

# SAS BULLETIN

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FROM THE EDITOR  
THOMAS R. FENN

I hope that the Summer is treating you all well. It seems as soon as you turn around another season passes. One thing I also see with greater frequency these days are high-profile stories on breaking news of the latest break through or discovery, and great many employed the methods and techniques of archaeological science to achieve their discoveries.

What does this mean? It means that the continued fast-paced consumption of these methods and techniques by the public and private sectors, and continued innovation in the methods and their applications to addressing archaeological questions, will lead to even more news stories. While archaeological scientists in the United States suffer from a lack of adequate funding in the form of research grants, the usage in the U.S. continues to expand. The struggles for support in the U.S. are well documented (e.g., Killick D. 2015. The awkward adolescence of archaeological science. *JAS* 56: 242-247), and likely will not change soon. However, this issue is being subverted, to some extent, by increased collaboration between archaeologist and other scientists who have extant labs and equipment, and who have access to better funding sources, allowing not only for continued support of facilities, instruments and equipment, but which also are providing new funding streams to develop new laboratories and analytical facilities.

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Finally, I want to remind our readers that we still are seeking to fill two positions at the *SAS Bulletin*, that of Associate Editor for the Meetings Calendar, and an updated version of a long-standing position, Associate Editor of Archaeo-Dating (formerly Associate Editor of Radiocarbon Dating). This latter position will bring us news and research on all forms of archaeological dating. If one of our members is interested, or if you want to recommend someone you think would be interested, please contact me as soon as possible about this opportunity.

SAS STUDENT RESEARCH INTERNATIONAL TRAVEL  
AWARD WINNER

*Stranded in South East Europe: LA-ICP-MS Analysis of Iron Age Glass Beads*

Ana Franjic, PhD Candidate, UCL Institute of Archaeology

My doctoral research, titled *Iron Age Glass Technology in South East Europe* and supervised by Prof. Ian Freestone and Dr Ulrike Sommer, looks at glassmaking and glass use on the territories of present-day Bosnia and Herzegovina, Croatia, and Slovenia during the first millennium BCE. The project seeks to contribute to our broader understanding of glass use in Iron Age Europe by assessing the variability in the technological recipes and styles of glass items occurring in the given period, and mapping the interrelations between various territories and communities, as well as large-scale patterns of prehistoric trade and exchange networks.

Glass beads are abundant in the Iron Age archaeological record of the region; the number of items retrieved speaks of extensive use of this material, especially when compared to the Late Bronze Age. How glass was perceived and valued as a material in prehistory has been a subject of some debate. However, the distinct contexts in which it is found during the Iron Age in this region – as part of the rich burial attire indirectly ascribed to female

individuals – indicate it was most probably considered a prestigious material, a non-verbal medium used to signal identity and status, and negotiate social relationships and associations between various social groups (cf. Appadurai 2007; Hayden 1998; Sciama 1998; Stevens 2008; Walton 2009).

In order to survey Iron Age glassmaking across South East Europe, I have analysed 550 glass bead samples with a scanning electron microscope with an energy dispersive spectrometer, as well as an electron probe micro-analyser for major oxides. These analyses have given me an indication of the variability of the glass types and I have been able to define four potential technological groups of glass circulating in the area. Results show diversity in the glasses used and reveal the coexistence of different production technologies in the period.



Figure 1. EIA ring eye beads from Lika, Croatia

The SAS Research Student International Travel Award helped me undertake further analysis of a hundred samples, chosen from the previously defined four technological groups, with a laser-ablation inductive coupled mass spectrometer (LA-ICP-MS). The study was conducted this March, over a six-day period at the Aarhus Geochemistry and Isotope Research Platform laboratories at the Department of Geoscience, Aarhus University, with the help of Drs. Gry Barfod, Rasmus Andreasen, and Graham Hagen-Peter. Analysis with an instrument with such superior limits of detection is an indispensable asset to my research, as it enabled me to expand on the investigation in more detail. Since glassmaking requires only a few specific raw materials, which were frequently obtained from just two ingredients, and since the majority of glass in my dataset is made with natron, whose sources are geographically well defined, analysis of the sand-related trace elements is instrumental in the interpretation of the samples' origin and the identification of the production centres (Freestone 2004: 2, 5). This sensitive instrument can precisely measure the presence of heavy-mineral related elements like zirconium, titanium, chromium, and lanthanum, which have been successfully used to distinguish between various types of sand (see Shortland 2007: 788; Shortland 2012: 156-7), and the rare earth elements, which are also highly indicative of a material's provenance, as they reflect fundamental geochemical differences and are relatively stable during weathering.



Figure 2. EIA glass beads from Dalj, eastern Croatia

At the moment I am still processing the data, but already there are indications that the results are confirming the existence of centralised production in a small number of primary glassmaking sites, which then traded the raw glass to more commonplace secondary glassworking shops, which is accepted as a standard model in current glass research (Rehren and Freestone 2015: 236). I will compare the rare-earth elements' signatures to the upper continental crust standards in order to pinpoint the

possible location of the silica source, which is likely to be found somewhere along the Mediterranean coast. Glass stabiliser, most often added in the form of lime, should offer another clue, as the strontium levels should help me discern if the stabilising ingredient came from marine shell or, alternatively, limestone.

