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Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Ιούλιος 2019 -

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

(Heraclitus)

Newsletter of the Hellenic Society of Archaeometry

- July 2019 -

Nr. 220

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ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS

15TH INTERNATIONAL ACCELERATOR MASS SPECTROMETRY CONFERENCE, 6- 11TH SEPTEMBER, 2020, SYDNEY, AUSTRALIA

ANSTO is pleased to host the 15th Accelerator Mass Spectrometry Conference (AMS-15) which will take place in Sydney, Australia, at the John Niland Scientia Conference Centre, located on the Kensington campus of the University of NSW, from Monday 6th to Friday 11th of September 2020.

We would like to announce that the AMS-15 website (www.ams15.sydney) is now open. The website will be updated with relevant information (important dates, abstract submission, registration costs, accommodation) in September 2019.

We invite you to visit the website to fill in the expression-of-interest page if you are thinking of attending or if you want to keep up with program details.

On behalf of ANSTO's AMS team, we hope to see you in Sydney for AMS-15 !!

AMS 15 Organizing Committee

David Fink (Conference Chairperson),
Kelly Cubbin,
David Child,
Geraldine Jacobsen and
Megan Williams

ABSTRACT SUBMISSION OPEN | SPEAKERS ANNOUNCED IN THE ARCHAEOLOGY & CULTURAL HERITAGE SYMPOSIUM, 11 - 14 AUGUST 2019, SWEDEN

ABOUT ORGANIZER: IAAM is a principal non-profit organization in the field of Advanced Materials and has honored about 530 high-profile researchers with the “IAAM Awards and Recognitions”. The glimpse of truly international networking has strengthened the objective, *Knowledge Experience at Sea*. Association has a rich legacy of 5000+ well-known speakers from 100+ countries in their previous [congress assemblies](#).

ABOUT EVENT: The symposium aims to create an interdisciplinary worldwide forum on the interdisciplinary topics of archaeology, bioarchaeology, ancient DNA, materials ceramic, ancient technology, radiocarbon dating, and cultural heritage. The symposium theme, “Highlighting the Recent Innovations and Technologies in Archaeology and Cultural Heritage”, offers opportunities for leading researchers, young scientists, engineer, students, archaeologist, ancient DNA researchers, anthropologist, historian, business giants and start-up companies to present their research result, breakthrough innovations, discoveries, path-breaking ideas, experiences, product display and new product launch at a global platform.

Symposium will line-up excellent speakers, including:

1. Dr. Manuel Palacios-Fest, Terra Nostra Earth Sciences Research, LLC, USA
2. Dr. Fumiko Ikawa-Smith, McGill University, Canada
3. Dr. Radu George Dimitriu, Development for Marine Geology and Geoecology-GeoEcoMar, Romania
4. Dr. Hsiao Goh, University of New South Wales, Australia

Recommendation for your colleagues and students

IAAM would also be grateful if you could forward this information to other people that could be interested in it.

PS. If you have any constrain to attend this year, please feel free to send an email to contact@iaamonline.org for IAAM upcoming congress updates and newsletters.

Look forward to receiving your abstract and welcoming you in the conference.

With kindest regards,

Susane Parck

IAAM Executive at Secretary General Office
International Association of Advanced Materials

Recent News - Researchers and decision makers from 50 countries met at global congress in Stockholm, www.infrasverige.se/forskare-och-beslutsfattare-fra-n-50-la-nder-ma-ttes-pa-global-kongress-i-stockholm

Scientists from 50 countries gather at The Silver Jubilee Assembly conference
<https://news.cision.com/iaam/r/press-invitation--scientists-from-50-countries-gather-at-the-silver-jubilee-assembly-conference-on-v,c2767198>

AMC Report 2018 - Advancement of Materials to Global Excellence in 2018,
www.iaamonline.org/blog/advancement-of-materials-to-global-excellence-in-2018

Ms. Casey Gale is a Convenor associate editor, USA recently reported about Advanced Materials Congress Takes a ‘Knowledge Experience’ Cruise, www.pcma.org/25th-advanced-materials-congress-meetings-we-like

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**CALL FOR PAPERS, HISTORICAL
METALLURGY SOCIETY RESEARCH IN
PROGRESS MEETING, FRIDAY THE
15TH NOVEMBER, 2019, MCDONALD
INSTITUTE FOR ARCHAEOLOGICAL
RESEARCH, UNIVERSITY OF CAMBRIDGE**

<http://hist-met.org/meetings/research-in-progress-meeting-2019.html>
<https://www.facebook.com/events/474320303343533/>

The Historical Metallurgy Society Research in Progress Meeting is back for another year, with the aim of bringing together a wide variety of contributors, from historical and archaeological metallurgists to field archaeologists, historians, and economists. We invite submissions from anyone currently working on, or recently having finished a project on archaeological or historical metallurgy, from historical and archaeological metallurgists to excavators, historians and economists. We are particularly keen in bridging the gap between archaeologists working in the academic, contract and public sectors, and fostering links between metallurgical specialists across different disciplines. Whether you are a researcher, a student or a non-specialist with an interest in the field, we welcome you to share your research and meet others working in the field.

Proposals for 10-15 minute oral communications are invited from anyone undertaking work in any area of ancient, historical, or industrial metallurgy, and/or other relevant areas of research. Please send your abstract as an attached text document to hmsresearch19@gmail.com by the **1st of September**.

The HMS prize will be awarded to the best presentation by a student or a recent graduate (anyone who has completed their studies within the past 12 months) at this annual meeting, as chosen by members of the HMS council attending the meeting. If you are eligible and wish to be considered, please indicate this in your abstract submission.

In addition to the prize, The Historical Metallurgy Society is offering a small number of travel bursaries for students presenting at the meeting. If you are a student and would like to be considered please indicate with your submission.

Please direct any general enquiries to the following e-mail address: hmsresearch19@gmail.com

Best regards,

HMS Research in Progress 2019 Organising Committee

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

ASSOCIATE PROFESSOR IN CHEMISTRY /
CONSERVATION SCIENCE,
UNIVERSITETET I OSLO, NORWAY

About the position

A permanent position as Associate Professor (SKO 1011) in chemistry / conservation science is available at the Department of Collection Management at the Museum of Cultural History.

We seek a candidate with solid competence and a good understanding of object-oriented scientific investigations and of the stability and degradation of archaeological and ethnographic material. You should be able to work at the intersection of natural sciences and humanities. The successful applicant is expected to collaborate with the museum's other academic environments and help promote the use of our collections in research. The researcher is expected to participate in and initiate research projects both nationally and internationally in line with the Museum's strategy.

The position includes 50% research time and 50% museal work, including administrative tasks within both fields. In addition to research, the position includes varied academic and practical tasks related to the management of the museum's collections as well as professional communication.

The Department of Collection Management has currently 40 employees and is organized into two groups; the Group for conservation and the Group for digital documentation, IT, photography and archives. The department also includes the research and development project Saving Oseberg that documents wooden objects from the Oseberg find and investigates preservation methods to slow down the degradation of alum-treated wooden objects. Within the framework of Saving Oseberg, the department and the museum have established considerable [analysis facilities](#) that can be developed further. For more information about Saving Oseberg, see the [project's website](#).

The conservation group constitutes the largest professional environment in Norway in conservation, with currently 14 conservators specialised in archaeological, ethnographic and painted materials, as well as a chemist.

Please visit the site: <https://www.jobbnorge.no/en/available-jobs/job/168106/associate-professor-in-chemistry-conservation-science>

ASSOCIATE PROFESSOR IN CONSERVATION OF PAINTED OBJECTS, UNIVERSITETET I OSLO, NORWAY

About the position

A permanent position as Associate Professor (SKO 1011) in Conservation of painted objects is available at the Department of Collection Management at the Museum of Cultural History.

We seek a candidate with solid competence in the preservation of painted objects, and with a broad understanding of painted surfaces and structures. You should be able to bring the various fields of conservation closer together. The successful applicant is expected to collaborate with the Museum's other academic environments and help promote the use of our collections in research. The researcher is expected to participate in and initiate research projects both nationally and internationally in line with the Museum's strategy.

The position includes 50% research time and 50% museal work, including administrative tasks within both fields. In addition to research, the position includes varied academic and practical tasks related to conservation of the museum's painted objects, loans and exhibitions, as well as professional communication.

The Department of Collection Management is organized into two groups; the group for conservation and the group for digital documentation, IT, photography and archives. The department currently has 40 employees. The department also includes the research and development project Saving Oseberg. This project documents wooden objects from the Oseberg find and investigates preservation methods to slow down the degradation of alum-treated wooden objects. Within the framework of Saving Oseberg, the department and the museum established considerable [analysis facilities](#) that can be developed further.

The conservation group constitutes the largest professional environment in Norway in conservation, with currently 14 conservators specialised in archaeological, ethnographic and painted materials, as well as a chemist.

Please visit the site: <https://www.jobbnorge.no/en/available-jobs/job/171752/associate-professor-in-conservation-of-painted-objects>

JOBS: BABYLONIAN SCIENCE (BOLOGNA)

I would like to draw your attention to the call for a 3-year position on Babylonian science and proto-chemistry (non-tenured assistant professor) in the framework of the AlchemEast project in Bologna.

The project is devoted to the study of alchemy from ancient Babylonia to the early Abbasid period, and it deals with Akkadian, Greek, Syriac and Arabic primary sources (for more information, please visit: www.alchemeast.eu).

The call is available on-line at the link: <https://tinyurl.com/y3rqmzv>.

The deadline for applying is July 26 (12:00 AM) and the application is only possible through the website mentioned in the call.

Kindly forward this information to any potential candidate you think might be suitable for this position? For any question, please do not hesitate to contact me: matteo.martelli@unibo.it

CAESAREA MARITIMA **ZOOARCHAEOLOGICAL PROJECT: CALL** **FOR APPLICATIONS**

The Roman/Byzantine capital of Palaestina Prima, Caesarea Maritima, is at the focus of a new archaeological research program led by NYU and NYU Tel Aviv in cooperation with Tel Aviv University and the Israel Antiquities Authority, under the patronage of the Rothschild Caesarea Foundation. As part of the project, the cultural and bio-archaeological connections of the provincial capital to the Western Roman Empire in the West will be explored using zooarchaeological methods. This project is in collaboration with Dr. Nimrod Marom of the Leon Recanati Institute for Maritime Studies at the University of Haifa.

