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The worst of all deceptions is self-deception.

(Plato)

Newsletter of the Hellenic Society of Archaeometry

- November 2020 -

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ΠΙΝΑΚΑΣ ΠΕΡΙΕΧΟΜΕΝΩΝ – TABLE OF CONTENTS

ΣΥΝΕΔΡΙΑ – CONFERENCES/WORKSHOPS

Metalwork wear analysis online masterclass, University of Aarhus, Denmark ... **page 4**

4th International Cycladological Conference, Second Circular **page 6**

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ – JOB VACANCIES/FELLOWSHIPS

Vacancy for Scientist: Inorganic Analysis/Metals, the British Museum **page 8**

2021 CAARI FELLOWSHIPS **page 10**

INTERNET SITES

Photographic Archive of the British School at Rome [1855 ca. - present] **page 13**

ΕΙΛΗΞΕΙΣ - NEWS RELEASE

6,500-year-old 'furnace' discovered in Beersheba, by Hannah Brown **page 15**

Cave dwellers forged their tools in fire 300,000 years ago, Israeli study shows,
by Amanda Borschel-Dan **page 17**

2,400-year-old kitchen, room unearthed in Turkey's ancient city of Patara **page 20**

New Secrets Unearthed at Minoan Palace of Zominthos on Crete, by Patricia
Claus **page 21**

Decoding Linear A, the Writing System of the Ancient Minoans, by Philip
Chrysopoulos **page 23**

The Archaeology of Clothing in the Ancient Near East, by Allison Thomason . **page 25**

Recent artifacts found to change Istanbul's history, by Ömer Erbil **page 29**

5th century bc ancient Greek shrine discovered in first ever excavations on tiny
St. Peter island off Bulgaria's Black Sea coast near Sozopol, by Ivan Dikov **page 30**

Memorial Tomb of Ancient Greek Astronomer Aratus Unearthed in Turkey,
by Patricia Claus **page 35**

Ancient "technological powerhouse" discovered in Israel, by Sarah Wells **page 37**

Negev trash mounds reveal secrets of ancient agriculture, by Hannah Brown ... **page 40**

An Exceptional Discovery at Pompeii: A Victim's Vitrified Brain Remains, by
Pier Paolo Petrone **page 42**

Ancient Dog DNA Shows Early Spread Around the Globe, by James Gorman . **page 44**

Can individual differences be detected in same-shaped pottery vessels by
unknown craftsmen? **page 47**

ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS
METALWORK WEAR ANALYSIS ONLINE
MASTERCLASS, UNIVERSITY OF AARHUS,
DENMARK

Dear colleagues,

Some of you might be interested in this online Masterclass on metalwork wear analysis, which I will be delivering for the University of Aarhus, Denmark, with Dr Heide Wrobel-Nørgaard, on 1-2 Dec this year. The course is open to all and it's free of charge upon registering here:

<https://phdcourses.dk/Course/70777?fbclid=IwAR2cqoyYJVEe3QF6oc1TD-fGGbvdCIMMBaeHOqJZmDn0B-Enn5sKbfunsOM>

All the best,

Andrea

Dr Andrea Dolfini

[Senior Lecturer in Later Prehistory](#)

[Convenor of Materiality, Artefacts & Technologies in Culture and History \(MATCH\)](#)

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<http://newcastle.academia.edu/AndreaDolfini>

Download my latest papers for free:

Hermann, R., Dolfini, A., Crellin, R.J., Wang, Q. & M. Uckelmann (2020). Bronze Age Swordsmanship: New insights from experiments and wear analysis. *Journal of Archaeological Method and Theory*. <https://doi.org/10.1007/s10816-020-09451-0>

Dolfini, A., Angelini, I. & G. Artioli (2020). Copper to Tuscany – Coals to Newcastle? The dynamics of metalwork exchange in early Italy. *PLoS ONE* 15(1).

<https://doi.org/10.1371/journal.pone.0227259>

Dolfini, A. (2020). From the Neolithic to the Bronze Age in Central Italy: Settlement, Burial, and Social Change at the Dawn of Metal Production, *Journal of Archaeological Research* 28: 503-556. <https://doi.org/10.1007/s10814-019-09141-w>

This exciting new monograph can be purchased from BAR Publishing:

Hermann, R., Crellin, R.J., Uckelmann, M. & A. Dolfini (2020). *Bronze Age Combat: An Experimental Approach*. Oxford: BAR Publishing.
<https://www.barpublishing.com/bronze-age-combat.html>





SOCIETY FOR CYCLADIC STUDIES

Academy of Athens Prize

4TH INTERNATIONAL CYCLADOLOGICAL CONFERENCE, SECOND CIRCULAR

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

After the successful organization of three International Cycladological Conferences, the First in 1991 on Andros, the Second in 1995 on Thera, and the third on Syra, in 2016, the proceedings of which have been published in volumes of the “Epetiris”, the Society is organising the **Fourth International Cycladological Conference in Tenos, from the 23rd to the 27th of September 2021**, after postponing it for a year due to the covid pandemic.

Titled: The Cyclades: Culture’s Euphoria through the time.

The proposed thematic conference sections are as follows:

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

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

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

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

The official languages of the conference will be Greek and English.

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

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

Those wishing to participate as delegates with oral announcements or poster presentations should send the completed Participation Form with the suggested title of their paper, their name and surname, their title and affiliation, and a summary of their paper (up to 300 words) **by March 31st, 2021** either via email in:

info.ekyklamel@gmail.com or,

via post to the following address: Feron Str. 7, 10434 Athens, Greece

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

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

Athens, October 2020

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –
JOB VACANCIES/FELLOWSHIPS

VACANCY FOR SCIENTIST: INORGANIC
ANALYSIS/METALS, THE BRITISH MUSEUM

Dear all,

We are currently advertising for a permanent position for a metals scientist at the British Museum. Some information below and the link to the web page with all the details: https://bmrecruit.ciphr-irecruit.com/templates/CIPHR/jobdetail_3084.aspx Feel free to circulate to anyone who might be interested.

Many thanks,

Aude

Scientist: Inorganic Analysis/Metals
Scientific Research Full-Time Permanent
£30,348 per annum Application

Deadline: 20 October 2020, Midday

The British Museum is seeking a Scientist: Inorganic Analysis/Metals to focus on the scientific examination and analysis of inorganic objects, especially metals, within the British Museum collection, and to deliver publicly-accessible research outputs in support of Museum priorities.

Key Areas of Responsibility:

- To undertake compositional analysis of inorganic objects, especially metals, using X-ray fluorescence (XRF) and other techniques, including X-ray diffraction.
- To determine the identity, provenance, and technology of inorganic objects, especially metals, in the collection according to research goals and priorities.
- To help meet the Museum's commitments to the Treasure process and the Portable Antiquities Scheme.
- To support and maintain the facilities for XRF, training and advising other users, managing data storage and ensuring best practice in laboratory health and safety, including Radiation Protection and risk assessments.
- To seek external funding to support the research programme, for example, through UKRI, charitable trusts and foundations, and via the provision of scientific services.
- To promote and develop best practice in data interpretation and research data management and to explore the potential of new analytical techniques.
- To develop new projects within the area of metals analysis to meet the challenges in the BM and SR research strategies.

- To produce research outputs through publication, conference presentations, website content & social media, gallery/exhibition display material and participation in public events. Person Specification:
- Educated to degree level (or equivalent) in a relevant science subject and has some publications in peer reviewed journals.
- Experience working in an analytical laboratory or related environment and has knowledge of compositional analysis of inorganic materials using X-ray fluorescence (XRF) and analysis of materials from cultural heritage contexts.
- Good problem solving and organisational capabilities with some experience of supervision/training and project management.
- Effective communicator, both orally and written, and able to work as part of a team.

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2021 CAARI FELLOWSHIPS

THE CYPRUS AMERICAN ARCHAEOLOGICAL RESEARCH INSTITUTE (CAARI) in Nicosia, Cyprus, welcomes scholars and students specializing in archaeology, history, and culture of Cyprus and the eastern Mediterranean. CAARI is located in central Nicosia close to the Cyprus Museum and the Archaeological Research Unit of the University of Cyprus (both with major libraries), as well as the main business and commercial district. In addition to hostel accommodation for a total of twelve residents, the institute has excellent research facilities: a 10,000-volume library, comprehensive map and artifact collections, archival material, and facilities for Internet, scanning, and photography.

Recipients of fellowships are required to spend time as residents of CAARI and to submit a written report for the CAARI newsletter.

All application forms can now be found within the CAARC website grant application portal here:

<https://nam10.safelinks.protection.outlook.com/?url=http%3A%2F%2Fforcfellowships.safelinks.org%2F&data=04%7C01%7Caeeanet%40lists.ku.edu%7Cdea24d4700fc470162ed08d8708acaef%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637383088704002588%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCI6Mn0%3D%7C2000&sd=mvnij1P6jfcyLk5Btu%2BFwRcBKJfOKXU3NXnqZ7y2aNY%3D&reserved=0>

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fforcfellowships.safelinks.org%2F&data=04%7C01%7Caeeanet%40lists.ku.edu%7Cdea24d4700fc470162ed08d8708acaef%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C1%7C637383088704002588%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCI6Mn0%3D%7C2000&sd=apGee2QJ8XpjiBCakqRouO%2Fa2k3LPF%2FVAPWyKoZHLoc%3D&reserved=0>

The deadline for the CAARI-sponsored graduate student fellowships is December 7, 2020. All other fellowships have a deadline of January 12, 2021.

We realise that travel restrictions due to Covid-19 are ongoing and CAARI is prepared to be flexible with start dates of the fellowships should it be necessary to postpone travel to Cyprus.

GRADUATE STUDENT FELLOWSHIPS

The Danielle Parks Memorial Fellowship

Danielle Parks, author of *The Roman Coinage of Cyprus* (Nicosia, 2004), directed excavations at the Amathus Gate Cemetery. She first came to Cyprus as an Anita Cecil O'Donovan Fellow. Her death as a young scholar in 2006, deeply felt by the wide circle of her colleagues and friends, is memorialized here by a fellowship designed to open the world of Cypriot culture to young scholars.