The studied material offers a glimpse of the technological change in the glass production recipes that started to occur around the tenth century BCE: from the Bronze Age plant ash to the natron flux tradition, which was used well into the common era. An improved understanding of the dynamics of glass use in the region will add to the ongoing study of prehistoric technology, its social implications, and human past experiences. I hope my research will contribute to our joint endeavours by offering new data for the study of the crucial formational phase when the technologies and production systems which matured into the Hellenistic and Roman industries were in development. Thank you for your support, SAS!

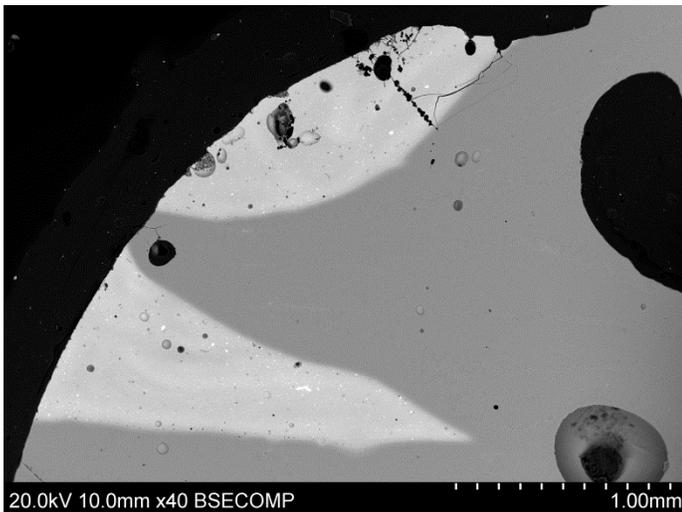


Figure 3. Microphotograph of yellow glass decoration on a blue glass bead (LIA, Kaptol, Croatia)

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#### LUMINARIES IN THE ARCHAEOLOGICAL SCIENCES: R. E. (ERV) TAYLOR

Welcome to a new series that will appear periodically in the *SAS Bulletin* focusing on some of the living legends of the archaeological sciences. The first in the series will present a biographical and bibliographical sketch of and interview with Dr. R. E. (Erv) Taylor.

R. E. (Erv) Taylor

#### BIOGRAPHICAL AND BIBLIOGRAPHICAL SKETCH

R. E. Taylor is Emeritus Professor of Anthropology at the University of California, Riverside (UCR). From 1973 to 2003, he was the Director of the UCR Radiocarbon Laboratory and from 1993 to 2000, he chaired the UCR Department of Anthropology. In 2004, he received the Fryxell Award for Interdisciplinary Research from the Society for American Archaeology. The citation stated that the award was "In recognition of his outstanding contributions in the development and application of radiocarbon dating in archaeological research."

He is currently a Visiting Professor at the Cotsen Institute of Archaeology at the University of California, Los Angeles (UCLA) and a Visiting Scientist at the Keck Carbon Cycle Accelerator Mass Spectrometry Laboratory at the University of California, Irvine (UCI).

Professor Taylor received his Ph.D. in anthropology at UCLA in 1970 in the Isotope Laboratory of the late

Willard F. Libby, 1960 Nobel Laureate in Chemistry for the discovery of the radiocarbon method. Following the receipt of his Ph.D., he held a NSF Postdoctoral Fellowship in the Department of Chemistry at UCLA undertaking research on the ESR dating of ceramics in the laboratory of Daniel Kivelson.

Research initiated by him and carried out in his laboratory at UCR by his students, colleagues and collaborators focused on examining various aspects of the application of dating and analytical techniques in archaeology with particular emphasis on radiocarbon ( $^{14}\text{C}$ ). In the 1970s, he also was involved in early studies of obsidian sourcing and hydration dating and edited the first volume addressing archaeological and geochemical issues involving obsidian.

He is best known for his work on the problems involving the  $^{14}\text{C}$  dating of bone, particularly human bone samples associated or thought to be associated with the earliest human populations in the New World. Several of his widely-cited papers examined the history of  $^{14}\text{C}$  dating particularly as applied in archaeology.

In the early 1970s, following from his dissertation research, he published a series of papers focused on the evaluation of  $^{14}\text{C}$  data from various sites in West Mexico. In connection with these studies, he published some of the first papers concerned with defining the marine reservoir effects in the  $^{14}\text{C}$  dating of marine shell for the Pacific coasts of North, Central, and South America and the first large suite of  $^{14}\text{C}$  dates on organics extracted from ceramics.

In the 1980s and extending into the early 1990s, in conjunction with a critical examination of the validity of the amino acid racemization (AAR) method applied to bone samples, he was involved in pioneering applications of the use of accelerator mass spectrometry (AMS) technology in  $^{14}\text{C}$  dating of archaeological materials. Early papers in this area were undertaken in association with the AMS laboratory at The University of Arizona.

Later, he was instrumental in developing support for establishing the Center of Accelerator Mass Spectrometry (CAMS) at the Lawrence Livermore National Laboratory (LLNL) and in the 1990s published AMS-based papers in collaboration with LLNL scientists. His laboratory was responsible for the chemical pretreatment of samples and the steps needed to convert pretreated samples to graphitic carbon, which is used as the target material in AMS systems.

