations that are still used in Upper Egypt. The ancient Egyptians even invented anaesthesia in the form of a treatment given to patients before operations. They used plants for painkillers, such as the clover that is still used by the Bedouin today. They were believed to be able to treat

brain damage, and this was confirmed by the UK scientists Douglas Derry and J.E. Harris who conducted research on mummies in the Egyptian Museum in the 1960s, finding traces of brain surgery on some of them in the form of small holes in their skulls.

Regarding the diseases the ancient Egyptians suffered from, Shaheen notes that Strouhal and his team had found traces of tuberculosis, pneumonia, and anthracosis in samples of lung tissues from 175 mummies they had examined between 1971 and 1974. They also found traces of fine desert sand, and microscopic investigations of other organs had confirmed the existence of parasitic diseases, especially those caused by bilharzia, trichinosis, thread worms, tape worms, liver flukes, strongyloides, trichuris, trichiura, ancylostoma duodenale, and dracunculus medinensis. Amoeboid cysts have also been discovered in ancient Egyptian mummies, with Shaheen noting that the presence of these diseases indicates the poor standards of hygiene in the countryside, where people were accustomed to go barefoot through water and eat unwashed fruit and vegetables.

The Strouhal team had discovered a case of the enlargement of the spleen, for example, probably due to malaria or bilharzia, in the mummy of a weaver called Nakht that dates back to the 19th Dynasty, Shaheen said. They had also found signs of smallpox and poliomyelitis, as well as over 30 cases of spinal tuberculosis, often with vertebral collapse and angular deformation. “Bone fractures were found three times more frequently in men than in women,” Shaheen said, adding that cases of degenerative diseases of the joints had also been noticed. A case of cancer had been found in the mummy of a man aged 40 to 50 from the Old Kingdom, originally found in a cemetery at Naga Al-Deir in Sohag. Cases of teeth decay and periodontitis had also been found in the examined mummies.

Al-Shamaa added that the list of diseases in the Ebers papyrus included a prescription for a disease called “a’ae,” believed to be heart disease. The papyrus mentions cases of “shaking” and damage to the heart, for example. Proof that the ancient Egyptians were advanced in ophthalmology and reflexology is found in the reliefs in the Ipyu Temple, which show a snwt iryt (oculist) curing one of the workers.

There is also a painting showing a doctor putting back the arm of one of the workers into its original place in a procedure now known as Kocher’s Method. “This proves that the workers received medical care at work,” Al-Shamaa said.

According to Strouhal, the ancient Egyptians distinguished a simple fracture, called sedj, where a bone is split in two, from a complicated fracture where a bone has many breaks, called peshen shetut. “Near the Sphinx in Giza are the tombs of workers who have traces of fractures in their legs, hands and necks,” Shaheen comments

Remedies, continued Shaheen, were derived from some 70 species of animals, 25 plants, 20 minerals, and a number of common food stuffs, drinks, and secretions. For example, the flesh, fat, blood, milk, gall, and urine of animals and humans were used in ancient Egyptian medicine, as were the leaves, fruit and powdered roots of plants like henbane, thorn apple and mandrake. Active ingredients were mixed by the doctor himself with bases such as milk, honey, sweetened beer or oil, or, for ointments, oil or fat.

The ancient Egyptians often resorted to fasting that could last for three days or so in some cases in order to enhance their health. They were very skilled in dressing wounds, using linen bandages, sutures, pads, and swabs. They normally drew the edges of wounds

together with bandages. For the first day, they would cover a wound with fresh meat and on the second with a dressing soaked in honey or oil. Severe or inflamed wounds were left uncovered, drenched in oil, kept cool and allowed to dry.

“Ancient Egyptian medicine still influences modern medicine,” said Shaheen, adding that dates and sycamore were very important resources for ancient Egyptian doctors. The seeds of dates were used to treat cancer. Fennel, called besbes, and watermelon were also used. “They had names for the parts of the body that can still be traced today, like the pupil of the eye, called boboon, which resembles the Arabic word bo’boa,” Al-Shamaa said.

They also invented the “prescription papyrus” on which a doctor would draw an eye that symbolised healing and resembled the eye of the god Horus. They developed replacement hands and other amputated parts of the body. At Deir Al-Medina on Luxor’s west bank, Shaheen said, Egyptologists had found a chair that resembles those used by women to give birth, this dating back to the Old Kingdom. However, by far the most famous procedure invented by the ancient Egyptians was embalming.