To co-lead this research, NYU Tel Aviv seeks applicants for a one-year postdoctoral position beginning September 1st, 2019. The applicants should satisfy the following criteria:

- (1) PhD in Archaeology/Biology with a focus on zooarchaeology;
- (2) Experience in zooarchaeological work on faunal assemblages from the Roman West (Italy, France, Spain, Britain), with emphasis on economic and social dimensions of Romanization;
- (3) Experience in the use of geometric morphometric methods in a zooarchaeological/biological context.

The one-year postdoctoral position holder will be awarded US\$ 35,000 Applications should be sent to Dr. Yifat Thareani yt26@nyu.edu Preference will be given to applications received by July 15th

ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS

PIGMENT IDENTIFICATION COURSE- WESTMONT, AUGUST 19-23, HOOKE COLLEGE OF APPLIED SCIENCES, WESTMONT, ILLINOIS

The focus of this course is the identification of pigments using polarized light microscopy (PLM). A practical introduction to PLM methods is taught using many examples from the world of pigments. A more thorough treatment of PLM theory and principles is covered in the Polarized Light Microscopy course.

This course also introduces students to other analytical methods used as confirmatory methods; these include microchemical methods, elemental characterization using XRF or SEM/EDS, Raman, and infrared spectroscopy. Students examine and sample paintings and architectural artifacts, prepare specimens for analysis, perform PLM analysis, and direct or perform further confirmatory analyses. Methods for characterization of binding media and support canvas materials are also discussed.

This is a course for conservation professionals.

Learn more or register: <https://www.mccrone.com/courses/pigment-identification/>

THE INVISIBLE
HERITAGE. APPLIED PHYSICS METHODOLOGIES FOR THE CHARACTERIZATION AND DIAGNOSIS OF CULTURAL HERITAGE
(ALPHA), SEPTEMBER 3RD-10TH 2019

Based onto a long-lasting interdisciplinary collaboration in the framework of cultural heritage, closely linked to the needs of heritage conservation and protection, a scientific training course has been developed joining together the humanistic and the physical sciences approaches.

Exact sciences approach and methodologies significantly contribute to a detailed knowledge of artifacts from the past, supporting the knowledge and conservation of heritage by defining: their age and state of preservation, their composition, the manufacturing technologies utilized, hence allowing to read the invisible.

The Summer School intends to present to an audience of young people based on both the exact sciences and humanities (archaeologists, art historians, architects) fields of research, the most utilized state of the art technologies in this field starting from specific research pathways based on the Department of Letters and Cultural Heritage of the Vanvitelli University and from the activity of a laboratory, Circe, connected to the Department of Mathematics and Physics of the same University, where a research line aimed to Cultural Heritage studies is currently applied.

The course has the support of Provincia di Caserta, Museo Archeologico Nazionale di Napoli, Museo di Capodimonte and Parco Archeologico di Pompei. The study period includes training with theoretical lectures and practical laboratories realized at the Circe Laboratory and visits to the main museums and archaeological parks of Campania to analyze the problems related to heritage conservation and the organization in the territory of diagnostic, knowledge and restoration experiences.”

Fabio Marzaioli, Ph.D.
Researcher in Applied Physics
Università degli Studi della Campania “Luigi Vanvitelli” (former Seconda Università di Napoli)
Department of Mathematics and Physics
Centre for Isotopic Research on Cultural and Environmental heritage-Head of Mass Spectrometry Services
Tel: +390823274661/4814 int 28
Fax: +390823274605

INTERNET SITES

FROZEN FOR MILLENNIA, AN ANCIENT GREEK SOLDIER IS FREED TO CHARGE INTO BATTLE ONCE AGAIN

The artifacts that underlie so much of our understanding of the ancient world can often feel like brittle remnants of a dim and dusty past that's hard to access without context and extensive knowledge. But sometimes just a little kineticism can transform a bit of pottery into a living story. Such is the effect of this animation produced for an exhibition at the Ure Museum of Greek Archaeology at the University of Reading in the UK, which breathes life into war scenes from a vase found on the island of Euboea and thought to date to roughly 550 BCE. The story follows a spear-wielding hoplite (citizen-soldier in the infantry) as he moves through several stages of the wartime experience. After witnessing a ceremonial animal sacrifice performed by a priest, he departs for battle alongside his fellow soldiers, fights the enemy and creates a trophy from their discarded equipment to mark his side's victory. Learn more about the video at the Panoply Vase

Animation Project [website](#).

Art director: Sonya Nevin

Animator: Steve K Simons

Website: [Panoply Vase Animation Project](#)

Please visit the site: https://aeon.co/videos/frozen-for-millennia-an-ancient-greek-soldier-is-freed-to-charge-into-battle-once-again?fbclid=IwAR1s5PTBwBe-9vI_OXUx9XDv_dhcQ0beB-lbySlo9AGMT3aKqullylnD_4

LINEAR A TEXTS & INSCRIPTIONS IN PHONETIC TRANSCRIPTION & COMMENTARY

Please visit the site: <http://people.ku.edu/~jyounger/LinearA/?fbclid=IwAR3-qE1X-bkEb7WpPwjSgR-Wazp42x6jsvd71F3khV-fP91X9VZSr5Crz4E>

A PREHISTORIC HOUSEHOLD

Three archaeologists talk about the prehistoric household. The video is projected at the permanent exhibition of the Archaeological Museum of Thessaloniki "Prehistoric Macedonia"

Please visit the site:

<https://www.youtube.com/watch?v=HCikyQLMkpg&fbclid=IwAR2MmaJreio0BRaVrs4mD-hnx7w6B1HnO5igEmu0mYbAzr-Qz50NskY3K38&app=desktop>

ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS
ARCHAEOLOGIA BULGARICA, ISSUE XXIII,
2019, 1

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Language Editors: Sven CONRAD PhD (German), Leipzig, Germany; Jean-Luc GUADELLI PhD (French), Bordeaux, France; Amber ROY (English), Newcastle, England.

All articles in Archaeologia Bulgarica are submitted to peer review.

2. English version of the board game "Archaeologists vs Treasure Hunters" is the first of a kind adventurous, educational (age 7+) and family game made with the participation of professional archaeologists.

The game explains in an enthralling manner what is like to be an archaeologist and why and how are treasure hunters harmful, popularizing national cultural-historical landmarks at the same time.

More info at:

<https://www.archaeologia-bulgarica.com/en/just-another-board-game-there-is-more-in-it/>

<https://nous-bg.com/produkt/game-archaeologists-vs-treasure-hunters-english-version/>

Regards,

Lyudmil Vagalinski

EΙΔΗΣΕΙΣ - NEWS RELEASE

SCIENTISTS FINALLY READ THE OLDEST BIBLICAL TEXT EVER FOUND, BY ANDREW GRIFFIN

The charred lump of scroll sat in an archaeologist's office, impossible to read without destroying it – until now.

Scientists have finally been able to read the oldest biblical text ever found.

The 2,000-year-old scroll has been in the hands of archaeologists for decades. But it hasn't been possible to read it, since it was too dangerous to open the charred and brittle scroll.

Scientists have now been able to read it, using special imaging technology that can look into what's inside. And it has found what was in there: the earliest evidence of a biblical text in its standardised form.

The passages, which come from the Book of Leviticus, show the first physical evidence of a long-held belief that the Hebrew Bible that's in use today has is more than 2,000 years old.

The discovery was announced in an article in Science Advances written by researchers from Kentucky and Jerusalem. It described how the researchers used a tool called "virtual unwrapping", which provides a 3D digital analysis of an X-ray scan.

Read more [Ancient cemetery could solve one of the Bible's biggest mysteries](#)

By using that, it was the first time that researchers have been able to read an ancient scroll without actually opening it.

"You can't imagine the joy in the lab," said Pnina Shor of the Israel Antiquities Authority, who participated in the study.

The digital technology, funded by Google and the U.S. National Science Foundation, is slated to be released to the public as open source software by the end of next year.

Researchers hope to use the technology to peek inside other ancient documents too fragile to unwrap, like some of the Dead Sea Scrolls and papyrus scrolls carbonized in the Mt. Vesuvius volcano eruption in 79 CE. Researchers believe the technology could also be applied to the fields of forensics, intelligence, and antiquities conservation.

The biblical scroll examined in the study was first discovered by archaeologists in 1970 at Ein Gedi, the site of an ancient Jewish community near the Dead Sea. Inside the ancient synagogue's ark, archaeologists found lumps of scroll fragments.

The synagogue was destroyed in an ancient fire, charring the scrolls.

The dry climate of the area kept them preserved, but when archaeologists touched them, the scrolls would begin to disintegrate.

So the charred logs were shelved for nearly half a century, with no one knowing what was written inside.

Last year, Yosef Porath, the archaeologist who excavated at Ein Gedi in 1970, walked into the Israel Antiquities Authority's Dead Sea Scrolls preservation lab in Jerusalem with boxes of the charcoal chunks. The lab has been creating hi-resolution images of the Dead Sea Scrolls, the earliest copies of biblical texts ever discovered, and he asked researchers to scan the burned scrolls.

"I looked at him and said, 'you must be joking,'" said Shor, who heads the lab.

She agreed, and a number of burned scrolls were scanned using X-ray-based micro-computed tomography, a 3D version of the CT scans hospitals use to create images of internal body parts. The images were then sent to William Brent Seales, a researcher in the computer science department of the University of Kentucky. Only one of the scrolls could be deciphered.

Using the "virtual unwrapping" technology, he and his team painstakingly captured the three-dimensional shape of the scroll's layers, using a digital triangulated surface mesh to make a virtual rendering of the parts they suspected contained text. They then searched for pixels that could signify ink made with a dense material like iron or lead. The researchers then used computer modeling to virtually flatten the scroll, to be able to read a few columns of text inside.

"Not only were you seeing writing, but it was readable," said Seales.

"At that point we were absolutely jubilant."

The researchers say it is the first time a biblical scroll has been discovered in an ancient synagogue's holy ark, where it would have been stored for prayers, and not in desert caves like the Dead Sea Scrolls.

The discovery holds great significance for scholars' understanding of the development of the Hebrew Bible, researchers say.

In ancient times, many versions of the Hebrew Bible circulated. The Dead Sea Scrolls, dating to as early as the 3rd century B.C., featured versions of the text that are radically different than today's Hebrew Bible.