During this period, studies that he initiated and organized in conjunction with a number of collaborators were responsible for major downward revisions in the Pleistocene ages assigned to a series of California Paleoindian skeletons – particularly Sunnyvale, Yuha, Los Angeles, and Haverly. The UCR laboratory was also responsible for  $^{14}\text{C}$  dates on the Calaveras Skull – the "Pitdown" of the New World. More recently, his laboratory obtained the first  $^{14}\text{C}$  age determinations on the Spirit Cave and Kennewick skeletons. It also was responsible for the more than 50  $^{14}\text{C}$  determinations on the Pendejo Cave sequence – documenting more than 50,000 years of sedimentary deposition in that New Mexico cave.

In the middle 1990s, he supported and initiated laboratory studies to address the problem of  $^{14}\text{C}$  dating of biochemically degraded bone samples. In a series of papers in collaboration with several colleagues, he reported experiments that examined the validity of  $^{14}\text{C}$  determinations on a non-collagen protein, osteocalcin, and its characteristic amino acid, Gla. Although initially promising, additional research by his group indicated a general lack of isotopic integrity of Gla in many of the bones examined.

The UCR radiocarbon laboratory also initiated an extensive study of the  $^{14}\text{C}$  dating of hair with very excellent results. In conjunction with the UCR laboratory studies on bone and hair, his laboratory was able to achieve the lowest background heretofore obtained in the processing of actual samples for AMS  $^{14}\text{C}$  measurements and, in doing so, had the capability to work with samples containing as little as 20 micrograms (1000 micrograms = 1 milligram) of carbon.

He also investigated the possibilities of developing several new dating methods. This included the use of fluorine diffusion profiles for dating lithics and the use of radiocalcium ( $^{41}\text{Ca}$ ) as a possible Quaternary dating isotope applicable to the dating of bone over the last 500,000 years. Although initial data suggested that both methods might be capable of achieving operational status, the high cost of obtaining effective fluorine diffusion profile measurements made continuing intensive studies of this technique impractical and variability in modern equilibrium values of radiocalcium as a function of geographical location and specific depositional histories greatly limited the general applicability of that technique.

Most recently, in collaboration with John Southon (AMS Laboratory, UC Irvine), Taylor has been involved in continuing studies focused on examining potential problems in the  $^{14}\text{C}$  dates obtained at the site of Monte

Verde in Chile and possible regional offsets in  $^{14}\text{C}$  calibration data for the mid-1<sup>st</sup> Millennium BC.

In addition to over 100 journal articles, chapters, and reviews in a wide range of scholarly journals including *Science*, *Nature*, *American Antiquity*, *Antiquity*, *Historic Archaeology*, *World Archaeology* and *Radiocarbon*, he is the author of *Radiocarbon Dating: An Archaeological Perspective* (Academic Press, 1987), editor of *Advances in Obsidian Glass Studies: Archaeological and Geochemical Perspectives* (Noyes Press, 1976), and a co-editor (with Austin Long and Renee Kra) of *Radiocarbon After Four Decades: An Interdisciplinary Perspective* (Springer-Verlag, 1992), *Chronologies in New World Archaeology* (Academic Press, 1978 with Clem Meighan), and (with Martin Aitken) *Chronometric Dating in Archaeology* (Plenum Press, 1997). The 2<sup>nd</sup> edition of his *Radiocarbon Dating: Archaeological Perspectives* (Left Coast Press), written with Ofer Bar-Yosef (Harvard University), appeared in 2014.

Finally, Erv Taylor was responsible for proposing the organization of the Society for Archaeological Sciences (SAS) in 1977 and until 2002 served as the SAS General Secretary (now General Secretary Emeritus). The SAS is an international organization that promotes the development and integration of archaeological science methods and applications in interdisciplinary archaeological research.

### **An Interview with Erv Taylor**

*Can you summarize your career in a couple of sentences?*

Since I was in high school, I have always been interested in knowing how anyone knew how old something was? Especially after I learned that history began only about 5,000 BCE? So how do you know how old something is, if a book or article says that it is 20,000 years old?

*What is your most memorable professional moment?*

Back in the early 1980s, when the first direct  $^{14}\text{C}$  date on the Sunnyvale (California) human skeleton using AMS technology was measured. The first run put it at, as I recall, about one-half life old, i.e., about 5,700 years old, while the amino acid racemization-based date said it was about 70,000 years old. Bingo!

*Who has been your most influential colleague, and why?*

On a long term basis, the most influential individual was clearly Willard Libby, but he was obviously not a colleague at the beginning. I suppose one could argue that when I obtained a faculty appointment at a UC campus that one could say he was a colleague, but that

was much later. The obvious reason is that, without his decision to take a first year graduate student on as a research assistant in his UCLA lab, I would have never had the subsequent career that I have had.

*What is your current main project?*

Right now, most of my time, is taken up in attempts to finish another book manuscript.

Research wise, I'm continuing to look more closely at terrestrial reservoir effects that impact on the accuracy of  $^{14}\text{C}$  dates in certain types of environments.

Another current interest is seeking ways to convince archaeological colleagues to make sure that some of the conclusions they are drawing are based, to some degree, on a lack of appreciation of the total range of factors that can impinge on the net precision of a single  $^{14}\text{C}$  value.

Everyone knows that the associated  $\pm$  term of a conventional  $^{14}\text{C}$  value *only* communicates the experimental or analytical precision of the measurement of the  $^{14}\text{C}$  content of a sample. There are many other factors that can influence the net precision.

However, there seems a general tendency, in some cases, to assign what I've called "spurious precision" to individual  $^{14}\text{C}$  dates. On top of that, there is also sometimes failure to appreciate how the calibration process can influence precision. And then, when Bayesian statistics are employed in an uncritical manner, additional problems are created.