This is a fellowship of US \$2,000 for a graduate student of any nationality who needs to work in Cyprus to further his/her research on a subject of relevance to Cypriot

archaeology and culture. The purpose of the fellowship is to help cover travel to and living expenses in Cyprus. Applications are invited especially from students of Hellenistic and Roman Cyprus. During his/her stay, the fellow is expected to give a presentation at CAARI on a subject related to his/her research. The fellow will periodically keep the Director of CAARI apprised of his/her research activities. The fellow will acknowledge CAARI and the Danielle Parks Memorial Fellowship in any publication that emerges from the research carried during the fellowship. Residence at CAARI is required.

Deadline: December 7, 2020.

The Helena Wylde Swiny and Stuart Swiny Fellowship:

One grant of US \$2,000 to a graduate student of any nationality in a college or university in the U.S. or Canada to pursue a research project that is relevant to an ongoing field project in Cyprus or that requires work on Cyprus itself. The award is to be used to fund research time spent in residence at CAARI and to help defray costs of travel. Residence at CAARI is required.

Deadline: December 7, 2020.

The Anita Cecil O'Donovan Fellowship:

Founded in memory of musician, composer, and homemaker Anita Cecil O'Donovan, this fellowship offers one grant of US \$2000 to a graduate student of any nationality, enrolled in a graduate program in any nation, to pursue research on a project relevant to the archaeology and/or culture of Cyprus; to be used to fund a period of research time in residence at CAARI and to help defray costs of travel. Residence at CAARI is required.

Deadline: December 7, 2020.

POST-DOCTORAL FELLOWSHIPS

The Edgar J. Peltenburg Postdoctoral Research Fellowship in Cypriot Prehistory

This annual fellowship is in honour of the late Professor Edgar Peltenburg and provides a stipend to conduct research on Cypriot prehistory (from the first visitors to the transition to the Iron Age). Applicants of all nationalities are encouraged to apply provided they have been awarded a PhD degree by the start of the fellowship. Although the fellowship is open to scholars of all ages, priority will be given to early career candidates who have received their PhDs within five years of the start of the fellowship. The period of the fellowship is nine months, renewable in exceptional cases for an additional nine months; it includes a US \$14,000 stipend and up to US \$1,500 travel expenses for those traveling to Cyprus from abroad. The fellowship can begin as early as March 1 or as late as June 30. The fellow will normally be expected to reside at CAARI for the duration of the fellowship and therefore accommodation in the CAARI residence is included. In addition, he or she is expected to play an active role in the CAARI community and to contribute to our academic environment with research-related and/or outreach events.

Deadline: January 12, 2021.

CAARI Scholar In Residence:

An established scholar who commits to stay at least 30 days in succession at CAARI, ideally during spring to fall, and to be available in evenings and weekends to younger scholars working there, in return for 50% reduction in residency rate. Must have PhD in archaeology or ancillary field for at least 5 years prior to visit, be fluent in English (but may be of any nationality), and be committed to mentoring students. Travel and other expenses not covered.

Deadline: January 12, 2021.

CAARI/CAORC Research Fellowships:

Two fellowships provide US \$5500 each (up to US \$1500 for transportation and up to an additional US \$4000 for research expenses on the island) and are designed for scholars who already have their PhDs, whose research engages the archaeology, history, culture, or geography of Cyprus, and who would derive significant benefit from a month's research time on the island. Particular consideration is given to applicants whose projects enable them to include Cyprus in their teaching. A minimum of 30 days residence at CAARI is required. Applicants must be U.S. citizens.

Deadline: January 12, 2021.

INTERNET SITES

PHOTOGRAPHIC ARCHIVE OF THE BRITISH SCHOOL AT ROME [1855 CA. - PRESENT]

The Photographic Archive of the British School at Rome includes over 100,000 items which are testimony to the evolution of processing techniques since the birth of Photography in 1839. A number of unique collections of 19th century photographs found their way into the BSR and out of these the Archive grew to include later collections, which document the research and activities of the BSR up to the present day.

A broad range of subjects is covered and make these collections of invaluable importance for research in the humanities, art history, architecture, visual studies and many other related disciplines.

Topics concerned are Italian and North African archaeology and topography, ancient Greek, Etruscan and Roman art, in particular sculpture, and European medieval and Renaissance art and architecture.

Collections of images relating to BSR events and activities, and the work of BSR Fine Art Fellows, have also been accurately preserved.

The photographic material was assembled and acquired thanks to the generous donations of former BSR Directors, Assistant Directors, Librarians or presented to the BSR by individuals in order to broaden and enrich the institutional resources for academic research.

The uniqueness of the BSR photographic holdings lies not only in the importance of the many and various collections which found their home in Rome throughout the years, but also in the nodes and relationships arising from their ownership and provenance. From the second half of the 19th Century with collections of master photographers and pioneering publishers - James Graham Collection (c. 1855), Robert MacPherson Collection (1854-1868), John-Henry Parker Collection (1865–79) - to the years marking the beginning of amateurial experiences - Peter Paul Mackey Collection (1890-1910), Thomas Ashby Collection (1890-1925), Dora & Agnes Bulwer Collection (1890-c.1930?), John William Cruickshank Collection (1892-1918), Robert Gardner Collection (1912-13).

Looking at the 20th Century and at the origins of more complex bodies of archival holdings, photographic materials to consider noteworthy belong to the Eugenie Strong Collection (1900-c. 1930), the John Marshall Collection (1900-28), the Lantern slides Collection (1901-1950?) and the John Bryan Ward-Perkins Collection (1946-74).

A short description to each collection is provided on the BSR website.

The Photographic Archive also encourages collaboration and discussion between other Archives, thus creating in the BSR a forum for discussion, lectures, courses, exhibitions and collaborative projects.

The increase in activities and events relating to the Photographic Archive was triggered in 2002 by a generous three-year grant from The Getty Foundation which funded the cataloguing and organization of three 19th century collections of photographs. A second two-year grant from The Getty Foundation in 2007 funded the cataloguing and organization of part of the J.B. Ward-Perkins collection. Other private individuals, sponsors and institutions have contributed to the enhancement of this extraordinary digital patrimony and we wish to thank the generosity and support of: Peter Brown, BSR Honorary Fellow (2008, 2010, 2012-2014); Università del Salento (2011-13); Peter and Ann Wiseman (2012-2014); and Jim and Angela Ball, BSR Ashby Society members (2013-2014).

All low resolution images on the BSR Library and Archive Digital Collections website may be downloaded and freely used for educational and scholarly purposes.

Please always include the credit line: British School at Rome Digital Collections.

Requests for high resolution images must be sent to archive@bsrome.it.

Please visit the site: <http://www.bsrdigitalcollections.it/photographic-archive> [Go there for access and linx]

ΕΙΔΗΣΕΙΣ - NEWS RELEASE

6,500-YEAR-OLD 'FURNACE' DISCOVERED IN BEERSHEBA, BY HANNAH BROWN

“It’s important to understand that the refining of copper was the high tech of that period.”

Beersheba may have been the true birthplace of Start Up Nation, since according to a new study by Tel Aviv University and the Israel Antiquities Authority, the capital of the Negev could have been the home of the world’s first furnace 6,500 years ago. The results of the study have just been published in the prestigious Journal of Archaeological Science.

It details how a 6,500-year-old workshop for smelting copper ore once operated in the Neveh Noy neighborhood of Beersheba. This study sheds light both on the level of technical advancement in that era and region and the hierarchy in the society, giving evidence for a theory that there was a clearly defined elite that possessed expertise and knew professional secrets, which preserved its power, because its members were the only ones who knew how to create shiny copper.

The study, which was conducted over several years, began in 2017 in the capital of the Negev when the workshop was first uncovered during an Israel Antiquities Authority emergency archaeological excavation to safeguard antiquities.

The study was conducted by Prof. Erez Ben-Yosef, Dana Ackerfeld and Omri Yagel of the Jacob M. Alkow Department of Archeology and Ancient Near Eastern Civilizations at Tel Aviv University, in conjunction with Dr. Yael Abadi-Reiss, Talia Abulafia, and Dmitry Yegorov of the Israel Antiquities Authority and Dr. Yehudit Harlavan of the Geological Survey of Israel.

According to Abulafia, director of the excavation on behalf of the Israel Antiquities Authority, “The excavation revealed evidence for domestic production from the Chalcolithic period, about 6,500 years ago. The surprising finds include a small workshop for smelting copper with shards of a furnace – a small installation made of tin in which copper ore was smelted – as well as a lot of copper slag.”

Objects on white cloth show copper slag found at the Neveh Noy excavation. (Anat Rasyuk, Israel Antiquities Authority) The Chalcolithic period (the word “chalcolithic” is made up of the Greek words for “copper” and “stone”) got this name because although metalworking was already in evidence, the tools used were still made of stone. An analysis of the isotopes of ore remnants in the furnace shards show that the raw ore was brought to Neveh Noy neighborhood from Wadi Faynan, located in present-day Jordan, more than 100 km from Beersheba.

During the Chalcolithic period, when copper was first refined, the process took place far from the mines, unlike the prevalent historical model in which furnaces were built near the mines for both practical and economic reasons. Researchers theorize that the copper was refined so far from the mines to preserve the technological secret. “It’s important to

understand that the refining of copper was the high tech of that period. There was no technology more sophisticated than that in the whole of the ancient world,” Erez Ben-Yosef said. “Tossing lumps of ore into a fire will get you nowhere. You need certain knowledge for building special furnaces that can reach very high temperatures while maintaining low levels of oxygen.”

The study provides new evidence on the extent to which this society, which was not yet urbanized, was hierarchical. The scientists feel that the findings from Neveh Noy could show that the elite who knew how to use the technology held a privileged position. The copper objects were not made to be used, but rather served some ritual purpose and had a symbolic value. They were probably used in rituals while the everyday objects in use continued to be of stone. Ben-Yosef said that the archaeology of the land of Israel shows evidence of the influence of the Ghassulian culture, named for the archaeological site in Jordan, Tulaylât al-Ghassûl, where the culture was first recognized. This culture, which spanned the region from the Beersheba Valley to present-day southern Lebanon, was unusual for its artistic achievements and ritual objects, as evidenced by the copper objects discovered at Nahal Mishmar and now on display at the Israel Museum in Jerusalem.

According to Ben-Yosef, the people who lived in the area of the copper mines traded with members of the Ghassulian culture from Beersheba and sold them the ore, but they were incapable of creating the shiny refined copper objects. Even among the Ghassulian settlements along Wadi Beersheba, copper was refined by experts in special workshops.