Scholars have believed the Hebrew Bible in its standard form first came about some 2,000 years ago, but never had physical proof, until now, according to the study. Previously the oldest known fragments of the modern biblical text dated back to the 8th century.

The text discovered in the charred Ein Gedi scroll is "100 percent identical" to the version of the Book of Leviticus that has been in use for centuries, said Dead Sea Scroll

scholar Emmanuel Tov from the Hebrew University of Jerusalem, who participated in the study.

"This is quite amazing for us," he said. "In 2,000 years, this text has not changed."

Noam Mizrahi, a Dead Sea Scrolls expert at Tel Aviv University who did not participate in the study, called it a "very, very nice find." He said the imaging technology holds great potential for more readings of unopened Dead Sea Scrolls.

"It's not only what was found, but the promise of what else it can uncover, which is what will turn this into an exciting discovery," Mizrahi said.

**Please visit the site: <https://www.independent.co.uk/life-style/gadgets-and-tech/news/scientists-finally-read-the-oldest-biblical-text-ever-found-a7323296.html>
[Go there for video]**

VOLCANIC ERUPTION WITNESSED BY PREHISTORIC HUMANS

A volcanic eruption believed to be eye-witnessed by humans in prehistoric times happened 245,000 years later than originally expected, according to new research involving Curtin University researchers.

The research, published in *Quaternary Science Reviews*, aimed to determine the age of prehistoric footprints found in the ash layer produced by the Çakallar volcano eruption, which took place in the town of Kula in western Turkey thousands of years ago.

Along with the footprints, a rock painting was discovered in close proximity to the eruption site in the Kula UNESCO Geopark, in Manisa Province, Turkey. The painting, which illustrates the eruption of the volcano, highlights how humans from thousands of years ago were able to illustrate natural phenomena in their own way.

Lead Australian author Dr. Martin Danišik, from the John de Laeter Centre based at Curtin University, said previous studies suggested the footprints belonged to *Homo neanderthalensis* from the Pleistocene age, but the new findings indicated they may be younger than previously thought.

"The footprints, widely known as 'Kula footprints,' were discovered in the 1960s when construction workers, who were moving volcanic rock away from one of the volcanoes in the area, found them well-preserved in fine-grained volcanic ash," Dr. Danišik said.

"Our team was able to determine the age of the volcanic ash that preserved the footprints by using two different techniques. A radiogenic helium dating method was used to measure the eruption age of tiny zircon crystals, and the cosmogenic chlorine exposure dating method was used to measure the time that the volcanic rocks have been residing near the Earth's surface.

"The two independent dating approaches showed internally consistent results and collectively suggest that the volcanic eruption was witnessed by *Homo sapiens* during the prehistoric Bronze Age, 4,700 years ago and 245,000 years later than originally reported."

The research also suggests that after the initial eruption, humans and their canine companions slowly approached the volcano, leaving distinctive footprints in the wet ash blanket on the surface. Volcanic activity continued, causing dark-colored volcanic rock to bury the ash and therefore preserve the footprints.

Dr. Danišik explained that the humans witnessed the final stages of the volcanic eruption from a safe distance, making it highly likely the *Homo sapiens* were also responsible for the rock paintings discovered close to the site.

"The rock painting is a fascinating connection to the footprints, as it showcases how humans from 4,700 years ago were able to paint natural processes, such as a volcanic eruption, in their own artistic way with limited tools and materials," Dr. Danišik said.

The research was led by researchers from Hacettepe University in Turkey, and co-authored by researchers from Curtin University, Istanbul Technical University and Celal Bayar University in Turkey, and Heidelberg University in Germany.

Please visit the site: <https://phys.org/news/2019-05-volcanic-eruption-witnessed-prehistoric-humans.html>

ARCHAEOLOGY PLACES HUMANS IN **AUSTRALIA 120,000-YEARS-AGO,** **BY BRUCE R. FENTON**

Shell middens and a potential ancient hearth add to growing evidence of a much deeper human occupation period in Australasia (prehistoric Sahul).

A meticulously detailed 11 years research program has concluded that there is compelling evidence for a human presence 120,000 years at Moyjil, Point Richie, on the far south coast of Victoria.

Excavation in basal calcrete at Moyjil containing burnt stones and charcoal. Image credit – Ian J. McNiven

In the past, scientific research suggestive of human habitation in Australia up to 120,000 years ago had been considered and then rejected. Several habitation sites have produced discoveries pointing to a much earlier than expected period, but the controversy led to more conservative dating. The new finding should cause a rethinking of all relevant archaeological sites.

The new research findings have been presented to the Royal Society of Victoria by a group of highly respected academics including Prof Jim Bowler, famous for his discovery of the oldest well-dated human remains on the continent, Mungo Lady and Mungo Man (42,000 years old).

The Collaborative efforts included Archaeologist Professor Ian McNiven along with a number of his professional colleagues including; David Price, John Sherwood and Stephen Carey.

Analysis of a shell midden, already suspected to be 70 – 80 thousand years old, was carried out along with additional discoveries including charcoal and burnt stones with all the hallmarks of being an ancient aboriginal type cooking hearth.

Thermal luminescence dating techniques used on the blackened stones provided ages in the range of 100-130 thousand years, consistent with independent stratigraphic evidence and contemporaneous with the age of the surface in which they lie.

It is important to note that the scientists consider the distribution of the fire-darkened stones to be inconsistent with wildfire effects. Included were two hearth-like features closely adding further indications of potential human action at the site.

This dating at 120,000 years may sound astonishing but consider here that there has been growing evidence of a much earlier habitation period, including the discovery of tools at Madjedbebe, Arnhem Land (northern Australia) which produced dates of 65 – 80 thousand years.

“In summary, although no single line of evidence precludes natural fire, taken collectively the case for exclusion is strong. Humans are obviously capable of these processes, of carrying fuel to a cliffed shoreline and repetitive burning at the same place,” the team explains.

While the article released by the team expresses some level of confusion over why there is no evidence of these mysterious earlier inhabitants of the region, it should be said that such evidence exists seemingly unknown to them.

“The prospect, however, of humans in that locality at 120 ka [years ago], although consistent with evidence presents more questions than answers. Who were they? Why here and not elsewhere? Why no legacy of any toolkit, no traces of food let alone human remains? In the absence of bones, stone flakes or any independent trace of people, the notion of occupation at 120 ka currently remains difficult to credit.”

The inter-glacial period starting 130,000 years ago would have enabled population movement south from equatorial Asia. Later cooling events 72,000 years ago would have likely initiated northward bound contraction of populations.

Two largely overlooked environmental studies had previously detected strong evidence of firestick farming used to deforest land at two sites almost 130,000 years ago. The first site is at Lake George, New South Wales and the second at the Great Barrier Reef, Queensland. The controversial early dating for a human presence suggested in both these studies was largely ignored. The depth of aboriginal inhabitation has long been a thorny political issue in modern Australia.

“However, marine shells, stones in unexplained depositional context and fire resemblance to hearth, successively diminish the possibility of a natural explanation. That absence leaves the currently unlikely option of human agency as the most likely alternative.”

The new research was undertaken collaboratively with Eastern Maar Aboriginal Corporation, Gunditj Mirring Traditional Owners Aboriginal Corporation and Kuuyang Maar Aboriginal Corporation.

“For some, an acceptance of human presence in Australia 120,000 years as a possibility may now tentatively advance to one of probability. For most, the question of Australia’s occupation at that time remains highly contentious. Different people will attach different levels of significance to the various lines of evidence presented here,” the researchers conclude.

Jim Bowler understands the controversy, having been embroiled in one over the Lake Mungo remains, he also recognises that there will be many scientists seeking to dismiss his team’s tentative findings.

Bowler explains that the site, “It presents the probability of people here on coastal Victoria 120,000 years ago. If correct, that would double the time of human occupation. That is a big jump to make. It will not be widely accepted until the evidence is definitive. Aware of that limitation, we have put this current evidence to the public. Each may make up their own minds.”

It is possible that the team is unaware of a genetic study carried out by Drs Luca Pagani and Toomas Kivisild from the University of Cambridge's Department of Archaeology and Anthropology in 2016. The Cambridge team found a "genetic signature" in present-day Papuans that suggested over 2% of their genome originates from an even earlier, and otherwise extinct, population present in the Oceanian region 120,000 years ago.

Jim Bowler is now 88-years-old and recognises that the Moygil research may be his swansong from an illustrious scientific career, hopefully, he will live to see this deeper occupation validated, which I am certain it will be now that archaeology and genetics are pointing in the same direction.

"If it was 60,000 years, readers would have no doubt it was people. But 120,000 is a different problem! For my part, I am convinced. However, I respect the scepticism of others, at least until the next stage of examination is complete. And I shall not be there for that event. At my age and stage, it is already past time to bow out. This work of the past 11 years awaits long-time judgement. You be the jury!"

Bruce Fenton, author of *The Forgotten Exodus: The Into Africa Theory of Human Evolution*

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Please visit the site: http://ancientnews.net/2019/03/11/archaeology-places-humans-in-australia-120000-years-ago/?fbclid=IwAR3Er_kzqT1YcSosaZcV6MnY5aoeKiMx-B3tHea63adepJU3iz75cY0YAYo

COLD WAR NUCLEAR BOMB TESTS ARE HELPING RESEARCHERS IDENTIFY ART FORGERIES, BY MEILAN SOLLY

Traces of carbon-14 isotopes released by nuclear testing enable scientists to date paintings created post-World War II.

A new method of detecting forgeries uses minuscule canvas fibers and paint samples to expose purportedly historic works of art as modern creations.

The technique, catalogued in the *Proceedings of the National Academy of Sciences*, dates would-be masterpieces by measuring traces of carbon-14 isotopes released into the atmosphere by mid-20th century nuclear bomb testing. Objects made after 1963 hold significantly higher levels of the unstable isotope, allowing researchers to differentiate between pre- and post-World War II paintings.

This isn't the first time scientists have turned to radiocarbon dating in an attempt to thwart forgers. As Niraj Chokshi explains for *The New York Times*, the idea of dating art by assessing the organic matter used to bind paint pigments was first floated as early as 1972; previous case studies include a 2015 investigation that debunked the provenance of a supposed Fernand Léger canvas owned by American art collector Peggy Guggenheim.

