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Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Μάιος 2013 -

Την άνοιξη αν δεν την βρεις, τη φτιάχνεις.

(Οδυσσέας Ελύτης)

Newsletter of the Hellenic Society of Archaeometry

- May 2013 -

Nr. 146

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

IWA REGIONAL SYMPOSIUM ON WATER, WASTEWATER, AND ENVIRONMENT: TRADITIONS AND CULTURE WILL BE HELD IN PATRAS, HELLAS, MARCH 22-25, 2014

Dear Colleagues,

"Probing the past and facing the future ". It is my great pleasure to invite you to the IWA Regional Symposium on *Water, Wastewater, and Environment: Traditions and Cultures*. This event will take place from 22nd to 24th of March 2014 in Patras, Greece, the cultural capital of Western Greece and the centre of many ancient civilizations, during which several water and wastewater technologies were developed. The opening day coincides with World Water Day 2014 and special events will be organized by IWA and other international and local organizations.

The Symposium is dedicated to themes relevant to traditional and cultural technologies of water and wastewater. The event will bring together research scientists, historians, archaeologists, and engineers from academic institutions and industries around the world. Its objectives are to foster interactions, stimulate discussions and promote co-operation among the global water community. The Symposium will present the major achievements in several scientific fields of water and wastewater technologies and management throughout the millennia. In addition, it will provide valuable insights into the ancient, traditional, and cultural water and wastewater technologies with their apparent characteristics of durability, adaptability to the environment, and sustainability. These technologies are the underpinning of modern achievements in water and wastewater engineering and management practices. It is the best proof that *"the past is the key for the future."* I believe that you will enjoy the Symposium and that your participation will contribute to your professional enhancement. More information are given in: <http://wwetc2014.env.uwg.gr/wms/>

See you in Patras, Greece, on March 22nd, 2014 to celebrate the World Water Day.

With kind regards,

Andreas N. Angelakis
Chairman of the IWA SG on Water and Wastewater in Ancient Civilizations

IWA Workshop on Traditional Qanats Technologies, in Marakesh, Morocco, 24-26 October 2013, <http://www.iwa-traditionaltechnologies2013.ma/>

IWA Regional Symposium on Water, Wastewater, and Environment: Traditions and Culture will be held in Patras, Hellas, March 22-25, 2014, <http://wwetc2014.env.uwg.gr/wms/>

Dr. Andreas N. Angelakis
Honorary Member of IWA
Fellow IWA
Past President of EUREAU
Chairperson of IWA-WWAC SG on Water and Wastewater in Ancient Civilizations

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IAMS SUMMER SCHOOL 2013

The Institute for Archaeo-Metallurgical Studies (IAMS) is once again hosting its annual summer school at UCL's Institute of Archaeology in London. This year's course will take place over the two weeks directly following the HMS' 50th Anniversary Conference, from the 17th to the 28th of June.

The summer school covers a wide range of topics on the study of archaeological but mainly focuses on the various methodologies employed in the analysis of metallurgical remains and the social and technological inferences that can be made from these. The lectures will be given by several academics supplementing the teaching with case studies from their own research to demonstrate this functional approach. In addition, some of the sessions will include artefact handling sessions and the practical use of archaeometric analysis using SEM, XRF, and pXRF.

We encourage anyone with an interest in archaeometallurgy to join us at the summer school, and it is certainly not restricted to students or academics. Some funding is available for students on a limited budget, so please don't hesitate to ask if you would like to attend.

For more details, please download the pdf here:

https://dl.dropbox.com/u/95322820/IAMS_summer_school_2013.pdf, or visit our website <http://www.ucl.ac.uk/iams>.

Questions should be sent to pira.venunan.10@ucl.ac.uk.

UPCOMING NARNIA TRAINING COURSES

1.
Title: Interior decoration in the Eastern Mediterranean during Hellenistic and Roman times : mosaics, paintings, iconography, materials, techniques and conservation
Dates: 22-25 May 2013
Organiser: Université de Paris Ouest
Location: Nanterre, France
Link for more info: <http://narnia-itn.eu/trainingcourses/seminar-on-the-creation-of-multilingual-digital-databases-with-data-and-images-of-ancient-mosaics/>
2.
Title: Information systems for Archaeology and Cultural Heritage
Dates: 27-29 May 2013
Organiser: Université de Paris Ouest
Location: Nanterre, France
Link for more info: <http://narnia-itn.eu/trainingcourses/seminar-on-the-evolution-of-mosaics-in-the-greek-world-of-the-classical-and-hellenistic-period-5th-1st-centuries-bc/>
3.
Title: Thermal and mechanical properties of archaeological ceramics
Dates: 17-19 June 2013
Organiser: N.C.S.R. Demokritos
Location: Athens, Greece
Link for more info: <http://narnia-itn.eu/trainingcourses/thermal-and-mechanical-properties-of-archaeological-ceramics/>
4.
Title: Aegean ceramic technology from theory to practice
Dates: 20-27 June 2013
Organiser: THETIS AUTHENTICS LTD
Location: Athens, Greece
Link for more info: <http://narnia-itn.eu/trainingcourses/aegean-ceramic-technology-from-theory-to-practice/>

I also encourage you to visit the NARNIA website (www.narnia-itn.eu) for more information about this FP7 Marie Curie ITN, the project's research and training activities.

With my best wishes,

Maria Dikomitou Eliadou

Dr Maria Dikomitou-Eliadou

Project Manager

New Archaeological Research Network for Integrating Approaches to ancient material studies (NARNIA)

FP7 - PEOPLE - Marie Curie Initial Training Network

www.narnia-itn.eu

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**VIRTUAL HERITAGE SCHOOL ON DIGITAL
CULTURAL HERITAGE (3D
DOCUMENTATION, KNOWLEDGE
REPOSITORIES AND CREATIVE
INDUSTRIES), 27-30 MAY 2013**

The workshop focuses on advanced technologies applied to Cultural Heritage (CH) research, in particular digital data acquisition (photogrammetry, laser scanning and Structure-from-Motion), the use of open-source software for data post-processing, metadata standards, knowledge repositories and creative industries. Theoretical aspects will be complemented with fieldwork activities at archaeological sites. Professionals from CH institutions (cultural foundations, museums), young researchers and students are invited to submit their application to attend the workshop. A limited number of fellowships are available.

The workshop is organized by The Cyprus Institute in collaboration with:

- Cyprus Department of Antiquities
- Fraunhofer-Institut für Graphische Datenverarbeitung IGD, Germany
- Consiglio Nazionale delle Ricerche, Italy
- Forth-Hellas, Greece
- West University, Romania

Please visit the site: <http://www.linksceem.eu/ls2/component/rsevents/event/23-Virtual-Heritage-School-on-Digital-Cultural-Heritage.html>

XRF BOOT CAMP FOR CONSERVATORS, YALE UNIVERSITY, NOVEMBER 5-8, 2013

The Institute for the Preservation of Cultural Heritage (IPCH) at Yale University and the Getty Conservation Institute (GCI) are inviting applications for the first, jointly-organized, XRF Boot Camp for Conservators to be hosted by Yale University in 2013.

Information about the XRF Boot Camp can be accessed by visiting:

[URL: http://ccap.yale.edu/news/x-ray-fluorescence-boot-camp-conservators](http://ccap.yale.edu/news/x-ray-fluorescence-boot-camp-conservators)

The online application form can be directly accessed by visiting:

[URL: http://www.regonline.com/xrfbootcampapplication](http://www.regonline.com/xrfbootcampapplication)

The XRF Boot Camp for Conservators is a professional development opportunity tailored to conservators who have some experience with the use of handheld x-ray fluorescence spectrometers. The objective of the Boot Camp is to empower conservators to become advanced users of XRF by providing in-depth training in the principles of x-ray fluorescence spectroscopy as well as in the collection and interpretation of data, focusing primarily on qualitative analysis.

Interactive lectures are paired with laboratory activities that involve hands-on instrument use, data processing and interpretation.

Curriculum for the first three days of the XRF Boot Camp deals with:

The dependence of analysis results on the nature of the excitation and the sample

The impact of instrument components and operating parameters on results

Development of a consistent approach to spectral interpretation and data management

The impact of sample matrices on results

Selection of excitation and other instrument parameters to meet analytical goals

Practical tips on dealing with proper setup of equipment

The optional fourth day of the XRF Boot Camp is dedicated to the analysis of painted surfaces, focusing on the common challenges faced by conservators of paintings, objects and works on paper when dealing with multilayer coatings on a variety of substrates. These include:

Challenges in the inference of pigments from elemental data

Issues in positioning the instrument relative to target areas

Interpretation of data from multilayered structures

Appropriate data analysis and reporting

Invited instructors:

Maggi Loubser (Group Chief Chemist at PPC Cement, South Africa)

Alexander Seyfarth (Senior Global Product Manager for Handheld XRF at Bruker AXS)

Chris McGlinchey (Sally and Michael Gordon Conservation Scientist at the Museum of Modern Art, New York)

Organizers and lab exercise facilitators:

Aniko Bezur (Director of scientific research) and Erin Mysak (Conservation Scientist) at the Yale Center for Conservation and Preservation

Karen Trentelman (Senior Scientist) and Lynn Lee (Assistant Scientist) at the Collections Research Laboratory, Getty Conservation Institute

The application deadline is June 3, 2013. Applicants will receive notification of their acceptance status by July 3, 2013.

Registration for accepted applicants will be July 8-26, 2013. If accepted applicants are unable to register for the workshop by July 26, 2013, their spaces will be offered to applicants on the waiting list.

The workshop registration fee for first three days is \$360 per person. Registration for the optional fourth day is an additional \$120 per person. (Registration fees for all four days total \$480.) Participants must complete the first three days in order to attend the optional fourth day.

Registration includes the conference attendance, a conference work booklet, continental breakfast at the workshop venue, coffee breaks, and the Thursday evening reception. Lunches and dinners are not included in the registration fee (lunch is available at the West Campus cafeteria for \$7 per person during the first three days).

For questions about the online application form, please contact Yale Conference and Event Services at 203-432-0465 or confserv@yale.edu.

Regarding questions about the XRF Boot Camp, please email xrfbootcamp@yale.edu.

Aniko Bezur, PhD
Director of Scientific Research
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email: aniko.bezur@yale.edu

UPPER HOUSE SEMINAR, THE BRITISH SCHOOL AT ATHENS, MONDAY, 13TH MAY

THE DIRECTOR OF THE BRITISH SCHOOL AT ATHENS
INVITES YOU TO AN UPPER HOUSE SEMINAR
MONDAY, 13TH MAY, 2013 AT 7.00 P.M.

Dr Katerina Douka

(University of Oxford & Early Career Fellow, British School at Athens)

will introduce the topic:

“Dating the arrival of the first modern humans and the disappearance
of Neanderthals in southern Mediterranean Europe”

The UH seminar will take place in the saloni of the Director’s residence, British School
at Athens.

Entrance from 52 Souedias str. Tel: 211 1022 800

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ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS
WILLIAMS FELLOW IN CERAMIC
PETROLOGY FITCH LABORATORY,
BRITISH SCHOOL AT ATHENS

The Fitch Laboratory of the British School at Athens, a centre of advanced research which promotes the integrated application of scientific techniques to the archaeology of Greece and the East Mediterranean, invites applications for the Williams Fellowship in Ceramic Petrology.

The Fellow will undertake research on archaeological ceramics, involving work in the field, the laboratory and the library, in order to produce publications of international excellence. In addition to Laboratory projects, the Fellow will be encouraged to pursue his/her own research initiatives. His/her research programme will be agreed with the Laboratory Director and approved by the Fitch Laboratory Committee, and his/her performance will be subject to periodic evaluation. The Fellow is expected to contribute to the postgraduate training course on ceramic petrology organised annually by the Fitch Laboratory and to be responsible for maintaining the laboratory facilities for ceramic petrology (e.g. microscopes).

Candidates must hold a PhD (or be close to acquiring one) in Archaeology or Archaeological Science combined with proven training/experience in using petrographic analysis with thin sections (optical microscopy). Importance is attached to familiarity with Aegean or East Mediterranean archaeology, and knowledge of Modern Greek is desirable (but not essential). Evidence of the ability to produce research publications to an international standard will be an advantage. Applicants should be able to engage in and contribute to a research group and develop research agendas.

The fellowship is for three years. The post is based in Athens, Greece, and the gross salary will be in the range of £20,000-22,000 per annum, plus private health insurance.

Applicants are asked to supply the following:-

- A covering letter, giving the applicant's contact details, outlining the reasons for applying, giving details of supporting enclosures, and summarising the applicant's principal qualifications for the job;
- A curriculum vitae, giving details of past employment, academic and other qualifications, any relevant experience, research interests and publications;
- A proposal for a potential research project matching both the interests of the applicant and the Laboratory (up to one page);
- The names, addresses, telephone numbers and email addresses of two referees, whom the candidate has contacted in advance and who have agreed to supply letters of reference which they will send to the School Administrator by the closing date;

Applications and references should be submitted via email to the School Administrator, Mrs Tania Gerousi (school.administrator@bsa.ac.uk).

Closing date for receipt of applications and references: 31 May 2013. Shortlisted candidates will be interviewed in late June/early July. The successful candidate will be expected to take up the post from 1 October 2013.

Equality of opportunity is BSA policy.

For further details on the British School at Athens and the Fitch Laboratory, check the relevant sections in the School's website (http://www.bsa.ac.uk/pages/award_drill.php?cat_id=9&award_id=21). For informal enquiries please contact the Laboratory Director, Dr Evangelia Kiriati (fdirector@bsa.ac.uk).

FITCH LABORATORY - FITCH BURSARY **AWARDS 2013-14**

Applications are invited from graduate students or young scholars for an award to support research at the Fitch Laboratory, British School at Athens (BSA) for up to 3 months in the academic year 2013-14 in any of the fields in which the Laboratory is active (e.g. ceramic petrology, archaeometallurgy, geophysical prospection, zooarchaeology, archaeobotany, soil micromorphology, ethnoarchaeology, landscape archaeology, archaeology of technology; normally in the context of Aegean/Mediterranean archaeology). Preference may be given to research on bioarchaeology and soil micromorphology. The Bursary includes a monthly stipend (400€), BSA membership and accommodation at the BSA Hostel in Athens and, if required for research purposes, also in Knossos. The award holder will be required to submit a report on her/his research at the Laboratory to the Laboratory's Subcommittee and Director.

The successful applicant will be expected to use the facilities of the Fitch Laboratory (including analytical equipment and reference collections) as well as the BSA library to further on-going work, in the context of a postgraduate degree or postdoctoral research. The award carries no other formal obligation, although involvement in the academic life of the BSA (for example in the form of a seminar) is welcome.

Applications should include a covering letter (indicating the preferred length and period of stay), a Curriculum Vitae, a statement of the proposed programme of research and the names and contact details of two referees. Applicants should ask referees to send their recommendations by the deadline. The successful applicant will be responsible for acquiring on time any required permits for study and transfer of archaeological material to the Fitch Laboratory. Applicants are also advised to contact the Laboratory Director if the use of analytical facilities is necessary for the proposed research.

Applications and reference letters should be submitted by **Friday 14 June 2013** via e-mail to Mrs Tania Gerousi, the BSA administrator (school.administrator@bsa.ac.uk). Candidates will be informed on the selection outcome by the end of July.

Potential applicants may contact Mrs Gerousi (school.administrator@bsa.ac.uk), or Dr Evangelia Kiriatzi, the Laboratory Director (fldirector@bsa.ac.uk), for further information. Additional details about the School and the Laboratory can be also found at <http://www.bsa.ac.uk/>.

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS
SPECIAL ISSUE ON WORLDWIDE HISTORY
OF WATER SUPPLY, SANITATION,
WASTEWATER AND STORMWATER
TECHNOLOGIES

Dear Colleagues,

The following Special Issue will be published in Water journal and is now open to receive submissions of full research papers and comprehensive review articles for peer-review and possible publication:

Special Issue: **Worldwide History of Water Supply, Sanitation, Wastewater and Stormwater Technologies.**

http://www.mdpi.com/journal/water/special_issues/stormwater_technologies,

Please submit your manuscripts before **1 July 2013**.

You may send your manuscript now or up until the deadline. Submitted papers should not have been published previously, nor be under consideration for publication elsewhere.

In case of questions, please contact the Editorial Office at: water@mdpi.com

We are looking forward to hearing from you.

Kind regards,

Andreas N. Angelakis and Zheng Xiao Yun

Andreas

IWA Workshop on Traditional Qanats Technologies, in Marakesh, Morocco, 24-26 October 2013, <http://www.iwa-traditionaltechnologies2013.ma/>

IWA Regional Symposium on Water, Wastewater, and Environment: Traditions and Culture will be held in Patras, Hellas, March 22-25, 2014, <http://wwetc2014.env.uwg.gr/wms/>

Dr. Andreas N. Angelakis
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Site: <http://www.a-angelakis.gr/>

OPEN ACCESS FUNDING REQUEST FOR INTCAL13 RADIOCARBON CALIBRATION ISSUE

Dear colleagues,

The IntCal13 calibration issue of the journal Radiocarbon is due to be published in June. We would really like to be able to make the entire issue Open Access so that it is freely available immediately without a subscription. Unfortunately there is very little funding available to pay for publication. We need to raise \$10,000 to cover the costs of publishing the issue as open access. We are asking the geoscience and archaeology community to help out with charitable donations of whatever amount they can to help us reach this goal.

Donations can be made through the University of Arizona Foundation, which is an Arizona nonprofit corporation. The University of Arizona Foundation is a 501c(3) organization so all US donations are tax deductible. The corresponding tax ID number is 866050388. Individuals outside the US should check with their tax offices as some countries honor the US tax-deduction for registered 501c(3) organizations.

To make a donation please go to the secure website (the designation says AMS workshop) through the link below:

<https://www.uafoundation.org/netcommunity/sslpage.aspx?pid=359&fid=eRiewIGFQfY%3d&fdesc=DBXoObY7r4GIrhcJXbv6vIzEsal7IA0lDrbkTeuzNoDjuKSzeZOSg%3d%3d>

Thanks for your support!

Paula J. Reimer (spokesperson for IntCal Working Group)

Prof. Paula J. Reimer, Director
Centre for Climate, the Environment & Chronology (14CHRONO)
School of Geography, Archaeology and Palaeoecology
Queen's University Belfast Belfast, BT7 1NN U.K

INTERNET SITES

MAPS OF THE ANCIENT WORLD

At <http://www.ancient.eu.com/mapselect/> are interactive maps of the ancient world. Go there for inspection.

NEW WEBSITE FOR THE JEZREEL VALLEY REGIONAL PROJECT

The Jezreel Valley Regional Project is pleased to announce the opening of its newly redesigned website!

Additional databases and other features designed to promote and facilitate regional cooperative research will be rolled out in the coming months.

The Jezreel Valley Regional Project (JVVP) is a long-term, multi-disciplinary survey and excavation project investigating the history of human activity in the Jezreel Valley from the Paleolithic through the Ottoman period. This project strives for a total history of the region using the tools and theoretical approaches of such disciplines as archaeology, anthropology, geography, history, ethnography, and the natural sciences, within an organizational framework provided by landscape archaeology.

Please visit the site: www.jezreelvalleyregionalproject.com

CRETO MINOAN TECHNOLOGY & ASTRONOMY

Dear all,

I am sending you an interview that I gave in a Greek television station 1 year ago (and has been uploaded on YouTube) about the technology of the Minoan civilization (and the mechanism of eclipses' calculator). For those who speak Greek it will be interesting for me to see if they want to us send their comments on this research.