*Which publication should every SAS member read?*

That's a difficult question. It largely depends on the specific area of research in which a member is involved since the archaeological sciences involve such a broad spectrum of disciplines and subdisciplines. However, I would suggest that an understanding of the historical trajectory of the various stands of research in the archaeological sciences is very necessary.

For a historical perspective up to late 1960s:

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For reviews into the 1990s:

Tite MS. 1991. Archaeological science – Past achievements and future prospects. *Archaeometry* 33: 139-151.

Taylor RE, Aitken MJ, eds. 1997. *Chronometric Dating in Archaeology*. New York: Plenum Press.

Bayley J, Herson C. 1998. Archaeological science in the UK: Current trends and future prospect. *Revue d'Archeometrie* 22: 137-140.

And, more recent reviews:

Brothwell DR, A.M. Pollard, eds. 2001. *Handbook of Archaeological Sciences*. London: Wiley.

Killick D. 2015. The awkward adolescence of archaeological science. *Journal of Archaeological Sciences* 56: 242-247.

*Have you got any advice for young students interested in archaeology and archaeological sciences?*

I've become increasingly convinced that whatever specific area of study or research someone wishes to pursue in some subset of the archaeological sciences, it is almost mandatory that one have an undergraduate major, or at the very least, a minor, in geology/earth sciences.

If you can be at a university whose geology department has a strong Quaternary focus, so much the better. In the last decade or two, this has become something that all serious students should consider as undergraduates if they want to do graduate work in archaeology. I've heard that some of the major graduate programs might be actually requiring that of any graduate student that they accept have at least a minor in geology/earth science.

Also, it is difficult to understand some of the issues that arise from time to time, if you have not taken at least a basic standard undergraduate chemistry course with a lab. A basic chemistry course sequence that would include upper division physical and organic chemistry would not hurt.

It seems to me that graduate students should get in the habit of reading the journals both the major archaeological ones and some of the major science journals that deal with the Quaternary. And, of course, the journal *Radiocarbon*. Most good graduate programs have some sort of course or other arrangement for at least a weekly journal reading club.

Finally, if you are a student at a major research university, ask around in the science departments if there is a way you can volunteer to wash glassware, or do some simple repetitive thing that the graduate and postdocs would rather push off on undergraduates to do. At some places it is difficult to obtain such a position if you are not an undergraduate in that department. But trying can't hurt.

If you are lucky, listen to the conversations of the graduate students and postdocs in that lab. You will learn a lot of things that are not in the textbooks or even journals. Be sure to always be on time, do the job to the best of your ability, project a positive image of one who wants to be a learner, keep your head down, and listen, don't talk, except to ask how to do the job in the best manner, until the people in the lab know you are a serious and diligent student after, say, at least 6 months.

*What was it like to work in the lab of Willard Libby, maybe the closest thing we ever had to a Nobel Prize winner in geology, and to work with other luminaries in radiocarbon dating, peopling of the New World, etc.?*

Libby was a genius with a photographic memory. He did not suffer fools well or at all. If you opened your mouth in his presence, you had better know what you are talking about in detail, and you needed to say it quickly and be on point – or don't say anything. He had a very sensitive BS meter and the individual who did not realize that was in very big trouble in interacting with him.

It was very fortunate that Libby himself was very interested in the peopling of the New World issue. When I was a graduate student, I never knew the reason for it, until many years later, the background of his interest in this topic was explained to me.

It was also very helpful that the two individuals who worked with Libby in the development of the method at Chicago, lived in the southern California region. They were Jim Arnold and Ernie Anderson. Both were very forthcoming in explaining about things that happened in the early years in Libby's lab at Chicago that never made it into print.

Another aspect of being in Libby's lab was that a number of very well-known scientists and senior archaeologists who I knew about as a graduate student only by reading their publications came through his lab. That includes many of the pioneers that did early work in radiocarbon dating both from the US and Europe.

*Can you tell me about the origins of SAS, and its significance and maybe also weaknesses as a professional society? For these last two points, whom else would you recommend I interview about the development of archaeological science and the history of the SAS?*

An important aspect involved in the origins of the SAS derived from a problem that the ethos of American archaeology 40 years ago as reflected in the SAA was a very field excavation orientated discipline. Many times very prominent archaeologists that I knew told me in

different ways, that one of the reasons that they gravitated toward anthropology and archaeology as undergraduates is because they found scientific fields either too hard or not interesting enough.

I came to the conclusion early on that the future of archaeology as a science lay in the laboratory and not primarily in the field. British and European archaeologists had embraced this idea many years ago. However, that perspective has had a hard time getting traction in American archaeology.

A related reason was a practical one. Forty years ago, it was sometimes difficult to get slots for Archaeometry/Archaeological Science sessions at the SAA sessions. Only by collective action did that problem get solved.

*From Rob Sternberg: There is still disagreement among the half dozen North American archaeomagnetists about how to interpret archaeomagnetic dates from the raw paleomagnetic results, a process somewhat akin to radiocarbon calibration. There recently was a little flurry of discussion. What did it take for the radiocarbon community to come to a reasonable consensus on how dates should be interpreted and calibrated? Was the need for some kind of consensus internal from radiocarbon daters, or was it external from users of dates? Does it take a critical mass of daters/users/dates, since archaeomagnetism is a "second-tier" and less common/important method, to compel some kind of consensus?*

I think you have identified a very important factor when you used the term "critical mass" of those doing archaeomagnetic dating research and users.