“It is believed that they may have used uranium to preserve the bodies, as one colleague has spotted traces of uranium in a mummy at the Egyptian Museum,” said Shaheen.

“Houses of life,” buildings that functioned as hospitals, were closely linked to temples and existed at Memphis, Akhetaten, Akhmin, Abydos, Koptos, Esna, and Edfu, among other places. The ancient Greeks called those who worked in the Houses of Life hierogrammatiki, or “experts.”

Doctors studied in such places, as they did at Per Bustet in the New Kingdom and at Abydos and Sais in the Late Period. They learnt from the texts left by their ancestors and from practical experience, according to the Ebers papyrus. A doctor who did not follow the prescribed rules could be punished by death. However, if he followed the rules and still could not cure a patient he was absolved from any charge.

According to Al-Shamaa, various ancient Egyptian papyri mention surgery especially in cases of labour and the diseases that can follow it. Four or more thousand years ago, there was an ancient Egyptian goddess named Neith who had an institute named after her that taught midwives medical skills as male doctors did not participate in delivering children. “This was the first childbirth hospital in the world,” al-Shamaa asserted.

Al-Shamaa said that the social status of doctors in ancient Egypt was very high. They were well paid and were given all sorts of privileges. For example, the pharaoh Djsor put his doctor’s name next to his own on the base of his statue, a considerable honour as the use of hieroglyphics was restricted. The pharaohs also had long life spans, which may say something about ancient Egyptian healthcare. Ramses II died at 90 years of age and queen E’aa Hetb at 84, while Thutmosis III ruled for 54 years.

“I believe that ancient Egyptian medicine should be taught in medical schools today, as it is the origin of modern medicine,” Al-Shamaa concluded.

**Please visit the site: <http://weekly.ahram.org.eg/News/6492/47/Ancient-Egyptian-remedies.aspx>**

## **SEAFARERS BROUGHT NEOLITHIC CULTURE TO EUROPE, GENE STUDY INDICATES**

How the Neolithic people found their way to Europe has long been a subject of debate. A study published June 6 of genetic markers in modern populations may offer some new clues.

Their paper, "Maritime route of colonization of Europe," appears in the online edition of the Proceedings of the National Academy of Sciences.

Between 8,800 to 10,000 B.C., in the Levant, the region in the eastern Mediterranean that today encompasses Israel and the West Bank, Jordan, Syria and part of southern Turkey, people learned how to domesticate wild grains. This accomplishment eventually allowed them to abandon their lives as nomadic hunter-gathers and become farmers.

Archeologists use this transition from hunter-gathering to farming to mark the end of the Paleolithic era, or Old Stone Age, and the beginning of the Neolithic era, or New Stone age.

Archeological evidence indicates that by 7,000 B.C. Neolithic farmers had moved into Europe. They introduced their ideas and genes to the native Paleolithic people, who had migrated into the continent 30,000 to 40,000 years before.

The transportation methods and travel routes the Neolithic used have long been questioned. Did they travel overland, by migrating first north from the Levant into Anatolia, a region that is now central Turkey, across the Bosphorus and then on through the Balkans into central Europe?

Or did they travel by sea? And if so, by what route? Did they travel directly from the coast of Levant to Crete and then across to Greece, as one theory holds? Or did they first travel north into Anatolia and then island hop from Turkey across a large group of islands, called the Dodecanese, to Crete and, from Crete, on to Greece and Europe?

To try to find an answer to those questions, an international team of researchers led by George Stamatoyannopoulos, professor of medicine and genome sciences at the University of Washington, looked at genetic markers found in 32 modern populations from the Near East and North Africa, Anatolia, the Aegean Islands and Crete, mainland Greece, and Southern and Northern Europe.

In this study, Stamatoyannopoulos and his colleagues compared the proportion, or frequency, of certain markers, called single nucleotide polymorphisms, (SNPs) or "snips," appearing in these different populations. When a migrating people moves into an area and intermixes with the local population, they introduce their genes into the native gene pool and acquire genes from the native peoples. This introduction of genes from one population to another is called "gene flow."



As subsequent generations continue the migration and the gene exchange is repeated again and again, the frequency of SNPs in the migrating population will reflect this genetic mixing. It is detectable in the populations they left behind.