<https://www.youtube.com/watch?v=aerLraEOwso>

Kind regards,

Minas Tsikritsis

Dr. Minas Tsikritsis
Researcher of Aegean Scripts
and
Acting director
Educational Center for New Technologies
Ministry of Education
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Crete, Greece
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Email: mtsikritsis@gmail.com

CONSERVATION ONLINE - RESOURCES **FOR CONSERVATION PROFESSIONALS**

Welcome to CoOL

CoOL, an online resource operated by the Foundation of the American Institute for Conservation is a full text library of conservation information, covering a wide spectrum of topics of interest to those involved with the conservation of library, archives and museum materials. It is a growing online resource for conservators, collection care specialists, and other conservation professionals.

Please visit the site: <http://cool.conservation-us.org/> [Go there for details and links]

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS

BIOARCHAEOLOGY - AN INTEGRATED APPROACH TO WORKING WITH HUMAN REMAINS

Series: Manuals in Archaeological Method, Theory and Technique Martin, Debra L., Harrod, Ryan P., Pérez, Ventura R. 2013, XVII, 262 p. 30 illus., 10 in color.

Hardcover

ISBN 978-1-4614-6377-1

\$179.00

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CURRENT ANTHROPOLOGY, VOL. 54, NO. 2, **APRIL 2013**

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TWO NEW BOOKS ON **ARCHAEOLOGICAL METALLURGY AND HANDHELD** **XRF**

Announcing the release of two new texts on archaeological metallurgy and handheld XRF by

1.

Shugar, A. and Simmons S. (2013)
Archaeological Metallurgy in Mesoamerica: Current Approaches and New Perspectives

[URL: http://www.upcolorado.com/book/New_Titles/Archaeological_Metallurgy_in_Mesoamerica_cloth](http://www.upcolorado.com/book/New_Titles/Archaeological_Metallurgy_in_Mesoamerica_cloth)

Presenting the latest in archaeological metallurgical research in a Mesoamerican context, Archaeological Metallurgy in Mesoamerica brings together up-to-date research from the most notable scholars in the field. These contributors analyze data from a variety of sites, examining current approaches to the study of archaeological metallurgy in the region as well as new perspectives on the significance metallurgy and metal objects had in the lives of its ancient peoples.

2.

Shugar, A. and Mass J. (2012)
Handheld XRF in Art and Archaeology
[URL: http://upers.kuleuven.be/en/titel/9789058679079](http://upers.kuleuven.be/en/titel/9789058679079)

Over the last decade the technique of X-ray fluorescence has evolved, from dependence on laboratory-based standalone units to field use of portable and lightweight handheld devices. These portable instruments have given researchers in art conservation and archaeology the opportunity to study a broad range of materials with greater accessibility and flexibility than ever before.

In addition, the low relative cost of handheld XRF has led many museums, academic institutions, and cultural centres to invest in the devices for routine materials analysis purposes. Although these instruments often greatly simplify data collection, proper selection of analysis conditions and interpretation of the data still require an understanding of the principles of x-ray spectroscopy. These instruments are often marketed and used as 'point and shoot' solutions; however, their inexperienced use can easily generate deceptive or erroneous results.

This volume focuses specifically on the applications, possibilities, and limitations of handheld XRF in art conservation and archaeology. The papers deal with experimental methodologies, protocols, and possibilities of handheld XRF analysis in dealing with the complexity of materials encountered in this research.

EIAHΣEIZ - NEWS RELEASE

TROVE OF NEANDERTHAL BONES FOUND IN GREEK CAVE, BY CHARLES CHOI

A trove of Neanderthal fossils including bones of children and adults, discovered in a cave in Greece hints the area may have been a key crossroad for ancient humans, researchers say.

The timing of the fossils suggests Neanderthals and humans may have at least had the opportunity to interact, or cross paths, there, the researchers added.

Neanderthals are the closest extinct relatives of modern humans, apparently even occasionally interbreeding with our ancestors. Neanderthals entered Europe before modern humans did, and may have lasted there until about 35,000 years ago, although recent findings have called this date into question.

To learn more about the history of ancient humans, scientists have recently focused on Greece.

"Greece lies directly on the most likely route of dispersals of early modern humans and earlier hominins into Europe from Africa via the Near East," paleoanthropologist Katerina Harvati at the University of Tübingen in Germany told LiveScience. "It also lies at the heart of one of the three Mediterranean peninsulae of Europe, which acted as refugia for plant and animal species, including human populations, during glacial times — that is, areas where species and populations were able to survive during the worst climatic deteriorations."

"Until recently, very little was known about deep prehistory in Greece, chiefly because the archaeological research focus in the country has been on classical and other more recent periods," Harvati added.

Harvati and colleagues from Greece and France analyzed remains from a site known as Kalamakia, a cave stretching about 65 feet (20 meters) deep into limestone cliffs on the western coast of the Mani Peninsula on the mainland of Greece. They excavated the cave over the course of 13 years.

The archaeological deposits of the cave date back to between about 39,000 and 100,000 years ago to the Middle Paleolithic period. During the height of the ice age, the area still possessed a mild climate and supported a wide range of wildlife, including deer, wild boar, rabbits, elephants, weasels, foxes, wolves, leopards, bears, falcons, toads, vipers and tortoises.

In the cave, the researchers found tools such as scrapers made of flint, quartz and seashells. The stone tools were all shaped, or knapped, in a way typical of Neanderthal artifacts.

Now, the scientists reveal they discovered 14 specimens of child and adult human remains in the cave, including teeth, a small fragment of skull, a vertebra, and leg and foot bones with bite and gnaw marks on them. The teeth strongly appear to be

Neanderthal, and judging by marks on the teeth, the ancient people apparently had a diet of meat and diverse plants.

"Kalamakia, together with the single human tooth from the nearby cave site of Lakonis, are the first Neanderthal remains to be identified from Greece," Harvati said. The discoveries are "confirmation of a thriving and long-standing Neanderthal population in the region."

These findings suggest "the fossil record from Greece potentially holds answers about the earliest dispersal of modern humans and earlier hominins into Europe, about possible late survival of Neanderthals and about one of the first instances where the two might have had the opportunity to interact," Harvati said.

In the future, Harvati and her colleagues will conduct new fieldwork in other areas in Greece to address mysteries such as potential coexistence and interactions between Neanderthals and modern humans, the spread of modern and extinct humans into Europe and possible seafaring capabilities of ancient humans.

"We look forward to exciting discoveries in the coming years," Harvati said.

The scientists detailed their findings online March 13 in the Journal of Human Evolution.

Please visit the site: <http://www.livescience.com/28326-neanderthal-remains-found.html>

POMPEII: WHAT OBJECTS DID PEOPLE TAKE AS THEY FLED? BY DHRUTI SHAH AND ROSIE WAITES

Buried in volcanic ash alongside the people of ancient Pompeii and Herculaneum were the possessions they took with them as Mount Vesuvius erupted, but what do these items they cling to tell us about them and us?

The city of Herculaneum at the foot of Mount Vesuvius was overwhelmed by a fiery pyroclastic flow - a fast moving current of superheated ash and gas - which would have swamped and killed its victims - instantly vaporising their flesh.

And around 10 miles (16km) away the citizens of Pompeii also died suddenly, killed by extreme heat of 300C. Falling ash preserved the forms of many of their bodies.

Until that day, they would not have had any idea that the volcano was a danger, says Paul Roberts, curator of the British Museum's Pompeii exhibition.

Vesuvius is thought to have lain dormant for the previous 700 years. There had been earth tremors for several days before the eruption, according to an eye-witness account made by the younger Pliny, a Roman administrator and poet.

But ancient Romans thought these were caused by currents of air, and were unaware that they could be a warning of a volcanic eruption.

All the evidence is that the eruption in AD79 caught the local population utterly unprepared.

But as Vesuvius began emitting black clouds of ash, and the danger became more obvious, most people fled or sought shelter. So what did they reach for in the hours before the fatal eruption?

There are many practical items like lamps and lanterns. Even before nightfall, the cities could have been plunged into darkness ahead of the main eruption which came shortly after midnight.

Some people had their keys, clearly hopeful that they would be returning home.

Hundreds of refugees from Herculaneum had taken shelter in the vaulted arcades at the beach, perhaps hoping to be rescued, clutching their jewellery and money.

Found at Herculaneum - One bracelet, 40 trinkets including amber from the Baltic and faience from Egypt

Among them was a young girl found with a charm bracelet, constructed of more than 40 charms from all over the Roman empire. She may have hoped it would bring her good

luck. The bracelet would have had "no financial value," says Paul Roberts, "but is a very poignant object, which must have had sentimental value for its owner."

People took things that had personal meaning - a doctor was found with his medical kit, which included scalpels, forceps, and a needle. "We can never know if this was to safeguard the tools of his trade, or a valiant attempt to help the wounded," says Roberts.

One woman was found with bags of jewellery, and gold and silver coins - more wealth than found with any other body. Around her neck was a large necklace, or "body chain", which she must have been particularly attached to, as it was the only piece of jewellery she was wearing.

Along with more precious items, there was a single battered earring and fragments of an armlet - suggesting that she didn't have time to carefully choose what she took, but may have simply grabbed or tipped her jewels into a bag as she fled.

The possessions of another young woman, found outside Pompeii's Nola gate, suggest that superstition and faith played their part as the victims tried desperately to escape from the rising heat and falling pumice.

The "Porta Nola" girl carried a silver statuette of the Egyptian goddess Isis-Fortuna, protective silver amulets including one in the shape of a phallus which was thought to protect against the evil eye, and rings containing icons associated with luck,

It is impossible to know whether she, or any of the victims, grabbed those objects at the last minute, but she had clearly tried to protect herself from bad fortune.

The people of Pompeii and Herculaneum were ordinary people, says Roberts, ranging from the very wealthy to poor slaves, but they died in an extraordinary way. They must have assumed that life would continue as normal, but they were interrupted by a force beyond their control.

And their reactions, he adds, may not have been so different from those of people caught up in recent catastrophes.

Following floods in Buffalo Creek in the US in 1972, sociologist Kai Erikson studied what possessions people took with them as they left their homes. He says they represented "a measure of security, an extension of self, a source of identity", which he describes as "the furniture of the self".

Will Gompertz takes a look at the British Museum's exhibition on domestic life in Pompeii and Herculaneum

Similar findings followed the 2007 floods which affected the community of Toll Bar in Doncaster.

Residents had little time to choose what to take with them when they were evacuated says Dr Lucy Easthope, an expert in disaster response. In hindsight, she says, they would either laugh or regret their choices.

One woman snatched up her cockatiel as firefighters evacuated her. But she forgot to bring the bird's cage and had to spend hours in the rest centre holding her pet in her arms. Others picked up their televisions, but wished later they had taken precious family photos.

People in Pompeii and Herculaneum were also found with impractical items, says Paul Roberts. Some had bulky silver pots, which would have made it hard to escape with any speed, but would have been seen as a valuable item that they could trade for food or money.

In any case, the people killed at Pompeii and Herculaneum did not live long enough to regret what they chose.

But one modern survivor of disaster has learned a vital lesson from his experience of fleeing after the earthquake and tsunami at Fukushima in 2011.

Should he ever be displaced from his home again, Ryan McDonald only has to reach into his closet where possessions are separated, "emergency things to the left and regular clothes to the right"

Please visit the site: <http://www.bbc.co.uk/history/0/21670737> [Go there for pix]

FOSSIL DNA USED TO RESET HUMANITY’S CLOCK PROVIDES A BETTER DATE OF WHEN SOME OF OUR ANCESTORS LEFT AFRICA, BY AKSHAT RATHI

Some time in humanity’s past, a small group of Homo sapiens migrated out of Africa before spreading out to every possible corner of the Earth. All the women of that group carried DNA inherited from just one woman, commonly known as mitochondrial Eve, whose DNA was inherited by all humans alive today. But the exact timing of this migration is not clear, and it has sparked debate among geneticists. Now, new research published in Current Biology may help calm both sides.

Studies of evolutionary events often involve the use of molecular clocks based on changes in DNA that accumulate over time. To accurately calibrate a clock, it helps to have a measure of the rate of mutations.

In 2012, UK Researchers used a method of analysis that involves DNA from the nucleus of present day humans. Armed with data from parents and their offspring, they estimated a new, much lower rate of DNA mutation. Based on their results, it would seem that human DNA may change much more slowly than was previously thought. The slow mutation rate puts the date of human migration out of Africa at somewhere between 90,000 and 130,000 years ago.

"This was very surprising," says Alissa Mittnik, a researcher at the University of Tübingen in Germany. "It contradicts what we know from fossil studies."

Those fossil studies have used mitochondrial DNA (mtDNA), which is easily preserved in old fossils, to estimate the mutation rate. The mutation rate was then used to calibrate events in humanity’s past.

This data spills into other areas of research. For example, when combined with evolutionary models, this information can help predict which humans were able to build the various things that have been dug up by archaeologists. Carbon dating can give the precise age of the objects, but depending on the mutation rates, the species that made and used the object could be, for instance, modern humans or the Neanderthals.

In Current Biology, Mittnik and her colleagues report a new mutation rate. This rate may help researchers find a middle ground on the period when the African migration happened.

Their estimate relies on mtDNA too, but they claim it is much more reliable, in part because it uses mtDNA from ten different fossils, ranging from 700 to 40,000 years old. The new estimated rate is higher than the UK researchers got using nuclear DNA, but lower than older estimates of mtDNA studies. The lower rates reported by UK researchers, Mittnik says, could be because of their use of “too stringent” filters—their analysis missed out on mutations that might have actually occurred (technically called “false negatives”).

Mittnik admits that, if it were possible, she would have studied nuclear DNA of fossils. That is because mtDNA only has 37 of the roughly 20,000 human genes—the rest are in nuclear DNA. But each cell has only two copies of nuclear DNA. Whereas it has hundreds of copies of mtDNA because it has many mitochondria in each cell, and each of them have multiple copies of the mtDNA. This makes it much harder to study nuclear DNA from fossil remains.

Based on Mittnik's results, the suggested range for the time when Homo sapiens moved out of Africa has been set to 62,000 to 95,000 years ago. Thus, there's common ground with other estimates between 90,000 and 95,000 years ago. Mittnik says she won't be surprised if the precise date of migration was later than archaeologists currently believe, but it certainly is earlier than what the UK researchers claim.

Please visit the site: <http://arstechnica.com/science/2013/03/fossil-dna-used-to-reset-humanitys-clock/>

CAMERAS WATCH ROYAL TOMBS IN ALACAHÖYÜK

The royal tombs at Çorum's Alacahöyük ancient site, one of the most important ancient sites in Turkey, are being protected with security cameras. The tombs display the skeletons of princes and princesses and some of their goods.

The royal tombs at the Alacahöyük site display the skeletons of the princes and princesses buried there and the gold and silver objects found in their graves. The new camera system is protecting the artifacts in the area.

The Culture and Tourism Ministry has installed a security camera system at the Alacahöyük ancient site in the Central Anatolian province of Çorum. The camera system will prevent damage to the ancient graves of princes and princesses at the site.

Alacahöyük was a Hittite settlement and is one of the most important archaeological sites in Turkey. It is located 15 kilometers from the Alaca district center in the northeast of Boğazköy, where the ancient capital city Hattuşa of the Hittite Empire was situated.

Excavations have been conducted at the ancient site for more than 100 years. The site, which has been settled continuously since the Chalcolithic Age in 4000 B.C., was also one of the most important centers in the Hittite Empire.

Graves reconstructed to original size

Thirteen royal tombs in Alacahöyük were richly adorned with gold fibulae, diadems and belt buckles and gold-leaf figures. Many of the artifacts discovered at Alacahöyük, including magnificent Hittite gold and bronze objects found in the royal tombs, are displayed today in the Museum of Anatolian Civilizations in Ankara.

Six of the 13 royal graves at Alacahöyük have been reconstructed in their original sizes and opened to visitors. The tombs display the skeletons of the princes and princesses buried there and the gold and silver objects found in their graves. The camera system was placed by the ministry to protect these graves and the ancient site.

Ankara University member and the head of the Alacahöyük excavations, Professor Aykut Çınaroğlu, said the ancient site received nearly 50,000 visitors a year and they sometimes caused minor damage to the site. He said eight cameras had been placed in the area in order both to protect the Alacahöyük Museum at the ancient site and prevent damage.

“This work has been done considering the increase in the number of visitors to Alacahöyük. As part of this work, ancient sites began to be protected with camera systems. Eight cameras have been placed in certain places. Now the area can be monitored 24 hours a day.

Previously tourists used to step up on the walls and reliefs to take photos and damaged the artifacts. Thanks to these cameras, this will be prevented.”

Please visit the site: <http://www.hurriyetdailynews.com/cameras-watch-royal-tombs-in-alacahoyuk.aspx?pageID=238&nID=43600&NewsCatID=375>

PLUTO'S GATE UNCOVERED IN TURKEY - A DIGITAL ILLUSTRATION SHOWS THE ANCIENT PLUTONIUM, CELEBRATED AS THE PORTAL TO THE UNDERWORLD IN GRECO-ROMAN MYTHOLOGY, BY FRANCESCO D'ANDRIA

A “gate to hell” has emerged from ruins in southwestern Turkey, Italian archaeologists have announced.

Known as Pluto's Gate -- Ploutonion in Greek, Plutonium in Latin -- the cave was celebrated as the portal to the underworld in Greco-Roman mythology and tradition.

Historic sources located the site in the ancient Phrygian city of Hierapolis, now called Pamukkale, and described the opening as filled with lethal mephitic vapors.

“This space is full of a vapor so misty and dense that one can scarcely see the ground. Any animal that passes inside meets instant death,” the Greek geographer Strabo (64/63 BC -- about 24 AD) wrote.

“I threw in sparrows and they immediately breathed their last and fell,” he added.

Announced this month at a conference on Italian archaeology in Istanbul, Turkey, the finding was made by a team led by Francesco D'Andria, professor of classic archaeology at the University of Salento.

D'Andria has conducted extensive archaeological research at the World Heritage Site of Hierapolis. Two years ago he claimed to discover there the tomb of Saint Philip, one of the 12 apostles of Jesus Christ.

Founded around 190 B.C. by Eumenes II, King of Pergamum (197 B.C.-159 B.C.), Hierapolis was given over to Rome in 133 B.C.

ANALYSIS: Tomb of Jesus' Apostle Found In Turkey?

The Hellenistic city grew into a flourishing Roman city, with temples, a theater and popular sacred hot springs, believed to have healing properties.

“We found the Plutonium by reconstructing the route of a thermal spring. Indeed, Pamukkale' springs, which produce the famous white travertine terraces originate from this cave,” D'Andria told Discovery News.

Featuring a vast array of abandoned broken ruins, possibly the result of earthquakes, the site revealed more ruins once it was excavated.

The archaeologists found Ionic semi columns and, on top of them, an inscription with a dedication to the deities of the underworld -- Pluto and Kore.

D'Andria also found the remains of a temple, a pool and a series of steps placed above the cave -- all matching the descriptions of the site in ancient sources.

“People could watch the sacred rites from these steps, but they could not get to the area near the opening. Only the priests could stand in front of the portal,” D'Andria said.

According to the archaeologist, there was a sort of touristic organization at the site. Small birds were given to pilgrims to test the deadly effects of the cave, while hallucinated priests sacrificed bulls to Pluto.

The ceremony included leading the animals into the cave, and dragging them out dead.

Top 10 Animal Mysteries and Myths Explained

“We could see the cave's lethal properties during the excavation. Several birds died as they tried to get close to the warm opening, instantly killed by the carbon dioxide fumes,” D'Andria said.

Only the eunuchs of Cybele, an ancient fertility goddess, were able to enter the hell gate without any apparent damage.

“They hold their breath as much as they can,” Strabo wrote, adding that their immunity could have been due to their "menomation," “divine providence” or “certain physical powers that are antidotes against the vapor.”

According to D'Andria, the site was a famous destination for rites of incubation. Pilgrims took the waters in the pool near the temple, slept not too far from the cave and received visions and prophecies, in a sort of oracle of Delphi effect. Indeed, the fumes coming from the depths of Hierapoli's phreatic groundwater produced hallucinations.