Radiocarbon dating had a much easier time because a "critical mass" of researchers was achieved very early on, not because of the use of  $^{14}\text{C}$  dating in archaeology, but due to the fact that the technique rapidly expanded out from the original focus which was in archaeology, into a number of other disciplines in physics, geophysics, geochemistry, and isotope geology.

The core funding available for  $^{14}\text{C}$  research labs now comes from a number of other NSF programs. Unlike the archaeometry/archaeology programs such are part of the Social Science Directorate, the other funding programs which have contributed funds for AMS development are in areas of NSF having much larger budgets, although to be fair, the NSF archaeometry program at the beginning, even with its relatively very limited budgets, did make significant resources available to  $^{14}\text{C}$  labs in the 1970s-1980s focused on

archaeological studies and contributed part of the funds for the development of early AMS labs.

## ARCHAEOGENETICS

*Ophélie Lebrasseur, Associate Editor*

### Abominable Genetics

*By Dr Ross Barnett*

*Department of Archaeology, Durham University, UK*

I think all of us get into science because we want answers. Not just to the small questions but to the big questions too. Within my limited social sphere it's usually something that can be traced to a defining childhood incident. A fossil found on a beach. A trip to a Roman ruin. A trick done with magnets. Whatever the trigger, we want to learn as much as possible about the hows and whys and that sets us on an unstoppable path towards knowledge.

In archaeological science, there is a wealth of information for the interested child to read. Unfortunately, there is also a plethora of pseudoscience too. Who hasn't heard of (or even read) books like "Chariots of the Gods", "Underworld", or "The Sirius Mystery". Books that offer fantastical explanations for amazing facets of our human past. As an uncritical child I read all these, and more, and quickly moved onto other fringe beliefs. UFOs and ghosts, lake monsters and aliens. When all facts are new to you, and there are no academic sources to consult, or even much life experience to draw upon, pseudoscience can be very seductive.

My favorite topic as a young teenager was cryptozoology, or the study of hidden animals. Lumped under this broad umbrella were the Loch Ness monster, bigfoot, the abominable snowman, the beast of Bodmin and sundry other creatures. Growing up next to Loch Ness, with relatives and friends who even said they had seen the beast, left a big impression. For me, the only cure was to read, grow older and try to gauge, which things still seemed reasonable, and which did not.

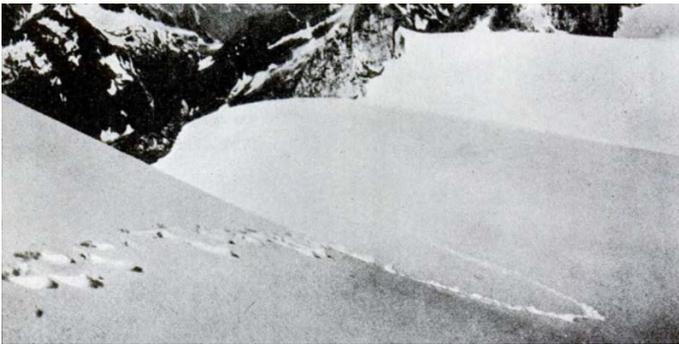
Many failed this test.

Even so, my interest in the study of hidden animals continued.

As a professional scientist I have been lucky enough to add a small contribution to the academic literature on cryptozoology. Perhaps surprisingly, there are a number of peer-reviewed papers on so-called wildmen. They come under a variety of guises, all with interesting anthropological meaning to those that named them. Alma,

yeti, sasquatch, yeren, orang pendek, ebu gogo, and yowie are just some of the terms for mysterious wild hairy people talked about in tales around the world.

In contrast to, say, ghosts, wildmen are supposed to be a tangible part of the real world. Living creatures that follow the same rules as the rest of the fauna. They leave “bigfoot” tracks in mud and snow, and they shed hair all over the place. Some have even tried to claim them as surviving relicts of Neanderthals, Denisovans, or even Hobbits. Crazy as it may sound, I think this is great! It is a testable hypothesis that we can explore with some of the tools of science.



Picture 1: Himalayan yeti footprints taken by Frank Smythe in 1937. Almost certainly made by a bear. Public Domain.

Thanks to DNA sequencing there have been a handful of wildmen studies with interesting results. Sorry to break it to everyone, but no surviving Neanderthals were identified. They did, however, find a whole lot of yeti hairs that were genetically indistinguishable from horse. And bear. And cows, dogs, raccoons, deer, and coyote. Basically, every wildman hair tested so far has been from a known species. There was a single well-publicised exception. One of the papers made the bold claim that they had identified not a yeti, but a polar bear, in the Himalayan foothills. That’s pretty far from the polar bear’s natural distribution. At first it looked like they had replaced one anomalous species with another. A legendary white bear, leftover from the apex of the ice age, haunting the tallest mountains on earth. Sadly, the claims didn’t hold up, and when the data was reanalysed, we discovered that rather than being a polar bear, it was simply a brown bear (which are native to the Himalayas). In the most recent paper to deal with yeti tissue, the researchers processed 24 samples from the Himalayas and every one turned out to be a brown bear. Serendipitously, brown bears from this region are severely understudied and prove to be completely fascinating in their own right. Using phylogenetic methods it became clear that Himalayan brown bears are a mix of two different lineages. One lineage is confined to the Tibetan plateau,

the other is wide ranging among the foothills. What started as a hunt for evidence of abominable snowmen turned into a sober and respectable study of the biogeography of a threatened mammal. Just not the mammal they secretly hoped for.