A chemical analysis of remnants indicates that every workshop had its own special formula which it did not share with its competitors. He said that it would seem that, in that period, Wadi Beersheba was filled with water year-round, making the location convenient for smelting copper where the furnaces and other apparatus were made of clay.“

At the first stage of humankind’s copper production, crucibles rather than furnaces were used,” Ben-Yosef explained. “This small pottery vessel, which looks like a flower pot, is made of clay. It was a type of charcoal-based mobile furnace. Here, at the Neveh Noy workshop that the Israel Antiquities Authority uncovered, we show that the technology was based on real furnaces.“

This provides very early evidence for the use of furnaces in metallurgy and it raises the possibility that the furnace was invented in this region. It’s also possible the furnace was invented elsewhere, directly from crucible-based metallurgy, because some scientists view early furnaces as no more than large crucibles buried in the ground,” Ben-Yosef added. “The debate will only be settled by future discoveries, but there is no doubt that ancient Beersheba played an important role in advancing the global metal revolution and that in the fifth millennium BCE the city was a technological powerhouse for this whole region.”

Please visit the site: <https://www.jpost.com/archaeology/6500-year-old-furnace-in-beersheba-sheds-light-on-ancient-technology-644415> [Go there for pix]

CAVE DWELLERS FORGED THEIR TOOLS IN FIRE 300,000 YEARS AGO, ISRAELI STUDY SHOWS, BY AMANDA BORSCHEL- DAN

Weizmann Institute findings based on AI analysis of flint from Qesem Cave, using tool-making re-enactment, hi-tech Raman spectroscopy, and machine learning

Ancient man harnessed the power of fire to skillfully forge specific stone tools, some 300,000 years ago, according to a new study from researchers at the Weizmann Institute of Science.

“We can’t know how they taught others the skill of toolmaking, what experience led them to heat the raw flint to different temperatures, or how they managed to control the process, but the fact that the longer blades are consistently heated in a different way than the other pieces does point to an intent,” said Dr. Filipe Natalio of the Institute’s Scientific Archaeology Unit in a press release.

The interdisciplinary team of Weizmann scientists opened their study — published Monday in the prestigious *Nature Human Behaviour* journal — with the question of whether a now-extinct branch of humanity that had lived in central Israel’s Qesem Cave adapted their tool making skills as their diet changed 300,000-400,000 years ago.

The many generations of Lower Paleolithic cave dwellers, whose residence spanned from 420,000 and 200,000 years ago, left behind tens of thousands of flint tools, some of which were excavated by Tel Aviv University’s Prof. Avi Gopher. As the residents’ diets changed from large prey such as elephants, to fallow deer, the Weizmann researchers wondered, did they adopt the technique of firing stone to temper the flint before knapping it into finer slices.

According to a Weizmann press release, Natalio of the Institute’s Scientific Archaeology Unit, postdoctoral fellow Dr. Aviad Agam, and Dr. Iddo Pinkas, who is an expert in a technique known as Raman spectroscopy in the Institute’s Chemical Research Support Department, decided to conduct an experiment. They collected flint from several Israeli locations, including the Qesem Cave. The researchers heated and cooled the rocks, then examined their chemical and molecular structure.

Slightly derailed by an avalanche of data, the team turned to an expert in machine learning and artificial intelligence, Dr. Ido Azuri, who is part of the Weizmann Bioinformatics Unit. Together, the scientists were able to sift the information and discern the changes caused by baking the rocks. Through the machine learning, they were also able to discover the temperature range in which each tool was heated and created a stratified model.

The researchers then studied Gopher’s ancient samples from Qesem Cave and attempted to figure out the temperatures to which ancient man heated the flints, through Azuri’s model.

“At first, the data seemed to be all over the place, and we did not know if we could say anything about these tools. But then Azuri created his model, and things just fell into place,” said Natalio in the press release.

The scientists compared three types of flint artifacts, which, it was revealed, were fired at three different temperature ranges according to tool type. The small flint “pot-lids,” were nicked and chipped shards. Spectroscopy and AI analysis indicated that during firing, the flint pieces were dislodged by the heat of up to 600 degrees Celsius. Small cutting tools, “flakes,” on the other hand, were fired to a large temperature range of temperatures.

The third group of tools, labeled “blades,” were long tools with one sharp edge and an opposite, thicker dull side for gripping. The scientists found that the blades were heated at a smaller temperature range and at relatively lower temperatures (some 200-300 degrees).

A comparison of temperatures for three types of tool reveals a small, relatively cool range for blades, in contrast with the other two.
(courtesy, the Weizmann Institute of Science)

The scientists concluded that this ability to harness fire to create better adapted tools was intentional.

This, said Pinkas, “is technology, as surely as our cell phones and computers are technology. It enabled our ancestors to survive and thrive.”

First use of ash as food preservative in Late Lower Paleolithic A separate analysis of Qesem Cave findings published in September in the prestigious PLOS journal identifies the earliest use of ash in food cooking and storage, as well as the treatment of hide.

Qesem Cave seems to provide the earliest evidence related to the utilization of ash for storing and processing vegetal foods “Qesem Cave seems to provide the earliest evidence related to the utilization of ash for storing and processing vegetal foods and hide linked to the outstanding preservation properties of ash,” write the authors.

The team of Italian researchers from Sapienza University implement use-wear and residue analyses, controlled experiments, and a corroborating blind test, according to the study, “The use of ash at Late Lower Paleolithic Qesem Cave, Israel—An integrated study of use-wear and residue analysis.”

“Our current findings present evidence for the processing of organic matters intentionally mixed with ash, leading us to suggest that the inhabitants of Qesem Cave were proficient not only in the habitual use of fire, but also of its main by-product, ash,” write the authors.

The impetus of the study came when the researchers noticed a fine polish on some of the flint tools from Qesem. Fine ash was readily available in the archaeological site, giving the researchers a powdery possibility.

“We thought that the brightness of the polish, and the tight linkage between polish and the striations suggest that animal and plant processing activities achieved with these tools involved some unknown abrasive powdery component that had the power to enhance the degree of leveling of the micro-surface of the used flint tools while also slightly grazing their surface,” they write.

Experiment: a) peeling and cutting fresh asphodel; b) peeling and cutting fresh asphodel in ashy environment presence of ash (blind test); c) peeling roasted cyclamen; d) cleaning off subcutis of fresh hide (blind test); e) cleaning off subcutis of fresh hide in ashy environment (blind test); f) cutting dry hide preserved in ash.

(Courtesy PLOS/ <https://doi.org/10.1371/journal.pone.0237502.g002>)

The scientists also noted a morphological similarity to results from hide-working experiments they had conducted in which hide was preserved in cold ashes before tanning. In addition, their onsite experiments have shown that ash aids in the preservation of dry untanned hides; for preserving drying tendons that can be turned into strings; and for drying fresh bone to easily remove fleshy tissues ahead of producing bone tools.

The researchers note that worldwide, ash was used for four main purposes: food roasting and cooking; preservation of edible matters, such as dried food, or of fresh hides; hygiene treatments against bugs and parasites; and medicinal uses.

In the Qesem Cave sample specifically, the scientists did not find indications of all four ash usages. Their results do indicate, however, that underground storage organs and other plants “were probably roasted or preserved (in ash) for delayed consumption, and that ash appears to have been used for treating and preserving raw hide. This suggests that the site’s inhabitants had already mastered the outstanding properties of ash for roasting/cooking and preservation purposes.”

Similar to the Weizmann researchers, the Italian study concludes that the use of fire and ash was highly intentional.

“Our results highlight the possibility that fire was used purposefully and indirectly (as opposed to its direct uses of heat, light, and security) in the Levant from ca. 300 kya onwards through the utilization of its by-product, ash,” they write.

Please visit the site: <https://www.timesofisrael.com/cave-dwellers-forged-their-tools-in-fire-30000-years-ago-israeli-study-shows/>

2,400-YEAR-OLD KITCHEN, ROOM UNEARTHED IN TURKEY'S ANCIENT CITY OF PATARA

Artifacts unearthed through archeological excavations in the ancient city of Patara, located in the Kaş district of southern Turkey's Antalya province, give a glimpse into the daily life of its past inhabitants and continue to excite scientists. A kitchen estimated to be 2,400 years old has been found as well as the room of a woman containing mirrors, ornaments and fragrance bottles in the Tepecik region, where the city's settlements were concentrated and acted as the capital of the Lycian Union.

Speaking to Anadolu Agency (AA), associate professor Erkan Dündar, the deputy chairman of the excavation team working in Patara, stated that the Tepecik settlement in the ancient city is where they uncovered the earliest findings and architectural structures.

Dündar emphasized that the excavations have helped shed light on the daily home life of residents during the Lycian Union and added that a military garrison to protect the region was also discovered along with residential structures. Explaining that the warrior king Alexander the Great is known to have spent time in the region, Dündar said: “After he seized the region, he set up a garrison here, as he did in many places. The soldiers staying in the garrison brought their families here as well. It is kind of like a military lodge. In our excavations, we have also uncovered findings related to residential life, not just war tools such as arrowheads, daggers, spears and sling stones.” The houses in the Tepecik region have stone bases with dry stone walls with flat rooftops raised with adobe (a type of clay), similar to the highland houses in the current Elmalı district in Antalya.

The most compelling find, for the scientists, is the kitchen found in a house, Dündar said: “We have found kitchen items in bulk. We have found pestles and mortars, storage pots, oil pots, stewpots and a trivet (placemat) that we are very excited about. The kitchen has provided us with important information about life in that period. We have also found a woman's room during excavations. In this room, we have discovered weaving loom weights, small items belonging to women, mirrors, ornaments and fragrance pots. We see that women pay attention to their beauty in every period of history.”

Please visit the site: <https://www.dailysabah.com/arts/2400-year-old-kitchen-room-uneearthed-in-turkeys-ancient-city-of-patara/news>

NEW SECRETS UNEARTHED AT MINOAN PALACE OF ZOMINTHOS ON CRETE, BY PATRICIA CLAUS

An elegant summer palace once belonging to the Minoan aristocracy at Zominthos on Crete, first discovered in 1982, has yielded many more of its priceless secrets in a recent dig.

It was found in this summer's dig that the original structure may have been up to three stories high and to date back to 2,000 BC. This year's excavations of the building, measuring 1,600 square meters, or 17,222 square feet, have also shown that the edifice contained ramps, a series of apartments and even religious altars.