“This is an exceptional discovery as it confirms and clarifies the information we have from the ancient literary and historic sources,” Alister Filippini, a researcher in Roman history at the Universities of Palermo, Italy, and Cologne, Germany, told Discovery News.

Fully functional until the 4th century AD, and occasionally visited during the following two centuries, the site represented “an important pilgrimage destination for the last pagan intellectuals of the Late Antiquity,” Filippini said.

During the 6th century AD, the Plutonium was obliterated by the Christians. Earthquakes may have then completed the destruction.

D'Andria and his team are now working on the digital reconstruction of the site.

Please visit the site: <http://news.discovery.com/history/archaeology/gate-to-hell-found-in-turkey-130329.htm> [Go there for pix gallery]

NEW EXPERIMENTS ON SHROUD SHOW IT'S NOT MEDIEVAL

Professor Giulio Fanti and journalist Saverio Gaeta have published a book with the results of some chemical and mechanical tests which confirm that the Shroud dates back to the 1st century ANDREA TORNIELLI ROME

New scientific experiments carried out at the University of Padua have apparently confirmed that the Shroud Turin can be dated back to the 1st century AD. This makes it compatible with the tradition which claims that the cloth with the image of the crucified man imprinted on it is the very one Jesus' body was wrapped in when he was taken off the cross. The news will be published in a book by Giulio Fanti, professor of mechanical and thermal measurement at the University of Padua's Engineering Faculty, and journalist Saverio Gaeta, out tomorrow. "Il Mistero della Sindone" (The Mystery of the Shroud) is edited by Rizzoli (240 pp, 18 Euro).

What's new about this book are Fanti's recent findings, which are also about to be published in a specialist magazine and assessed by a scientific committee. The research includes three new tests, two chemical ones and one mechanical one. The first two were carried out with an FT-IR system, so using infra-red light, and the other using Raman spectroscopy. The third was a multi-parametric mechanical test based on five different mechanical parameters linked to the voltage of the wire. The machine used to examine the Shroud's fibres and test traction, allowed researchers to examine tiny fibres alongside about twenty samples of cloth dated between 3000 BC and 2000 AD.

The new tests carried out in the University of Padua labs were carried out by a number of university professors from various Italian universities and agree that the Shroud dates back to the period when Jesus Christ was crucified in Jerusalem. Final results show that the Shroud fibres examined produced the following dates, all of which are 95% certain and centuries away from the medieval dating obtained with Carbon-14 testing in 1988: the dates given to the Shroud after FT-IR testing, is 300 BC \pm 400, 200 BC \pm 500 after Raman testing and 400 AD \pm 400 after multi-parametric mechanical testing. The average of all three dates is 33 BC \pm 250 years. The book's authors observed that the uncertainty of this date is less than the single uncertainties and the date is compatible with the historic date of Jesus' death on the cross, which historians claim occurred in 30 AD.

The tests were carried out using tiny fibres of material extracted from the Shroud by micro-analyst Giovanni Riggi di Numana who passed away in 2008 but had participated in the 1988 research project and gave the material to Fanti through the cultural institute Fondazione 3M.

Please visit the site: <http://vaticaninsider.lastampa.it/en/inquiries-and-interviews/detail/articolo/sindone-23579/>

ANCIENT KINGDOMS IN LAND OF WAR, BY ISMA'IL KUSHKUSH

Every winter they come and go, like birds migrating south. Most of them nest in downtown Khartoum's old Acropole Hotel, but they're not here to rest. They're here to work in Sudan's blistering deserts, and the past few years have yielded outstanding results.

For many people around the world, Sudan conjures images of war, instability, drought and poverty. All of those things exist here, often in tragic abundance. But lost in the narrative are the stories of the ancient kingdoms of Kush and Nubia that once rivaled Egypt, Greece and Rome.

Lost to many, that is, but not to the archaeologists who have been coming here for years, sometimes decades, to help unearth that history.

"Sudan is the only country in sub-Saharan Africa that has real archaeology and local teams working," said Claude Rilly, the director of the French Archaeological Unit in Sudan.

Though its historical importance has long been overshadowed by Egypt, its neighbor to the north, Sudan's archaeological record is pivotal to understanding the history of Africa itself, experts say, and a wave of new discoveries may be adding crucial new information.

"The history of Sudan can play a role for Africa that Greece played for the history of Europe," Mr. Rilly said enthusiastically. "People have been living here for 5,000 years" along the Nile, he added. "It is difficult not to find something."

One overlooked fact is that Sudan has more pyramids than Egypt, in places like Nuri and Bijrawiyah, though they are smaller and not as old. In the town of Sedeinga in northern Sudan, for instance, Mr. Rilly and others excavated 35 small pyramids in the past few years, a discovery that points to what he called an ancient "democratization of pyramids."

"Anyone who could afford it built one," he said. "It was for social distinction."

The pyramids at Sedeinga are built close together. Made of mud brick, they range in height from under three feet for children to as high as 32 feet for nobles.

Not far from Sedeinga is the town of Dukki Gel, where a Swiss archaeologist, Charles Bonnet, has been working in the area for 44 years. He focuses on the ancient civilization of Kerma — so much so that his friends call him Charles "Kerma" Bonnet — which flourished around 1500 B.C. Mr. Bonnet's colleagues say that his research has greatly added to the understanding of 1,000 years of Sudan's ancient history.

"I discovered a Nubian city in Dukki Gel with original African architecture from around 1500 B.C., and in a cache we found 40 pieces of seven monumental statues of black pharaohs," Mr. Bonnet said. In late 2012, he found what he believes are the city's walls.

At the height of its military power around 750 B.C., the ancient kingdom of Kush in northern Sudan ruled over Egypt and Palestine, inaugurating what historians call the rule of the 25th dynasty and the black pharaohs.

In the heartland of the Kush kingdom, Richard Lobban Jr., an American archaeologist who has been visiting Sudan since 1970, works mostly in the area of the Island of Meroe, which was added to Unesco's World Heritage sites in 2011. Along with colleagues from Russia and Italy, Mr. Lobban uncovered an ancient and previously unknown Merotic temple in late 2011.

“The orientation of the temple has the sun directly pouring into the temple twice a year,” said Mr. Lobban, suggesting that it was dedicated to the ancient Egyptian sun god Amun.

Ancient Meroe, known today as Bijrawiyah, was a second capital in the kingdom of Kush from around 300 B.C. to 350 A.D. It was a major center for iron smelting, earning it the nickname “the Birmingham of Africa” by historians. Meroe was often ruled by queens, known by the title “kandake,” and boasts scores of pyramids similar in shape to the one exhibited on a one-dollar bill.

“We hope to excavate further and deeper and find still more of the missing pieces of this ancient puzzle,” Mr. Lobban said.

As fruitful as it may be, archaeology in Sudan faces many challenges, including the difficulty of protecting sites from development projects. There has even been a literal gold rush, in which many young Sudanese head to the desert in search of gold but occasionally find artifacts instead, leading to a rise in illegal trade in relics.

“Someone was arrested recently for trying to smuggle a statue,” says Abdel-Rahman Ali, director general of the National Corporation for Antiquities and Museums.

Financing archaeological efforts has also been low on the list of priorities for the Sudanese government, but in February the government signed a \$135 million agreement with Qatar that would provide money for 27 archaeological missions, the renovation of the Sudan National Museum and the development of tourism projects.

“Archaeology in Sudan is getting ready for a boom,” says Geoff Emberling, an archaeologist from the University of Michigan, who has been working in the town of El Kurru.

The impact of new archaeological discoveries has generated interest beyond the ring of specialists.

Since South Sudan split off from Sudan in 2011, Sudan's economy has been hard hit because most of the oil is in the south. In January 2012, South Sudan shut off production in a dispute with Sudan. An agreement between both countries now promises to send the oil through the north for a fee, but some in Sudan have been searching for new sources of hard currency, including tourism.

Sohaib Elbadawi is a member of Sudan Archaeological Society and heads a private group working on establishing a five-star resort near the ancient site of Jebel Barkal.

Showing a model of the project in his office in downtown Khartoum, Mr. Elbadawi said that foreigners told him, “ ‘You have a history, but you don’t know how to market yourself.’ ” “There are voices rising in Sudan that tourism should be a source of income for the country after separation,” Mr. Elbadawi added optimistically.

Sudanese archaeologists are also conscious of current opportunities.

“We have been working to illuminate Sudanese heritage through exhibitions held abroad, such as in France and Germany, and we are planning for exhibitions in Qatar, Japan and Korea,” said Mr. Ali of the National Corporation for Antiquities.

Of course, it will take years for Sudan to turn itself into a tourism attraction, if it ever can. The lack of fully developed infrastructure and facilities, United States sanctions that bar the use of major credit cards, a maddening bureaucracy and, above all, political instability stand in the way.

But archaeologically speaking, the bounty is evident.

“This is a land of great history indeed,” said Mr. Lobban.

Please visit the site: <http://www.nytimes.com/2013/04/01/world/africa/in-sudan-archaeologists-unearth-ancient-kingdoms.html>

A BOG YIELDS EVIDENCE OF MASSACRE DURING THE TIME OF CHRIST, BY GUY GUGLIOTTA

In the days of ancient Rome, it was never a good idea to send amateurs to pacify the Germanic tribes. The Emperor Augustus found this out in A.D. 9, when his handpicked crony, Varus, blundered into a series of ambushes in the Teutoburg Forest and lost about 20,000 men in three days.

Several years later, another Roman army stopped at that battlefield, a bit south of the modern German city of Bremen, to clean up the scene.

According to the historian Tacitus, they found “bleaching bones, scattered or in little heaps,” while “hard by lay splintered spears and limbs of horses.” Human skulls “were nailed prominently on the tree-trunks.” There were “gibbets and torture pits for the prisoners,” and “in the neighboring groves stood the savage altars at which they [the Germanic tribes] had slaughtered the tribunes and chief centurions.” Varus had fallen on his sword after the battle, either out of shame or because he was terrified. It was impossible to know which.

Scattered archaeological evidence has long suggested that the warriors of ancient Germania were not kind-hearted in victory. But new evidence suggests just how grisly things were at about the time of Christ, when an aggressive and well-organized young Roman empire was trying — ultimately, unsuccessfully — to subdue the equally aggressive inhabitants of Germania.

A Danish team, working in a bog about 325 miles south of the site of the Roman massacre, is analyzing the recently excavated remains of 40 men, part of a larger contingent of as many as 200 soldiers, whose bodies were apparently hacked to bits and thrown into the shallows of Lake Mosso after a battle that took place between German rivals, probably a few years before the Varus massacre. The Alken bog, lying today beneath a lakeside meadow, conceals the largest concentration of apparent war dead ever found from that era. These findings, added to artifacts from other sites and the writings of the ancient Romans, are supplying insights into a warlord culture of fiercely egalitarian German tribes that fought constantly, routinely slaughtered their enemies and offered their bodies — and their weapons — to their gods.

Hack wounds, animal marks

The remains in the bog “are all young males,” said Aarhus University archaeologist Mads Holst, leader of the excavation team from the university and Denmark’s Skanderborg and Moesgard museums. “There is quite a lot of weapon damage on them, and none of the wounds were healed. Some were dead already when they were thrown into the lake, and we can see there were animals gnawing on the bones. One of the things we are investigating now is whether they all died of battle wounds, or were executed after the battle. We suspect both.”

Holst said Danes have been digging peat and finding bones and artifacts at the Alken Bog, which is located in present-day Denmark, for at least a century. Peat is compressed plant material used as fuel in stoves and fireplaces. Because it is wet and oxygen-free, it provides ideal conditions for preserving human remains.

Archaeologists in the 1950s and early 1960s found a large concentration of human bones preserved below the water table, but Holst said scientists ignored the find at first because of the spectacular discovery nearby of an enormous deposit of Roman weapons. These dated to A.D. 200, but other artifacts at that site, known as Illerup, suggested that the weapons' owners were invaders from Scandinavia who carried Roman equipment. Illerup, Holst said, "tells you something about arms trafficking at the time."

The Alken bog dead, by contrast, were buried with typically German iron axes, spears and wooden clubs. They were Germans with German weapons.

Archaeologist Tina Thurston of the University at Buffalo, part of the State University of New York, described the European Iron Age at the time of the early Roman Empire as "a very cosmopolitan period," with "a lot of contact" between the Romans and the various German tribes.

"A lot of these guys became mercenaries" for Rome, she added, and "it would come as no surprise" that some German warriors "would have Roman equipment."

Arminius, the German chieftain who defeated Varus, was trained in Rome.

Ancient historians described the Germans as egalitarians who elected their leaders and followed them as long as they brought wealth and prestige. "The chieftains were all in competition," Thurston said. "If you had something, the others wanted it. The war booty was the thing, so they attacked each other."

The rules of this game were apparently unforgiving. Win, and you got the opportunity to fight again. If you lost and you were lucky, your followers simply abandoned you. But if you were not lucky, like perhaps the leader of the Alken warriors, you were hacked to bits.

"We've read about these mass sacrifices, but this is the first time anything like this has ever been found," said Thurston, an Iron Age specialist who has not participated in the Alken bog project. "Were they captives, saved for sacrifice, or did they die in battle, or were they executed? Were some sold into slavery, burned, set free? Maybe in this case everyone was simply rounded up and killed."

Thurston said archaeological sites in the region show no evidence that Germanic chieftains during the early Roman Empire were interested in holding territory or building their own empires. "There were no big houses, no big graves," she said.

So why throw away the enemy's weapons and dump the bodies in the lake?

Holst said his team has counted the remains of at least 200 dead in the bog, many of them buried close to the 40 whose bodies have already been recovered and perhaps all of them soldiers. Nearby sites have yielded ceramic pots, cloven goat skulls and other civilian artifacts:

“Our interpretation is that the whole valley should be seen as a sacrificial area,” he said. “It is a religious place.”

Holst said the team will try to determine where the Alken bog soldiers came from by comparing their genetic signatures and isotope concentrations to those of human remains and geographical features elsewhere.

Scholars’ traditional theory about burying the weapons is one of contrived scarcity: The chieftains got rid of enemy equipment because they wanted to control trade and imports, and they did so by keeping themselves at the center of the arms traffic.

Recently, however, archaeologists have suggested there is no reason to impute modern economic motives to ancient behavior. Perhaps the warlords threw enemies and their gear into the bog simply because their religion required it. “In a system like this, it wasn’t important to be decked out in gold and jewels,” Thurston said. “If you were supposed to make offerings, you made offerings.”

Gugliotta, a former national reporter for The Washington Post, is an author and freelance science writer living outside New York.

Please visit the site: http://www.washingtonpost.com/national/health-science/2013/04/01/16a2524a-85aa-11e2-999e-5f8e0410cb9d_story.html

BRONZE WARSHIP RAM REVEALS SECRETS, BY KIRSTEN FLEMMING

Analysis of a bronze battering ram from a 2000 year-old warship sheds light on how such an object would have been made in ancient times.

Known as the Belgammel Ram, the 20kg artefact was discovered by a group of British divers off the coast of Libya near Tobruk in 1964.

The ram is from a small Greek or Roman warship -- a "tesseraria."

These ships were equipped with massive bronze rams on the bow at the waterline and were used for ramming the side timbers of enemy ships.

At 65cm long, the Belgammel Ram is smaller in size and would have been sited on the upper level on the bow. This second ram is known as a proembolion, which strengthened the bow and also served to break the oars of an enemy ship.

Leading marine archaeologist, Dr Nic Flemming a visiting fellow of the National Oceanography Centre, co-ordinated a team of specialists from five institutes to analyse the artefact before it was returned to the National Museum in Tripoli in May 2010. Their results have been published in the International Journal of Nautical Archaeology.

Dr Flemming said: "Casting a large alloy object weighing more than 20kg is not easy. To find out how it was done we needed specialists who could analyse the mix of metals in the alloys; experts who could study the internal crystal structure and the distribution of gas bubbles; and scholars who could examine the classical literature and other known examples of bronze castings.

"Although the Belgammel Ram was probably the first one ever found, other rams have since been found off the coast of Israel and off western Sicily. We have built a body of expertise and techniques that will help with future studies of these objects and improve the accuracy of past analysis."

Dr Chris Hunt and Annita Antoniadou of Queen's University Belfast used radiocarbon dating of burnt wood found inside the ram to date it to between 100 BC to 100 AD. This date is consistent with the decorative style of the tridents and bird motive on the top of the ram, which were revealed in detail by laser-scanned images taken by archaeologist Dr Jon Adams of the University of Southampton.

It is possible that during its early history the bronze would have been remelted and mixed with other bronze on one or more occasions, perhaps when a warship was repaired or maybe captured.

The X-ray team produced a 3-D image of the ram's internal structure using a machine capable of generating X-rays of 10 mevs to shine through 15cm of solid bronze. By rotating the ram on a turntable and making 360 images they created a complete 3-D replica of the ram similar to a medical CT scan. An animation of the X-rays has been put together by Dr Richard Boardman of m-VIS (mu-VIS), a dedicated centre for computed tomography (CT) at the University of Southampton.

Further analysis was carried out by geochemists Professor Ian Croudace, Dr Rex Taylor and Dr Richard Pearce at the University of Southampton Ocean and Earth Science (based at the National Oceanography Centre). Micro-drilled samples show that the composition of the bronze was 87 per cent copper, 6 per cent tin and 7 per cent lead. The concentrations of the different metals vary throughout the casting. Scanning Electron Microscopy, SEM, reveals that the lead was not dissolved with the other metals to make a composite alloy but that it had separated out into segregated intergranular blobs within the alloy as the metal cooled.

These results indicate the likelihood that the Belgammel Ram was cast in one piece and cooled as a single object. The thicker parts cooled more slowly than the thin parts so that the crystal structure and number of bubbles trapped in the metal varies from place to place.

The isotope characterisation of the lead component found in the bronze (an alloy of copper and tin) can be used as a fingerprint to reveal the origin of the lead ore used in making the metal alloy. Up until now, this approach has only provided a general location in the Mediterranean. But recent advances in the analysis technique means that the location can be identified with higher accuracy. The result shows that the lead component of the metal could have come from a district of Attica in Greece called Lavrion. An outcome of this improved technique means that the method can now be applied to other ancient metal artefacts to discover where the ore was sourced.

Micro-X-Ray fluorescence of the surface showed that corrosion by seawater had dissolved out some of the copper leaving it richer in tin and lead. It is significant that when comparing photographs from 1964 and 2008 there is no indication of change in the surface texture. This implies that the metal is stable and is not suffering from "Bronze Disease," a corrosion process that can destroy bronze artefacts.

The Belgammel Ram was found by a group of three British service sports divers off the coast of Libya at the mouth of a valley called Waddi Belgammel, near Tobruk. Using a rubber dinghy and rope they dragged it 25 metres to the surface. It was brought home to the UK as a souvenir but when the divers discovered that it was a rare antiquity, the ram was loaned to the Fitzwilliam Museum, Cambridge.

Ken Oliver is the only surviving member of that group of three and the effective owner. He decided in 2007 that it should be returned to a museum in Libya. With the help of the British Society for Libyan Studies this was arranged in 2010. During the intervening period Dr Nic Flemming invited experts to undertake scientific investigations prior to its return to Libya. These services were offered freely and would have cost many tens of thousands of pounds if conducted commercially. The team's objective was to understand how such a large bronze was cast, the history and composition of the alloy, its strength, how it was used in naval warfare, and how it survived 2000 years under the sea.

Since the Belgammel Ram was discovered, other rams have been found, some off the coast of Israel near Athlit, and more recently, off western Sicily. The latter finds look to be the remains of a battle site. On the 8th April there is a one-day colloquium hosted by the Faculty of Classics, University of Oxford, to discuss the finds of the Egadi Islands Project.