Ross Barnett, Jan Freedman and Rena Maguire run the blog <http://www.twilightbeasts.org>, in which they all contribute posts on various aspects of the fauna of the Pleistocene.

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#### The Domestication of Rabbits: Deconstructing a Myth

By Ophélie Lebrasseur

Palaeo-BARN, School of Archaeology, University of Oxford

Inferring the origins of domestic taxa is far from being a straightforward task, riddled with centuries of population movement, admixture and replacement. A lack of archaeological material and an absence of diagnostic morphological features between wild and domestic during the early stages of such a process render this task even more arduous. But rabbits seem to be one of the exceptions. Their domestication is well cited in the English literature, leaving little doubt regarding its validity and credibility. The story goes that back in AD

600, Pope Gregory the Great declared that foetal rabbits, also known as *laurices*, were not considered meat, and that Christians could consume them during Lent. This led French monks to domesticate rabbits as a reliable source of fasting protein. However, new analysis combining historical, archaeological and genetic data suggests this version of events is a myth, with no supporting evidence.

A review published on February 14th in *Trends in Ecology and Evolution* finds that historical documents, the archaeological record and genetic data each suggest different timeframes for the domestication of rabbits. Evan Irving-Pease and Prof Greger Larson originally aimed to compare the genomes of domestic rabbits and their wild counterparts in order to determine their time of divergence using the molecular clock. Their hopes were to match their results with the historically well-cited date of AD 600. Instead, their analysis suggests that the split between domestic rabbits and wild French ones occurred between 12,200 and 17,700 years ago; calibrated using four separate published mutations rates, varying by up to 45%. This places the split close to the Last Glacial Maximum, predating the historical domestication date by over ten millennia.

Population substructure is a feature of rabbit evolutionary history and as such could explain this result. Yet, Irving-Pease and Larson also highlight the possibility that the wild rabbits used in their study may not have descended from the wild population involved in the domestication process. The authors also turned towards the archaeological record for further support, but came across yet another discrepancy. It is commonly known among zooarchaeologists that morphological features distinct to domesticates are often not present in animals in their early stages of domestication. In the case of rabbits though, the appearance of these traits is extreme, only occurring during the 18th century and coinciding with the modern pet-breeding era. "I had cited [AD 600], colleagues of mine had cited it, it's all over Wikipedia, it's all over the web... but it turns out that the modern story is a complete house of cards," Larson says. "What was really interesting to me then was why nobody's really thought about it or been critical about it."

According to Prof Larson, this lack of criticism comes from the way we tell stories and how we view domestication: "We really have trouble appreciating slow, continuous change over long periods of time," Larson says. "Our narrative structures work much better if you have a eureka moment." Archaeologists and geneticists are always on the search for that one specific domestication date. In a way, it makes it easier to understand and grasp that event. But the present case

study on rabbits suggests their domestication was more likely the cumulative effect of various human interventions through time, including hunting and pet-breeding. "For the vast majority of human existence, no one said, 'I am going to grab this wild organism and bring it into captivity and, voila, I will create a domestic one,'" Larson says. "If you want to divide the continuum into a dichotomy of wild and domestic, you can do that, but you have to know that it's necessarily going to be arbitrary."

For Larson and his team, the next step in untangling domestication is not finding specific dates for domestication events, but rather reconsidering the concept of domestication and intentionality. "We have been slightly arrogant," says Irving-Pease. "We know a hell of a lot less about the origins of the things that matter most to us than we think we do."

*For access to the full article: Irving-Pease, E. et al., (2018) "Rabbits and the Specious Origins of Domestication", Trends in Ecology and Evolution 33(3). <https://doi.org/10.1016/j.tree.2017.12.009>*

**Call for the 8<sup>th</sup> International Symposium on Biomolecular Archaeology (ISBA), 18<sup>th</sup>-21<sup>st</sup> September 2018, Jena, Germany**

*By Julian Unger*

*Project Assistant, ISBA*

The symposium aims at bringing together scientists from a multitude of disciplines in the field of Biomolecular Archaeology in order to have the opportunity to discuss their latest work on a multidisciplinary basis and to join their forces for applying state-of-the-art biomolecular techniques to archaeological research.

Various sessions will cover diverse methodologies such as proteomics, genetics and analysis of other biomolecules or isotopes applied to a range of exciting topics covering for example human migrations and population genetics, diet and nutrition, domestication, adaptation and ecology or microbiomes and pathogens.

Please note the deadline for the abstract submission expires on 8th May 2018. For all further information please visit the conference homepage: [www.isba8.de](http://www.isba8.de).

ARCHAEOLOGICAL CERAMICS  
*Charles C. Kolb, Associate Editor*

This issue contains two topics: 1) Previous Professional Meetings; and 2) Book Reviews on Ceramics.

### Previous Professional Meetings

11<sup>th</sup> ICAANE (*International Congress on the Archaeology of the Ancient Near East*) was held at LMU Munich (Ludwig-Maximilians-Universität München) from 3-7 April 2018. <http://www.icaane2018.vorderas-archaeologie.uni-muenchen.de/programme/sections/index.html>.