Still, the approach has its drawbacks. According to *artnet News*' Taylor Dafoe, savvy forgers recycle antique canvases and even paint, making it difficult to determine if a painting is original or simply artfully doctored. At the same time, the *Economist* notes, radiocarbon testing is so destructive that a sample can rarely be analyzed twice. Typically, the process also requires a "sufficient[ly]" sized sample: Given the possibility that a suspected forgery may actually be a bonafide masterpiece, investigators are often reluctant to remove significant amounts of paint. Fragments of a wooden frame or pieces trimmed from the edge of a canvas, on the other hand, "might be [considered] an acceptable loss."

The new research, led by Laura Hendriks of Switzerland's ETH Zurich, draws on the latest technological advances to reduce the size of samples needed for testing. Working with a known forgery dating to the 1980s, the team extracted hairlike strands of canvas fiber measuring just a few millimeters long and a paint particle weighing less than 200 micrograms.

Although the painting—titled *Village Scene with Horse and Honn & Company Factory*—mimics the American primitive folk art style and is signed "Sarah Honn May 5, 1866 A.D.," it's actually the work of convicted forger Robert Trotter. As *Treasures on Trial*, an online portal run by Delaware's Winterthur Museum, Garden & Library, notes, Trotter stripped, repainted and artificially aged worthless old paintings, as well as created lengthy provenance reports that seemingly testified to the works' authenticity. Ultimately, he admitted to selling 52 falsified paintings and served 10 months in prison. Following Trotter's conviction, Buffalo State College's Art Conservation Department

acquired the “Sarah Honn” canvas, which has been studied to better understand forgery methods.

According to *Chemistry World*’s Emma Stoye, Hendriks and her colleagues relied on “standard non-destructive techniques” to identify a suitable paint particle within an existing crack on the painting. Once the researchers had extracted the paint and canvas fiber samples, they used an elemental analyzer to burn the materials into carbon dioxide. This gas was then fed into an accelerated mass spectrometer capable of measuring the ratio of carbon-14 to carbon-12 isotopes present.

Based on carbon isotope ratios, the team found that the canvas could have been crafted at any point between the late 1600s and mid-1900s, suggesting it was likely a recycled, age-appropriate specimen. The binder found in the paint, however, had enough carbon-14 to definitively date it to the post-war period. Additionally, Chokshi writes for *The New York Times*, the oil used to bind the paint was shown to be derived from seeds harvested between 1958 and 1961 or 1983 and 1989.

Speaking with Stoye, Jilleen Nadolny, a principal investigator at Art Analysis & Research who was not involved in the study, says there are still limitations to the revamped technique. “You have to be very aware when sampling to avoid contamination,” she explains, “and there are huge chunks of time where you don’t get anything specific.”

Greg Hodgins, a physicist who leads a radiocarbon dating lab at the University of Arizona and was also not involved in the new research, echoes this sentiment, telling Chokshi that while the method is “an important advance, ... it’s not a silver bullet.” Crucially, Chokshi notes, carbon-14 isotopes, spurred by ocean absorption and dilution by fossil fuel emissions, are on track to return to pre-war levels. This could lead to inconclusive results further down the road, making it essential to use radiocarbon dating in conjunction with other techniques.

“It can still be useful but it’s going to be more and more difficult,” Hendriks concludes to Chokshi. “It’s kind of like a puzzle coming together.”

Please visit the site: https://www.smithsonianmag.com/smart-news/cold-war-nuclear-bomb-tests-helping-researchers-identify-art-forgeries-180972381/?fbclid=IwAR1IIT64vHb22Dg_Qkvtr5Qw4Hy3a2S2-1jdUUcQqKihmgh6JAYwX7dfbSA

ANCIENT ATHENIAN NEIGHBORHOOD OPENS TO PUBLIC AT ACROPOLIS MUSEUM, BY TASOS KOKKINIDIS

Athens' Acropolis Museum will celebrate its tenth anniversary with several events, including a photography show, a lecture on ancient sculpture colors, a concert by famous Greek composer Stavros Xarchakos and the opening of a walk-through excavation of an ancient Athenian neighborhood.

The museum was founded in 2003, and it opened to the public on June 20, 2009. Nearly 4,000 priceless objects showing the panorama of Greek history through the ages are exhibited over an area of 14,000 square meters.

A schedule presented by museum director Dimitris Pantermalis in a press conference on Wednesday highlighted the following events.

An excavation of an ancient Athenian neighborhood, visible under transparent walkways at the entrance to the museum, will be opened to the public on Friday, June 21. The new site will allow visitors to walk on a metal corridor shaped like the Greek letter pi above the 4,000 square-meter (43,000 square foot) area, and gaze down at the ancient neighborhood which thrived from the Classical era to Byzantine times.

Visitors will see original homes, workshops, baths and streets, all of which have been painstakingly excavated, Dr. Pantermalis said. "Essentially, it consists of a new level to the museum that will provide information about the daily life of Athenians, under the shadow of the Acropolis," he explains.

A lecture by professor Giovanni Verri will be presented on the subject of the paint colors used on the ancient Greek sculptures of the Parthenon. Verri uses advanced techniques to analyze remnants of paints on ancient sculptures and buildings, and has proven that the frieze and the pedimental sculptures of the Parthenon at the British Museum were originally painted "Egyptian blue." The lecture will be held at the museum's amphitheater on Thursday, June 13 at 7:00 PM.

Composer Stavros Xarchakos will give a free concert on June 19 at 9:00 PM in the museum's courtyard, which will be devoted to the works of Mikis Theodorakis, Vassilis Tsitsanis, Markos Vamvakaris and Manos Hadzidakis. The museum will remain open until midnight on that day, with free entrance starting at 8 PM.

Photographs of marble stone cutters and carvers working on the preservation of the Acropolis, pictured both on the ground and on high scaffolding, will be on show from June 11 to October 31. Dr. Pantermalis says that the photos "sometimes bring to mind those who built the Parthenon over 2,500 thousand years ago."

The historic corner building on Mitseon and Hadzichristou Streets near the museum will open to the public on June 18 at midday to show the library of late archaeologist Giorgos

Despinis, the core of which is devoted to classical sculpture. This will serve as a study center for the museum and for any researcher or student working in specialized studies. Entrance to the Museum will also be free on Thursday, June 20, to celebrate the anniversary of its opening, from 8:00 am to 8:00 PM.

Please visit the site: https://greece.greekreporter.com/2019/06/06/ancient-athenian-neighborhood-opens-to-public-at-acropolis-museum/?fbclid=IwAR1-Z_fJ2q9fYIIMohRcMrHcHo6ADx-vYBXchTO94w_9fsr-ZkdZRoOW4ng

STILL SNARLING AFTER 40,000 YEARS, A GIANT PLEISTOCENE WOLF DISCOVERED IN YAKUTIA, BY THE SIBERIAN TIMES REPORTER

Reports of a the sensational find of head of a toothy beast with its brain intact that has been preserved since prehistoric times in permafrost, have been a delight for archaeologists and the like. The severed head of the world's first full-sized Pleistocene wolf was unearthed in the Abyisky district in the north of Yakutia.

The Discovery of the Pleistocene Wolf

A local man, Pavel Efimov, found it in the summer of 2018 on the shore of the Tirekhtyakh River, a tributary of Indigirka. The wolf, whose rich, mammoth-like fur and impressive fangs are still intact, was fully grown and aged from two to four years old when it died.

The head was dated as older than 40,000 years by Japanese scientists. Scientists at the Swedish Museum of Natural History will examine the Pleistocene predator's DNA.

The Pleistocene Wolf Is Extremely Well Preserved

“This is a unique discovery of the first ever remains of a fully grown Pleistocene wolf with its tissue preserved. We will be comparing it to modern-day wolves to understand how the species has evolved and to reconstruct its appearance,” said an excited Albert Protopopov, from the Republic of Sakha Academy of Sciences.

The Pleistocene wolf's head is 40 centimeters (16 inches) long, so half of the whole body length of a modern wolf which varies from 66 to 86 centimeters (26 – 39 inches). This is a unique discovery of the first ever remains of a fully grown Pleistocene wolf with its tissue preserved.

The astonishing discovery was announced in Tokyo, Japan, during the opening of a grandiose Woolly Mammoth exhibition organized by Yakutian and Japanese scientists.

The Study of the Ancient DNA

Alongside the wolf the scientists presented an immaculately-well preserved cave lion cub.

“Their muscles, organs and brains are in good condition,” said Naoki Suzuki, a professor of palaeontology and medicine with the Jikei University School of Medicine in Tokyo, who studied the remains with a CT scanner, “We want to assess their physical capabilities and ecology by comparing them with the lions and wolves of today.”

The cave lion cub named Spartak, which had been announced previously, is about 40 centimeters (16 inches) long and weighed about 800 grams (1.8 pounds). Scientists believe the cub died shortly after birth.

The recent discovery follows that of the remains of three cave lions in 2015 and 2017 by the same team.

The article ‘[Still snarling after 40,000 years, a giant Pleistocene wolf discovered in Yakutia](#)’ originally appeared on [The Siberian Times](#) and has been republished with permission.

Please visit the site: <https://www.ancient-origins.net/news-history-archaeology/pleistocene-wolf-0012122?fbclid=IwAR2b07jwroAQUjR9BILbYFCegmEAMyhiLva1ZVSulAyw5xluRPsDfzKaJdo>

ANCIENT DNA REVEALS COMPLEX STORY **OF HUMAN MIGRATION BETWEEN** **SIBERIA AND NORTH AMERICA,** **BY BRIAN HANDWER**

Two studies greatly increase the amount of information we have about the peoples who first populated North America—from the Arctic to the Southwest U.S.

There is plenty of evidence to suggest that humans migrated to the North American continent via Beringia, a land mass that once bridged the sea between what is now Siberia and Alaska. But exactly who crossed, or recrossed, and who survived as ancestors of today's Native Americans has been a matter of long debate.

Two new DNA studies sourced from rare fossils on both sides of the Bering Strait help write new chapters in the stories of these prehistoric peoples.

The first study delves into the genetics of North American peoples, the Paleo-Eskimos (some of the earliest people to populate the Arctic) and their descendants. “[The research] focuses on the populations living in the past and today in northern North America, and it shows interesting links between Na-Dene speakers with both the first peoples to migrate into the Americas and Paleo-Eskimo peoples,” Anne Stone, an anthropological geneticist at Arizona State University who assessed both studies for *Nature*, says via email.