Under the direction of Honorary Director of Antiquities Dr. Efi Sapouna- Sakellaraki, the aim of the new dig was to clarify what served as the access to the northern entrance to the main building and to verify what had been discovered through biomagnetic research north of the main building.

This year's excavations disclosed to archaeologists that the usage of the building actually extended back as far as 2,000 BC — and possibly further. From 1,700 BC onward it expanded into the surrounding area, and this year's work uncovered two new complexes further out from the main building.

The archaeologists now believe that the northern slope of the hill on which the palace is located holds even more historical secrets, and they plan to investigate this area further in the future.

As shown in these photos from the Greek Ministry of Culture, this year's dig proved that access to the northern entrance was made possible by the construction of a stone ramp, which may have been built as early as 1,900 BC. The ramp ended in a robust retaining wall.

The area was paved with stones twice during the years 1,700 -1,600 BC and an oblique ritual corridor had been formed in the retaining wall itself.

Researchers believe that the palace of Zominthos served political, economic and religious functions throughout its existence. It is very near the religious center of Ideo Andros, which had an influence spreading throughout the Eastern Mediterranean, the New East and even Egypt.

The remains of ceramics, in particular cups from what archaeologists term the “MM period,” associated with Knossian pottery, have been found at the site, which date the use of the structure back to 1,800 BC.

In addition, three stone drainage pipes in the main building complex have also been identified now by the archaeologists down at the level of what archaeologists call the YM IA period, approximately 1,650 BC. (group 1)

Of particular note is the “Northern sanctuary” from the first complex, from the period of the new palaces. Excavated first in 2019, this area was found to have an altar paved with stones; vessels associated with rituals, including rhymes, were found at this site as well.

In what was perhaps the most serendipitous act of the entire dig, a sudden rainstorm revealed a small golden plate to archaeologists. New excavations of the layer underneath the altar where the plate was found uncovered a piece of burned wood. Scattered all around this wood were what the researchers called “a multitude,” approximately 90, of other small, golden plates.

Additionally, carved ivory idols which were clad in a thin layer of gold, similar to those found at Archanes and Paleocastro, were found in this area. On this same level was also found a stone and ritual grater and a seal featuring an animal.

Researchers now believe that the subsequent occupants of the building had preserved the remains of the ruined idol after the original palace had been destroyed, and then constructed a new stone altar atop it.

Even further down and to the north of the site, archaeologists uncovered an older sanctuary from the period of the old palace, from 1,900 BC, with fragments of figurines representing people and animals nearby, including a beautiful female figurine who has now been dubbed “The Lady of Zominthos.”

Please visit the site: <https://greece.greekreporter.com/2020/10/03/new-secrets-unearthed-at-minoan-palace-of-zominthos-on-crete/> [Go there for pix]

DECODING LINEAR A, THE WRITING SYSTEM OF THE ANCIENT MINOANS, BY PHILIP CHRYSOPOULOS

Linear A, a writing system that was used by the ancient Minoans from 1800 to 1450 BC, has never been fully decrypted. Used in governmental and religious writings of the Minoan Civilization, the script has intrigued and frustrated experts for centuries.

Now, for the first time, scientists and archaeologists believe that they have decrypted symbols denoting numerical fractions in the Linear A writing system.

The alphabet called Linear A was first discovered and named by British archaeologist Sir Arthur Evans, who lived from 1851-1941. It was succeeded by Linear B, which was used by the Mycenaeans to write an early form of Greek. No complete texts in Linear A have ever been deciphered.

The term ‘linear’ derives from script that was written by using a stylus to cut lines into a clay tablet, as opposed to “cuneiform,” which was written by using a stylus to press wedge shaped letters into the clay.

Linear A belongs to a group of scripts which are similar to hieroglyphics, but they evolved independently from the Egyptian and Mesopotamian writing systems. During the second millennium BC, there were four major branches of this alphabet: Linear A, Linear B, Cypro-Minoan, and Cretan hieroglyphic.

In the 1950s, archaeologists deciphered Linear B as Mycenaean Greek. They found that Linear B shares many symbols with Linear A, and they may notate similar syllabic values. But neither those nor any other proposed readings led to a language that can be read by experts.

The only part of the script that can be deciphered and read are the signs for numbers — which, however, are still only known as numerical values. The actual words for those numbers remain unknown.

One symbol for each fraction

But now, researchers in Bologna, Italy have deciphered the mathematical quantities for these symbols by combining methods of linguistics, mathematics and archeology and comparing the material with the corresponding hieroglyphic symbols from Egypt and Mesopotamia, which are known.

The researchers started with the hypothesis that the simple division by two, the fraction $\frac{1}{2}$, was the most common and that any fraction greater than $\frac{1}{2}$ can be expressed as $\frac{1}{2} + x$. On this basis, the researchers calculated the various combinations and the frequency of the fractions they saw.

The Bologna researchers created a table in which all the possible symbols of the fractions of Linear A were classified into specific numerical quantities. Published in the Journal of Archaeological Science, the table shows semicircular symbols with a serial number of lines for the fractions 1/4, 1/5 or 1/20, 1/30 and so on up to 1/60.

The symbol for 1/10 is reminiscent of the letter T. However, the fraction most often found on clay tablets is 1/2, which is like the letter J. The researchers from Bologna are optimistic that the combined method they used will one day lead to the decipherment of the entire enigmatic Linear A writing system.

The researchers found that tens were marked with horizontal lines or dots, hundreds with circles and thousands with circles framed by lines. What is striking is that the Minoans used even decimal fractions for their calculations and for recording quantities.

According to the researchers, Linear A contains 17 symbols which obviously meant fractions. These decimal fractions were represented by triangular or semicircular symbols supplemented by one or more dots.

Scientists had already discovered this, but to date they had not been able to find the correspondence of the symbols with specific fractions. The clay tablets that have survived are often fragmentary, and the correspondences have changed over time.

Linear A texts have been found throughout the island of Crete and also on Kythera, Kea, Thera, and Melos in the Aegean and on the Greek mainland.

The Bologna researchers believe that by continuing the study, they will one day decipher all the Linear A symbols and gain better insight into the language.

Please visit the site: <https://greece.greekreporter.com/2020/10/06/decoding-linear-a-the-writing-system-of-the-ancient-minoans/>

THE ARCHAEOLOGY OF CLOTHING IN THE ANCIENT NEAR EAST, BY ALLISON THOMASON

The ancient Near East was the area of the world where sheep were first domesticated and their wool used in textiles, and where flax plants were first cultivated and their fibers used for threads. It is therefore arguably the most important place to study the history of clothing. Textiles were worn by humans on their bodies, but clothing was only one of many choices in the broader sense of “dress,” a term that includes other forms of adornment and body alteration, such as jewelry, and even perfume, that archaeologists may study. In the ancient Near East most items of clothing were worn as ensembles—that is, in conjunction with other adornments and body-altering processes to create a complete bodily experience for wearers and the people with whom they came into contact, stimulating all of the senses including olfactory and auditory.

Most of the archaeological material and representational evidence for clothing dates to the Bronze and Iron Ages, but there is some evidence related to clothing that is preserved as early as the Neolithic period. Despite this geographic and temporal range, the problem remains that unless a relatively large fragment from an easily identifiable section of clothing (e.g., a hemline) is excavated, it is difficult to affirm the use of any textile as an item of clothing. In other words, textile remains can come from many and any archaeological contexts, but securely identified examples of clothing worn on the body are relatively rare and primarily from mortuary contexts.

Furthermore, most of these finds of textiles come from elite areas of sites – predominantly tombs and sometimes palaces – thus the use of archaeological remains to understand how non-elites wore clothing is limited.

While there is less archaeological evidence relating to how non-elites wore their clothing, the situation is different regarding the production of textiles by craft workers and family members. Wool was the main type of material used to produce textiles and form clothing in the ancient Near East. Environmentally, many regions are excellent for sheep rearing, which was performed by pastoral nomads as well as rural and urban inhabitants.

Wool’s uniquely sustainable and inexpensive production rendered it an ideal material for the production of textiles as trade exports. In addition, the chemical and organic abilities of wool to resist water penetration, to retain heat or breathe for coolness, to accept colors and dyes, and to be spun into variable widths and weights of thread made it an obvious choice for clothing.

Wool can require carding and combing, either before spinning or even once a textile is finished, and these and other finishing or weaving techniques result in various qualities of softness, flexibility, weight, and uniformity. Textile quality is often noted in ancient texts, reflecting human choices and awareness of demand for finished products. Typically the finest quality woolen textiles were reserved for clothing elites and royal figures as well as statues of the gods in the polytheistic Near Eastern societies.

The other major type of cloth, linen woven from flax threads, was considered a more luxurious material outside of Egypt and the southern Levant. Flax thread is made from the fibers of the plant, which requires a great deal of agricultural attention, such as steady watering and harvesting, and preparation work, including retting (separating the fibers through soaking in water), beating, and combing to render it soft and flexible. The vast majority of flax thread and linen in the ancient Near East would have been imported as luxury or prestige commodities and finished products through trade, tribute or even plunder from Egypt or the Levant. Cotton and silk were generally not known in the ancient Near East until Classical periods or later.

Almost all woolen and linen textiles in the ancient Near East were woven on looms, including the horizontal ground loom (especially prevalent in Egypt), the two-beam loom, and the warp-weighted vertical loom.

Textile production occurred in institutions and in small households.

Evidence from a variety of textual sources indicates that the producers were typically female who left behind in houses, workshops, or in graves many objects related to production. These artifacts were made of ceramic, terracotta, or stone, and included spindles and whorls for forming and collecting thread, and combs for thread and fabric. A woven textile involves the “background” warp strings, arranged in parallel, which are then criss-crossed by passing a shuttle with the weft strings attached through them in various patterns and configurations. An array of different sizes and shapes of spindle whorls, and thousands of loom weights used in warp-weighted vertical looms, where gravity pulled down the warp strings tied with weights, have been excavated from archaeological sites, such as at Arslan Tepe in Turkey. Textile producers also used needles made out of more durable materials such as stone, bone or ivory, or metals.

Outside of Egypt, the preservation of organic remains such as textiles and wooden tools or loom beams is spotty in the archaeological record.

While earlier excavation records attest to thousands of examples of such tangible traces of inorganic weaving tools, only recently have archaeological publications given space and attention to these often numerous and sometimes monotonous-looking objects. In addition, new awareness and techniques have allowed archaeologists to search for woven textile imprints (called pseudomorphs or *cretulae*) in excavation strata, which can yield information about contexts of production and consumption of clothing.