Nic Flemming continued: "We have learned such a huge amount from the Belgammel Ram and have developed new techniques which will help us unpick future mysteries.

"We will never know why the Belgammel Ram was on the seabed near Tobruk. There may have been a battle in the area, a skirmish with pirates. It could be that it was cargo from an ancient commercial vessel, about to be sold as salvage. The fragments of wood inside the ram show signs of fire, and we now know that parts of the bronze had been heated to a high temperature since it was cast which caused the crystal structure to change. The ship may have caught fire and the ram fell into the sea as the flames licked towards it. Some things will always remain a mystery. But we are pleased that we have gleaned so many details from this study that will help future work."

The Libyan uprising of 2011 resulted in many battles in the area around the museum. Fortunately the museum suffered no damage. The Belgammel Ram is safe.

Please visit the site:

<http://esciencenews.com/articles/2013/04/04/bronze.warship.ram.reveals.secrets>

UK ARCHAEOLOGISTS IN IRAQ FIND ANCIENT COMPLEX NEAR UR, HOME OF BIBLICAL ABRAHAM

British archaeologists said Thursday they have unearthed a sprawling complex near the ancient city of Ur in southern Iraq, home of the biblical Abraham.

The structure, thought to be about 4,000 years old, probably served as an administrative center for Ur, around the time Abraham would have lived there before leaving for Canaan, according to the Bible.

The compound is near the site of the partially reconstructed Ziggurat, or Sumerian temple, said Stuart Campbell of Manchester University's Archaeology Department, who led the dig.

"This is a breathtaking find," Campbell said, because of its unusually large size — roughly the size of a football pitch, or about 80 meters (260 feet) on each side. The archaeologist said complexes of this size and age were rare.

"It appears that it is some sort of public building. It might be an administrative building, it might have religious connections or controlling goods to the city of Ur," he told The Associated Press in a phone interview from the U.K.

The complex of rooms around a large courtyard was found 20 kilometers (12 miles) from Ur, the last capital of the Sumerian royal dynasties whose civilization flourished 5,000 years ago.

Campbell said one of the artifacts they unearthed was a 9-centimeter (3.5-inch) clay plaque showing a worshipper wearing a long, fringed robe, approaching a sacred site.

Beyond artifacts, the site could reveal the environmental and economic conditions of the region through analysis of plant and animal remains, the archaeological team said in a statement.

The dig began last month when the six-member British team worked with four Iraqi archaeologists to dig in the Tell Khaiber in the southern province of Thi Qar, some 200 miles (320 kilometers) south of Baghdad.

Decades of war and violence have kept international archaeologists away from Iraq, where significant archaeological sites as yet unexplored are located. Still, the dig showed that such collaborative missions could be possible in parts of Iraq that are relatively stable, like its Shiite-dominated south.

Campbell's team was the first British-led archaeological dig in southern Iraq since the 80s. It was also directed by Manchester University's Dr. Jane Moon and independent archaeologist Robert Killick.

“This has been an opportunity to get back to an area very close to our heart for a long time,” Campbell said.

Iraq faces a broader problem of protecting its archaeological heritage. Its 12,000 registered archaeological sites are poorly guarded.

Please visit the site: <http://tinyurl.com/bpmyesz>

EGYPT'S KING KHUFU'S HARBOUR IN SUEZ DISCOVERED, BY NEVINE EL-AREF

French-Egyptian archaeological mission discover the oldest commercial harbour from fourth dynasty Egyptian King Khufu at Wadi Al-Jarf area, 180 km south of Suez.

On the Red Sea shore at Wadi Al-Jarf area along the Suez-Zaafarana road, a French-Egyptian archaeological mission from the French Institute for Archaeological Studies (IFAO) stumbled upon what it believed to be the most ancient harbour ever found in Egypt.

The harbour goes back to the reign of the fourth dynasty King Khufu, the owner of the Great Pyramid in Giza Plateau. The harbour is considered one of the most important commercial harbours where trading trips to export copper and other minerals from Sinai were launched.

A collection of vessel anchors carved in stone was also discovered as well as the harbours different docks.

Minister of State for Antiquities Mohamed Ibrahim announced that a collection of 40 papyri, showing details of daily life of ancient Egyptians during the 27th year of King Khufu's reign, was also unearthed during excavation work carried out.

“These are the oldest papyri ever found in Egypt,” asserted Ibrahim.

He also stated that these papyri are very important because it reveals more information on the ancient Egyptians' daily life, as it includes monthly reports of the number of labours working in the harbour and details of their lives.

The papyri have been transferred to the Suez Museum for study and documentation.

French Egyptologist Pierre Tallet, director of the archaeological mission, pointed out that it is very important to carefully study the information in these papyri because it will introduce plenty of information about this period. The papyri will also show the nature of life that the ancient Egyptians once lived, their rights and duties, which we know little about, Tallet added.

The mission has also succeeded in discovering remains of workers' houses, which reveals the importance of this harbour and area commercially whether among the different cities of Egypt or abroad, said Adel Hussein, head of the Ancient Egyptian Sector at the Ministry of State for Antiquities.

A collection of 30 caves were also discovered along with the stone blocks used to block their entrances, inscribed with King Khufu's cartouche written in red ink. Ship ropes and stone tools used to cut ropes and wooden remains were discovered as well.

Please visit the site:

<http://english.ahram.org.eg/NewsContent/9/40/69024/Heritage/Ancient-Egypt/Egypt-King-Khufus-harbour-in-Suez-discovered.aspx> [Ho there for pix gallery]

A HIGH-TECH LOOK AT ANCIENT CIVILIZATIONS NEW DUKE PROFESSOR MAURIZIO FORTE USES HIGH-TECH WIZARDRY TO RE-IMAGINE AGED CIVILIZATIONS

The Italian farmer resolutely tilling his soil may have no idea he's standing atop the remains of an ancient villa.

But seated at his desk at Duke University, Maurizio Forte knows. Using satellite photos and high-tech imaging technology, he can see what the farmer cannot. And this semester, his students are creating a virtual replica of the hidden villa.

Sounds cool, huh? This is what Forte does. An archaeologist, he uses the latest gadgetry to discover ancient civilizations and piece them back together digitally.

Forte arrived at Duke in January after a five-year stint on the faculty of the University of California's Merced campus. At Duke he has faculty appointments in the departments of classics and art, art history and visual studies (AAHVS). He will work in a new Smith Warehouse lab being designed for him and other visual artists and scientists. He also expects to spend a great deal of time in the Duke Immersive Virtual Environment facility -- the "Dive" -- which he will use to poke around and analyze ancient ruins in Turkey, China, Italy and elsewhere.

He wants not to just bring ancient civilizations to life, but to simulate them with an unusual level of detail and accuracy.

"Technology is a wonderful catalyzer, and there are people here from a lot of different backgrounds who together can share a lot of ideas and research," he said. "I want to make this field very different from the traditional view of it."

Forte's path to Duke is unusual for American academia. Born in northern Italy, Forte, 51, became interested in ancient artifacts and history as a youngster when he visited archaeological sites with his parents. After getting his Ph.D. in archaeology in Italy, he went to work at the National Research Council, a government agency in Rome, where he spent a decade running a research laboratory.

Please visit the site: <https://today.duke.edu/2013/03/maurizioforte>

Video at:

http://www.youtube.com/watch?feature=player_embedded&v=71s0UpaFY68

CRACKING THE VOYNICH CODE, BY **BATYA UNGAR-SARGON**

The quixotic quest to read meaning in the patterns of a bizarre manuscript that has bedeviled scholars for years

Does a rock in New Mexico show the Ten Commandments in ancient Hebrew? Harvard professor says yes.

The Tablet Longform newsletter highlights the best longform pieces from Tablet magazine. Sign up here to receive occasional bulletins about fiction, features, profiles, and more.

A mysterious manuscript has plagued historians, mathematicians, linguists, physicists, cryptologists, curators, art historians, programmers, and lay enthusiasts alike since an antiquarian and book dealer named Wilfrid Voynich first began to mention it in his correspondence in 1912. Voynich maintained that it was the work of a 13th-century English philosopher, Roger Bacon. Written in an unknown script and replete with pictures and diagrams, and now residing at the Beinecke Library at Yale, the Voynich Manuscript has become a beacon for a secular community of quasi-Talmudic scholars whose interpretive ingenuity and stamina have few parallels.

The manuscript is a small book—23 x 16 centimeters (about the size of a small volume of Penguin Classics)—of around 240 pages. It is written in a code made up of an alphabet of between 20 and 30 characters, depending on the transcription. Most of the pages also bear illustrations: large-leafed plants, long tubes, astrological charts, a few goats, and many, many naked ladies bathing in pools and holding hands. Compared to the careful and sophisticated nature of the calligraphy, the drawings are primitive, even crude, a child's assessment of the female form. (One of the women looks vaguely annoyed, her hands inserted into two pipes, a small beard sprouting from her chin.) The plants, like the language—dubbed “Voynichese”—give off a frustrating and titillating feeling of familiarity, one recorded by experts, many of whom concur when asked how they got hooked on the Voynich: “It just looked so easy,” they say.

Perhaps the manuscript's most famous wooer was William F. Friedman, a Jewish U.S. Army cryptographer, who is considered one of the foremost code-breakers of all time. Born Wolf Friedman in Kishinev, Bessarabia, to a father who worked as a translator for the Russian Postal Service—Friedman Sr. reportedly knew eight languages—Wolf's name was changed to William after the family immigrated to Pittsburgh in 1892.

While working as a geneticist in the 1920s, he met Elizabeth Smith, a cryptographer who helped break codes for the government in order to expose communists and drug runners during Prohibition. They met when Smith was working for Elizabeth Wells Gallup, who was trying to prove that there were hidden cyphers in Shakespeare's works, which Gallup believed were composed by Francis Bacon.

During World War I Friedman worked for the U.S. Army to break German codes, and in 1940 he led the team that broke PURPLE, a Japanese cryptographic machine used to convert messages into code, which was believed unbreakable (the Japanese didn't believe

the Germans who told them that the Americans had cracked it and continued using PURPLE long after the Americans had already procured one of the machines). He spent the rest of his life, or something close to it, obsessed with the Voynich. Friedman broke PURPLE, but he did not break Voynich.

Last year, a group of scholars convened for the centenary of Voynich's purchase of the manuscript. The Voynich 100 Conference was held at the Villa Mondragone, where a 1960 letter claims Voynich purchased the manuscript (though during his life, he told a different tale). New data about the manuscript were floated, as well as linguistic analyses of its syllable structure, the possible presence of microscopes in the manuscript's illustrations, and a forensic investigation into the parchment upon which it is inked. But no firm conclusion was drawn.

After 100 years, the manuscript's language still has yet to be deciphered.

Wilfrid Voynich, born Wilfridas Mykolas Vojničius, had a life filled with instances of the uncanny. A Lithuanian pharmacist, Voynich was imprisoned for his role in revolutionary attempts to free Poland from Russian rule. While serving a two-year prison sentence, Voynich looked out the window of his cell one day and caught sight of a blonde in a black dress. Two years later, after escaping from a Siberian prison and arriving penniless in London (he had to sell his waistcoat and glasses for a third-class ticket and a piece of herring, the story goes), he found that same woman in the home of his contact, another revolutionary. She was Ethel Lillian Boole, daughter of the famous mathematician George Boole, and a revolutionary in her own right. They were married, and Voynich managed to become, quite mysteriously, a recognized antiques dealer in just eight short years.

Voynich told people he thought that the manuscript that now bears his name had been written by Roger Bacon, the famous 13th-century philosopher and Franciscan. But he kept the location from which he claimed to have bought the manuscript a secret, naming another place altogether—the Villa Mondragone, he wrote in a letter to his wife, which was only disclosed after her death by her companion, Anne Nill.

During his life, Voynich claimed to have bought the manuscript in “an Austrian Castle.”

Beyond that, there are few clues. A letter in the inside cover of the book addresses Father Kircher, a German Jesuit with a penchant for (wrongly) translating hieroglyphics and (correctly) establishing the link between Coptic languages and Egyptology. The letter is signed and dated Johannes Marcus Marci, Prague, 19 August 1665 (or 1666—it is curiously ambiguous). Marci was the official doctor of the Holy Roman Emperors Ferdinand and Leopold. The book, he says in the letter, was bequeathed by an old friend, who devoted his life to deciphering it, unsuccessfully, for “such Sphinxes as these obey no-one but their master, Kircher.”

Kircher was not up to the task, and neither was Friedman, who never published anything on the Voynich save a footnote to a paper on Chaucer that he and his wife wrote for *Philological Quarterly*. The footnote was anagrammed (in the tradition of Galileo's repudiation of Ptolemy), with its solution provided in a sealed envelope for later disclosure, when Friedman believed he would have solved the cypher.

The anagram, which reaches the limit of Friedman’s sense of humor, reads, “I put no trust in anagrammatic acrostic cyphers, for they are of little real value—a waste—and may prove nothing.—Finis.” Readers wrote in possible solutions, some delightfully reprinted in an editor’s note (“To arrive at a solution of the Voynich Manuscript, try these general tactics: a song, a punt, a prayer. William F. Friedman.”)

Or “This is a trap, not a trot. Actually I can see no apt way of unraveling the rare Voynich Manuscript. For me, defeat is grim.”) Friedman never managed to solve the Voynich, and after his death, the editor of *Philological Quarterly* opened the envelope bearing the solution to the anagram: “The Voynich Manuscript was an early attempt to construct an artificial or universal language of the A-Priori type.—Friedman.” A synthetic language, rather than a cryptogram, was his best guess.

One of Friedman’s most important publications focused on the role of statistics in cryptanalysis. In Voynich scholarship, all are in agreement that statistics matter. The difference between these analyses lies less in the statistics themselves and more in their analysis. Most experts concur that there is a syllable structure to be found, as well as the recurrence of prefixes and suffixes. Jorge Stolfi, a professor of computer science at the State University of Campinas, Brazil, composed a grammar for Voynichese and concluded that it behaves like a natural language, more so than like a code, as many others believe. “I am a bit of an outlier,” he told me on the phone.

“I think there is a linguistic message.” The statistics, he elaborates, point to an Asian language like Chinese, short words with tonal structures. His theory is that someone went to the Far East and phonetically transcribed something he heard or read. “It is not unusual at that time to make up an alphabet to record a foreign language,” he said. Stolfi presented at the 2012 Voynich 100 Conference, and his research has made a deep impact on some. René Zandbergen, one of the conference’s organizers, considers it to be one of the biggest inroads in recent attempts to solve the mystery of the manuscript.

But the existence of a pattern does not necessarily mean that Voynichese is a natural language. There is a bit of a logical fallacy at play in assuming that just because the cipher is not random, that it is therefore linguistic. Indeed, the non-randomness of syllable distribution is exactly what one would expect from a hoax, according to analysts like Andreas Schinner. When I asked Schinner, a theoretical physicist, how he got involved with the Voynich Manuscript, he replied, “At first I was just fascinated by the sometimes ridiculous, often tragic-comical efforts of the VMS enthusiasts. I never expected to find out something useful myself. But as often, things are found by someone, who does not really search, rather than someone, who is too enthusiastic.”

What Schinner found was that, contrary to Stolfi’s analysis of the statistics of Voynichese, the language did not operate as other natural languages do. “You can see any text as a long string of symbols,” Schinner explained. “Then you can ask several statistical questions: How are symbols and symbol groups (substrings) distributed, how are they correlated?” Schinner did just that to the Voynich and found “that the Voynich Manuscript ‘language’ is very different from human writings, even from ‘exotic’ languages like Chinese. In fact, the results better fit to a ‘stochastic process’ (a sequence of correlated random events).” In an article in *Cryptologia*, he concluded that the Voynich contains no encrypted message at all.

But why would someone create such a document? Schinner thinks the most probable reason for creating such a hoax would be for the purpose of selling it. “However,” he

added in our email correspondence, “I like the idea that it might have been created as an artwork.”

Another Voynich scholar, Gordon Rugg, also believes that the statistical analysis reveals the manuscript to be a hoax. Rugg is a psychologist by training who studies how humans interact with technology. He specializes in locating the bugs in human reasoning.

“In all fields, humans make the same mistakes,” Rugg said over the phone. “We make faulty assumptions that are totally plausible,” especially in research areas where different disciplines overlap. For example, many disciplines rely on statistics, yet many experts in those fields do not understand statistics, resulting in mistakes.

Other sorts of errors occur precisely where intuitive knowledge is used. People make category errors, or they default to the most common option, or they fall prey to the dreaded yet ubiquitous confirmation bias, testing only for evidence consistent with their hypothesis.

Rugg’s aim is twofold—to analyze the errors in expert reasoning, but also to generate models that represent knowledge to help correct those errors and convey more accurately the complex units of different fields. To this end, he has designed among other things a computer program called “Search Visualizer” (a version is free online) that generates a visual representation of a text, revealing structural properties and patterns that were previously invisible, even to experts. Rugg calls his process the “Verifier” approach, for verifying expert reasoning. If you want to solve a problem, the theory goes, look at how experts who have failed to do so have worked. You will soon find an error whose correction yields results—or, you will if you are Gordon Rugg.

There is a playfulness to Rugg’s manner that masks the rigor of his thought process. It is the manner that accompanies people willing to consider all options, those few who truly apply the scientific method to their own thought patterns. He originally became interested in the Voynich Manuscript as a hobby—“like a crossword puzzle”—and then as a good way to show students how to narrow down a research question and utilize the scientific method. His teaching style is patient, tireless; I got a taste of it as he took me again and again through the intricacies of the Verifier approach. He thanked me repeatedly for “making him think about what he is doing in new ways,” despite the fact that it was mostly the old ways that I kept badgering him for more of.

Too weird to be a language, but too complex to be a hoax

Like Andreas Schinner, who called the Voynich Manuscript a “precious mirror to human reasoning,” Rugg sees approaches to decoding the Voynich as illustrative of the kinds of typical errors in reasoning that humans make, especially when using technology, and especially when cross-utilizing information from different disciplines. Rugg found himself wanting to tackle Alzheimer’s, a famously opaque and cross-disciplinary problem, but he needed a test case. The Voynich was perfect.

Rugg began by analyzing the reasoning used by the experts who had as yet failed to decipher the manuscript. He found that the prevailing notion, that the manuscript represents an encoded message, was based on a certain analytic, namely, that it was too weird to be a language, but too complex to be a hoax; therefore, the reasoning went, it must be a code. Because the idea of a hoax was so easily discarded, it flashed like a red light for Rugg, who proceeded to teach himself Voynichese (“I can now write

Voynichese faster than I can write English,” he told me) and to investigate how hard it would be to create the manuscript from scratch. Using a simple table and grille (a chart of letters, and a square paper with two boxes cut out), Rugg was able to recreate the Voynich Manuscript in a matter of months, syllable structure, drawings, and all.

Gordon Rugg’s Search Visualizer analysis of the manuscript text, showing the banded distribution of syllables. (Courtesy Gordon Rugg)

Between our first and second conversations, Rugg put some common Voynichese syllables into the Search Visualizer program. The results were staggering. While natural languages have an even distribution of common suffixes and prefixes, common prefixes and suffixes of the Voynich Manuscript are clustered in different parts of the text. But perhaps even more astonishing is the distribution of four parallel charts with four different syllables: The clusters all align. The banding of syllables—where they change frequency quite radically—all occur at the same place in the text. While this is radically inconsistent with natural languages, it is quite consistent with the table and grille method of producing words, in which, to create the illusion of a language, the writer would turn the grille on its axis to start creating a new frequency. Imagine trying to fool people into believing that you lived in a certain neighborhood. You might come into work every day bearing coffee from a café in that neighborhood.