Beringia had formed by about 34,000 years ago, and the first mammoth-hunting humans crossed it more than 15,000 years ago and perhaps far earlier. A later, major migration some 5,000 years ago by people known as Paleo-Eskimos spread out across many regions of the American Arctic and Greenland. But whether they are direct ancestors of today's Eskimo-Aleut and Na-Dene speaking peoples, or if they were displaced by a later migration of the Neo-Eskimos, or Thule people, about 800 years ago, has remained something of a mystery.

An international team studied the remains of 48 ancient humans from the region, as well as 93 living Alaskan Iñupiat and West Siberian peoples. Their work not only added to the relatively small number of ancient genomes from the region, but it also attempted to fit all the data together into a single population model.

The findings reveal that both ancient and modern peoples in the American Arctic and Siberia inherited many of their genes from Paleo-Eskimos. Descendants of this ancient population include the Yup'ik, Inuit, Aleuts and Na-Dene language speakers from Alaska and Northern Canada all the way to the Southwest United States. The findings stand in contrast to other genetic studies that had suggested the Paleo-Eskimos were an isolated people who vanished after some 4,000 years.

"For the last seven years, there has been a debate about whether Paleo-Eskimos contributed genetically to people living in North America today; our study resolves this debate and furthermore supports the theory that Paleo-Eskimos spread Na-Dene

languages," co-author David Reich of Harvard Medical School and the Howard Hughes Medical Institute says in a press release.

The second study focused on Asian lineages, Stone notes. "The study is exciting because it gives us insight into the population dynamics, over 30-plus thousand years, that have occurred in northeastern Siberia. And these insights, of course, also provide information about the people who migrated to the Americas."

Researchers retrieved genetic samples for 34 individuals' remains in Siberia, dating from 600 to 31,600 years old. The latter are the oldest human remains known in the region, and they revealed a previously unknown group of Siberians. The DNA of one Siberian individual, about 10,000 years old, shows more genetic resemblance to Native Americans than any other remains found outside of the Americas.

Fifteen years ago scientists unearthed a 31,000-year-old site along Russia's Yana River, well north of the Arctic Circle, with ancient animal bones, ivory and stone tools. But two tiny, children's milk teeth are the only human remains recovered from the Ice Age site—and they yielded the only human genome yet known from people who lived in northeastern Siberia during the period before the Last Glacial Maximum. They represent a previously unrecognized population that the study's international team of authors have dubbed "Ancient North Siberians."

The authors suggest that during the Last Glacial Maximum (26,500 to 19,000 years ago) some of these 500 or so Siberians sought more habitable climates in southern Beringia. Stone says the migration illustrates the ways that shifting climate impacted ancient population dynamics. "I do think that the refugia during the Last Glacial Maximum were important," she says. "As populations moved to refugia, likely following the animals they hunted and to take advantage of the plants they gathered as those distributions shifted south, this resulted in population interactions and changes. These populations then expanded out of the refugia as the climate warmed and these climate dynamics likely affected population around the world."

In this case, the Ancient North Siberians arrived in Beringia and likely mixed with migrating peoples from East Asia. Their population eventually gave rise to both the First Peoples of North America and other lineages that dispersed through Siberia.

David Meltzer, an anthropologist at Southern Methodist University and coauthor of the new study, says when the Yana River site was discovered, the artifacts were said to look like the distinctive stone tools (specifically projectile "points") of the Clovis culture—an early Native American population that lived in present-day New Mexico about 13,000 years ago. But the observation was greeted with skepticism because Yana was separated from America's Clovis sites by 18,000 years, many hundreds of miles, and even the glaciers of the last Ice Age.

It seemed more likely that different populations simply made similar stone points in different places and times. "The odd thing is, now as it turns out, they were related," Meltzer says. "It's kind of cool. It doesn't change the fact that there's no direct historical descent in terms of the artifacts, but it does tell us that there was this population floating around in far northern Russia 31,000 years ago whose descendants contributed a bit of DNA to Native Americans."

The finding isn't particularly surprising given that at least some Native American ancestors have long been thought to hail from the Siberian region. But details that seemed unknowable are now coming to light after thousands of years. For example, the Ancient North Siberian peoples also appear to be ancestral to the Mal'ta individual (dated to 24,000 years ago) from the Lake Baikal region of southern Russia, a population that showed a slice of European roots—and from whom Native Americans, in turn, derived some 40 percent of their ancestry.

“It's making its way to Native Americans,” Meltzer says of the ancient Yana genome, “but it's doing so through various other populations that come and go on the Siberian landscape over the course of the Ice Age. Every genome that we get right now is telling us a lot of things that we didn't know because ancient genomes in America and in Siberia from the Ice Age are rare.”

A more modern genome from 10,000-year-old remains found near Siberia's Kolyma River evidences a DNA mix of East Asian and Ancient North Siberian lineages similar to that seen in Native American populations—a much closer match than any others found outside of North America. This finding, and others from both studies, serve as reminders that the tale of human admixture and migration in the Arctic wasn't a one-way street.

“There's absolutely nothing about the Bering land bridge that says you can't go both ways,” Meltzer says. “It was open, relatively flat, no glaciers—it wasn't like you wander through and the door closes behind you and you're trapped in America. So there's no reason to doubt that the Bering land bridge was trafficking humans in both directions during the Pleistocene. The idea of going back to Asia is a big deal for us, but they had no clue. They didn't think they were going between continents. They were just moving around a large land mass.”

Please visit the site: <https://www.smithsonianmag.com/science-nature/ancient-dna-reveals-complex-story-human-migration-between-siberia-and-north-america-180972356/?fbclid=IwAR0piJPakEzzymwXx9Q74pyH1IjgUtJIS7mm1KfTpe1UurtAphk26i8xYo0#gkqvZ7AICPJs0mX.99>

ÇATALHÖYÜK: 9,000 YEARS AGO, A COMMUNITY WITH MODERN URBAN PROBLEMS, BY JEFF GRABMEIER

Some 9,000 years ago, residents of one of the world's first large farming communities were also among the first humans to experience some of the perils of modern urban living.

Scientists studying the ancient ruins of Çatalhöyük, in modern Turkey, found that its inhabitants—3,500 to 8,000 people at its peak—experienced overcrowding, infectious diseases, violence and environmental problems.

In a paper published June 17, 2019 in the *Proceedings of the National Academy of Sciences*, an international team of bioarchaeologists report new findings built on 25 years of study of human remains unearthed at Çatalhöyük.

The results paint a picture of what it was like for humans to move from a nomadic hunting and gathering lifestyle to a more sedentary life built around agriculture, said Clark Spencer Larsen, lead author of the study, and professor of anthropology at The Ohio State University.

"Çatalhöyük was one of the first proto-urban communities in the world and the residents experienced what happens when you put many people together in a small area for an extended time," Larsen said.

"It set the stage for where we are today and the challenges we face in urban living."

Çatalhöyük, in what is now south-central Turkey, was inhabited from about 7100 to 5950 B.C. First excavated in 1958, the site measures 13 hectares (about 32 acres) with nearly 21 meters of deposits spanning 1,150 years of continuous occupation.

Larsen, who began fieldwork at the site in 2004, was one of the leaders of the team that studied human remains as part of the larger Çatalhöyük Research Project, directed by Ian Hodder of Stanford University. A co-author of the *PNAS* paper, Christopher Knüsel of Université de Bordeaux in France, was co-leader of the bioarchaeology team with Larsen.

Fieldwork at Çatalhöyük ended in 2017 and the *PNAS* paper represents the culmination of the bioarchaeology work at the site, Larsen said.

Çatalhöyük began as a small settlement about 7100 B.C., likely consisting of a few mud-brick houses in what researchers call the Early period. It grew to its peak in the Middle period of 6700 to 6500 B.C., before the population declined rapidly in the Late period. Çatalhöyük was abandoned about 5950 BC.

Farming was always a major part of life in the community. The researchers analyzed a chemical signature in the bones—called stable carbon isotope ratios—to determine that

residents ate a diet heavy on wheat, barley and rye, along with a range of non-domesticated plants.

Stable nitrogen isotope ratios were used to document protein in their diets, which came from sheep, goats and non-domesticated animals. Domesticated cattle were introduced in the Late period, but sheep were always the most important domesticated animal in their diets.

"They were farming and keeping animals as soon as they set up the community, but they were intensifying their efforts as the population expanded," Larsen said.

The grain-heavy diet meant that some residents soon developed [tooth decay](#)—one of the so-called "diseases of civilization," Larsen said. Results showed that about 10 to 13 percent of teeth of adults found at the site showed evidence of dental cavities.

Changes over time in the shape of leg bone cross-sections showed that community members in the Late period of Çatalhöyük walked significantly more than early residents. That suggests residents had to move farming and grazing further from the community as time went on, Larsen said.

"We believe that environmental degradation and climate change forced [community members](#) to move further away from the settlement to farm and to find supplies like firewood," he said. "That contributed to the ultimate demise of Çatalhöyük."

Other research suggests that the climate in the Middle East became drier during the course of Çatalhöyük's history, which made farming more difficult.

Findings from the new study suggest that residents suffered from a high infection rate, most likely due to crowding and poor hygiene. Up to one-third of remains from the Early period show evidence of infections on their bones.

During its peak in population, houses were built like apartments with no space between them—residents came and left through ladders to the roofs of the houses.

Excavations showed that interior walls and floors were re-plastered many times with clay. And while the residents kept their floors mostly debris-free, analysis of house walls and floors showed traces of animal and human fecal matter.

"They are living in very crowded conditions, with trash pits and animal pens right next to some of their homes. So there is a whole host of sanitation issues that could contribute to the spread of [infectious diseases](#)," Larsen said.

The crowded conditions in Çatalhöyük may have also contributed to high levels of violence between residents, according to the researchers.

In a sample of 93 skulls from Çatalhöyük, more than one-fourth—25 individuals—showed evidence of healed fractures. And 12 of them had been victimized more than once, with two to five injuries over a period of time. The shape of the lesions suggested that blows to the head from hard, round objects caused them—and clay balls of the right size and shape were also found at the site.