The study of clothing in the ancient Near East has recently focused on textiles as material culture, situating the production of clothing within the larger processes of state formation, economic materialism, and socio-political complexity. Many studies focus on textual discussions of textile workers and products as well as the production processes. In addition, clothing has been studied recently as communicative behavior linked to identity creation, performance and practice. The choice of clothing is both conditioned by and formative of gender, status, power, ethnic, and other identities. In the new turn towards understanding the relationship between clothing and the individual and their body, clothing is a verb, not a noun, which allows individuals to act in embodied ways as agents making unacknowledged or active sartorial choices in response to their surroundings.

Excavated materials from elite burials of the Bronze and Iron Ages, such as the hypogean tombs at Qatna (ca. 1600-1200 BCE) and the tombs of Neo-Assyrian queens

at Nimrud (ca. 900-750 BCE), contained textiles wrapped around bodies. From the royal palace at Qatna, white textiles with murex-dyed purple meander patterns were incorporated into the burials. Royals were also accompanied in death by textiles decorated with thousands of small gold beads attached, along with other forms of dress such as jewelry and headdresses made of gold and semi-precious stones. A single finely-woven and polished linen tassel as well as chunks of layered linen cloth were also found in the Nimrud tombs. The dangling and flexible items of jewelry, and hanging gold beads and tassels in the Nimrud tombs demonstrate that elites preferred clothing made with components that dazzled the senses and which would flash and jingle as they moved. Such clothing was “high-maintenance” and required the wearer to make multiple adjustments in posture and wrapping to properly comport themselves. Throughout the ancient Near East, such attention-grabbing ensembles donned for important events are discussed in texts and represented in images on different types of objects, from the portable to the monumental.

Our understanding of the archaeology of clothing in the ancient Near East is certainly dominated by artifacts from elite contexts, however, the textiles found at the Iron Age site of Timna, a copper-smelting center near the Red Sea (dating eleventh to tenth centuries B.C.E.), force a rethinking. The discovery of wool textiles decorated with wide bands of red-purple and made with organic materials such as red madder and indigo in the context of a mineworkers’ settlement and a smelting site indicates that workers in the desert had access to luxury and prestige items as much as did elites in the urban centers of the Levant.

What common factors emerge from these limited archaeological examples?

First, when preserved, textiles most often come from mortuary contexts, and are part of larger burial assemblages or dress ensembles. A few fragments of textiles come from non-mortuary contexts, but they are often too poorly preserved to confirm any significant findings. While some textile fragments preserve decoration, dye, and finished edges or tassels, none can be identified for certain as anything more than a type of rectangular or amorphous sheet, shroud, or wrap. In other words, the poor preservation and fragmentary nature of the archaeological material prevents a certain identity of any clothing shaped and sewn to actually “fit” onto an individual body. “Ready-to-wear” garments are not accessible to us archaeologically.

Overall, the archaeological accessibility of clothing in the ancient Near East can be categorized as at worst frustrating and at best tantalizing. Despite these frustrations, the new data-driven studies on weaving tools and technology, the increasing awareness of fabric imprints in excavations, and laboratory analyses of preserved textile remains offer promising new directions for the study of clothing in the ancient Near East.

Allison Thomason is a professor in the Department of History at the Southern Illinois University Edwardsville.

Further Reading:

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**Please visit the site: <http://www.asor.org/onetoday/2020/10/archaeology-of-clothing>
[Go there for pix, figs and better format]**

RECENT ARTIFACTS FOUND TO CHANGE ISTANBUL’S HISTORY, BY ÖMER ERBİL

Due to the metro and railway constructions in the Beşiktaş district, Haydarpaşa and Yenikapı neighborhoods and soil removal work in the Silivri district, so many artifacts have come to light over the years that have enriched the history of Istanbul, reported the daily Hürriyet.

“In these excavations done by Istanbul Archaeology Museum, they have found so many artifacts that a new museum could be built with it,” wrote the daily in its feature.

“These artifacts date back to 6,500 B.C., the founding date of the metropolis.”

According to the daily, the oldest “kurgan” style cemetery has been found in the Canbaztepe neighborhood in the Silivri district.

Kurgan, which means “Castle” in old Turkish, is a name given to an ancient cemetery that is covered with sand and looks like a small hill.

In the kurgan, skeletons of a commander from 3,500 B.C. and a spearhead from 5,500 B.C. have been found.

Amid the railway diggings in Haydarpaşa, some city walls and building remains of the historical Khalkedon, “Land of the Blinds,” were explored.

In the metro works in the Beşiktaş district, traces of the first Turks of the metropolis have been unearthed.

“Archaeologists have found some 80 kurgan cemeteries, axes and many pots and pans dating back to 3,500 B.C.,” wrote the daily.

In the Yenikapı neighborhood, officials came face to face with “a collection of submerged remains.” Some 37 submerged ship remains, two canoe rows, 2,080 footprints from the ancient eras were unearthed.

Among the artifacts found, there were 1600-years-old ivory dices, 1500-years-old sandals with lines engraved, “Wear these in healthy and happy days my lady,” and 1600-years-old wooden comb with lines carved in the wood that read, “Oh Lord, please help,” in Latin.

“Officials can establish several museums with different concepts with these artifacts,” the daily said, concluding its feature.

Please visit the site: <https://www.hurriyetdailynews.com/recent-artifacts-found-to-change-istanbuls-history-159084>

5TH CENTURY BC ANCIENT GREEK SHRINE DISCOVERED IN FIRST EVER EXCAVATIONS ON TINY ST. PETER ISLAND OFF BULGARIA'S BLACK SEA COAST NEAR SOZOPOL, BY IVAN DIKOV

An Antiquity shrine from the 5th century BC, the time of the Ancient Greek colonization of Bulgaria's Black Sea coast, has been discovered during the first ever archaeological excavations on the tiny St. Petar / St. Peter Island off the coast of Sozopol, right next to the St. Ivan / St. John Island famous for the discovery of relics of St. John the Baptist.

The discovery has been announced by the Regional Museum of History in the Black Sea city of Burgas.

The St. Ivan ("St. John") Island is located about 900 meters away from the closest point on the Bulgarian mainland, the Stolets Peninsula (Cape Stolets, or Scamnia) in the town of Sozopol. The St. Peter Island, which is really small, is roughly the same distance from the coast, and only 50 meters away from the St. Ivan Island.

The town of Sozopol itself is the modern-day successor of ancient Apollonia Pontica (Sozopolis), an Ancient Greek colony dating back to the 6th century BC, on the western Black Sea coast which was inhabited by Ancient Thracians.

The St. Ivan Island is the largest from Bulgaria's several small islands in the Black Sea. It is best known for the discovery of the relics of St. John the Baptist in 2010, with the excavations there yielding new finds such as the 2015 discovery of a tomb possibly containing the bones of the monastery founder, a Syrian monk who brought the relics.

The St. Peter Island next to it, however, had never been researched by archaeologists before the fall of 2020, the Burgas History Museum says.

It points out that the St. Peter Island near the St. Ivan Island and Sozopol has a maximum altitude of 9 meters above sea level. Its territory is only 15 decares (0.015 square kilometers or 3.7 acres).

The St. Petar / St. Peter Island (front) and the St. Ivan / St. John Island (back) near Sozopol on Bulgaria's Black Sea coast. Photo: Burgas Regional Museum of History

An aerial view of the St. Petar / St. Peter Island off Sozopol's coast. Photo: Burgas Regional Museum of History

"It is hypothesized that the St. Peter Island used to be part of the St. Ivan Island, and that it got separated from it due to the rising sea levels and the ensuing geological processes over the past two millennia. The St. Peter Island is not mentioned in historical sources predating the second half of the 19th century," the Burgas Museum states.

It also explains there have been presumptions that the St. Peter Island used to harbor an ancient church or monastery named after St. Peter.

It quotes Greek historian Lambros Kamberidis as hypothesizing that must have been the case considering that the St. Ivan Island had an early Christian monastery named after St. Ivan, i.e. St. John the Baptist. The same was true of the St. Kiril (St. Cyricus), also known as the Sts. Quriaqos and Julietta Island), which is today a peninsula as it was connected with the mainland.

The late long-time director of the Burgas Regional Museum of History Tsonya Drazheva also mentioned the existence of chapel foundations on the St. Peter Island.

At the same time, there have been no data about accidental discoveries of archaeological artifacts from the St. Peter Island near Bulgaria's Sozopol.

The only find to have been associated with the island has been a stone stock found south of it by divers who donated it to the National Museum of History in Sofia.

Thus, the first ever archaeological excavations on the St. Peter Island were carried out between September 28 and October 8, 2020, the Burgas Museum has announced.

They included drills on an area of 66 square meters, which resulted in the discovery of two structures in the eastern section of the surveyed area: two low mounds of soil brought from a different location, which were covered up with small stones.

Inside the mounds, the archaeologists have found fragments from pottery vessels such as amphorae, bowls, thick kitchen vessels, and ceramic vessels covered with red polish and black glaze.

A remarkable artifact found in the mounds is the bronze tip of a three-edged arrow.

Based on their findings, the archaeologists have concluded that the spot they have excavated on the St. Peter Island in the Black Sea off the coast of Bulgaria's Sozopol used to harbor a coastal shrine from the 5th century BC.

The shrine was used as part of a ritual for making small soil mounds covered with stones.

That was the period of the Ancient Greek colonization of the Bulgarian Black Sea coast. No artifacts from other time periods have been found.

Bulgaria's St. Ivan (St. John) Island off the coast of Sozopol (left) with the smaller St. Petar (St. Peter) Island to the right. Photo: Spiritia, Wikipedia

A Google Maps image showing the islands of St. Ivan and St. Petar, and the town of Sozopol with the St. Cyricus Island (today a peninsula), and the Stolets (Scamnia) Peninsula. Photo: Google Maps

The geological research carried out as part of the excavations has indicated that some 2,500 years ago, today's St. Peter Island was part of the largest nearby St. Ivan Island, and that the two became separate islands at a much later stage.

The first ever archaeological excavations on the St. Peter Island near Sozopol have been led by Prof. Ivan Hristov, deputy director of the National Museum of History in Sofia, and Milen Nikolov, director of the Burgas Regional Museum of History. The geological research has been performed by Assist. Prof. Stefan Velev from Sofia University "St. Kliment Ohridski". The digs have been funded by Bulgaria's Ministry of Culture.