But they might catch on. So one day, after a month or so, you come in with lunch from an eatery in that neighborhood. You do that for a while, and then start purchasing books from a local bookstore. In the same manner, turning the grille gives a new set of prefixes and suffixes, so that the illusion is maintained, and words aren’t repeated too much.

“After a few weeks, we found something no one else had seen,” Rugg says. His book, *The Blind Spot*, is due out in May, and has a chapter on the Voynich.

In 2000, a second letter mentioning a mysterious book in code and addressed to Sphinx master Kircher was found. René Zandbergen, an engineer by trade with a website about the Voynich, discovered it in Kircher’s letters. Georg Baresch, an antiques dealer, wrote to Father Kircher in 1639 (for the second time), asking him to take an interest in a mysterious manuscript that he couldn’t decipher. He hoped that Kircher, who “burns with a publication of things which are good, will not disdain from revealing also those things which are good in his books, buried in unknown characters.” Like Marci, Baresch seemed to think Kircher alone capable of deciphering the text, “given that here there is nobody capable of lifting such a weight, which consists of such obscure material that it requires a special genius.” The letter suggests, “from the pictures of herbs, of which the number in the Codex is enormous, of various images, of stars and of other things which appear like chemical secrets, I conjecture that it is all of medical nature.” This led Zandbergen to conclude that the manuscript described was the Voynich. Because “all details he mentions (unknown writing, herbs, stars) fit as well, there can be no doubt at all,” he wrote in an email.

Voynich’s contention that the book was written by Roger Bacon came from Marci’s letter, which was inside the manuscript when Voynich presented it for the first time at a Chicago Art Institute exhibition in 1915. The letter mentions that “Dr. Raphael, tutor in the Bohemian language to Ferdinand III, then King of Bohemia, told me the said book

had belonged to the Emperor Rudolph and that he presented the bearer who brought him the book 600 ducats. He believed the author was Roger Bacon, the Englishman.” A signature on one of the pages also seems to suggest that the manuscript was once in or around the court of Rudolf II. The name “Jacobus de Tepenec” appears on the first page. Tepenec was a pharmacist of Rudolf’s.

Born in 1552, King Rudolf II of Bohemia was prone to bouts of melancholia, which led him to consort with doctors of the occult, such as Edward Kelly, a known alchemist and spiritualist, and John Dee, a consultant in Queen Elizabeth’s court on all things mathematical, astronomical, and alchemical. The two worked closely to communicate with angels, Kelly transcribing whole books in the Enochian language with which they spoke to him. The relationship lasted until one day, while consulting with the spirits, “Kelly pretended to be shocked at their language, and refused to tell Dee what they had said,” according to Charles Mackay’s 1848 *Memoirs of Extraordinary Popular Delusions and the Madness of Crowds*. Upon Dee’s insistence, Kelly told him that, according to the angels, the two men “were henceforth to have their wives in common. Dee, a little startled, inquired whether the spirits might not mean that they were to live in common harmony and good-will?

Kelly with apparent reluctance, said the spirits insisted upon the literal interpretation.” It marked the end of the friendship.

Interestingly, the parchment, when radiocarbon dated, revealed what seemed to be a different conclusion than the one suggested by the 16th-century paper trail. In 2011, physicist Gregory Hodgins of the University of Arizona sampled four of the Voynich Manuscript’s pages:

the page with Tepenec’s signature, one of the foldouts, and two pages bearing the two handwritings noticed by experts. Because the unstable form of carbon, or C14, decays at a known rate from the day that an animal or plant dies, its measurement can yield a time frame of death, Hodgins explained to me patiently on the phone. This time frame is then compared to a database assembled of known C14 measurements gathered from trees, whose rings correspond to years. “Radiocarbon dating is not accurate, but it is precise,” Hodgins explained. “There is a true value to what we are measuring, even if we don’t know what our target is before we begin the process.”

What he found when sampling the Voynich Manuscript was even more precise than usual, due to a fortuitous accident of nature. C14 levels are contingent upon external factors as well, such as cosmic rays and changes in atmosphere. In the 16th century, for example, C14 had stabilized relatively, making it harder to radiocarbon date things within less than a 100-year time frame. The change in C14 was simply too slow. But the animal upon whose skin the Voynich Manuscript is written died in a century during which the rate of decay enabled a very precise window. Hodgins estimates with 95 percent certainty that the animal died between 1404 and 1438.

This date, roughly 150 years before that suggested by the Tepenec signature, has led many experts to conclude that the manuscript must have been written in the 15th century. “It’s just logic,” said Paula Zyats, assistant chief conservator of the Yale Library. “Velum was too expensive to leave untouched. It did not get wasted; the opposite—it was used over and over. Nobody lost a big chunk of parchment.”

Zandbergen too thinks that the radiocarbon date provides ample evidence for an early-1400s date. In Hodgins’ experience, forgeries tend to get different results on different

pages, whereas with the Voynich Manuscript, all four pages overlapped in a 34-year period.

“It’s possible that they came from different skins, but the four samples are very closely tied together,” Hodgins said. “Why would someone buy two-hundred-year-old paper?” Stolfi asked me. “That would be equally mysterious.”

Does a radiocarbon date really rule out the possibility that a talented hoaxer might have procured old vellum in order to perpetrate a hoax? Do letters mentioning an undecipherable manuscript necessarily describe this undecipherable one? Or are all these simply the errors in reasoning made when experts from one field assume the conclusions of another?

Ink cannot be dated—so the date that the vellum was written on cannot be confirmed. But for Gordon Rugg, the biggest blind spot in Voynich scholarship has been the assumption that ink went onto fresh vellum.

Rugg thinks the most likely culprit for penning the manuscript is Edward Kelley, of wife-swapping fame, well-seasoned in creating made-up languages and perpetrating frauds and hoaxes. (He had his ears cropped for forgery, a common punishment, which he spent his life covering up with ingenious hairstyles.) But once the suspect assumption that the manuscript was written on fresh vellum is done away with, is there any reason that the 16th century becomes more compelling than, say, the 17th century? Or the 20th century?

Rich SantaColoma thinks not. SantaColoma is another Voynich scholar, a former jeweler, a current writer, and a sometime historian. “I do all sorts of things,” he told me recently in a café in the New York’s Village. A jack of all trades, he lives Upstate, where he curates the Voynich mailing list. SantaColoma is a deeply humble man who exudes an openness and curiosity about the world around him. At one point he became engrossed in the benches we sat on, wondering where they must have come from. (“They are pews of some kind. And what about those paintings? Do you think they are real? I mean, obviously they are real, but from when?”) He told me that when he first heard of the theories surrounding strange relics in Michigan Copper Mines, he immediately began to research those, too; “they had solved them.

Otherwise, my wife and I would have jumped on our motorbikes and headed out there to check it out!” About the Voynich, SantaColoma says with admiration, “It’s still a mystery, after all this time.”

On his blog, SantaColoma listens to everyone, even people who he thinks are probably wrong. “Who knows what golden nugget one might discover from someone who has been thinking freely about the subject?

You have to encourage people to contribute, to openly share ideas. That’s how Michael Ventris solved Linear B!”

Like Rugg, SantaColoma was intrigued by the commonly held assumption that blank vellum wouldn’t have been available to an industrious antiques dealer. Upon further investigation, he found the assumption to be flat out wrong. He emailed me a list of six sources of blank vellum, with between 80 and 150 pages each, carbon dated as far back as the 15th century. Some were available as late as 2007, and may still be available for purchase.

“My thinking is, how can you apply existing probability to an object that is totally unique?” SantaColoma explained to me. “That’s the Voynich Manuscript problem. I don’t want to sound crazy.” He interrupted himself. I assured him he didn’t. He continued: “But I think scholarship is a hindrance in this case. Scholarship can only categorize. What happens when you have a completely unique object? It doesn’t fit any category. But the academic core of Voynich scholarship is playing it very safe.”

SantaColoma sites the uncanny feeling reported about initial encounters with the Voynich Manuscript as a crucial factor in uncovering its meaning: “Every single point is just off enough to make it seem familiar and yet be completely unidentifiable. That had to be intentional; think of how difficult it would be to create something that reminds you of something else, getting everyone to follow different directions. It must have been intentional,” he reiterates, “or the author would have given it away! They wanted it to be unidentifiable.”

“Every single point is just off enough to make it seem familiar and yet be completely unidentifiable.”

There is a category for a text that borrows heavily from reality, without itself being real: It is the category of fiction. “I think it’s fantasy,” SantaColoma says. He noticed another thing: The cylinders, which other scholars called “jars,” were actually quite similar to early microscopes—long, leather encased cylinders with glass on either side, and details along the leather. These microscopes were being created in the 17th-century, a time when there was also a resurgence of utopian, i.e., fantasy, writing. In fact, SantaColoma sees in the Voynich many similarities to Francis Bacon’s New Atlantis, a 17th-century utopian tract about a fantasy island where Bacon’s ideal college is described: the unknown plants, the grafting, the code, books on velum, and new types of animals, as well as a bath full of naked ladies.

“If you took a group of artists and gave them New Atlantis and asked them to draw a book from that place,” SantaColoma said, “it would probably look a lot like the Voynich.” As for why someone would do such a thing, SantaColoma said he didn’t know. “Maybe as a tribute, or a gift.” His theory resembles Friedman’s “artificial or universal language,” which a colleague heard Friedman compare to “the form of a philosophical classification of ideas by Bishop Wilkins in 1667 and Dalgarno a little later.”

At the centennial conference, SantaColoma presented these three observations, to the expected objections of the other scholars. Their objections boiled down to one: the slippery slope. If it could have been written in the 17th century, what’s wrong with saying it was written in the 20th century? Because he is a man who considers all possibilities, SantaColoma went home with their objections and seriously considered them. Indeed, what is wrong with saying that it was written in the 20th century? he wondered. “There is a nagging sense of newness in the manuscript,” he explained. “So people say, well, it looks new, but it can’t be new, so it must be old! But why?” he continued to ask. He recalled Robert Brumbaugh, who wrote about the Voynich in the 1970s, saying that the manuscript looked less like Bacon than like someone trying to make it look like Bacon.

But if it was not a 17th-century fantasy text, what then? Who in the 20th century could have cooked up such a hoax, and to what end? One man had the opportunity and the know-how: Wilfrid Voynich.

“I don’t want to sound crazy,” SantaColoma said, “but think about it: Voynich is a Polish revolutionary. He falls in love with Ethel Lillian Boole, an English girl working for the Russian revolutionaries. She has an affair with Sidney Reilly, the guy who James Bond is based on, a known forger, who took out books from the library on creating medieval ink. Voynich is set up in the book business, some say by the revolutionaries in order to overthrow the Russian aristocracy. There were other bizarre coincidences in his book-keeping. He had two copies of the Valturius, but only promoted one. The other was more primitive—was it a failed forgery? Voynich lived 1,300 feet from an Italian museum with 17th-century microscopes that look just like the ones in the Voynich. Are you telling me that this wonderful crazy man failed to make the connection between his mysterious manuscript and these 17th-century inventions, ruling out the possibility of a 15th-century manuscript?” SantaColoma then interrupted himself to speak to a gentleman at the table next to ours about a racing car he had overheard the man mention. (“I have one in my backyard! The trick is to keep all four wheels on the road.”)

He showed me pictures of the microscope in the Museo Galileo, just a short distance from Voynich’s Libreria. They look a lot like the tubes in the Voynich Manuscript. He points to two illustrations in the Voynich, one that looks curiously like an armadillo, and one that scholars have called a sunflower, both of which he says were New World discoveries, placing the Voynich squarely after 1492. And what about the letters mentioning the manuscript? Couldn’t Voynich, who knew of these letters, and the absence of a referent for them, have cooked up a book to look a lot like what was being described? Surely all the mystery surrounding where he purchased the book is consistent with such a narrative.

Finally, SantaColoma points out, the radiocarbon date is averaged out between all four samples, in other words, the date arrived at was done using a faulty assumption—that the book’s pages were created at the same time. As SantaColoma explained in an email, “if we had one sample only, from folio 68, the date of the Voynich would be circa 1365 to 1435, covering the range we know, but going back decades from it; and if it was one sample only from folio 8, from 1423 to 1495. So if the samples were not averaged, the range of dates given for the Voynich would have been 1365 to 1495, which as you see is quite a bit different than the announced ‘1404 to 1438’ range, which we learned was based on these average dates.”

Many experts believe that the key to the Voynich manuscript is just around the corner, but the “golden nugget,” as SantaColoma puts it, seems more likely to come from the honest skepticism he applies so liberally to his own thought processes than from an undiscovered document. If the Voynich Manuscript hides any meaning, surely it is that.

Please visit the site: <http://www.tabletmag.com/jewish-arts-and-culture/books/129131/cracking-the-voynich-code>

HOW THE TECHNOLOGY BEHIND AIRPORT SCANNERS CAN REVEAL HIDDEN ANCIENT ART, BY ARIEL SCHWARTZ

No one likes the TSA seeing them naked, but we can all get behind discovering art that's hiding beneath other paintings.

Airport body scanners--especially the newer full-body scanners--can be unnerving. Sure, they ostensibly protect us from other passengers, but they also expose us to unnecessary radiation, no matter how slight.

But that doesn't mean the technology can't be used for good.

Researchers announced at this year's National Meeting & Exposition of the American Chemical Society that they have figured out how to use terahertz technology, used in everything from airport whole-body scanners to pharmaceutical industry quality control, to find hidden images located beneath frescoes (paintings done on a wall after fresh plaster has been added).

Scientists have all sorts of techniques at their disposal to evaluate art--in paintings, for example they use a variety of X-ray techniques (neutron, infrared, etc.) to find hidden art. But the use of terahertz spectroscopy, which involves beaming weak electromagnetic radiation at art, is fairly new.

The researchers presenting at the ACS meeting spent hours using terahertz technology to examine *Trois hommes armés de lances*, a 19th-century fresco that lives in the Louvre. They suspected that other art lay below the surface--a common occurrence with frescos, which were often redone after fading or if new owners wanted different art on their wall. And they were right--an entirely different Roman fresco is under the current one.

"We were amazed, and we were delighted," said J. Bianca Jackson, one of the researchers behind the study. "We could not believe our eyes as the image materialized on the screen. Underneath the top painting of the folds of a man's tunic, we saw an eye, a nose and then a mouth appear. We were seeing what likely was part of an ancient Roman fresco, thousands of years old."

No word on who the mystery man is. That's a puzzle for others to figure out. The researchers are already using the terahertz technique to study different works of art.

Please visit the site: <http://www.scientificamerican.com/article.cfm?id=how-the-technology-behind-airport-s-2013-04>

ANCIENT TSUNAMIS AND THEIR MODERN SIGNIFICANCE, BY BEVERLY GOODMAN

On March 11, 2011, the word “tsunami” went from being an esoteric term to a household word. The world’s television screens were filled with images of destruction and carnage when massive waves generated by an offshore earthquake devastated large portions of northeastern Japan.

Waves reaching as high as 40 meters resulted in more than 19,000 people either killed or missing, almost one million damaged or destroyed buildings, and \$230 billion in damages. To make matters worse, the Fukushima Nuclear Power Plant was severely damaged, causing a meltdown and explosions that released radioactive contamination into the air and water. According to Forbes, more than 315,000 people remain displaced today.

Just two years after this catastrophe, we are still asking whether any of the devastation could have been prevented. Should houses have been built differently? Should nuclear plants have been sited differently?

How safe is it to live near any coast? In the aftermath of Hurricane Sandy in October 2012, such questions are even more pressing for Americans living on the east coast. While archaeology cannot answer all of these questions, it can contribute to our understanding of tsunamis. In turn, the geological study of tsunamis helps us understand important archaeological phenomena in the eastern Mediterranean.

The perception that tsunamis—waves generated by geological events such as earthquakes and landslides—are occurring more regularly is not incorrect but it has been magnified through the smart-phone lens.

Never before has information been passed so quickly, so widely, and so personally by witnesses to these infrequent events. The news media and video documentation allows us to experience these events like never before. But just as earthquakes existed long before the era of human perception, so too have tsunamis. Our problem is that we only have instrument-derived data on tsunamis for the last 100 years, though we know that tsunamis occurred in antiquity even when modern observations have yet to document evidence of them. In particular, geoarchaeological evidence also suggests that the Eastern Mediterranean region is overdue for this type of natural catastrophe.

Mediterranean coastal archaeological sites provide an invaluable opportunity to supplement the last century of instrument data and allow us to identify regions of tsunami risk. These archaeological data allow us to postulate the timing, magnitude, and impact of tsunami events in the past, and they provide vital information for future predictions. However, locating the remains of a tsunami event in coastal archaeological contexts is difficult and involves major methodological challenges. Since it is not a simple endeavor, archaeological evidence of tsunami events is grossly under-researched.

The same limitations with measured data are found in earthquake studies, and archaeological data have provided important details to define earthquake magnitudes in the past, using both textual and material remains. All geologists are familiar with historical catalogues that summarize all of the known earthquake events in a given geographical area and their textual sources. David Amiran’s famous catalogue of

earthquakes in Palestine, published in the Israel Exploration Journal in 1951, and Nicholas Ambraseys' 2009 book Earthquakes in the Mediterranean and Middle East are two important examples. Great effort and attention has been paid to historical texts and passing remarks that included any mention of seismic-like events.

Archaeological evidence has been helpful for corroborating these records or determining exactly how 'completely destroyed' a site or region really was. Visitors to Beth Shean are quickly impressed by the evidence of the 749 CE earthquake. In turn, these catalogues have been critical for civil engineers and authorities who design modern building codes and disaster plans.

Tsunami records ride the coattails of earthquake catalogues, and until recently have been treated as curious but less-significant events.

Recent articles and books summarizing tsunami events in regions including the Mediterranean have helped focus attention on the power of these events to alter human settlement as dramatically as earthquakes or other natural disasters. And as with earthquake catalogues, historical tsunami catalogues must be continually reassessed to determine the nature and extent of any given event.

Geoarchaeological data have only begun to make a contribution.

Utilizing historical information about tsunamis, however, depends first on the ability to use geological tools to look at and recognize tsunami deposits for what they are. Sedimentological studies of tsunamis were significantly expanded in the decade following the major tsunamis that devastated Japan in 2011 and the Indian Ocean in 2004.

Following these events, scientists flocked to the impact sites to measure and record the deposits left by the waves and to determine the extent of damage. In the process, expansive sets of sedimentological descriptions became available, far overshadowing all the literature available previously, and this research created a richer database for interpreting tsunami deposits. However, it also complicated matters by exposing the wide range of sometimes contradictory geological signatures left behind. For example, in the case of the 2004 Indian Ocean tsunami, most post-tsunami surveys consisted of trenches oriented perpendicular to a shore. These recorded both sediment sequences that were fining upward (that is, where grain size increases going down in a horizon) and fining downward (where grain size decreases going down in a horizon). In some areas the wave also produced more erosional than depositional remains.

Until recently, sedimentology suggested a relatively limited set of requirements to consider a deposit tsunami-derived. The primary test consisted of a marine deposit, for example sand and shells, located in a non-marine context far beyond the limits of a storm's influence. The challenge is differentiating such a deposit from an average storm deposit.

It is at this point in the investigative process that archaeological sites are especially useful. First, archaeological remains can provide more precise dates than the absolute methods used by geosciences.

Second, the condition and location of the marine deposit helps model and characterize the tsunami event. For example, deposits without immediate resettlement allow us to posit a more significant event than those deposits within an area of continuous occupation. When contemporaneous written data are available, archaeological deposits provide complementary or comparative data. In non-literate contexts or where a tsunami

is not mentioned within the written record, geoarchaeological data can fill important gaps.