In their study, the researchers hypothesized that the Neolithic migrants to Europe had primarily travelled by sea. They tested their hypothesis by comparing the frequency of the SNPs in populations that now inhabit the Levant, Turkey, the islands of the Aegean and the Mediterranean and Europe and North Africa. The results of their study are being published online today, June 9, by the Proceedings of the National Academy of Sciences.

The analysis confirmed the Neolithic migrants arose from the Levant. They then appear to have migrated first to Anatolia in central Turkey, across the Dodecanese, to Crete and then to Laconia at the southeastern tip of Greece.

As the migration continued, some populations moved north into northern Greece. but the bulk of the migration continued west to Sicily and then to the Mediterranean coast of Southern Europe and into Northern Europe.

"There were multiple migrations of Neolithic people into Europe and some, no doubt, went by the land route, but the predominant route was through Anatolia and then by sea, with Crete serving as major hub," said Stamatoyannopoulos.

Although it was not the main focus of their study, the researchers also looked at the gene flow in populations in the Arabian Peninsula and North Africa. They found that migrations of Neolithic people originating from the Near East also moved southeast into Arabia and through what is now Egypt and across the North African coast.

There was no evidence, however, of gene flow across the Mediterranean between Africa and Europe, This observation suggests that, although the sea allowed migrants to move along the coasts, it created a formidable barrier between the two continents.

The findings also address older controversies: whether Neolithic culture spread primarily by cultural diffusion, in which ideas move from population to population through cultural contacts, or whether the ideas were carried by migrating peoples, called demic diffusion, from the Greek demos meaning "people."

"While cultural diffusion certainly took place," Stamatoyannopoulos said, "These findings strongly bolster the demic diffusion hypothesis."

More information: [phys.org/news/2014-06-neolithi...migrated-europe.html](http://phys.org/news/2014-06-neolithi...migrated-europe.html)

**Please visit the site: <http://phys.org/wire-news/163847888/seafarers-brought-neolithic-culture-to-europe-gene-study-indicat.html>**

## **ANCIENT REMAINS FOUND ATOP BRISTOL UNIVERSITY CUPBOARD FOOD OFFERINGS FROM A ROYAL TOMB OF ANCIENT MESOPOTAMIA HAVE BEEN FOUND ON TOP OF A CUPBOARD IN BRISTOL**

The 4,500 year-old crab apple rings and fish bones were excavated from what is now southern Iraq in the 1920s but turned up at the University of Bristol.

The British Museum, which sponsored the original excavation, said the recovery of the finds was "exciting".

Dr Tamar Hodos, a university lecturer, said: "The remaining mystery is how it came to be here in the first place."

The ruins of the long-buried city of Ur were unearthed by British archaeologist Sir Leonard Woolley in the 1920s and early 1930s.

Sponsored by the British Museum and the University of Pennsylvania Museum, the finds from the dig were distributed between London, Philadelphia and Baghdad.

But during a clear-out of the University of Bristol's archaeology and anthropology department, a heavy wooden box was found with index cards linking it to Sir Leonard's excavations.

"I saw these keywords like predynastic, sargonid and royal tombs," said Dr Hodos.

"I Googled them and up popped the British Museum's excavations of the royal tombs at Ur."

The desiccated remains, which include tunny fish bones and crab apple rings, were studied in the 1970s for a paper published in the Journal of Archaeological Science.

But according to Dr Hodos, none of the authors had any connection with the university and "cannot account for how the material came to be in Bristol".

The British Museum, which has acquisitioned the remains, said they were "hopeful" they would go on display but because of their "organic nature" it would only be for short periods at a time.

Please visit the site: <http://www.bbc.com/news/uk-england-bristol-27940712>

---

## **DEMOLITIONS REVEAL ANCIENT ROMAN THEATER IN AEGEAN TOWN**

The stage walls and entrance of a Roman-era amphitheater in İzmir's Kadifekale neighborhood, once covered by expropriated shanty houses, have been unearthed due to the efforts of the İzmir Metropolitan Municipality.

The municipality has issued an order of expropriation on a 12,900-squaremeter area to unearth the ruins of the amphitheater. So far, 137 title deeds covering an area of 11,115 square meters have been purchased and 175 buildings have been demolished. The judicial process for the expropriation of the last 15 buildings in the area is ongoing, municipal officials noted.