The presentations cover all aspects of the archaeology of the Near East, from prehistoric to Islamic times, from archaeological fieldwork to art historical, historical and philological studies, as well as cultural heritage. Ceramic-related papers included: Section 1: Mobility in the Ancient Near East (4 papers): Pamela Fragnoli and Giulio Palumbi “The Handmade Red-Black Burnished ware from Arslantepe (Malatya): investigating multiscaled phenomena of mobility through ceramic materiality”; Mariacarmela Montesanto “Lost in transition: The Late Bronze-Iron Age pottery assemblage in Tell Atchana/Alalakh”; Mustafa Kibaroglu et al. “On the Origin of Red Lustrous Wheel-made Ware (RL): Preliminary Results of Chemical, Sr and Nd Isotopic Analysis and Archaeological Interpretation”; and Mark Iserlis and Raphael Greenberg “Contact Between First Dynasty Egypt and Specific Sites in the Levant: New Evidence from Ceramic Analysis.”

Other ceramic papers are scattered throughout the other sessions: Jean-Jacques Herr “Pottery Technological Analysis for the Neo-Assyrian Period in the Peshdar Plain”; Reza Nafari and Aboozar Kazemi “Introducing and Classification of the Kaftari Period Pottery”; Takehiro Miki “Considering mobility of pottery and potters during the Chalcolithic period in Fars, Iran: a comparative analysis of ceramics from Tall-e Gap and Rahmatahad”; Georges Mouamar “Identification of a new material culture and circulation of potteries stemming from the production centres of the early regional states during the 3<sup>rd</sup> millennium in Central Syria”; Alireza Khosrowzadeh, Naser Nowruz, Zadeh Chegini and Samer Nazari “Description, Classification and Typology of the Excavated Parthian Pottery from Qal'eh-I Yazdigird, Kermanshah Province, Iran”; Kyra Kaercher “Chronology and Social Identity in the Middle and Late Islamic Periods in Northeastern Iraq via the Study of Unglazed Earthenwares”; Djangar Ilyasov “Two Little-known Groups of Glazed Pottery from Central Asia (9<sup>th</sup>-12<sup>th</sup> centuries)”; Richard McClary “Archaeology of the Object: A Detailed Study of the Production, Decoration and Distribution of *Mina'i* Wares”; Samar Shammass “The „Syrian“ Tell el-Yahudiyeh Ware”; Nurşen Özkul Findik and Deniz Yasin Meier “Islamic Period Ceramics found in the excavations at Adana/Tepebağ”; Elisabeth Katzy “The terracotta figurines at Tell Halaf in the Hellenistic

period: Between continuity and change”; Sergio Taranto “Husking tray: a shared technology between the Late Neolithic communities of the Near East?”; Valentina Oselini “On the move: is it the vessel or its idea? The Ceramic Horizon of Middle Bronze I-II in the Lower and Middle Diyala Basin”; Melania Zingarello “Ceramic Grave Goods from Late Third Millennium BC Mesopotamia: A Fresh Look at the So-Called ‘Four-Part Sets’”; and Anna Smogorzewska “Pots and people: Mesopotamia-Gulf interaction in the Ubaid period.”

### Book Reviews on Ceramics

*Insight from Innovation: New Light on Archaeological Ceramics: Papers Presented in Honour of Professor David Peacock's Contributions to Archaeological Ceramic Studies*. Emilie Sibbesson, Ben Jervis, and Sarah Coxon (eds.), Southampton Monographs in Archaeology, New Series 6. St. Andrews: The Highfield Press, 2016. xxxvi + 277 pp., 85 color and b/w illustrations, 13 tables, ISBN: 978-0-9926336-4-6, £65.00 / \$130.00 to \$76.90 (hardcopy); distributed by Oxbow Books. Emilie Sibbesson holds a BA in Archaeology from Newcastle University and her MA and Ph.D. from the University of Southampton. She is currently on the faculty at Canterbury Christ Church University, Archaeology Department, and has research interests in food remains and food technologies. Hence, she focuses on biomolecular archaeology, residue analysis, and clay technology. Ben Jervis earned a BA Hons Archaeology from University of Exeter, an MA in Ceramic and Lithic Analysis for Archaeologists at the University of Southampton, and completed his Ph.D. in archaeology at the University of Southampton. He worked in heritage management before taking up a lectureship in later medieval archaeology at Cardiff University, Cardiff School of History, Archaeology and Religion. Jervis is the author of *Pottery and Social Life in Medieval England: Towards a Relational Approach* (Oxford: Oxbow, 2014), co-editor with Lee G Broderick and Idoia Grau Sologestoa of *Objects, Environment and Everyday Life in Medieval Europe* (Turnhout: Brepols, 2016), and *Food and Drink in Archaeology 4* with Wendy Howard and Kirsten Bedigan (Totnes: Prospect Books, 2015). Sarah Coxon graduated with BA (Hons) in Archaeology, an MA with distinction in Ceramics and Lithics Analysis, and her doctorate in Archaeology all from the University of Southampton.