To understand how archaeology can contribute to the issue at hand, it is helpful to look at the evidence from Caesarea. At this site, underwater cores reveal evidence of four tsunami events at ca. 1500 BCE, 100-200 CE, 500-600 CE, and 1100-1200 CE. The first event (ca. 1500 BCE) was produced by the eruption of the Aegean island of Santorini and produced immense deposits as much as 40 centimeters thick. The next event can be dated precisely to December 13, 115 CE, thanks to the Roman historian Cassius Dio and to observations in the Talmud. Cassius Dio noted a tsunami and earthquake destroyed Antioch in December 115, while the Talmud, in Baba Metzia, noted that a tsunami resulted in the destruction of Caesarea's Herodian harbor and reached as far south as Yavne. Although there was a tsunami in 502 CE, multiple texts speak to the devastation wrought across the Eastern Mediterranean by the event of July 9, 551 CE. Other texts attest to seismic activity in Greece and Anatolia during that year. John of Ephesus wrote of the sea receding at Beirut and the crowds who rushed to gather fish and treasure only to be engulfed by the wave itself.

Modern crowds familiar with video of tsunamis are unlikely to be fooled the same way and would hopefully run to higher ground.

To the modern tsunami specialist, ancient deposits, for all their usefulness, are still rare. But it may be that tsunami deposits in the archaeological record have actually been grossly underestimated. A wide range of factors work against the preservation of such deposits, even in the short term, and we still have limited abilities to recognize the deposits.

It has been nearly a decade since the Indian Ocean tsunami of 2004, and researchers are returning to re-measure and record many of the same tsunami related features examined soon after the event. Just seven or eight years later, these deposits are now only rarely visible to the naked eye. One study found that over 70% of the deposits recorded in 2005 were virtually non-existent in 2011. Presumably, older tsunami deposits, which have also been subject to human modification such as rebuilding, are even less likely to be preserved and identified. The deposits that do remain and are recognized are thus especially important.

In coastal archaeological deposits the issue of preservation is compounded in cases of continued rebuilding. Just as the coast of Thailand has not become a vacant ghost town filled with memorials to the deceased, ancient coastal sites were not necessarily abandoned and left for paleo-tsunami scientists and archaeologists to investigate.

People return, rebuild, rearrange, and remove the remains of the tsunami events and carry on with their lives. All the Mediterranean must be described this way. And even in areas where tsunami deposits are likely to be preserved, differentiating a typical coastal fill horizon made up of shell, ceramic, and sand from one containing the same materials but caused by a tsunami is well beyond typical excavation parameters. New methods are necessary.

Many proxies for recognizing tsunami deposits are proving useful.

These include marine micropaleontological indicators, unique distributions of fine grain size fractions, mineralogical signatures, and the distribution of optically stimulated luminescence signals. In addition, work in underwater archaeological excavations as well

as offshore coring have revealed a nearly untapped area for discovery of less-disturbed, better preserved tsunami horizons.

All of these finds provide a rare window into understanding the minimum impacts of past events and producing better tsunami records as a means to estimate future risk. Three hundred thousand people were killed by the tsunami that struck Southeast Asia in 2004. Tens of millions of people live around the Mediterranean and the number of people at risk from tsunamis there is vast. Tsunami studies offer important opportunities for pioneering new geoarchaeological methods and for using scientific and textual data in creative ways. Putting these insights to use to mitigate the risks of the inevitable tsunami, through early warning systems, guidelines for construction and infrastructure, and disaster response, is a challenge facing governments and scientists regardless of nationality.

Beverly Goodman is Assistant Professor in the Leon Charney School of Marine Sciences at the University of Haifa. Her specialty is Marine Geoarchaeology and coastal environments. She has participated and directed fieldwork in Israel, Turkey, Yemen, and Mexico.

Please visit the site: <http://asorblog.org/?p=4344>

LATE PALAEOLITHIC SITE AT OURIAKOS **(LIMNOS, GREECE) IN THE NORTH-** **EASTERN AEGEAN**

The Late Palaeolithic site of Ouriakos is located on the south-eastern coast of the island of Limnos in the northern Aegean. It was discovered in 2006 during the construction of a car park close to the beach which removed part of a sand dune.

The site is partly located on a Pleistocene calcarenite marine terrace, some 10m above present sea level, delimited by two seasonal streams. A profile along the right bank of the southern stream shows a buried dark clayey palaeosoil that developed above the calcarenite, containing chipped stone artefacts at its top, and which was sealed by a sand dune.

Surface collections made in 2008–2010 on the exposed archaeological surface, and the excavations that followed in 2009–2012, revealed that the site extends for some 1500m²;

The lower part of this deposit yielded a few unidentifiable bone fragments, a burnt sample of which was AMS-dated to 10,390±45 uncal BP/10,564–10,124 cal BC at 2σ (GrA-53229), suggesting that the site was settled during an advanced period of the Younger Dryas cold oscillation (c. 11,000–10,000 uncal BP; Lowe et al. 2001: tab. 3). Chipped stone artefacts were recovered.

Please visit the site: <http://www.pasthorizonspr.com/index.php/archives/04/2013/a-late-palaeolithic-site-at-ouriakos-limnos-greece-in-the-north-eastern-aegean>

ROMAN RUINS IN OLD CAIRO, BY ABDEL- RAHMAN SHERIEF

The remnants of Fort Babylon, a colossal round building located near the Coptic Museum and the Greek Orthodox St. George Church, are often overlooked by tourists and neglected by tour guides when they visit the old Coptic area of Cairo.

The fort was built by the Romans northeast of the old capital Memphis and overlooked the Nile, meant to secure transportation along the river between Upper and Lower Egypt. In the present day there is little left of its former glory.

The fort was built on the southern end of the old Pharaonic town Per-Hapi-On, or ‘The river house of On’. According to some historians the mispronunciation of the name by the Romans led to the name Fort Babylon but others claim it was named after a number of captives brought there from Babylonia during the time of Sesostris.

Roman Emperor Diocletian built the fort in 300 C.E. as the stronghold of three legions in charge of securing Egypt. The garrison of Fort Babylon vowed to secure ships on the Nile and a canal that passed through the town connecting the Nile with the Red Sea. This canal was first established by the Pharaohs, and was restored and enlarged by the Roman Emperor Trajan. The fort was renovated and fortified by the Roman Emperor Arcadius.

The harbour flourished, hosting ships from the Red and Mediterranean Seas, and the city thrived and became Egypt’s centre of commerce. This prompted the Roman emperors and governors to enlarge the garrison and dedicate resources to the city.

As the city grew, the fort became the home of the Roman Governor and the bastion of the Roman legions that secured the region. Commercial, economic and political interest drifted away from the older city of Memphis, which before the Roman invasion was the Egyptian capital, towards the new city of Babylon.

Babylon’s strategic and administrative significance in controlling the Egyptian province prompted the Arab Muslim leader ‘Amr Ibn-El-‘Aas to mark it as his key target and the first objective in his campaign to conquer Egypt in 641 A.D.

The Arab army attacked the city and besieged the fort for seven months, until on 9 April the fort surrendered and Fort Babylon fell into the hands of ‘Amr Ibn-El-‘Aas and his army, as did Memphis. The importance of the city of Babylon declined shortly after the Muslims’ domination of Egypt; all significant commercial and political interests moved to the new capital Fustat, built close by on the same bank of the Nile.

Today only parts of the inner towers remain of the fort and do not reflect the mighty shape the fort once had; the ground floor was six metres below where the churches are now. In the past many Christian religious buildings and the Coptic museum were built on what was once part of the fort. The hanging church (Al-Mu’llaqa) is adjacent to the south towers of the fort, and the St. George Church sits next to the northern tower.

The fort occupied an area of half a kilometre square; it was approximately 15 metres high and its walls were four metres thick. It was built from limestone and red rock taken from ancient Pharaonic temples in Memphis, which were also used for many other historic buildings, including the ‘Amr Ibn El-‘As Mosque and Cairo’s Ayyubid boundary wall.

The whole historic area is being renovated to preserve it for future generations with the help of several international organisations. Fort Babylon represents an important phase in Egyptian history and its once glorious city is considered part of the three historic cities from which contemporary Cairo originated: Memphis, On and Babylon.

Please visit the site: <http://www.dailynewsegypt.com/2013/04/09/roman-ruins-in-old-cairo/>

TRUTH BEHIND GOSPEL OF JUDAS **REVEALED IN ANCIENT INKS, BY** **STEPHANIE PAPPAS**

The Gospel of Judas, a text dated to about A.D. 280, tells the story of Judas as a collaborator with Jesus instead of a betrayer. (Joseph Barabe, McCrone Associates, Inc)

A fragment of the Gospel of Judas with writing. (Joseph Barabe, McCrone Associates, Inc)

The Gospel of Judas, a text dated to about A.D. 280, tells the story of Judas as a collaborator with Jesus instead of a betrayer. (Joseph Barabe, McCrone Associates, Inc)

A long-lost gospel that casts Judas as a co-conspirator of Jesus, rather than a betrayer, was ruled most likely authentic in 2006. Now, scientists reveal they couldn't have made the call without a series of far more mundane documents, including Ancient Egyptian marriage licenses and property contracts.

The Gospel of Judas is a fragmented Coptic (Egyptian)-language text that portrays Judas in a far more sympathetic light than did the gospels that made it into the Bible. In this version of the story, Judas turns Jesus over to the authorities for execution upon Jesus' request, as part of a plan to release his spirit from his body. In the accepted biblical version of the tale, Judas betrays Jesus for 30 pieces of silver.

As part of a 2006 National Geographic Society (the Society) investigation of the document, microscopist Joseph Barabe of McCrone Associates in Illinois and a team of researchers analyzed the ink on the tattered gospel to find out if it was real or forged. Some of the chemicals in the ink raised red flags — until Barabe and his colleagues found, at the Louvre Museum, a study of Egyptian documents from the third century A.D., the same time period of the Gospel of Judas.

"What the French study told us is that ink technology was undergoing a transition," Barabe told LiveScience. The Gospel of Judas' odd ink suddenly fit into place.

Barabe and his colleagues specialize in thorough investigations of old — or supposedly old — documents and artwork. The chemical composition of inks used can reveal the difference between something authentically ancient and a forgery. In 2009, Barabe helped expose a gospel called the "Archaic Mark," which some claimed was a 14th-century manuscript, as a modern forgery. He's also worked with the Federal Bureau of Investigation to detect forged paintings.

A call from National Geographic, however, was a "big deal," Barabe said. "It was both thrilling and an honor," he added.

The Society wanted to find out if the Gospel of Judas, discovered in the 1970s, really dated back to early days of Christianity or whether it was, like Archaic Mark, a fake.

Barabe brought together a team of scientists with a variety of specialties, and they ran the Gospel through an intensive analysis of microscopy and spectroscopy.

At first, their findings offered little hope that the Gospel of Judas was real. The document was written in two inks — black and brown — mixed together. The black was an ink called "lamp black," which was consistent with the inks used in Egyptian writings from ancient times and into the third century, Barabe said.

But the brown ink was more mysterious. It was an iron-rich ink called iron gall, but it lacked the sulfur usually found in inks of this sort. The pressure was on to explain the difference.

"One thing that made this a little bit more dramatic than we would have liked is, we did the sampling in the third week of January of 2006, and the press conference was already scheduled for the third week in April of that same year," Barabe said. "So we had three months to turn this critter around with a conclusion, and it really put an enormous amount of pressure on us, because we were faced with what was essentially a three-month rush project."

Authenticating the gospel

Some facets of the document did suggest authenticity. The most promising of these characteristics, Barabe said, was that the ink wasn't piled up in the warped papyrus, suggesting the document was written before the warping happened. Had someone tried to write on a pre-warped papyrus, the ink would have gathered in crevices and dips — a sure sign someone had intentionally tried to make new papyrus look old. Instead, the Gospel seems to have been written on flat papyrus and aged naturally. National Geographic also commissioned other analyses of the Gospel, including radiocarbon dating, script analysis and linguistic style.

Barabe hit the books, looking for other studies on early Egyptian inks. The study of Egyptian marriage certificates and land documents from the Louvre proved to be the clincher.

That study found that contracts in Egypt in the mid-third century were written in lamp black ink, in the traditional Egyptian style. But they were officially registered in the traditional Greek style, using brown iron gall ink.

The Louvre study findings suggested to the team that the presence of both inks was consistent with an early date for the Gospel of Judas, Barabe said.

What's more, the Louvre study found that the metal-based inks from this time period contained little sulfur, just like the ink on the Gospel of Judas.

The discovery gave the researchers the confidence to declare the document consistent with a date of approximately A.D. 280. (Barabe and his colleagues caution that this finding doesn't prove beyond doubt that the document is authentic, but rather that there are no red flags proving it's a forgery.)

"There was definitely a point where, all of the sudden, I just kind of relaxed and said, 'This is probably just fine,'" Barabe said.

Barabe presented the behind-the-scenes story of the Gospel of Judas investigation Monday, April 8, at the annual meeting of the American Chemical Society in New Orleans. After the National Geographic investigation of the Gospel of Judas, the document was returned to the Coptic Museum in Cairo.

Please visit the site: <http://www.foxnews.com/science/2013/04/08/truth-behind-gospel-judas-revealed-in-ancient-inks/>

FROM EGYPTIAN BLUE TO INFRARED, BY NIKHIL SWAMINATHAN

Egyptian blue is known as the world's oldest artificial pigment, first used more than 4,500 years ago, found on wall paintings at Luxor and sculptures recovered from the Parthenon. The hue comes from a compound called calcium copper tetrasilicate. Over the past decade, museum conservators and archaeologists have taken advantage of its properties to spot the presence of Egyptian blue on antiquities: When red light is shone on the pigment, it reflects infrared light, which can be detected via night-vision goggles or cameras.

Chemists at the University of Georgia (UGA) have now determined that the luminescent quality of calcium copper tetrasilicate is retained even when the compound is reduced to what are termed “nanosheets,” a thousand times thinner than a human hair. “Even if you have a single layer, the thinnest possible, you still get the effect,” explains UGA’s Tina Salguero. At that scale, she believes, you can start thinking about modern applications.

Salguero says that Egyptian blue’s primary molecule could be incorporated into a dye to improve medical imaging, since the infrared radiation it would reflect can pass through human tissue. The pigment’s luminescent quality could also be effective for developing new types of security ink, typically used to secure currencies and other official documents from forgery. Further, the possibilities for a second act for the long-out-of-use coloring extend to devices such as light-emitting diodes and optical fibers, both of which transmit signals using the relatively long wavelength of infrared light.

The UGA team is now looking at another compound, barium copper tetrasilicate, which was also used as an ancient pigment, in this case by the Chinese.

Please visit the site: <http://www.archaeology.org/issues/90-1305/trenches/741-ancient-egypt-blue-pigment-modern-applications>

EGYPTIAN MUMMIES YIELD GENETIC SECRETS - NEXT-GENERATION SEQUENCING FINDS DNA PRESERVED IN HOT CLIMATES, BY JO MARCHANT

Advanced DNA sequencing finds that genetic reconstruction is possible not just for mummies that have been preserved in freezing conditions but also for those from hot climates such as this one, of King Tutankhamun's mother.

The ancient Egyptians could soon be getting their genomes sequenced as a matter of routine. That's the view, at least, of the first researchers to use next-generation techniques to analyse DNA from Egyptian mummies.

In a preliminary study that the authors describe as “a first step”, they detected hints of one of the mummies' ancestral origins, as well as pathogens and a range of plant materials presumably used in the embalming process. The researchers, led by Carsten Pusch, a geneticist at the University of Tübingen in Germany, published their findings last week in the *Journal of Applied Genetics*¹.

Previous studies of DNA from Egyptian mummies have used a technique called polymerase chain reaction (PCR) to amplify specific segments of DNA. But these studies have been controversial. The PCR method is susceptible to contamination with modern DNA, especially when amplifying genes from humans or bacteria that are likely to be present in the environment.

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DNA degrades relatively quickly in warm conditions, leading to doubts that it would survive for long in the Egyptian desert. For example, a high-profile DNA analysis of 3,300-year-old royal mummies² published by Pusch and his colleagues in 2010 attracted scepticism. But the authors stood by their results, arguing that the embalming process must have preserved the DNA despite the heat.

Further support for their argument came in 2011, when researchers amplified DNA from 2,000-year-old mummified crocodile hatchlings³. So researchers on both sides of the debate have been looking forward to the application of next-generation sequencing techniques. Instead of amplifying specific sequences, these methods read millions of small fragments and give a broad picture of all the DNA present in a sample, making it easier to spot contamination.

Since 2010, next-generation sequencing has been used to decipher the genomes of a variety of ancient humans preserved in cold conditions, including a 4,000-year-old

Palaeo-Eskimo dubbed Saqqaq Man⁴; ‘Denisova Man’, a novel hominin unearthed in Siberia⁵; and ‘Ötzi the Iceman’, a 5,300-year-old mummy found frozen in the Central Eastern Alps⁶.

Now, Pusch and his colleagues, including Rabab Khairat, have carried out next-generation sequencing on five Egyptian mummified heads held at the University of Tübingen. The heads date from relatively late in ancient Egyptian history — between 806 bc and 124 ad.

The data sets retrieved so far are small — a tiny fraction of what would be required for a whole genome sequence. But they show that human DNA survives in the mummies and that it is amenable to sequencing.

The researchers determined that one of the mummified individuals may belong to an ancestral group, or haplogroup, called I2, believed to have originated in Western Asia. They also retrieved genetic material from the pathogens that cause malaria and toxoplasmosis, and from a range of plants that includes fir and pine — both thought to be components of embalming resins — as well as castor, linseed, olive, almond and lotus.

According to Pusch, the proportion of human DNA in the identified sequences is comparable to that from frozen specimens, such as Saqqaq Man. In mummies, “DNA preservation appears to be independent of temperature,” he says.

But Tom Gilbert, who leads two research groups at the Center for GeoGenetics in Copenhagen and was part of the team that sequenced the Saqqaq genome, warns against making such a comparison, because many of the sequences obtained in the latest study were unidentifiable.

Now that Pusch and his colleagues have demonstrated next-generation sequencing in Egyptian mummies, however, moving on to entire genomes “isn’t rocket science”, Gilbert says. “What limits you is the size of a sample. For Denisova Man they had just a finger bone. Here they have the whole mummy.”

Indeed, Pusch and his colleagues say that they are now working on a more comprehensive analysis, and that “entire-genome sequencing of ancient Egyptian individuals is likely to become standard in the not-too-distant future”.

“It would be nice to know more about the origins of the ancient Egyptians,” says Pusch. “Where did they come from? Where did they go? Are there still traces of ancestral DNA in today’s Egypt?”

Nature doi:10.1038/nature.2013.12793

Please visit the site: <http://www.nature.com/news/egyptian-mummies-yeild-genetic-secrets-1.12793>

NEW DISCOVERY SOLVES ANCIENT EGYPTIAN CHARIOT MYSTERY, BY NEVINE EL-AREF

During routine archaeological research as part of the Ancient Egypt Leatherwork Project (AELP) carried out by Salima Ikram, Professor of Egyptology at the American University in Cairo (AUC) and Andre Veldmeijer, head of the Egyptology section at the Netherlands Flemish Institute in Cairo, a collection of 300 leather fragments of an Old Kingdom chariot were uncovered at the Egyptian Museum in Cairo.

Ikram describes the discovery as very important and the collection as “extremely rare.” Only a handful of complete chariots are known from ancient Egypt, and of these, only one heavily restored in Florence and one in the Egyptian Museum have any significant amount of leather.

“Even then, they are largely unembellished and not as well-preserved as the fragments we found,” asserted Ikram. Although horse-drawn chariots are often illustrated in ancient Egyptian artwork, she said, archaeological evidence that goes beyond wooden frames is rare due to their organic nature, as leather fragments seldom survive.

“The fragments are in a much better shape than we originally anticipated, and we were able to achieve a sense of how the leather unfolds,” Ikram pointed out, adding that the fine condition that the leather was in suggests that it may have been preserved in a tomb.