Archeologists will start working in the area once the demolition is over.

The most comprehensive information about the ancient theater in Kadifekale can be obtained in the studies of Austrian architects and archaeologists Otto Berg and Otto Walter, who conducted studies in the region in 1917 and 1918, from their plans and drawings.

The remains of the theater, which is thought to have held a capacity of 16,000 people, has characteristics of the Roman era according to many researchers, the study reports.

Ancient resources claim Saint Polycarp from İzmir was killed in this theater during the early ages of Christianity, namely the paganism period of the Roman era, suggesting the theater has witnessed some tragic events in history.

When the municipality revives the theater, it will be able to be seen by those visiting the Konak, Akllsancak, Karşıyaka and Bornova neighborhoods of the city. The renovated theater will be home to shows and concerts similar to the Ancient Theater of Ephesus.

**Please visit the site: <http://www.hurriyetdailynews.com/demolitions-reveal-ancient-roman-theater-in-aegean-town-.aspx?pageID=238&nID=68118&NewsCatID=375>**

---

## **4,000-YEAR-OLD BURIAL WITH CHARIOTS** **DISCOVERED IN GEORGIA,** **BY OWEN JARUS**

An ancient burial containing chariots, gold artifacts and possible human sacrifices has been discovered by archaeologists in the country of Georgia, in the south Caucasus.

The burial site, which would've been intended for a chief, dates back over 4,000 years to a time archaeologists call the Early Bronze Age, said Zurab Makharadze, head of the Centre of Archaeology at the Georgian National Museum.

Archaeologists discovered the timber burial chamber within a 39-foot-high (12 meters) mound called a kurgan. When the archaeologists reached the chamber they found an assortment of treasures, including two chariots, each with four wooden wheels.

The team discovered ornamented clay and wooden vessels, flint and obsidian arrowheads, leather and textile artifacts, a unique wooden armchair, carnelian and amber beads and 23 golden artifacts, including rare and artistic crafted jewelry, wrote Makharadze in the summary of a presentation he gave recently at the International Congress on the Archaeology of the Ancient Near East, held at the University of Basel in Switzerland.

"In the burial chamber were placed two four-wheeled chariots, both in good condition, [the] design of which represents fine ornamental details of various styles," Makharadze wrote. The chamber also contained wild fruits, he added.

While the human remains had been disturbed by a robbery, which probably occurred in ancient times, and were in a disordered position, the archaeologists found that seven people were buried in the chamber.

"One of them was a chief and others should be the members of his family, sacrificed slaves or servants," Makharadze told Live Science in an email.

### **A time before the horse**

The burial dates back to a time before domesticated horses appeared in the area, Makharadze said. While no animals were found buried with the chariots, he said, oxen would have pulled them.

Other rich kurgan burials dating to the second half of the third millennium B.C. have also been found in the south Caucasus, said Makharadze in another paper he presented in February at the College de France in Paris. The appearance of these rich burials appears to be connected to interactions that occurred between nomadic people from the Eurasian steppes and farming communities within and near the south Caucasus, Makharadze said.

These interactions appear to have led to some individuals, like this chief, getting elaborate burials. The newly discovered armchair symbolizes the power that individuals

like the chief had. "The purpose of the wooden armchair was the indication to power, and it was put in the kurgan as a symbol of power," Makharadze said in the email.

The kurgan was found in eastern Georgia near the municipality of Lagodekhi and was excavated in 2012.

**Please visit the site: [http://www.huffingtonpost.com/2014/06/26/ancient-chariots-discovered-georgia\\_n\\_5532997.html](http://www.huffingtonpost.com/2014/06/26/ancient-chariots-discovered-georgia_n_5532997.html)**

---

---

## **MAN’S BEST FRIEND: DOGS IN PHARAONIC EGYPT, BY ANNIE SHANLEY**

Dogs were popular pets in ancient Egypt and were the objects of genuine affection by kings, nobles, and laborers. While not all ancient animals were given names, over 75 dog names have been identified and usually refer to the color or character of the dog. That owners cared for their dogs in this life is apparent by the veterinary papyri uncovered from ancient Egypt. Pets also shared in the afterlife with their owners as evident by their inclusion in tomb scenes and human burials.