More than half of the victims were women (13 women, 10 men). And most of the injuries were on the top or back of their heads, suggesting the victims were not facing their assailants when struck.

"We found an increase in cranial injuries during the Middle period, when the population was largest and most dense," Larsen said.

"An argument could be made that overcrowding led to elevated stress and conflict within the community."

Most people were buried in pits that had been dug into the floors of houses, and researchers believe they were interred under the homes in which they lived. That led to an unexpected finding: Most members of a household were not biologically related.

Researchers discovered this when they found that the teeth of individuals buried under the same house weren't as similar as would be expected if they were kin.

"The morphology of teeth are highly genetically controlled," Larsen said. "People who are related show similar variations in the crowns of their teeth and we didn't find that in people buried in the same houses."

More research is needed to determine the relations of people who lived together in Çatalhöyük, he said. "It is still kind of a mystery."

Overall, Larsen said the significance of Çatalhöyük is that it was one of the first Neolithic "mega-sites" in the world built around agriculture.

"We can learn about the immediate origins of our lives today, how we are organized into communities. Many of the challenges we have today are the same ones they had in Çatalhöyük—only magnified."

More information: Clark Spencer Larsen et al., "Bioarchaeology of Neolithic Çatalhöyük reveals fundamental transitions in health, mobility, and lifestyle in early farmers," *PNAS* (2019). www.pnas.org/cgi/doi/10.1073/pnas.1904345116

Journal information: [Proceedings of the National Academy of Sciences](https://www.pnas.org)

Please visit the site: <https://m.phys.org/news/2019-06-atalhyk-years-modern-urban-problems.html?fbclid=IwAR3WIBn8HTcV4zQxe4y8TdXvxYXYS-1K3dsROOyZRB0yGnFnxcIaw3Hvqyk>

DIET AT THE DOCKS: LIVING AND DYING AT THE PORT OF ANCIENT ROME

Portus Romae was established in the middle of the first century AD and for well over 400 years was Rome's gateway to the Mediterranean. The port played a key role in funnelling imports - e.g. foodstuffs, wild animals, marble and luxury goods - from across the Mediterranean and beyond to the citizens of Rome and was vital to the pre-eminence of the city in the Roman Mediterranean.

But, what of the people who lived, worked and died there?

In a study published today in *Antiquity*, an international team of researchers present the results of the analysis of plant, animal and human remains, reconstructing both the diets and geographic origins of the Portus inhabitants. The findings suggest that the political upheaval following the Vandal sack of Rome in AD 455 and the 6th century wars between the Ostrogoths and the Byzantines may have had a direct impact on the food resources and diet of those working at Portus Romae.

Lead author, Dr Tamsin O'Connell of the Department of Archaeology, University of Cambridge said, "The human remains from the excavations at Portus belong to a local population involved in heavy, manual labour, perhaps the *saccarii* (porters) who unloaded cargoes from incoming ships. When looking isotopically at the individuals dating to between the early second to mid fifth centuries AD, we see that they have a fairly similar diet to the rich and middle-class people buried at the Isola Sacra cemetery just down the road. It is interesting that although there are differences in social status between these burial populations, they both have access to similar food resources. This contradicts what we see elsewhere in the Roman world at this time. But, later on, something changes."

Dr O'Connell continues, "Towards the end of the mid fifth century we see a shift in the diet of the local populations away from one rich in animal protein and imported wheat, olive oil, fish sauce and wine from North Africa, to something more akin to a 'peasant diet', made up of mainly plant proteins in things like potages and stews. They're doing the same kind of manual labour and hard work, but were sustained by beans and lentils"

"This is the time period after the sack of the Vandals in AD 455.

We're seeing clear shifts in imported foods and diet over time that tie-in with commercial and political changes following the breakdown of Roman control of the Mediterranean. We are able to observe political effects playing out in supply networks. The politics and the resources both shift at the same time."

Director of the University of Southampton's Portus Project, Professor Simon Keay explained, "Our excavations at the centre of the port provide the first archaeological evidence of the diet of the inhabitants of Portus at a critical period in the history of Imperial Rome. They tell us that by the middle of the 5th century AD, the outer harbour basin was silting up, all of the buildings were enclosed within substantial defensive walls, that the warehouses were used for the burial of the dead rather than for storage, and that the volume of trade that passed through the port en route to Rome had contracted dramatically."

"These developments may have been in some way related to the destruction wrought upon Portus and Rome by invading Vandals led by Gaiseric in AD 455, but may also be related to decreasing demand by the City of Rome, whose population had shrunk significantly by this date. These conclusions help us better understand major changes in patterns of production and trade across the Mediterranean that have been detected in recent years."

Dr O'Connell concludes, "Are food resources and diets shaped by political ruptures? In the case of Portus, we see that when Rome was rich everybody, from the local elite to the dockworkers, was doing fine nutritionally. Then this big political rupture happens and wheat and other foodstuffs have to come from somewhere else. When Rome is on the decline, the manual labourers, at least, are not doing as well as previously."

Please visit the site: https://www.eurekaalert.org/pub_releases/2019-06/uoc-dat061119.php

WHAT DID ANCIENT EGYPTIANS REALLY EAT? BY ALEXANDER HELLEMANS

Did the ancient Egyptians eat like us? If you're a vegetarian, tucking in along the Nile thousands of years ago would have felt just like home.

In fact, eating lots of meat is a recent phenomenon. In ancient cultures vegetarianism was much more common, except in nomadic populations. Most sedentary populations ate fruit and vegetables.

Although previous sources found the ancient Egyptians to be pretty much vegetarians, until this new research it wasn't possible to find out the relative amounts of the different foods they ate. Was their daily bread really daily? Did they binge on eggplants and garlic? Why didn't someone spear a fish?

A French research team figured out that by looking at the carbon atoms in mummies that had lived in Egypt between 3500 B.C. and 600 A.D. you could find out what they ate.

All carbon atoms are taken in by plants from carbon dioxide in the atmosphere by the process of photosynthesis. By eating plants, and the animals that had eaten plants, the carbon ends up in our bodies.

The sixth-lightest element on the periodic table – carbon – exists in nature as two stable isotopes: carbon-12 and carbon-13. Isotopes of the same element behave the same in chemical reactions but have slightly different atomic masses, with the carbon-13 being slightly heavier than the carbon-12. Plants are categorized into two groups. The first group, C3, is most common in plants such as garlic, eggplants, pears, lentils and wheat. The second smaller group, C4, comprises foodstuffs like millet and sorghum.

The common C3 plants take in less of the heavier isotope carbon-13, while the C4 plants take in more. By measuring the ratio of carbon-13 to carbon-12 you can distinguish between these two groups. If you eat a lot of C3 plants, the concentration of carbon-13 isotopes in your body will be lower than if your diet consisted mainly of C4 plants.

The mummies that the French researchers studied were the remains of 45 people that had been shipped to two museums in Lyon, France during the 19th century. "We had an approach that was a little different," explained Alexandra Touzeau, who led the research team at the University of Lyon. "We worked a lot with bones and teeth, while most researchers study hair, collagen and proteins. We also worked on many different periods, with not many individuals for each period, so we could cover a very long time span."

The researchers reported their findings in the Journal of Archaeological Science. They measured carbon-13 to carbon-12 ratios (and also some other isotope ratios) in bone, enamel and hair in these remains, and compared them to similar measurements performed on pigs that had received controlled diets consisting of different proportions of C3 and C4 foodstuffs. As pigs have a similar metabolism to humans, their carbon isotope ratios could be compared to what was found in the mummies.

Hair absorbs a higher rate of animal proteins than bone or teeth, and the isotope ratios in hair of the mummies corresponded to that found in hair of modern European vegetarians, confirming that the ancient Egyptians were also mainly vegetarians. As is the case with many modern people, their diet was wheat- and barley-based. A main conclusion of the research was that C4 cereals, like millet and sorghum, were only a minor part of the diet, less than 10 percent.

But there were a few surprises.

"We found that the diet was constant over time; we had expected changes," said Touzeau. This showed that the ancient Egyptians adapted well to the environment while the Nile region became increasingly arid between 3500 B.C. and 600 A.D.

To Kate Spence, an archeologist and specialist in ancient Egypt at the U.K.'s University of Cambridge, this could be expected: "Although the area is very arid, they were cultivating crops along the river just by managing irrigation, which is very effective," she said. When the level of the Nile decreased, farmers just came closer to the river and kept on cultivating in the same way.

The real mystery is the fish. Most people would probably expect the ancient Egyptians living along the Nile to have eaten loads of fish. However, despite considerable cultural evidence, there seems to have been little fish in their diet.

"There is abundant evidence for fishing in Egyptian wall reliefs and models (both spear and net fishing), and fish shows up in offering lists. There is also a lot of archeological evidence for fish consumption from sites such as Gaza and Amama," said Spence, who added that some texts indicated that a few fish species were not consumed due to religious associations. "All this makes it a bit surprising that the isotopes should suggest that fish was not widely consumed."

Please visit the site: <https://www.livescience.com/45450-what-did-ancient-egyptians-really-eat.html>

9,000 YEARS AGO, A COMMUNITY WITH MODERN URBAN PROBLEMS

Çatalhöyük had overcrowding, violence, environmental troubles.

Some 9,000 years ago, residents of one of the world's first large farming communities were also among the first humans to experience some of the perils of modern urban living.

Scientists studying the ancient ruins of Çatalhöyük, in modern Turkey, found that its inhabitants – 3,500 to 8,000 people at its peak – experienced overcrowding, infectious diseases, violence and environmental problems.

In a paper published June 17, 2019 in the Proceedings of the National Academy of Sciences, an international team of bioarchaeologists report new findings built on 25 years of study of human remains unearthed at Çatalhöyük.

The results paint a picture of what it was like for humans to move from a nomadic hunting and gathering lifestyle to a more sedentary life built around agriculture, said Clark Spencer Larsen, lead author of the study, and professor of anthropology at The Ohio State University.

“Çatalhöyük was one of the first proto-urban communities in the world and the residents experienced what happens when you put many people together in a small area for an extended time,” Larsen said.

“It set the stage for where we are today and the challenges we face in urban living.”

Çatalhöyük, in what is now south-central Turkey, was inhabited from about 7100 to 5950 B.C. First excavated in 1958, the site measures 13 hectares (about 32 acres) with nearly 21 meters of deposits spanning 1,150 years of continuous occupation.