The archaeological team is now studying the technology and resources used to make the leather chariots in order to reconstruct a complete exact replica of an ancient Egyptian royal leather chariot in 2014.

“The team is also going to test hypotheses about the uses of the different pieces of leather, which may prove to be a challenging endeavour,” said Ikram.

She explains that studies on the newly discovered leather fragments reveal that some pieces are folded over in a crumpled state, and the reconstruction of certain portions while trying to maintain accuracy in reproducing the technologies used might be more difficult than anticipated.

The AELP started in 2008 working on all leather artefacts on display at the Egyptian Museum. During the work, Ikram and Veldmeijer came across a 1950s publication by Robert Jacobus Forbes titled *Studies in Ancient Technology* with a black and white photograph of ancient reigns and horse harnesses, evidently intact and said to exist at the Egyptian Museum in Cairo.

Thrilled by Forbes's findings, both Egyptologists sought the help of museum curators to locate a cache of leather items related to an ancient chariot, including parts of the bow-case.

Ikram and Veldmeijer documented, examined and conducted analytical studies of the technology and resources utilised. They categorised the leather into two main groups based on colour and sturdiness. The leather fragments have been numbered and described, and include nave hoops, neck straps, gauntlets and parts of the bow-case. The remnants evidently comprised all parts of the chariot.

“Everything we saw about the chariot leather was new,” affirmed Ikram, adding that it provided a revelation on how the chariot was put together in terms of the technologies and materials used.

“Our examinations also disclosed how drawstrings served as the means of securing leather components over the skeleton of the chariot.”

According to a press release sent from the AUC press, the findings fit in with a larger multidisciplinary and holistic research venture on leatherwork in ancient Egypt, which also includes the study of other fragmentary chariot pieces, such as those originating from the tombs of Thutmose IV (Carter and Newberry, 1904), Amenhotep II (Daressy, 1902) and Amenhotep III (Littauer and Crouwel, 1985, 1968 and 1987), as well as the leather finds from the Amarna period (Veldmeijer, 2010). This larger project is directed by Veldmeijer and Ikram.

“Chariots introduced the notion of roadways for faster wheel conveyance, revolutionising the way Egyptians moved through the landscape and pioneering means of transportation and warfare,” said Ikram.

Please visit the site: <http://www.albawaba.com/editorchoice/ancient-egypt-chariot-486726>

GIZA SECRET REVEALED: HOW 10,000 PYRAMID BUILDERS GOT FED, BY OWEN JARUS

The builders of the famous Giza pyramids in Egypt feasted on food from a massive catering-type operation, the remains of which scientists have discovered at a workers' town near the pyramids.

The workers' town is located about 1,300 feet (400 meters) south of the Sphinx, and was used to house workers building the pyramid of pharaoh Menkaure, the third and last pyramid on the Giza plateau. The site is also known by its Arabic name, Heit el-Ghurab, and is sometimes called "the Lost City of the Pyramid Builders."

So far, researchers have discovered a nearby cemetery with bodies of pyramid builders; a corral with possible slaughter areas on the southern edge of workers' town; and piles of animal bones.

Based on animal bone findings, nutritional data, and other discoveries at this workers' town site, the archaeologists estimate that more than 4,000 pounds of meat — from cattle, sheep and goats — were slaughtered every day, on average, to feed the pyramid builders.

This meat-rich diet, along with the availability of medical care (the skeletons of some workers show healed bones), would have been an additional lure for ancient Egyptians to work on the pyramids.

"People were taken care of, and they were well fed when they were down there working, so there would have been an attractiveness to that," said Richard Redding, chief research officer at Ancient Egypt Research Associates (AERA), a group that has been excavating and studying the workers' town site for about 25 years.

"They probably got a much better diet than they got in their village," Redding told LiveScience.

Feeding the Giza work force

At the workers' town, which was likely occupied for 35 years, researchers have discovered a plethora of animal bones. Although the researchers are still unsure of the exact number of bones, Redding estimates he has identified about 25,000 sheep and goats, 8,000 cattle and 1,000 pig bones, he wrote in a paper published in the book "Proceedings of the 10th Meeting of the ICAZ Working Group 'Archaeozoology of southwest Asia and adjacent Areas'" (Peeters Publishing, 2013).

About 10,000 workers helped build the Menkaure pyramid, with a smaller work force present year-round to cut stones and complete preparation and survey work, the AERA team estimates. This smaller work force would have ramped up for a few months starting around July of each year. "What they would do is, for about four or five months a year,

they would bring in a big work force to move blocks, and they would do nothing but move blocks," explained Redding, who is also a research scientist at the Kelsey Museum of Archaeology and a member of the faculty at the University of Michigan.

Needless to say, pyramid building is hard work. The workers would need at least 45 to 50 grams of protein a day, Redding said. Half of this protein would likely come from fish, beans, lentils and other non-meat sources, while the other half would come from sheep, goat and cattle, he estimated. Milk and cheese were probably not consumed due to transportation problems and the cattle's low milk yield during that time, Redding said.

Combining these requirements and other protein sources with the ratio of the bones (and the amount of meat and protein one can get from an animal), Redding determined about 11 cattle and 37 sheep or goats were consumed each day.

This would be in addition to supplying workers with grain, beer and other products.

Vast herds ... and herders

In order to maintain this level of slaughter, the ancient Egyptians would have needed a herd of 21,900 cattle and 54,750 sheep and goats just to keep up regular delivery to the Giza workers, Redding estimates.

The animals alone would need about 155 square miles (401 square kilometers) of territory to graze. Add in fallow land, waste land, settlements and agricultural land for the herders, and this number triples to about 465 square miles (1,205 square km) of land — an area about the size of modern-day Los Angeles. Even so, this area would take up just about 5 percent of the present-day Nile Delta.

These animals also needed herders — likely one herder for every six cattle and one herder for every 50 sheep or goats, based on ethnographic observations. This brings the total number of herders to 3,650 overall and, once their families are included, 18,980, just under 2 percent of Egypt's estimated population at the time.

These herds would have been spread out in villages across the Nile Delta, then brought to the workers' town at Giza to be slaughtered and cooked. At the end of their lives, the animals were likely kept in the southern part of the town, in a recently unearthed structure that researchers have dubbed the "OK corral." ("OK" stands for "Old Kingdom," the time period in which the Giza pyramids were built.) The structure, which includes two small enclosures where animals may have been slaughtered and a rounded pen, is partly hidden under a modern-day soccer field.

The boss eats the beef

The research revealed interesting details about life in the workers' town. For instance, the overseers — who lived in a structure the archaeologists call the "north street gatehouse" — got to eat the most cattle, and those living in an area called the "galleries," where the everyday workers lived, ate mainly sheep and goats.

Redding said it wasn't surprising that the overseers preferred to dine on beef, considering it was the most valued meat in ancient Egypt.

"Cattle is, of course, the highest-status meat," he said, noting that it appears far more frequently than sheep or goat in tomb scenes, and that pigs never appear in tomb scenes.

The settlement located adjacent to the workers' town, dubbed "eastern town," wasn't as rigidly planned as workers' town, and its residents were eating a considerable number of pigs, the researchers found.

Evidence also suggested the people in eastern town were trading with people in workers' town for hippo-tusk fragments.

These finds suggest that the residents of the eastern town were not as directly involved in pyramid building and had a special relationship with the pyramid workers.

"They were not provisioned; they were not given their meat and food every day," like those in the workers' town were, Redding said. "It's more of a typical urban farming settlement, and there was a symbiotic relationship between the two —probably," he said.

Future discoveries at Giza

Research at workers' town suggests that not all the workers lived there and some may have actually camped out near the Giza pyramids.

"What we think now is — and this is something we're going to be coming out with in the next little while — is that, more likely, it was a large portion of the work force, the more skilled laborers [living at workers' town], and that there were temporary camps up by the pyramids where the temporary workers who came in would be housed," he said.

"They probably (didn't) need much in the way of housing; they would need more shade than anything else. They wouldn't need any kind of warmth because it wouldn't be winter."

Future studies will look for the remains of the workers' towns of Khufu and Khafre, the two other pharaohs who built pyramids at Giza. A dump area, investigated in the 1950s, may hold them; seal impressions found at the dump have the rulers' names on them.

"What we think was going on was that Menkaure came along, he establishes his reign, he leveled that whole area and he took all the levelling debris, took it to the top of the hill and threw it over the back in a big dump," Redding said.

"That dump on the back side of the ridge may represent a remnant of Khufu and Khafre's construction's town," Redding said, adding that he hopes new excavations will begin on the dump in the next year or two.

Please visit the site: <http://news.yahoo.com/giza-secret-revealed-10-000-pyramid-builders-got-125146214.html>

DOCUMENTS FOUND IN KÜLTEPE REVEAL THE EXISTENCE OF BRIDE PRICES

Archaeological excavations in the Aegean province of Kütahya's Kültepe tumulus have revealed that men paid bride prices, divorce money and alimony to women 4,000 years ago, just like they do in today's Anatolia.

“After divorce, many problems like the situation of children, division of property and alimony appeared and people needed to document it. This increased the number of divorce documents,” said Professor Fikri Kulakoğlu of Ankara University, noting that there were more divorce documents than marriage documents.

Excavations at the 4,000 year-old tumulus have been continuing since 1948, said the professor.

Please visit the site: <http://www.hurriyetdailynews.com/bride-prices-existed-in-ancient-era.aspx?pageID=238&nid=45547&NewsCatID=375>

POSSIBLE ANCIENT BURIAL GROUND DISCOVERED BENEATH SEA OF GALILEE IN ISRAEL, BY CHARLIE CAMPBELL

Archaeologists are studying evidence of a 60,000-ton stone structure at the bottom of the Sea of Galilee in Israel that could denote an ancient burial ground.

The giant cone-shaped configuration is formed by basalt cobbles and boulders up to four feet in diameter and its base lies roughly 40 feet beneath the surface, reports CNN.

Researcher Yitzhak Paz, of the Israel Antiquities Authority and Ben-Gurion University, told Live Science that the mound could date back more than 4,000 years. “The more logical possibility is that it belongs to the third millennium B.C., because there are other megalithic phenomena [from the same time] that are found close by,” he said.

Although researchers carrying out a sonar survey of the sea first discovered the 30-foot-tall ‘monument’ in 2003, divers have only now been down to investigate further. Their findings have just been published in the International Journal of Nautical Archaeology.

“This is such a huge structure that it truly is something unusual,” Dani Nadel, an archeologist from the University of Haifa, told CNN.

“It could have been a big ceremonial structure, or a ramp. There could have once been statues on top of people in certain rituals. I mean, I’m really going wild here. The truth is we don’t know how it was constructed, what its exact age is, how it was used, or how long ago it was used. We have several speculations, but we don’t know much except that it’s there and it’s huge.”

Other explanations include the possibility that it was created below the surface as a fish nursery, as similar smaller structures have already been discovered that were built for that purpose. But the main theory is that the 230-foot-wide structure — larger than a Boeing 747 — was built on dry land and then became submerged as the water level rose. Underwater archaeological excavations are now being planned in order to find associated artifacts that might reveal more about its true function, according to the Daily Mail.

The Sea of Galilee is actually a freshwater lake — the largest in Israel and lowest on the planet — and measures roughly 64 square miles with a maximum depth of 141 feet. It plays a key role in the New Testament — Jesus would often teach by its shores — and remains a major destination for Christian pilgrims.

Please visit the site: <http://newsfeed.time.com/2013/04/24/possible-ancient-burial-ground-discovered-beneath-sea-of-galilee-in-israel/>

DID AN EARTHQUAKE DESTROY ANCIENT GREECE? BY BECKY OSKIN

The grand Mycenaens, the first Greeks, inspired the legends of the Trojan Wars, "The Iliad" and "The Odyssey." Their culture abruptly declined around 1200 B.C., marking the start of a Dark Ages in Greece.

The disappearance of the Mycenaens is a Mediterranean mystery. Leading explanations include warfare with invaders or uprising by lower classes. Some scientists also think one of the country's frequent earthquakes could have contributed to the culture's collapse. At the ruins of Tiryns, a fortified palace, geologists hope to find evidence to confirm whether an earthquake was a likely culprit.

Tiryns was one of the great Mycenaean cities. Atop a limestone hill, the city-state's king built a palace with walls so thick they were called Cyclopean, because only the one-eyed monster could have carried the massive limestone blocks. The walls were about 30 feet (10 meters) high and 26 feet (8 m) wide, with blocks weighing 13 tons, said Klaus-G. Hinzen, a seismologist at the University of Cologne in Germany and project leader. He presented his team's preliminary results April 19 at the Seismological Society of America's annual meeting in Salt Lake City.

Hinzen and his colleagues have created a 3D model of Tiryns based on laser scans of the remaining structures. Their goal is to determine if the walls' collapse could only have been caused by an earthquake.

Geophysical scanning of the sediment and rock layers beneath the surface will provide information for engineering studies on how the ground would shake in a temblor.

The work is complex, because many blocks were moved by amateur archaeologist Heinrich Schliemann in 1884 and later 20th-century restorations, Hinzen said. By combing through historic photos, the team found unaltered wall sections to test. They also hope to use a technique called optical luminescence dating on soil under the blocks, which could reveal whether the walls toppled all at the same time, as during an earthquake.

Another hurdle: finding the killer quake. There are no written records from the Mycenaean decline that describe a major earthquake, nor oral folklore. Hinzen also said compared with other areas of Greece, the region has relatively few active faults nearby. "There is no evidence for an earthquake at this time, but there was strong activity at the subduction zone nearby," he said.

The Mycenaean preference to place their fortresses atop limestone hills surrounded by sediment would concentrate shaking, even from distant earthquakes, Hinzen said. "The waves get trapped in the outcrop and this can do a lot of damage. They are on very vulnerable sites," he said.

The researchers also plan to study the ancient Mycenaean city of Midea. The group has done similar work investigating ancient earthquakes in Turkey, Germany and Rome.

Please visit the site: <http://news.discovery.com/history/archaeology/did-earthquake-destroy-ancient-greece-130426.htm>

MOVING THE STONES OF BAALBEK–THE WONDERS OF ROMAN ENGINEERING

Previously I had talked about an amazing piece of computational engineering from the ancient world, the Antikythera mechanism, which was also posted up at A Tippling Philosopher. In the comments there, a discussion came up about another wonder of antiquity which has attracted all sorts of speculations among alternative thinkers. This is the construction of the temple complex at the city of Baalbek, also known as Heliopolis, in modern-day Lebanon, about 70 kilometers* north of Damascus. The site has considerable antiquity, but it is the large stones at the temple, especially the three known as the Trilithon, that have garnered the greatest attention, each weighing in around 800 tons.* And deservedly so, as they are some of the largest single objects ever moved in the pre-modern era.

There are standard explanations for this place, but as noted, alternative scholars like to also propose other ideas. So, here I will look at what sorts of strange hypotheses have been proposed, and then I will describe what is the most likely explanation based on current knowledge of the site. No matter which explanation (giants, aliens, Romans), the structure is a wonder all its own and should inspire awe.

If only we could have seen it in its heyday.

First off, a little bit about the location. Baalbek is in the Beqaa Valley, which in the Hellenistic period was called Coele Syria. The location of the megalithic structures is atop of a hill in the region, known as Tel Baalbek. Numerous archaeological expeditions have gone to the site starting in the 19th century, primarily German and French groups, and into the 20th century research continued. To this day there is still literature published about the location and calls for further looks into the chronology of the place.

The site has a long history, and newer expeditions have extended that history even farther than many would have known. The first German expeditions had been unable to find anything there before the Roman period (after the conquests of Pompey in c. 64 BCE), but later expeditions have found Persian, bronze age, and even neolithic artifacts, making the place a settled area for thousands of years.

After the time of Constantine, the temple complex there became devoted to Christianity, many of the pagan artifacts destroyed, and later the region would be under the jurisdiction of the Islamicate with its own architectural features and history, including the brickwork portion of the walls.

With its long history and monuments, many legends have been attached to the megaliths. While the summary by Alouf (1949) is very much out of date, it relates many of the legends of that region, mostly from Arabs. Some believed that the monument was the construction of the Nephilim, the giants mentioned in Genesis that were destroyed by the Deluge, and some creationists believe this today (see also here). For those that don't believe in the supernatural in Genesis, they may instead see the giants as somehow related to aliens. Also related to the Bible, some believed that the structure was created by Nimrod, ordering the giants to built up the location. Others claim that this was the location of the Tower of Babel. Still others say that it was built by Adam's son, Cain, making this the oldest building in the world.

In modern times, new legends have been attached to the site, probably the most notable one is due to one person (and rarely can we pin a legend down to an individual), Zecharia Sitchin [EDIT: Jason Colavito informs me that the following idea is older than Sitchin; in fact, it was Soviet propaganda.]. Starting in the 1970s, Sitchin made all sorts of claims about Sumerian culture and their contact with aliens from the planet Nibiru, very much of it getting academic ire. What Sitchin believed was that the site, especially the trilithon stones, acted as the landing pad for extraterrestrial space craft, probably shuttles coming from their mother ship (cf. Sitchin 1999). He also claimed to find evidence of the use of Baalbek in the Epic of Gilgamesh, though unfortunately it appears to be wishful thinking. Nonetheless, this is the idea presented in Ancient Aliens, though the show is also inconsistent in saying the Nazca Lines were runways.

Along with these legendary claims comes the belief in the extreme antiquity of the site. Various sources will claim the megaliths there are over 9000 years old, and this also fits into the idea of Genesis (the earth is less than 10,000 years old) and its race of giants, aliens making civilization-forming contact with the pre-human apes, or some sort of Atlantis-like civilization. It is of the opinion of David Childress (2000) that the construction was from a civilization known as the Osirian Empire which existed before the Egyptian dynastic period and contemporary with Atlantis. So not only are there amazing claims about who is responsible for creating this site, there are claims of extreme age.

Lastly, when it comes to legends, there are some attached to just a single stone, and one that isn't even part of the Baalbek temple complex. It is a stone about 800 meters from the tel, still not taken out of the ground. Known as the Stone of the Pregnant Woman, it has a mass of 1000 tons!* Stories surround the object. One gives it its name: a woman was said to know how to lift the great rock, but she was pregnant and would only reveal this knowledge should she receive prenatal care and her costs of living until her due date. Once the time came, no great secrets were revealed. Others have said that touching the stone helps ones fertility. In just the last few decades, another even larger stone was found south and across the road from the Pregnant Woman stone; it was mostly buried, but it appears to have a mass on the order of 1200 tons.* These stones appear to be the same as those used in the trithilon, though they were not completely worked into shape, let alone detached from the quarry rock (Ruprechtsberger 1999). Nonetheless, these stones help show where much of the building material at Baalbek came from.

So, how on earth were these dense pieces of earth moved before the innovations of gas-powered engines or any of the machines we take for granted? Sure, we have cranes that can lift these rocks, but we have modern alloys and steel, powerful motors, and years of experience and education for engineers. How could this have been done in antiquity?

According to Alouf (1949), to move the Stone of the Pregnant woman would require a team of 40,000 men, an effective impossibility of concentrated humans with the needed coordination. Doesn't it require some sort of otherwise unknown advanced civilization to do the job?

Now, there has been a fair amount of literature on the subject, and some of it has been made accessible to the layman by Michael Heiser and the documentary Ancient Aliens Debunked, but the story isn't complete, especially on the point of dating the quarrying and moving of the trilithon. So, I will explore here, best I can, what seems to be the

mainstream view of how the stones were moved, and what evidence is used. I provide my sources at the bottom of this post.

But before I get into that view, I have come across one other idea for the moving of the stones without an Atlantis-like or ET civilization, and the idea is to use a canal and so using the buoyant force to make the stones weigh less and thus easier to transport and put into place.