When looking at depictions of dogs in ancient Egyptian art, scholars and general audiences are eager to determine what type of dog is being shown. Beginning in the Predynastic Period (c. 4000 BCE) the most commonly portrayed dog is a type of hunting hound with erect pointed ears and a short curly tail. This dog is often referred to as a Pharaoh Hound, an Ibizan Hound, or a Basenji.

But what about the actual remains of dogs? Bones recovered from archaeological sites have not been subjected to systematic studies, but those bones that have been examined belong to mutts. Recent DNA research into modern dog breeds may help point us in the right direction. Based on preliminary findings, the Basenji can be positively classified as an “ancient dog breed”, while the Pharaoh Hound and Ibizan appear to be more modern breeds. The Pharaoh Hound originates from Malta, and the name was given to the breed during the 1920’s because they look like the dogs in Egyptian art. The Ibizan Hound was first identified on the island of Ibiza off the coast of Spain. While it is true that more comprehensive DNA testing needs to be conducted, and the impact of selective breeding needs to be taken in to account as well, DNA science does offer exciting possibilities for identifying ancient Egyptian man’s best friend.

Annie Shanley is a doctoral student in the Art History Department at Emory University. Her research interests include the material culture and technology of Egypt, the Near East, and the ancient Mediterranean, Egyptian texts, and ancient trade. Annie’s current work focuses on glass and faience in Egyptian and Hittite texts.

Please visit the site: <http://www.wondersandmarvels.com/2014/06/mans-best-friend-dogs-in-pharaonic-egypt.html> [Go there for pict]

---

## **MODERN CHEMISTRY TECHNIQUES SAVE ANCIENT ART, NANOPARTICLES, LASER CLEANING, AND GLUE-EATING BACTERIA RESTORE VALUABLE FRESCOES AND PAINTINGS, BY RACHEL BRAZIL AND CHEMISTRYWORLD**

The history of art conservation is almost as long as the history of art itself. Michelangelo's [Sistine Chapel](#) frescoes were first restored in the mid-16th century, only decades after being painted. Water damage had caused a white potassium nitrate scale, which was treated with linseed and walnut oil. But such cosmetic solutions were sticking plasters and lacked the scientific understanding that has now revolutionised the field. Today, conservation scientists are finding innovative ways to clean and protect our cultural heritage.

Joyce Townsend, a conservation scientist at the [Tate Gallery](#) in London, UK, explains that all conservation projects start with a detailed assessment of the work. 'There is always a debate between conservators, curators and scientists thinking what is absolutely necessary to be done. Is there an option right now to do nothing at all, or is that unsafe because the object is deteriorating?' As well as providing for an artwork's survival, Townsend describes the basic ethical principles of any conservation process as 'ensuring that you do no harm to the work, and that wherever possible anything you do could be reversed by a later generation'.

Cleaning aims to restore artworks to how the artist intended them to look, but this is rarely simple and sometimes controversial. For example, the most recent Sistine Chapel restoration in 1994 had a small number of critics expressing horror and labelling the now bright frescoes 'Disney-esque'. Conservation scientist Bronwyn Ormsby, also at the Tate Gallery, believes a more nuanced view is required. 'The concept of taking a work back to its original appearance is essentially flawed, as materials change with time regardless of the level of protection.'

How an artwork is cleaned will depend on the nature of the material to be removed. With paintings, a variety of organic solvents are used, but the most common solvent is water, often with chelating agents, surfactants or salts to control pH. Applying solutions through tissues, gels and sponges is becoming the norm, due to the level of control offered by holding the cleaning system at the upper surface of the art. Such gels, introduced in the late 1980s, are usually water-based emulsions thickened with cellulose or synthetic polymers. By slowly releasing the solvent, they prevent some of the swelling damage that free solvents cause to paint layers.

### **Cleaning up past mistakes**

The problems that conservators face are sometimes caused by past conservation treatments. Historical conservation techniques seem bizarre to us today – for example,

the Sistine Chapel was restored in the seventeenth and early eighteenth centuries using, among other things, wine and sponges made of bread. The common practice of ‘lining’ deteriorating canvases is a good example of a process that now causes problems. ‘In the nineteenth century, they did this by hand ironing on the surface and actually pressing the painting. That has led to a lot of changes,’ Townsend explains. ‘At the same time, if they hadn’t done it, these paintings might not be with us today.’