Larsen, who began fieldwork at the site in 2004, was one of the leaders of the team that studied human remains as part of the larger Çatalhöyük Research Project, directed by Ian Hodder of Stanford University. A co-author of the PNAS paper, Christopher Knüsel of Université de Bordeaux in France, was co-leader of the bioarchaeology team with Larsen.

Fieldwork at Çatalhöyük ended in 2017 and the PNAS paper represents the culmination of the bioarchaeology work at the site, Larsen said.

Çatalhöyük began as a small settlement about 7100 B.C., likely consisting of a few mud-brick houses in what researchers call the Early period. It grew to its peak in the Middle period of 6700 to 6500 B.C., before the population declined rapidly in the Late period. Çatalhöyük was abandoned about 5950 BC.

Farming was always a major part of life in the community. The researchers analyzed a chemical signature in the bones – called stable carbon isotope ratios – to determine that

residents ate a diet heavy on wheat, barley and rye, along with a range of non-domesticated plants.

Stable nitrogen isotope ratios were used to document protein in their diets, which came from sheep, goats and non-domesticated animals.

Domesticated cattle were introduced in the Late period, but sheep were always the most important domesticated animal in their diets.

“They were farming and keeping animals as soon as they set up the community, but they were intensifying their efforts as the population expanded,” Larsen said.

The grain-heavy diet meant that some residents soon developed tooth decay – one of the so-called “diseases of civilization,” Larsen said.

Results showed that about 10 to 13 percent of teeth of adults found at the site showed evidence of dental cavities.

Changes over time in the shape of leg bone cross-sections showed that community members in the Late period of Çatalhöyük walked significantly more than early residents. That suggests residents had to move farming and grazing further from the community as time went on, Larsen said.

“We believe that environmental degradation and climate change forced community members to move further away from the settlement to farm and to find supplies like firewood,” he said. “That contributed to the ultimate demise of Çatalhöyük.”

Other research suggests that the climate in the Middle East became drier during the course of Çatalhöyük’s history, which made farming more difficult.

Findings from the new study suggest that residents suffered from a high infection rate, most likely due to crowding and poor hygiene. Up to one-third of remains from the Early period show evidence of infections on their bones.

During its peak in population, houses were built like apartments with no space between them – residents came and left through ladders to the roofs of the houses.

Excavations showed that interior walls and floors were re-plastered many times with clay. And while the residents kept their floors mostly debris-free, analysis of house walls and floors showed traces of animal and human fecal matter.

“They are living in very crowded conditions, with trash pits and animal pens right next to some of their homes. So there is a whole host of sanitation issues that could contribute to the spread of infectious diseases,” Larsen said.

The crowded conditions in Çatalhöyük may have also contributed to high levels of violence between residents, according to the researchers.

In a sample of 93 skulls from Çatalhöyük, more than one-fourth – 25 individuals – showed evidence of healed fractures. And 12 of them had been victimized more than once, with two to five injuries over a period of time. The shape of the lesions suggested

that blows to the head from hard, round objects caused them – and clay balls of the right size and shape were also found at the site.

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**Please visit the site: <https://popular-archaeology.com/article/9000-years-ago-a-community-with-modern-urban-problems/> [Go there for pix]**

## **THE EVIL ROBOTS OF THE ANCIENT WORLD, BY CANDIDA MOSS**

While most think of robots as an outgrowth of the past 100 years of science fiction, the ancient world was also obsessed with them, and theirs weren't always so friendly.

This week, Oxford University announced that American billionaire and philanthropist Stephen A. Schwarzman had given the university its largest cash donation yet—£150 million—to fund (among other things) an institution to investigate the ethics of artificial intelligence.

Schwarzman said that universities need to serve as advisers on the ethics of artificial intelligence and technological advances. While it is certainly true that the technology has moved rapidly ahead of the legislation that patrols it, this is hardly the first time people have thought about the ethics of AI. As any sci-fi buff will tell you, we have been mulling over the ethical ramifications of technologies we didn't possess for a century. What they might not know, however, is that people have been thinking about the potentials and pitfalls of the robot world for thousands of years.

In Greek mythology the first “robot” to walk the earth was the bronze giant Talos. Talos was one of a trinity of technological advanced gifts bequeathed by Zeus to his son Minos, the first king of Crete. An anthropomorphic machine, Talos would patrol the coastline of Crete three times a day, keeping watch for pirates. He would hurl boulders at foreign ships and, if he identified a “stranger,” would clutch them to his chest, heat up his bronze torso, and roast his captive alive.

Talos proved something of a challenge for Jason when he, the Argonauts, and his wife Medea arrived on the island. In the end it was Medea who came to Jason's rescue. She used telepathy to confuse the metal giant and disorient him. The giant stumbles around and a rock strikes against the bolt that dams the single “vein” in his ankle. The bolt is dislodged, the giant's life force drains out of him, and he dies.

This is but one example of ancient imaginings of biotech that appears in the recently published and beautifully written book, *Gods and Robots: Myths, Machines, and Ancient Dreams of Technology*. Throughout the book, the medical historian and classicist Adrienne Mayor charts the history of technological dreaming in the ancient world, from robot giants to lifelike statues that actually moved, or self-piloted boats.

Some of this mythological tech (like the moving statues) had its basis in real-life engineering, while other parts, like Pygmalion's vivified ivory sex-doll, does not.

The most talented craftsman in ancient thought was undoubtedly Hephaestus, the god of the forge. Not only did he make Talos, he helped craft Pandora (who is shown in ancient artwork as almost mechanically stilted), and had his own team of “living statues” of golden handmaidens. In the *Iliad*, when Thetis goes to visit Hephaestus in his workshop she observes the maidens who “moved quickly, bustling around their master like living women.” Hephaestus had endowed these women with “mind (our equivalent of thinking), wits, voice, and vigor”

as well as the knowledge and skill sets of the immortal gods. Mayor remarks, “they are endowed with what AI specialists term ‘augmented intelligence’ based on ‘big data’ and ‘machine learning’.” They even served as a storehouse, you might say database, of divine knowledge.

According to Homer, there was a people known as the Phaeacians who possessed ships that were steered exclusively by thought and words.

King Alcinous, who permits Odysseus to use one of these ships, says that the ships merely “need to be told his city and country and they will devise the route accordingly.” As Mayor wryly notes, the ancient Greeks appear to have dreamt of something like GPS. Others were said to have created doors that moved automatically, anticipating our modern distaste for getting out of our cars with almost prophetic skill.

Not every technological device or biotechnical innovation had such lofty purposes. Today, modern historians of robotics divide automata by functionality: they exist for the purpose of entertainment, labor, or sex. Arguably the most disturbing case of an ancient “sexbot” involves Queen Pasiphae, the wife of King Minos of Crete. Pasiphae was the jealous sort and cast a spell over her husband so that if he tried to have sex with another woman he would ejaculate scorpions, snakes, and millipedes. Shockingly, that’s not the gross part of this story.

Zeus, whose affinity for extramarital affairs is well-known, retaliated on Minos’ behalf by cursing Pasiphae with the desire to copulate with one of Minos’ bulls (an attractive bull, if it helps).

Bulls, however, are not so interested in women. Pasiphae turned to the brilliant sculptor and craftsman Daedalus for assistance. Daedalus constructed a realistic wooden cow into which the queen could clamber and present herself to the bull on all fours. The result of Pasiphae’s encounters with the bull was the half-human half-bull child better known to us as the Minotaur.

Even in the ancient world, people doubted the truth of this story. Those who defended it responded that realistic imitations of other animals often provoked their biological counterparts to attempt to mount them. But as Mayor remarks, “Daedalus’s realistic, life-size sex toy presents a remarkable form of ancient technepornography.” The story was so popular that it appeared in frescoes and mosaics centuries later. It was even popular in medieval artwork, which focused on the supposed romance between the bull and his human lover.

Stories like this are not unique to the Greeks and Romans. Mayor relates a story about an artificial man created by the craftsman Yen Shih during the reign of King Mu of the Zhou dynasty of China (ca. 976-922 BCE). The android, which dances, sings and imitates human behaviour, delights the king right up until the moment when the robot begins “to flirt with the concubines.”

For those who thought about such things, robot stories provoked some conversations about ethics. In a section of the Politics dedicated to a defense of slavery, Aristotle speculated that if life could become fully automated “then craftsmen would have no need of servants and masters would have no need of slaves.” The statement is somewhat



ironic: machines have freed many people from hard labor but they also threaten the ability of many others to earn money and support themselves. Aristotle was further still from the our modern sci-fi trope, in which rebellious machines attempt to enslave or destroy the human race.

One of the most troubling aspects of ancient fantasies about automata is that the robots do not appear to play by any rules. Isaac Asimov’s first “Law of Robotics” stipulates that robots should be incapable of injuring a human being. Many ancient robots were benign or even helpful, but others were downright malicious. Pandora, the “first woman” was not a woman at all but actually something “made, not born” and endowed with the gifts. The ramifications of the actions of this artificial woman injured human beings on an unprecedented scale when she opened her “box” (fun fact: it was actually a jar. The box idea comes from a mistranslation). It’s not accidental, Mayor suggests, that she was presented to a man known for his boundless optimism.

Perhaps stories like these, she hints, should stand alongside the cautionary words of those like Stephen Hawking and Bill Gates who warn that “AI could spell the end of the human race.”

Interestingly, ancient tech continues to influence modern invention, especially in the military arena. In 1948 a ramjet missile was named Talos, after the Cretan robot. Then, in 2013, Talos experienced something of a rebirth. The US Special Operations Command and Defense Advanced Research Projects Agency started a project to create a special ops robotic exoskeleton (yes, like Iron Man). The purpose of the suit, Mayor writes, is to provide superhuman strength, heightened sensory awareness, and ballistic protection. They self-consciously named it the Tactical Assault Light Operator Suit (TALOS). The project has not been completed.

Please visit the site: <https://www.thedailybeast.com/the-evil-robots-of-the-ancient-world>

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## **WHAT KINDS OF FISH WERE EATEN IN ANCIENT JERUSALEM?**

### **PROF. OMRI LERNAU, M.D.**

Fishbone remains discovered in eight different excavations in Jerusalem, from the Iron age to the early Islamic period, give us a sense of what fish the locals ate, and from where they were imported.