It's not a crazy idea, and the Romans did have the ability to move water in such a way to make it plausible. However, 800 ton stones would need to displace 800 cubic meters of water, and that will require a rather large ship, such as the ones designed to go on the Nile for moving obelisks to Rome. It would be difficult to produce a large water canal, a large enough ship, and it still seems like a fair bit of lifting of the triliton stones would be needed at the construction site. The key thing, though that could show such a hypothesis is correct is find some sign of early plumbing. Then again, a good source of water will be needed, and in large quantities, and in a place such that it can go uphill enough to fill in this canal that is above the Beqaa valley. While I don't know of anything that would kill this hypothesis, it seems that it is not the most probable solution.

So, to begin looking at the standard view, it is necessary to date the site. While artifacts going back thousands of years before the Roman occupation have been found, there is no record of Baalbek in Assyrian records. One particular silence is a war during the reign of Shalmaneser III (9th century BCE), in which a coalition of kingdoms of north Syria, headed by the ruler of Damascus fought the Assyrian forces. In the tribute list after that war, numerous cities are mentioned, but Baalbek is not one of them. The silence continues into the Babylonian and Persian occupations of the Beqaa valley, suggesting that the location was of minimal importance (Jedijian 1975). After Alexander the Great the region would go back and forth under the control of the dynasties Alexander's generals had formed, and in the Beqaa another dynast formed and had its own currency. By the time the Roman general Pompey conquered the region, the place was noted by the geographer Strabo as mountainous with high regions controlled by robbers, and the plains had farming communities. There are no indications of any great structures there, let alone some of the largest stones ever moved.

The literary silence from a multitude of sources is already suggestive that this wonder of the ancient world did not yet exist. That leads us to the archaeology to see how much antiquity we can put into the great stone structures there.

To understand how to date the site, we first need to note what was built there besides the amazing western wall that houses the triliton. There were several temples built there, the largest being the Temple of Jupiter, in the past boasting a multitude of huge Corinthian columns. These are some of the largest columns in antiquity, and they were hewn from the local stone sources. These columns are not a single, solid piece, but instead there are several pieces (or drums) that had to be stacked together, with the capitol placed at the top, holding up the roofing structure as well as having its own classical elegance. The other temples there, such as that of Bacchus and Venus, also have these columns, a staple of Greek and, later, Roman architecture.

This is important because of what is found underneath the base stones that are themselves under the triliton. As you can see in this picture, below the three great stones are other impressive stones that act as a base for the triliton.

While not as massive as the trilithon stones, these base structures each have a considerable mass. However, below them was discovered a part of a drum to a column. The size of the drum corresponds to the columns used for the Jupiter temple, so this was likely a leftover or no longer useful piece of one of those columns. Because it is underneath the base stones, this drum must have been placed there before the trilithon was put into place. Also, on top of one of the trilithon stones there is a drawing of the plans for the Temple of Jupiter, which was built over by the Romans when it was no longer needed. By having pieces of the Jupiter temple below the trilithon and these drawings on top, we can be reasonably certain that the trilithon stones were put into place contemporaneously with the construction of the Temple of Jupiter (Kalayan 1969).

So already, by having the trilithon stones contemporaneous with the temple we have established the Roman provenance of the structure.

However, we can do more to pin down the dating of the megalith's placement. In the rubble found at the temple complex, the top drum of a column of the Temple of Jupiter had an inscription placed on it which dates itself to the reign of Emperor Nero. Dedicated to Fortuna, the inscription was likely made just before it was placed into the column structure. As such, we know that the temple was still being built during the reign of Nero (Kalayan 1969). However, it likely began before he took control of the empire. Recent research indicates that before the great Temple of Jupiter was built, there was an earlier, unfinished temple there built perhaps during the reign of King Herod the Great. This temple would have been worked out before the time of the great retaining wall with the trilithon, so we can say that the construction and placement of the trilithon must have been after Herod's time (dying in 5/4 BCE) and before the end of Nero's reign (Kropp & Lohmann 2011).

So not only can we discount the fanciful ideas of the structure having been built by aliens in the great and distant past, but we can actually narrow down to several decades when the structures were being put into place. Moreover, when it comes to the cultures we know of, the Romans are far and away the most plausible people that could have built this place up. While the Egyptian pyramids are a marvel, the average stones that were moved are not within two orders of magnitude of the mass of the trilithon stones (2.5 vs. 800 tons), and the Egyptians didn't have tools such as cranes or compound pulleys. The construction of these buildings required a level of technology that would not exist until the Hellenic period, and the Romans would perfect it. Moreover, the Romans had the political stability in the region, the finances, and the technical know-how. In particular, they had a lot of knowledge and practice with the use of the crane.

We can reasonably know the Romans used cranes for construction at multiple sites, including at Baalbek, and one of the tell-tale signs are "dents" in the stones that were lifted. In order to lift up an object and be able to set it down with precision, you won't have much luck having ropes or other things wrapped around and going underneath.

Once the object is set down, you now have to get those ropes out of there, which can be challenging if you are moving multi-ton stones.

Pulling the ropes like that will also not allow for precision in laying the stones in place. Only being able to gradually put the stones in place without anything in between the surfaces will be up for the job.

To do this lifting, you will need grip, and there are two primary ways to get grip on stones without having to specially shape them. One could use the lewis which will fit into a pre-fabricated hole and get an excellent grip on the rock. The hole is placed over the center of gravity of the object, so this cannot be what was used at many of the Baalbek stones which have holes placed well above the center of gravity and along the length of the stones.

More likely what was used were iron forceps or tongs (*ferrei forfices*), which were even faster and easier to use than the lewis. In the same way you apply a force onto paper when using scissors, the forceps grip into the holes made in the rock and hold into place. Once the pressure is released, then the forceps let go. There were limitations with the use of this tool, so they tended to be used on average-sized stones; there were limits on how wide you can get the forceps (not a problem with a lewis) and there is always the risk of slipping. Details are provided by Adam (1994).

However, there is another thing notable in the large stones at Baalbek: there are several holes in a side of the stones, usually in a line. It's hard to find a picture of this, but there is a good example on the base stones under the trilithon for figure 84 in Jidejian (1975) (see also here), but not in all cases. It's hard to tell, but in some cases perhaps forceps were used, and in other cases lewis were used, leaving no exposed holes as there are stones covering them on top. Either way, there are several of them, and it needs explanation, to which we must turn to what you need once you have a grip: lifting force.

If you want to lift something up, it tends to be easier when you use a pulley and can pull down with all your weight. However, that simple pulley also means the maximum you can lift is your own body weight. If you are planning on lifting objects several tons in mass, consuming a lot of hot dogs and cola isn't going to do the trick; but never fear, mechanical advantage is here! As first-term students in college physics will learn, when you draw a free-body diagram of the forces in a system of pulleys you cut down on the force you need to apply in lifting an object by the number of pulleys used. If you have an apparatus with 3 pulleys, you will only need to apply one third the force to lift the same object using only one pulley. This wouldn't be exactly true in practice, in part because of the friction in the system, among other issues. Nonetheless, a large number of pulleys can greatly multiply one's lifting potential, and this was understood by the Greeks as it is discussed in treatises by Hero of Alexandria, Vitruvius, and someone in Aristotle's school in the 3rd century BCE.

But that is not all. There is also the ability to use cranes. The invention of the crane is usually placed in the 6th century in Greece, with evidence coming from archaeological finds of lifted stones with lewis holes (Coulton 1974). After this time the lifting potential of the Greeks and then later still the Romans sky-rocketed as the use of the compound pulley was put into practice. There were limitations with the designs at first, but the Greeks in the fourth century BCE and later the Romans greatly advanced their methods. The cranes they would create would be amazing machines, some even using humans in a wheel acting as hamsters to drive up a load. Apparently these machines were well-regarded as they were put into the funeral relief of one rich Roman family, the Haterii.

In addition, if one combined a crane that would lift vertically with a capstan that pulls horizontally or with the tread-wheel design seen in the Haterii tomb relief, a couple of

people could lift something on the order of ten tons (Adam 1977). However, even that much would not be sufficient to lift many of the stones at Baalbek. But we also noticed that there were several gripping holes in those heavy stones, so it is likely that multiple cranes would be used to lift such objects. As such, several compound pulley cranes were used in tandem to lift some very heavy rocks. This becomes particularly impressive when one of the reliefs that went into the Temple of Jupiter had to be lifted up 19 m and had a mass of about 100 tons!

However, this ignores one major thing about the trilithon stones: there are no signs of lewis holes on the top and no forceps grips on the sides that are visible. Perhaps there are holes on the ends we cannot see, but that would leave little space to fit all the gripping points to lift the 800 ton masses. Also, there were not likely to be forceps 20 m wide to grip the trilithon stones, an iron tool that probably would have been heavy enough on its own. What this means is that there are no signs that the trilithon stones were lifted. So how to get them into place?

There is a feature of the stones that needs consideration, and that is the elevation of the quarry vs. the current location of the trilithon stones. According to the reliable sources on the site, the quarry is actually slightly higher in elevation (Adam 1994). To check this, I looked at a late 1940s US Navy topographical map of the area (that was what I had at the university library), which I have placed here ([click to enlarge](#)). The scale is that 1 mm is equal to 200 m (1:200,000). In the image I put a yellow circle for the approximate location of the Stone of the Pregnant woman, and it's just about on or next to the 1150 meter line, while the temple complex is below that, though you can pretty much follow the 1150 line from the quarry to the temple, providing an almost perfectly level route. I also verified this with relief map data from US space-based sources (Shuttle Radar Topography Mission 3 [SRTM3]), where again the elevation difference was small and the temple location of the stones was slightly lower. What that means is that you could get the stones from the quarry to the ground level of the temple without ever having to lift them an inch.

If you want to check for yourself, here is the Google maps image of the Stone of the Pregnant Woman with coordinates; there are two stones like it in the area, but this is the correct one because of that red-roofed house you see in the northeast corner—you can see it in some modern pictures of the stone in the background (i.e. [here](#), [here](#), and [here](#)).

South and west of that is the other major stone that was uncovered a couple of decades ago.

Now, the terrain between the quarry and the temple isn't flat today, but there has been 2000 years of soil erosion. Still, this wouldn't matter because of all the things the Romans could do, they could build flat roads. A little bit of leveling and no worries about ever having to push the trilithon stones uphill at any point on the way to their resting place. As for how to get there, Adam (1977) provides the key insights. As you can see with the unfinished stones in the quarry, the stones are pointing upward a bit, giving space between the ground and their bottom surface. This process means there is space to place rollers; when the stone is finally freed from the mountain, it will already be on a bed of rollers, never even needing to be lifted onto them.

Now, many think that a sled for the stone would be good, which would reduce the friction between the rollers and the stone. However, this probably won't be a good idea because you will need to get the stone off the sled in order to get it slid into place on the base stones; with 800 tons, that is no easy task. So it would be all rollers from the quarry site to the temple mound. This sort of use of rollers was done for the 600 ton stone for the obelisk of Mussolini, all done with human and animal power, plus a lot of ingenuity (Adam 1994). The largest single stone ever moved, the Thunder Stone, had similar principles, though it used a sled on top of what were effectively ball bearings to greatly reduce the friction. In antiquity, the trilithon is comparable to the largest stones at the modern Wailing Wall, namely the Western Stone, massed at around 520 tons, which we know was put into place during the Julio-Claudian dynastic period, starting under King Herod. In other words, a stone of a bit smaller mass than the trilithon stones was placed during about the same time as the great Baalbek stones were.

Another feature is that the base stones that were mentioned earlier will be in place and have reached the level of the ground, which is also about the level of the of the quarry. So, as seen in the diagram above, the trilithon stones continued to slide along rollers until reaching the base stones, and it just continued to slide. Never was it necessary to build ramps, lift the stone, or create some new soil structures to get the stones from their quarry to their resting place; it's a flat road from the quarry to the destination.

But there is still the issue of dragging the stones, and there will be a whole lot of frictional force. However, if the workers used a bunch of capstans, then it would be possible to pull the stones into place using a mere 144 workers (Adam 1977). (Note that in the diagram below, the soil marked 4 is temporary during the construction, and afterwards it will go away; it is only the soil behind the wall that will remain, and on the outside the ground level will be where it is marked 3.)

So now the project has gone from needing an estimated 40,000 workers to get the stones out of the quarry to a matter of hundreds for pulling the stones into place. It's almost easy. Well, not easy. and considering the two stones found in the quarry, that indicates that work was stopped on that front, probably because it was found to be unnecessary and extremely labor-intensive (making it expensive and time-consuming).

This also brings up the question about where these other two large stones would have been placed. According to Ruprechtsberger (1999), it seems that these stones would have finished wrapping around the main temple complex. As can be seen in this picture of the wall, the trilithon stone did not go all the way into the corner of the base, but the size of that gap (~4 m) is just the size to fit another such stone going perpendicular to the trilithon (also note, the brickwork in place is an Arab construct, not part of the original wall). On the other end of the trilithon, another massive stone would have been similarly placed perpendicular to the current trilithon stones. This way the great stones would have surrounded much of the base of the Jupiter Temple, as can be seen in this reconstruction of the temple mound with the current trilithon in place (from Adam 1977):

But why were these large stones put into place at all? What's wrong with using smaller stones?

This gets to the purpose of the wall that the trilithon is part of: it is a retaining wall. Because of soil erosion, the ground of the tel with the massive temples being constructed

would not be stable over time. As the soil gives way, the buildings will settle, lean, and stone isn't good when it comes to that. You can expect the structures to collapse in a relatively short period of time, making the religious project a waste (not to mention pissing off your preferred deity). But building a retaining wall will block the soil from moving downhill.

The most effective retaining walls will use the most massive, solid blocks, so that they are not moved by the force of the soil. The shape of the base, which does not simply provide a vertical wall but widens near the bottom, also resists the torque of the soil pressing at the top of the wall. So, in order to make the temple complex safe from eroding down the hill and taking the buildings with them, the Romans built some of the most massive retaining walls in history. And considering how well they stand after 2000 years, that is mighty impressive.

With all the above, we can say when the stones were placed, what civilization was involved, likely how the stones were moved and placed, and why it was done. Compare this to the alien claims: the wall cannot have great antiquity because of the archaeological context; we don't know if such beings even exist, let alone came by and did things with rocks (and why); the methods of moving are unknown and seem to differ between stones for no explicable reason (why lifting holes in some stones but not others); and there is no plausible reason why the wall was constructed (it would have been rather thin for a landing pad with just the trilithon stones). Same issues when it comes to the Nephilim of the Bible. Plausibility and evidence are all on one side of this ancient mystery.

But that isn't to say there isn't more to learn. Archaeologists have noted how the designs and plans changed multiple times, and while construction may have begun under Herod the Great, structures were still being worked on throughout the second and into the third century. The nature of these changes and how they affected the construction of the rest of the temple complex is not completely understood. Other points of why the workers and engineers decided not to continue in using the most massive monoliths are also worth exploring. So there is plenty to research; it's just that there isn't anything that aliens/giants can explain better.

*Note: all measurements will be in metric units, so ton will mean 1000 kg of mass, etc.

Sources:

Adam, Jean-Pierre. "À propos du trilithon de Baalbek: Le transport et la mise en oeuvre des mégalithes", *Syria* 54, 1/2 (1977): 31–63.

Adam, Jean-Pierre. *Roman Building: Materials and Techniques*. Indiana University, 1994.

Alouf, Michael M. *History of Baalbek*. American Press Beirut, 1949 [1890].

Childress, David. *Technology of the Gods: The Incredible Sciences of the Ancients*. Kempton, IL: Adventures Unlimited Press, 2000.

Coulton, J. J. "Lifting in Early Greek Architecture", *The Journal of Hellenic Studies* 94 (1974): 1-19.

Jidejian, Nina. *Baalbek: Heliopolis, "City of the Sun"*. Dar el-Machreq Publishers: Beirut, 1975.

Kalayan, Haroutune. "The Engraved Drawing on the Trilithon and the Related Problems about the Constructional History at Baalbek", *Bulletin du Musee de Beyrouth* 22 (1969): 151-5.

Kropp, Andreas J. M. Lohmann, Daniel. “‘Master, look at the size of those stones! Look at the size of those buildings!’ Analogies in Construction Techniques Between the Temples of Heliopolis (Baalbek) and Jerusalem”, *Levant* 43, 1 (2011): 38-50.
Ruprechtsberger, Erwin M. “Vom Steinbruch zum Jupitertempel von Heliopolis/Baalbek (Libanon)”, *Linzer Archäologische Forschungen* 30 (1999): 7–56.
Sitchin, Zechariah. *The Stairway to Heaven*. HarperCollins: New York, 1999 [1980].

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Please visit the site: <http://michaelsheiser.com/PaleoBabble/2012/08/transporting-trilithon-stones-baalbek-applied-physics-ancient-aliens/>



MILLENNIA-OLD BURIAL CHAMBER **FOUND IN OMAN**

The site dating back to around 1300 BC was unearthed while building a sports club

Muscat: An international team of archaeologists has stumbled upon a cache of relics dating back several millennia in the northern Omani enclave of Musandam.

The discovery, which was made in the Dibba district of Musandam Governorate, is believed to be some 3,500 years old, and has been billed by the Ministry of Heritage and Culture as among the most stunning archaeological finds of recent times.

According to a report in the Arabic newspaper Oman, the site first came to light last year when construction workers building the foundations of a local sports club, chanced upon what appeared to be an ancient tomb strewn with human bones.

Italian and Greek archaeologists, who were brought in by the Ministry to study the site, have since uncovered the trappings of a full-fledged burial chamber housing the human remains of at least 188 individuals. Scattered around the site were remnants of pottery, swords, daggers and ancient jewellery. Using carbon-dating techniques, experts have pinpointed the site's antiquity to around 1300BC.

The chamber itself was an impressive structure. But with limestone material and rocks sourced from a local wadi, the structure measured 14 metres long and 3.5 metres wide. Using ground penetrating radar (GPR), the international teams are scouring the surrounding area for similar burial chambers or other subterranean structures that may yield evidence of a much larger archaeological find.

Significantly, the site is the most important archaeological find to date in the Musandam peninsula, a rugged region of Oman known for its dramatic massifs and magnificent fjords.

Little is known about the origins of the ancient communities that settled in this remote and mountainous region, although experts point to possible trade ties with ancient Persian civilizations that thrived across the Hormuz Strait in modern day Iran.

Further archaeological studies are ongoing, according to the report.

Please visit the site: <http://gulfnews.com/news/gulf/oman/millennia-old-burial-chamber-found-in-oman-1.1175535>

MAQSUD DISCOVERS 200 AD INDUSTRIAL ZONE IN SINAI ARTISAN COMPLEX PRODUCED TABLEWARE, BRONZES, HOUSED WORKERS

A team led by Egyptian archeologist Mohamed Abd el Maqsud has uncovered a Greek-Roman industrial zone dating from 200 AD in the northern Sinai east of the Suez canal, Al-Ahram online weekly reported.

The zone produced amphorae, plates, and other tableware as well as bronze statues, Antiquities Minister Mohamed Ibrahim announced. "This is a very important discovery" because it points to economic and trade relations between Egypt and its Mediterranean neighbors in antiquity, the minister said. The zone was unearthed during a routine dig at the Tell Abu Seifi archeological site, which includes a fortress built by Roman Emperor Maximinus Thrax, who ruled from 235-238 AD. Archeologists discovered artisans' workshops, homes, warehouses and administrative offices, all of which render a plausible picture of daily life in a factory at that time, Ibrahim explained.

The dig also unearthed a limestone block with Latin incisions describing the deployment of Roman legions within the fortress, and a small terracotta statue of Bes, the ancient Egyptian god who protected the household, Maqsud added.

Please visit the site:

http://www.ansamed.info/ansamed/en/news/nations/egypt/2013/04/25/Archeology-Maqsud-discovers-200-industrial-zone-Sinai_8612079.html