Learn more about the ancient and medieval history of Bulgaria's Black Sea city of Sozopol in the Background Infonotes below!

Background Infonotes:

The history of the resort town Sozopol (Apollonia Pontica, Sozopolis) on Bulgaria's Southern Black Sea coast started during the Early Bronze Age, in the 5th millennium BC, as testified by the discoveries of artifacts found in underwater archaeological research, such as dwellings, tools, pottery, and anchors. In the 2nd-1st millennium BC, the area was settled by the Ancient Thracian tribe Scyrmians who were experienced miners trading with the entire Hellenic world.

An Ancient Greek colony was founded there in 620 BC by Greek colonists from Miletus on Anatolia's Aegean coast. The colony was first called Anthea but was later renamed to Apollonia in favor of Ancient Greek god Apollo, a patron of the settlers who founded the town. It became known as Apollonia Pontica (i.e. of the Black Sea). Since the Late Antiquity, the Black Sea town has also been called Sozopolis.

The Greek colony of Apollonia Pontica emerged as a major commercial and shipping center, especially after the 5th century AD when it became allied with the Odrisian Kingdom, the most powerful state of the Ancient Thracians. As of the end of the 6th century BC, Apollonia Pontica started minting its own coins, with the anchor appearing on them as the symbol of the polis.

Apollonia became engaged in a legendary rivalry with another Ancient Greek colony, Mesembria, today's Bulgarian resort town of Nessebar, which was founded north of the Bay of Burgas in the 6th century BC by settlers from Megara, a Greek polis located in West Attica. According to some historical accounts, in order to counter Mesembria's growth, Apollonia Pontica founded its own colony, Anchialos, today's Pomorie (though other historical sources do not support this sequence of events), which is located right to the south of Mesembria.

Apollonia managed to preserve its independence during the military campaigns of the Ancient Greek kingdom of Macedon under Philip II (r. 359-336 BC), and his son Alexander the Great (r. 336-323 BC). Apollonia, today's Sozopol, is known to have had a large temple of Greek god Apollo (possibly located on the Sts. Quiricus and Julietta Island, also known as the St. Cyricus Island), with a 12-meter statue of Apollo created by Calamis, a 5th century BC sculptor from Ancient Athens.

In 72 BC, Apollonia Pontica was conquered by Roman general Lucullus who took the Apollo statue to Rome and placed it on the Capitoline Hill. After the adoption of Christianity as the official religion in the Roman Empire, the statue was destroyed.

In the Late Antiquity, Apollonia, also called Sozopolis lost some of its regional center positions to Anchialos, and the nearby Roman colony Deultum (Colonia Flavia Pacis Deultensium). After the division of the Roman Empire into a Western Roman Empire and Eastern Roman Empire (today known as Byzantium) in 395 AD, Apollonia / Sozopolis became part of the latter. Its Late Antiquity fortress walls were built during the reign of Byzantine Emperor Anasthastius (r. 491-518 AD), and the city became a major fortress on the Via Pontica road along the Black Sea coast protecting the European hinterland of Constantinople.

In 812 AD, Sozopol was first conquered for Bulgaria by Khan (or Kanas) Krum, ruler of the First Bulgarian Empire (632/680-1018 AD) in 803-814 AD. In the following centuries of medieval wars between the Bulgarian Empire and the Byzantine Empire, Sozopol changed hands numerous times. The last time it was conquered by the Second Bulgarian Empire (1185-1396 AD) was during the reign of Bulgarian Tsar Todor (Teodor) Svetoslav Terter (r. 1300-1322 AD).

However, in 1366 AD, during the reign of Bulgarian Tsar Ivan Alexander (r. 1331-1371 AD), Sozopol was conquered by Amadeus IV, Count of Savoy from 1343 to 1383 AD, who sold it to Byzantium. During the period of the invasion of the Ottoman Turks at the end of the 14th century and the beginning of the 15th century AD, Sozopol was one of the last free cities in Southeast Europe. It was conquered by the Ottomans in the spring of 1453 AD, two months before the conquest of Constantinople despite the help of naval forces from Venice and Genoa.

In the Late Antiquity and the Middle Ages, Sozopol was a major center of (Early) Christianity with a number of large monasteries such as the St. John the Baptist Monastery on St. Ivan Island off the Sozopol coast where in 2010 Bulgarian archaeologist Prof. Kazimir Popkonstantinov made a major discovery by finding relics of St. John the Baptist; the St. Apostles Monastery; the St. Nikolay (St. Nikolaos or St. Nicholas) the Wonderworker Monastery; the Sts. Quriaqos and Julietta Monastery on the St. Cyricus (St. Kirik) Island, the Holy Mother of God Monastery, the St. Anastasia Monastery.

During the Ottoman period Sozopol was often raided by Cossack pirates. In 1629, all Christian monasteries and churches in the city were burned down by the Ottoman Turks leading it to lose its regional role. In the Russian-Turkish War of 1828-1829, Sozopol was conquered by the navy of the Russian Empire, and was turned into a temporary military base.

After Bulgaria's National Liberation from the Ottoman Empire in 1878, Sozopol remained a major fishing center. As a result of intergovernmental agreements for exchange of population in the 1920s between the Tsardom of Bulgaria and the Kingdom of Greece, most of the ethnic Greeks still remaining in Sozopol moved to Greece, and were replaced by ethnic Bulgarians from the Bulgarian-populated regions of Northern Greece.

The modern era archaeological excavations of Sozopol were started in 1904 by French archaeologists who later took their finds to The Louvre Museum in Paris, including ancient vases from the beginning of the 2nd millennium BC, the golden laurel wreath of an Ancient Thracian ruler, and a woman's statue from the 3rd century BC. Important

archaeological excavations of Sozopol were carried out between 1946 and 1949 by Bulgarian archaeologist Ivan Venedikov.

The most recent excavations of Sozopol's Old Town started in 2010. In 2011-2012, Bulgarian archaeologists Tsonya Drazheva and Dimitar Nedev discovered a one-apse church, a basilica, and an Early Christian necropolis. Since 2012, the excavations of Sozopol have been carried out together with French archaeologists.

In 2010, during excavations of the ancient monastery on the St. Ivan (St. John) Island in the Black Sea, off the coast of Sozopol, Bulgarian archaeologist Prof. Kazimir Popkonstantinov discovered a reliquary containing relics of St. John the Baptist. In 1974, the Bulgarian government set up the Old Sozopol Archaeological and Architectural Preserve.

A 2012 National Geographic documentary featuring the discovery of the St. John the Baptist relics in Bulgaria's Sozopol can be seen here (in English <https://www.youtube.com/watch?v=e-QjoorU03g> and here in Bulgarian <https://www.youtube.com/watch?v=EunBltxFXwM>).

Please visit the site: <http://archaeologyinbulgaria.com/2020/10/14/5th-century-bc-ancient-greek-shrine-discovered-in-first-ever-excavations-on-tiny-st-peter-island-off-bulgarias-black-sea-coast-near-sozopol/> [Go there for pix]

MEMORIAL TOMB OF ANCIENT GREEK ASTRONOMER ARATUS UNEARTHED IN TURKEY, BY PATRICIA CLAUS

Archaeologists working in the ancient Greek city of Soli Pompeipolis in the southern Mersin province in Turkey have unveiled the memorial tomb of the Greek poet and astronomer Aratus, who was born in 315 BC.

The city, located in the ancient region of Paphlagonia, was still prominent during Roman times but was only rediscovered in the 1800s with the unearthing of the ruins of Zımbılı Tepe in the Black Sea region of the country.

The Greek poet and astronomer Aratus, in an illustration from the Renaissance era. Credit: Public domain

Soli Pompeipolis, lying just across the river from Taşköprü, in the Gökırmak (Greek: Amnias) Valley, in ancient times stretched as far as the Küre and Ilgaz mountains

The tomb of the gifted poet and astronomer is being excavated by Professor Remzi Yağcı, who is the head of the Department of Museology at Turkey's Dokuz Eylül University.

According to the archaeologist, the discovery is of lasting importance to the history of the area and will be of great interest to travelers who will want to see the monument. Speaking to interviewers from the Anadolu News Agency, Yağcı said "For the first time, a memorial tomb has been unearthed linked to the archaeology of the ancient city of Soli Pompeiopolis.

"Aside from more familiar structures, such as the colonnaded streets, the ancient port, the theater, and the bathhouse, something very unique has been found. This find brings dynamism to the ancient city and can influence tourism in the region – for both those interested in cultural heritage and general visitors to the region."

The unearthing of the ruins has been ongoing since July 20 of this year, Yağcı said. Showing photographs of the unique discovery, he indicated the two rows of hexagonal structures and arches around the memorial tomb that had been unearthed by his workers.

"This place looks like a crater," he explained, "and has a circular area (that could have been used by) an astronomer. We have also come across a solid and large monumental structure."

Yağcı added that Aratus was widely known during both the Hellenistic and Roman periods and his works on astronomy, as well as his poetry, are still read and studied to this day.

Additionally, he noted that NASA had named a crater on the moon after the brilliant Greek thinker, leading the archaeologist to hope that the tomb of the great man will one day be included on the UNESCO World Cultural Heritage List.

Please visit the site: <https://greece.greekreporter.com/2020/10/14/memorial-tomb-of-ancient-greek-astronomer-aratus-unearthed-in-turkey/>

ANCIENT "TECHNOLOGICAL POWERHOUSE" DISCOVERED IN ISRAEL, BY SARAH WELLS

Before quantum computing and self-driving cars, a different kind of cutting edge was sweeping the world: metal smithing. To ancient people living over 6,000 years ago, mining raw metal from the Earth and carefully melting it to craft into currency, tools, and even ornate ritualistic objects, was the height of innovation.

In a recent study in the *Journal of Archaeological Science: Reports*, scientists describe an archaeological site that may have been the first place in the world to host this technology's secret sauce — a furnace.

Chemical analysis of remnants at an ancient copper-smelting site in Israel points to a two-stage crafting process for metal objects. Not only that, but the site appears to have used copper ore from mines located over 60 miles away.

The combined evidence of an elaborate supply network and the specialized, multi-step process is a testament to the importance of this ancient, cutting-edge technology, the researchers say.