#### **The Study of Fishbones**

Over the past century and a half, archaeologists have excavated a variety of sites in Jerusalem, bringing to light many aspects of everyday life in the biblical city. The examination of ceramic vessels for cooking and serving, as well as the uncovering of food waste, mainly comprised of discarded bones, have taught us much about the diet of the city's inhabitants in different periods.

In the early stages of archeology, archeologists concentrated on the bones of larger animals such as sheep, goats, and cattle, but later turned also to shells and the bones of small animals such as birds and fish. As it is very possible to miss such small objects during excavation, the study of these bones was enhanced with the introduction of dry, and especially wet sifting of the excavated soil.

In the latter method, a dirt sample is poured onto a sieve in water. The dirt is then fully unpacked and falls through the holes while other material, especially organic material such as bones, is trapped in the mesh and remains for study.[1]

Fishbones are found in almost every excavation where proper measures of collection are used. The bones tend to preserve fairly well over long periods of time and can be identified taxonomically by using a reference collection of modern fishbones. Moreover, by identifying the type of fish, we can also determine its origin: marine (i.e. saltwater) fish come from either the Mediterranean or the Red Sea, while freshwater fish come from either the Jordan River system, coastal rivers and streams, or from the Nile. This kind of information helps to assess trade connections in ancient times.

In this piece, I shall describe briefly the fish remains excavated and analyzed in eight different areas of ancient Jerusalem from the Bronze Age to the Early Islamic period.

There is no doubt that fish comprised an important part of the diet of the population. Fish had to be imported to Jerusalem mainly from fish markets along the coast. The shelf life of fresh fish is short and therefore, in ancient times they were probably bought in the local market in Jerusalem dried, salted, or smoked.

The largest assemblage of fish bones in Jerusalem was found in the City of David, in an excavation called "The Rock Cut Pool" adjacent to the Gihon spring, carried out by Ronny Reich and Eli Shukrun. During the Middle Bronze Age (early to mid 2nd millennium B.C.E.), a deep large hole was hewn into the rock as part of the intricate

water carrying system of the city (despite its modern name it apparently never functioned as a pool).

Hundreds of years later, about the middle of the 8th century B.C.E., a house was built inside this hollow, the floor of which was raised above a thick fill of soil.[2] This fill, which was dated to an earlier period (about the end of the 9th century B.C.E.), was thoroughly wet-sifted by the excavators' team, and produced among other artifacts, over 10,000 fish bones and several hundred broken clay seals, known as "bullae," which were used to seal letters or packages and thus, would have been broken when the packages and letters were opened.

It was therefore, suggested that the fill under the floor of the house probably originated from some garbage dump of an administrative center admitting goods imported to the city, including packages containing fish, likely the remains of fish that arrived at the city rotten and were thrown into the garbage with the broken bullae. Moreover, it seems likely that the center itself can be identified.

Near the Rock Cut Pool excavation is another site, known as "Building 2482," which was excavated by Joe Uziel and Nahshon Szanton. There again fish bones and bullae were found and in exactly the same proportion, strongly implying that building 2482 is the administrative center which dumped its garbage in the Rock Cut Pool.

### **What Kinds of Fish?**

Most of the bones found in these two sites belonged to *Sparus auratus*, the gilt-head sea bream, locally known as "denis." This is a marine fish inhabiting the Mediterranean. Isotope analysis of this fish's teeth from different excavated sites across the country has shown that it was not captured in the open sea but rather imported to the Levant from the Bardawil hypersaline lagoon in Northern Sinai. this lagoon is rich in fish, and large numbers of gilt-head sea breams are caught there even today.

In addition to the gilt-head sea bream, 15 other species of fish were found. All of the fish were kosher, with the major exception of catfish, sharks, and rays. (More on this later.) Most of the bones were from marine fish from the Mediterranean (no Red Sea fish were found), but some freshwater fish, such as the Lates niloticus, the Nile perch, locally known today as "The Princess of the Nile," were also found there. Nowadays, Nile perch is widely imported from Lake Tanganyika in Kenya, but in the Iron Age, the ancient Egyptians caught this fish, the largest in the Nile, and exported it, probably smoked, all over the Eastern Mediterranean.

This exporting of Nile perch lasted for more than 1500 years, beginning in the Middle Bronze Age and even earlier. Whether or not Nile perch was the fish that the Israelites, in Numbers 11:5, claim to have eaten while they wandered in the wilderness, "We remember the fish that we used to eat free in Egypt" (לֹא בַמִּצְרַיִם הָיְתָה חֵמְסָנוּ אֶת הַדָּגָה אֲשֶׁר נָאֵכ), their descendants were able to enjoy this (and other) Egyptian fish throughout the First Temple Period.

The rich assortment of fish consumed by Jerusalemites during the First Temple period points to a community interested in maintaining multiple sources of food, through diverse sources of commerce. Nehemiah 3:3, a Persian Period source, in describing the

reconstruction of the walls of Jerusalem, explicitly mentions “the fish gate” (שַׁעַר הַדָּגִים; Neh 3:3), which likely functioned as a fish market. Moreover, Nehemiah explicitly makes reference to Tyrian fisherman:

לְבָנֵי יְהוּדָה וּבִירוּשָׁלַם נִחְמִיָּה יָגִט: וְהַצְרִיִם יָשָׁבוּ בָּהּ מִבְּיָאִים דָּאֵג וְכָל מִקְרָ וּמִקְרִים בַּשַּׁבָּת.

Neh 13:16 Tyrians who lived there brought fish and all sorts of wares and sold them on Shabbat to the Judahites in Jerusalem.

This illustrates how even in the smaller Second Temple city of Jerusalem in the Persian period, it was still worthwhile for coastal Phoenicians to show up in Jerusalem and sell their fish to the local Judeans, again dried, salted, or smoked.

### **Other City of David Excavations**

Other more modest assemblages give us a further glimpse of fish consumption during later periods.

**Shilo’s Excavation (Late First Temple Period)** The first study of fish bones in Jerusalem was based on a small assemblage of 245 bones uncovered in the excavations of the City of David in the 1980s by Yigal Shilo. Most of the bones were dated to the late Iron Age, First Temple period, around the 7th century B.C.E.

In one building located in area G, known as “The House of Ahikam,” eight kinds of fish were found, including Nile perch, as well as freshwater catfish and tilapia, marine porgies, meagre, mullets and sea bass, and another kind of catfish imported from the Nile. These, together with other finds in the same building, suggest a high economic and social status of the inhabitants.

**Mazar’s Excavation (Late First Temple Period)** Another assemblage of 530 fish bones was found in an excavation led by Eilat Mazar dated to the end of the First Temple period, and to the short Babylonian and later Persian periods. These were the same types of fish found in the Rock Cut Pool and Building 2348 excavations, including gilt-head bream from Lake Bardawil and Nile perch, both imported from Egypt.

**Gadot’s Excavation (Second Temple Period)** A site excavated by Yuval Gadot provides information about the consumption of fish in the Early Roman Second Temple period. A thick layer of garbage from this period covers the remains of the Iron Age city along the eastern slopes into the Kidron River. Wet sifting of the dirt produced 590 fish bones mainly from the Mediterranean but also from the Sea of Galilee.

**Reich and Shukron’s Excavation (Second Temple Period)** Also dated to the Early Roman Second Temple period is another layer of garbage, east of the Temple Mount, and excavated by Reich and Shukron.

They dubbed this site “the Holy Dump,” since the thick dirt piles they dug through appear to hold the remains of the Second Temple’s trash.

The dirt here yielded remains of what seems to have been sacrificial animals, and also about 300 bones of fish of the same kinds found in the other digs surveyed above.

### **Amit and Wolff’s Excavation (Byzantine)**

A small number of fish bones were found in the remains of an Armenian monastery dated to the Byzantine period excavated by David Amit and Sam Wolff. Among them were again the remains of Nile perch, attesting to the very long period of Egyptian trade in these fish.

### **Ben Ami Excavation (Early Islamic)**

Another small assemblage of fishbones was found in garbage pits from the Early Islamic period by the Givati Parking Lot Excavation led by Doron Ben Ami. These pits were thought to have served as trash for a local market, and fishbones were found in two of them. There were 320 bones, half of them belonged to freshwater catfish and a few to parrot fish from the Red Sea. As a small Islamic town on the northern coast of the Red Sea near today's Eilat was in existence at the time, these remains suggest trade connections between this town and Jerusalem.

### **Treif Fish in Jerusalem?**

According to the Torah, only fish with fins and scales may be eaten (Deut 14:9–10, ≅ Lev 11:9–12):

דברים יד:ט אֵת זֶה תֹאכְלוּ מִכָּל אֲשֶׁר בַּמַּיִם כָּל אֲשֶׁר לוֹ סָנְפִיר וְקַשְׂקֶשֶׁת תֹאכְלוּ. יד:ינכּל אֲשֶׁר אֵין לוֹ סָנְפִיר וְקַשְׂקֶשֶׁת לֹא תֹאכְלוּ טָמֵא הוּא לָכֶם.

Deut 14:9 These you may eat of all that live in water: you may eat anything that has fins and scales. 14:10 But you may not eat anything that has no fins and scales: it is unclean for you.

Nevertheless, each of these assemblages of fish bones from Jerusalem contained remains of catfish and cartilaginous fish (sharks and rays) none of which have scales. Their remains in the set of excavations in Jerusalem were quite common during the First Temple and Persian periods (up to 25%), rare in the later Second Temple period (less than 3%), and then again common in the Byzantine and Early Islamic periods (up to 50%).

These findings suggest that the laws concerning pure and impure fish either evolved or became generally accepted among Jews only during the post-Persian Second Temple period.

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[1] Editor's note: For another example of wet-sifting and its uses, see Gabriel Barkay and Zachy Dvira, "What We Learned from Sifting the Earth of the Temple Mount," TheTorah.com(2018)

[2] For more on the findings from this excavation, see the section, “Findings from the Iron Age II in the Rock-Cut ‘Pool’ Near the Spring,” in, Ronny Reich, Eli Shukron, and Omri Lerna, “Recent Discoveries in the City of David, Jerusalem,” *Israel Exploration Journal* 57.2 (2007): 153–169 [153–163].

Please visit the site: <https://thetorah.com/what-kinds-of-fish-were-eaten-in-ancient-jerusalem/> [Go there for nice format]

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