The problem is not confined to the distant past: during the 1960s, for example, it became popular to use synthetic polymers to consolidate and stabilise frescoes – plaster-based wall paintings. They seemed like the perfect replacement for the wax coatings previously used, but over time it became clear that this was not the case. Their presence drastically changed the paintings’ surface properties, causing mechanical stresses and crystallisation of salts beneath the painting leading to accelerated disintegration. In addition, the polymers themselves became discoloured and brittle, particularly in hot countries such as Mexico, where they were extensively used on murals at pre-Colombian archaeological sites.

These problems have driven innovations, but so has the need to create treatments that do not expose conservators to harmful solvents and chemicals. Conservation does not always take place in a lab – a conservator might be treating a fresco in a small, badly ventilated space. Health and safety concerns have motivated new methods, as well as a desire to use green processes that minimize environmental harm.

### **Destroying dirt with lasers**

One method that ticks these boxes is laser ablation. Surface deposits can be removed from artworks with short bursts from a laser beam. The technique was first used in the 1970s for cleaning ‘black crust’ from marble buildings and sculptures. This is a deposit often found in polluted environments and can be difficult to clean. It is largely gypsum (calcium sulfate dehydrate) mixed with airborne particulates. The method was slow to catch on as lasers were very expensive, and there was also scepticism about the cleaning control it offered.

By the mid-1990s, laser cleaning was established for stone and started to be used for other materials such as gilded bronzes and frescoes. A major breakthrough came when an Italian physicist at the National Research Council Institute of Applied Physics in Florence, [Salvatore Siano](#), developed a method that used even shorter pulses, of only micro to nanosecond duration. The neodymium-doped yttrium aluminium garnet (Nd:YAG) lasers commonly used in conservation emit light of 1064nm wavelength, in the near infrared. They are hand-held, portable devices and in most cases treatments will be carried out on a wetted surface to prevent over-heating. Siano’s work investigated a number of pulsing methods, including Q-switching which uses an optical switch to create a maximum energy pulse as short as 6ns.

The laser cleans by heating and expanding the surface, causing pressure waves that act like a rapid vacuum cleaner burst and detach surface material. If water is present at the interface between layers, its vaporisation also produces fractures. Shorter high-intensity laser pulses favour pressure effects while thermal effects dominate with longer pulses. By carefully selecting the pulse energy criteria, the laser will remove encrustations and dirt while leaving the material underneath unharmed.



Siano and his team first used laser treatments on metals in 2001 with a major restoration of the *Porta del Paradiso* (Gates of Paradise), the gilded-bronze doors of [Florence's Baptistery of San Giovanni](#), designed in 1401 by early Renaissance artist [Lorenzo Ghiberti](#). The masterpiece, often claimed as the starting point of the Renaissance itself, contains 40 gilded reliefs of Old Testament scenes, which were heavily encrusted. 'The use of an infrared wavelength, which is highly reflected by gold, makes the laser removal very safe without any risk of damaging the gold film,' explains Siano.

His team also began using lasers for treating frescoes and one of the most interesting examples is the 2009–10 restoration of the Santa Tecla catacombs beneath Rome. The early Christian paintings in this damp underground environment were covered with a hard-to-remove calcareous crust. Siano says this was 'a conservation problem that was absolutely insoluble with the traditional approaches'. The laser cleaning uncovered the earliest known images of the apostles Paul, Peter, John and Andrew on the ceiling of a fourth century AD tomb.

Siano is now turning his laser to removing old varnishes and restorations from easel paintings. He is still using a Nd:YAG laser, but passing the 1064nm beam through a nonlinear optical crystal to produce a visible green second harmonic wavelength of 532nm. At this lower wavelength, the laser cleans by causing photomechanical surface expansion. Siano used this method to restore a female portrait from the studio of the Italian Futurist artist [Giacomo Balla](#) (1871–1958). While not a standard option for paintings, Siano estimates that laser systems are now regularly employed for sculptures, bronzes and frescoes by more than 400 European conservation institutions.

**Please visit the site: [http://www.scientificamerican.com/article/modern-chemistry-techniques-save-ancient-art/?&WT.mc\\_id=SA\\_DD\\_20140627](http://www.scientificamerican.com/article/modern-chemistry-techniques-save-ancient-art/?&WT.mc_id=SA_DD_20140627)**

---