Melting metal is no easy feat. Lead researcher on the study and professor of archeology at Tel Aviv University Erez Ben-Yosef said in a statement the reality is an incredibly delicate and precise process that requires serious skill.

"It's important to understand that the refining of copper was the high-tech of that period. There was no technology more sophisticated than that in the whole of the ancient world," Ben-Yosef says. "Tossing lumps of ore into a fire will get you nowhere. You need certain knowledge for building special furnaces that can reach very high temperatures while maintaining low levels of oxygen."

Older studies suggest people living some 6,000 years ago in what is now the Middle East used clay crucibles — which resemble vases — for smelting copper ore. But when archaeologists excavated this site in 2017, they found evidence of a different kind of technology: a small furnace made of tin and clay.

"This provides very early evidence for the use of furnaces in metallurgy and it raises the possibility that the furnace was invented in this region," said Ben-Yosef.

Copper slag, a byproduct of smelting, found at the excavation site. Anat Rasiuk, Israel Antiquities Authority

RECONSTRUCTING HISTORY — The archeologists first conducted a chemical analysis on uncovered remnants of the site's metal works using a portable X-ray instrument. After studying 14 crucible and 18 furnace fragments, as well as metallurgy's glass-like byproduct, 'slag,' the team retraced these ancient innovator's steps to imagine what their process would've looked like.

In the study, they describe there was likely a two-step metal-smithing process that began with melting ore in a clay-lined, pit furnace, and then scraping it into a smaller crucible to be remelted. Finally it would be poured into a sand-based mold in the ground to cool and form transportable lumps.

The irregularity of these final forms and the lack of other casting remnants led researchers to believe that this site was not constructing objects themselves, but instead processing the metal for other communities to use.

In addition to the copper found, the team also found reoccurring signatures of phosphorous, which they think may have come from burnt bones. While there isn't enough evidence to know for sure, the researchers write that it's possible an animal sacrifice was made during the smelting process as a form of organic fuel.

Archaeologists digging up the ancient Beer Sheva site in Israel. Anat Rasiuk, Israel Antiquities Authority

The analyses also reveal the site used an ore found more than 60 miles away, in what is now the Jordan Valley. In future centuries, these smelting sites and mines would move closer together for practical and economic reasons, but the researchers write that the more ancient, long-distance network uncovered here is further evidence that the process of smelting these metals was highly specialized and safe-guarded by each community — like a secret family recipe, or how a tech company protects its intellectual property with NDAs.

"At the beginning of the metallurgical revolution, the secret of metalworking was kept by guilds of experts. All over the world, we see metalworkers' quarters within Chalcolithic settlements, like the neighborhood we found in Beer Sheva," explains Ben-Yosef.

A FIRST... OR NOT? — The evidence suggests this Israeli site may be one of the first in the ancient world to begin using a furnace for copper smelting. But the technology may have been invented and used around the same time in neighboring regions, Ben-Yosef says.

Nevertheless, the discovery cements a place in history for this community as an ancient, "technological powerhouse," he adds.

"[T]here is no doubt that ancient Beer Sheva played an important role in advancing the global metal revolution," he says.

Abstract: Recent discoveries at Horvat Beter (Beersheva, Israel) shed new light on the earliest phase of Southern Levantine metallurgy (second half of the 5th millennium BCE). Multiple fragments of furnaces, crucibles and slag were excavated, and found to represent an extensive copper smelting workshop located within a distinct quarter of a settlement. Typological and chemical analyses revealed a two-stage technology (furnace-based primary smelting followed by melting/refining in crucibles), and lead isotope analysis indicated that the ore originated exclusively from Wadi Faynan (MBS Formation), more than 100 km away. These observations strengthen previous suggestions that metallurgy in this region started with furnace-based technology (possibly not locally invented). Furthermore, the absence of any artifact related to the contemporary industry

of copper-based alloys indicates a high degree of craft specialization, and together with other regional observations testifies to the important role of metallurgy in the society of the Beer-sheba Valley during this formative time.

Please visit the site: <https://www.inverse.com/innovation/ancient-tech-powerhouse>

NEGEV TRASH MOUNDS REVEAL SECRETS **OF ANCIENT AGRICULTURE,** **BY HANNAH BROWN**

The study explores how the detailed study of trash can lead to wide-ranging conclusions about the economic and agricultural life of a community.

They say one man’s trash is another man’s treasure, and that is certainly true with ancient trash mounds found in the Negev.

A new paper published last week in the PLOS ONE journal explains how trash mounds found in villages and agricultural settlements in the Negev from the Byzantine and Early Islamic periods show that there was a turning point in the management of herbivore livestock dung, a vital resource in the Negev. It also explores how the detailed study of trash can lead to wide-ranging conclusions about the economic and agricultural life of a community.

According to the article, “Byzantine—Early Islamic resource management detected through micro-geoarchaeological investigations of trash mounds (Negev, Israel),” ancient hinterland trash mound features can be important sources of evidence for community-scale resource management, economics, social and ecological trends.

The study focuses on trash mound sediments from three of the six major Negev settlements from this period: the UNESCO World Heritage Sites of Shivta and Elusa, as well as the village of Nessana. The researchers note that these sites were selected for study because their histories are well known, and because stratified trash mounds spanning the Byzantine-Early Islamic periods (c. 4th-10th century CE) were found in them.

The research characterizes the sediment deposits comprising hinterland trash mounds and classifies the types of trash and tracks changes in the use and disposal of agricultural resources through time and between villages. It also puts these findings into context within newly developing understandings of the rise and fall of Negev agropastoral systems during Late Antiquity.

“We show how changes in the management of critical dryland resources, specifically livestock dung, are registered in the sedimentary archives comprising the studied trash mounds. The work underscores the value of micro-sedimentary archives in classical studies aiming to track long-term societal change and human-environment interactions in urban settings. Our findings provide much-needed new insight into community-specific responses to social and economic transformations in the Negev during a pivotal time in its history—during the collapse of market-oriented agriculture and naturalization of the urban heartland near the end of the first millennium CE,” write the authors.

The article was written by Don H. Butler, Zachary C. Dunseth, Yotam Tepper, Tali Erickson-Gini, Guy Bar-Oz and Ruth Shahack-Gross. The research and excavations were overseen by the Israel Antiquities Authority.

The researchers discovered that dung was used as a sustainable fuel resource during both the Byzantine and Early Islamic periods and that significant amounts of raw dung were dumped and then managed by incineration outside Early Islamic Nessana. These results support the hypothesis that agropastoral change and development are reflected in the management of livestock dung.

“They highlight a previously unrecognized community-scale response to disruption within the long-standing agropastoral socio-ecological niche,” the study concludes.

Beyond this specific finding, the study further “demonstrates the high potential of archaeological trash proxies in studies aiming to detail and explain wide-ranging diversity in the processes conditioning socio-ecological transformations, as well as how communities contribute and respond to such transformations.”

Please visit the site: <https://www.jpost.com/archaeology/negev-trash-mounds-reveal-secrets-of-ancient-agriculture-646238>

AN EXCEPTIONAL DISCOVERY AT POMPEII: A VICTIM'S VITRIFIED BRAIN REMAINS, BY PIER PAOLO PETRONE

Volcanoes are uniquely destructive, but paradoxically, they can also preserve. In 79 CE, Herculaneum, Pompeii and other Roman settlements were hit by hot ash-avalanches capable of killing instantly all residents who were not yet evacuated. The most famous eruption of Vesuvius buried entire Roman towns and villas as far as 20 kilometers away from the volcano, killing thousands of residents.

But the 1980s excavation of the suburban area of Herculaneum brought to light 350 human victims crowding the beach and 12 seafront chambers, fixated into a final posture by the first deadly ash-avalanche (a fast current of hot ash and gases generated by the collapse of the eruptive column). A few decades earlier, during the archaeological investigations of the town directed by the superintendent of Herculaneum, Amedeo Maiuri, about fifty victims were found sheltered inside houses and public buildings.

In the mid-1960s, on the Decumanus maximus, the main street of this thriving city gently sloping down to the sea, in the Collegium Augustalium a small room was discovered containing a human victim lying on a wooden bed buried by the volcanic ash. The victim was lying ventrally within the volcanic ash, face down, the skull and the postcranial skeleton completely charred and burst from being subjected to the intense heat of the volcanic ash. Given the context of discovery, a small service room, archaeologists believe that this 20-year-old male was the guardian of the College. The building is located at the corner of Cardo III where it intersects with Herculaneum's main street, the Decumanus Maximus. The College was the headquarters of the Sodales Augustales, made up of the most important representatives of the town, as testified by a stone inscription found within the building.

A study published in the New England Journal of Medicine by a research team I led reveals the extraordinary discovery of vitrified brain remains from this eruption victim. The term vitrified referring to material recovered in the archaeological record is applied to biological substances that, as in our case, have been converted to a glass-like appearance because of a rapid drop in temperature after exposure to intense heat. This glassy material was undetectable in other parts of the skeleton and in the volcanic ash, nor was it found elsewhere at the archaeological site. Cerebral tissues from archaeological human remains are rare finds, thus, only few well preserved brains are known so far, which are generally saponified, a process by which tissues have been converted to soap.

The corpse of this man is still visible nowadays at the Archaeological Site of Herculaneum, a seaside town at the foot of Vesuvius, close to Naples. This unprecedented find is the result of 25 years of site and laboratory research, started in the mid-1990s with the excavation I directed of dozens of victims found inside some seafront chambers on the beach of this Roman port city.

Biochemical analysis of the glassy material allowed us to identify fatty acids from human hair and brain, and even more incredibly, several proteins (7 enzymes) related to various parts of the human brain like cerebral cortex, hippocampus, hypothalamus, cerebellum, or amygdala. Vitrification rarely occurs in nature and it is even more rare to find it in the archaeological context, where the process mostly involves charcoal. A single wood fragment of a charred beam from a workshop situated in the third Cardo (a secondary street) nearby the Collegium Augustalium showed as well glassy-like appearance. Analysis of charred wood from the College revealed a temperature in the range 470 – 520 °C (878 – 968 °F).

A further peculiarity is that the chest bones of the victim were trapped by a solidified black spongy mass, which was found as well to be rich in fatty acids. In a previous study published on PloS ONE we hypothesized that the hot volcanic ash clouds were able to vaporize soft tissues and burn body fat, a fluid mass that in turn solidified entrapping the bones. These observations seem similar to those reported by an eyewitness on the firestorm victims in Dresden and Hamburg during the Second World War bombings.

The preservation of ancient brain remains is a rare find, but this is the first ever discovery of ancient human brain vitrified during a volcanic eruption. Further ongoing studies are showing that this process of vitrification has made possible the integral preservation of neuronal structures from the central nervous system, an ultra-microscopic world that has revealed itself to our astonished gaze, ready to be analyzed and understood. Beside this, the research will go through the vitrification process in reverse, liquefying the remains of glass-like solidified brain: we expect the results to provide further information useful to understand this unique process and the environmental conditions at the time of the eruption. The effects on the people of the 79 CE Vesuvius eruption is a silent warning for the risk of a similar outcome for three million people living today in metropolitan Naples.

Pier Paolo Petrone is Head of the Laboratory of Human Osteobiology and Forensic Anthropology of the Department of Advanced Biomedical Sciences at the University Federico II of Naples.

Please visit the site: <http://www.asor.org/onetoday/2020/10/discovery-at-pompeii>
[Go there for pix and nicer format]

ANCIENT DOG DNA SHOWS EARLY SPREAD AROUND THE GLOBE, BY JAMES GORMAN

Research on fossil canine genomes is expanding and producing some surprises about the lives of dogs and humans in prehistoric times.

The most extensive study of ancient dog DNA to date has shown how rapidly dogs spread across the world after domestication, and pins their likely origin to a group of extinct wolves.

The new report in the journal *Science* pushes ancient DNA studies of dogs to a new level, but raises as many questions as it answers. Until Thursday, scientists had published the genomes of only six ancient dogs and wolves. Now an international team of researchers has sequenced and analyzed an additional 27 genomes of ancient dogs.

David Reich, at Harvard University, who specializes in using ancient human DNA to understand migrations and population change, said the new research, “for the first time brings ancient DNA analysis of dogs to the kind of sophistication that exists with studies of humans” and other animals.

Among the new and sometimes puzzling findings:

By 11,000 years ago, dogs had already diverged into five different lineages and spread worldwide. It is widely accepted that dogs were domesticated at least 15,000 years ago. The new study suggests, but doesn’t prove, that domestication probably began around 20,000 years ago.

Dogs probably evolved from an extinct form of wolf, yet to be identified. There is some disagreement among experts about the strength of this finding.

Ancient dogs were much more diverse genetically than modern dogs. Four thousand years ago, European dogs had a wide genetic diversity that disappeared long before the Victorians started creating new breeds.

All European dogs appear to have descended from one group of ancient European dogs, and the great modern diversity of dog shapes and sizes indicates an emphasis by breeders on certain very powerful genes.

Dogs are a continuation of a line of wolves, but since those wolves became dogs more than 15,000 years ago, no new wolf DNA has entered dog genomes. This puzzles researchers because humans crossbred dogs and wolves, but none of the wolf DNA survived in dogs at large. Modern wolves, however, do show the incorporation of some dog DNA.

The geographic spread of dogs sometimes mirrors and sometimes diverges from human migration, leaving unanswered the effects of dog-trading and why the genes of particular populations of dogs sometimes extended and other times did not.

As for mapping clear, definitive timelines for when, where and how dogs were domesticated, the researchers said they continue to make some progress.

The report involved a collaboration among many scientists, including Greger Larson at the University of Oxford, Pontus Skoglund and Anders Bergstrom at the Francis Crick Institute in London, and Laurent Frantz at Queen Mary University of London.

The extraordinarily rich amount of information gathered from the 27 genomes provided many new perspectives on dog domestication and their association with humans. And, perhaps not surprisingly, interpretations of the findings varied.

Dr. Reich, for example, described the new paper as “important and exciting,” and said that it “nailed” the single origin of dogs from one extinct wolf population. He also considered the research “a very strong refutation” of an earlier paper on which Dr. Larson and Dr. Frantz were authors that suggested two or more instances of domestication.

“Nope!” Dr. Larson wrote in an email. “The needle has been pushed toward single,” he said, since the new data is consistent with that idea. But there are still gaps in the available ancient genomes, so other possibilities remain.

Dr. Skoglund said, “We cannot exclude that some of the dogs could have partially different origins/domestications (it is hard to exclude), but we see no evidence of it at the moment.”

Among the other findings, Dr. Larson said he found it particularly intriguing that once dogs had become domesticated, and even while they were sometimes breeding with wolves, no new wolf DNA entered their genomes.

By contrast, pigs, for example, were brought to Europe by farmers from Anatolia. But the genes of those first domesticated pigs have been completely lost, replaced by the genes of wild European boars, even though the pigs stayed domesticated animals.

While dogs do interbreed, no new wolf genes survive over the years. One possibility, Dr. Larson said, is that “wolfiness” just doesn’t fit with an animal as close to people as a dog. Pigs can be a little wild but “if you’re a dog and you’ve got a little bit of wolf in you, that’s not a good thing and those things get knocked on the head very quickly or run away or disappear but they don’t get integrated into the dog population.”

Dr. Skoglund said another intriguing and unexplained finding from the genome data was how fast dogs spread around the globe, and diversified, so that by 11,000 years ago, not only were there five distinct lineages, but some fossil DNA also showed that those lineages had begun to recombine.

“How did that happen?” he said. “In ancient humans, we don’t really know of any human expansion that would have facilitated this, on the order of 15 to 30,000 years ago.”

In the past 11,000 years, he said, the dog genomes showed the evidence similar to that in human genomes of Anatolian farmers moving into Europe. But then there was the sudden loss of diversity in dogs starting around 4,000 years ago.

Also migrations from the steppes changed human genomes in Europe, but had almost no effect on dog genomes. Conversely, migrations from the steppes eastward left an imprint on dog genomic history, but not on humans.

In Africa, ancient dogs were descended from dogs from the Middle East. But that did not parallel any human migration. The Basenji breed still has the majority of its ancestry from these Middle Eastern dogs.

More research is coming on ancient dogs in Eurasia and the Americas, and on ancient wolves, the researchers said.

The exact where and when of dog domestication remain unclear, and will never be pinned down to the kind of moment in time that dog owners like to imagine, but, in terms of a period of time and geographic area, Dr. Larson said, “We’re getting closer.”

Please visit the site: <https://www.nytimes.com/2020/10/29/science/dogs-ancient-DNA-wolves.html> [Go there for pix]

CAN INDIVIDUAL DIFFERENCES BE DETECTED IN SAME-SHAPED POTTERY VESSELS BY UNKNOWN CRAFTSMEN?

An interdisciplinary research team has investigated whether there are quantitative differences that can be used to identify individual potters who make traditional, fixed-shape vessels that have been made in the same way for generations. Consequently, they discovered that there are clear variations between individuals in the formation process and hand movements used.

Members of the research team included Dr. Enora Gandon (Institute of Archaeology, University College London), Professor NONAKA Tetsushi (Graduate School of Human Development and Environment, Kobe University), and Professor Emeritus John A. Endler (Deakin University).

Up until now, the transmission of cultural traditions has been viewed in terms of ‘imitation’ and ‘transmitted information’. However, the results quantitatively show that other factors beyond imitation, such as the individual’s corresponding ability and exploratory learning process, play a role. In addition, it is hoped that these results will serve as a basis for determining whether unattributed archaeological artefacts were produced by one or multiple artisans.

These research results were published in the scientific journal ‘PloS ONE’ as two separate papers on September 22 and October 1 respectively.

There were quantitative differences distinct to individual potters, even when standard traditionally-shaped vessels were produced.

There was greater diversity between potters during the formation process compared with the finished product.

Multiple hand movement patterns that could be used to distinguish individual craftsmen were found.

Research Methodology and Findings

Humans pass down various skills to their communities and the next generation. One of these skills that has been transmitted since ancient times is pottery. This study investigated how the individuality of each craftsman stands out during the formation process of traditional pottery pieces, in particular the standardized, unsigned pottery produced for the mass-market.

First of all, the research team recorded video footage of potters making traditionally shaped pottery in the workshops of two different communities located in the Indian state of Uttar Pradesh (a Hindu community which uses a hand-operated stick-wheel, and a Muslim community which uses a foot-operated kick-wheel). The researchers performed

an elliptical Fourier analysis on the recorded images in order to investigate the shape formation process during pottery throwing (Figure 1).

The results revealed that:

1. There were quantitatively distinguishable differences between the pottery produced by individual craftsmen, even among standard traditionally-shaped vessels produced for the consumer market.
2. There was greater variation between potters during the formation process than in the finished form.

Next, the researchers recorded video footage of traditional pottery shapes being made by craftsmen in a workshop in Bhaktapur, Nepal. The research team used this footage to analyze the hand movement patterns and transitions during the vessel formation processes, comparing them with those from the Indian communities.

Out of the 31 identified patterns of hand movements; similarities could be seen between different communities in approximately half of this number (cross-cultural), ten were particular to the Nepalese community (cultural), and five were identified as unique to the particular individual. The remaining movements were only observed once in one individual.

Cross Recurrence Quantification Analysis (CRQA) is a method used to quantify the dynamics of shared activity between two time series. CRQA was conducted on hand position sequences from different trials resulting in plots showing the temporal relationship between all possible combinations of hand positions in one trial with hand positions in another trial during the fashioning. These analyses revealed that there were hand position sequences that were unique to individual craftsmen (Figure 3).

The significance of this research

This research revealed that there is actually much variation in the formation process and the hand movements of the individual craftsmen, even when producing traditionally-shaped pottery in a manner that has been passed down for generations. From these results it can be surmised that each potter has been searching for their own distinct way of forming the shape of the vessel within the constraints of the tools used, such as the type of wheel, and differences in material.

Various theoretical models that have been proposed on the cultural transmission of handicrafts have viewed the inheritance of such skills as ‘imitation’ and ‘transmitted information’. Conversely, this study provides quantitative evidence that traditional ‘inherited’ craftsmanship is more than mere imitation, shedding light on how individuals’ ability is flexibly adopted from exploratory activities channelled by the social environment (e. g. of the pottery workshop) and the processes behind these factors. These aspects have been overlooked by existing theoretical models. The impact of these results will bring about the revision of existing theories that have reduced the transmission of traditional handicraft skills to ‘imitation’ and ‘transmitted information’.

Furthermore, it is also hoped that this study's methodology and data could be used to determine whether unattributed archaeological artefacts were produced by an individual or several craftspeople.

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PLoS ONE article at

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