The festschrift includes a “List of illustrations” (pp. vii-x), “List of tables” (p xi), a list of the “Contributors” (pp. xii-xv), and three essays that precede 15 contributions by 34 contributors honoring Professor David Peacock’s many and lasting contributions to archaeological ceramic studies. Peacock (1939-2015) began his academic life as

a geologist holding a doctorate from the University of St. Andrews followed by a Research Fellowship in the Application of Science to Archaeology (University of Birmingham, 1965-1968). He became intrigued by archaeological ceramics and was a dedicated teacher at the University of Southampton for 47 years (1968- ff.) producing a “legion” of doctoral students – Ian Whitbread and Peter Day among them, including the volume’s editors. Building on Peacock’s legacy of inventive approaches, the volume contains contributions on exciting developments currently taking place within archaeological ceramic studies, including cutting-edge provenancing techniques, computer-aided visualizations, and contemporary craft and design perspectives. Pottery is approached not as an end to itself but as a vehicle for addressing a wide range of archaeological questions, and the papers thereby demonstrate that ceramic studies represent one of the frontiers in modern-day archaeology. Developing new techniques and finding new uses for old ones open up avenues for research which enrich our understanding of past societies through all periods. A color picture of David Peacock appears on p. iii shows him receiving the 2012 Archaeological Institute of America’s Pomerance Award for Scientific Contributions to Archaeology.

There is a “Foreword by Simon Keay” (pp. xvi-xix) providing contextual information for the volume which stems from Southampton Ceramics Research Group hosting a conference at the university in 2012 in honor of Professor Peacock’s contributions to archaeological ceramic studies. Peacock’s own and frequently collaborative research spanned thousands of years and the geographical scope was equally vast, stretching from Cornwall to Egypt and the Siberian Palaeolithic and medieval Iran and Syria. The contributions to this festschrift focus on the ethnography of pottery production and the application of scientific analyses to the study of archaeological ceramics. A second essay “David Peacock 1939-2015” by Michael Fulford (pp. xx-xxix, 41 references; 37 are to Peacock’s writings) reminds us of his significant publications: *Pottery and Early Commerce* (ed., London: Academic Press 1977), *Pottery in the Roman World: An Ethnoarchaeological Approach* (London: Longman, 1982), and *The Stone of Life: Querns, Mills and Flour Production in Europe up to c. AD 500* (Southampton: Highland Press, 2013). Lastly, the “Editors’ Introduction” (pp. xxx-xxxvi, 2 references). The chapters are organized into three parts: “Analyzing Materials,” Chs. 1-7, emphasizing thin section petrography; “Making and Experiencing Pottery,” Chs. 8-13, focusing on potters’ skills, creativity, and social implications; and “Reflecting upon Pottery” Chs. 14-15, concerning clay properties and contemporary practices in

Archaeological ceramic analysis. The volume concludes with a very basic of proper noun “Index” (pp. 270-276). Chapter 1. “Context is Everything: Early Pottery, Hunter-Gatherers and the Interpretation of Technological Choices in Eastern Siberia” by Peter M. Hommel, Peter M. Day, Peter Jordan, and Viktor M. Vetrov (pp. 1-18, illust. [5 in color], 54 references). The importance of hunter-gatherer pottery is stressed – it is older and more widespread than previously recognized. The authors detail the spatial and chronological distribution of Pleistocene pottery assemblages 18,000-10,500 BC and 11,000-1,000 BC, and focus on the Siberian Transbaikal Region, Us’t-Karenya culture, and Upper Paleolithic tools associated with ancient ceramics. Fabric grain analysis through microphotographs provided evidence of the homogeneity of inclusions. Societal tethered mobility is suggested and pottery was produced in late spring to early summer in upland environments. Chapter 2. “The Social Life of Clay: A Metaphysical Characterisation of Ceramics through Petrographic Analysis” by Imogen Wood (pp. 19-41, 4 illust. [2 in color], 58 references). The contribution builds on Peacock’s (1969, 1988) “marriage” of archaeometry and materiality and is a reassessment of gabbroic pottery from southwest England in use for 5,000 years and defined by Peacock (1967). The region has a highly complex geology. Clay rather than pottery was transported by the makers and identified using thin-section petrology (sample size: n = 100). She comments that “petrology is not generally considered to be a highly theoretical field of interpretation, and is more often categorized as entirely processual in nature ... Archaeological theory can be used to fill this void by drawing on a vast array of concepts, approaches, and philosophies disseminated to construct meaning” (p. 23). Clay sourcing is viewed as a part of taskscapes (socialized material landscapes) following Michelaki et al. (2012). Wood takes a more holistic approach and merges materiality with the socialized landscape. Using data on clay procurement strategies used in the Lizard Peninsula, she defines 14 fabrics and shows that the gabbroic clay proportion decreased from the Neolithic through Post-Conquest period (4<sup>th</sup>-11<sup>th</sup> centuries) as local clay use increased; she also identifies micro- and macro networks. The research is based upon her uncited dissertation. Chapter 3. “Revealing Complexity: The Sourcing of Early Neolithic Ceramics in South-West Britain” by Henrietta Quinnell and Roger Taylor (pp. 42-56, 1 color illust., gazetteer, 63 references). In 1969 Peacock published a seminal paper in *Antiquity* that shed new light on Neolithic pottery production in Cornwall. Quinnell and Taylor bring this work up to date and place it into a broader context, drawing upon a large body of research into the prehistoric pottery of southwest Britain (Cornwall and Devon). Thin-section petrology generates

better understanding of the complexities of the sourcing of raw materials in the Early Neolithic. They focus on the Early Neolithic (3900-3400 BC) in 43 sites and map all known pottery fabrics (fig. 3.1), six of which are primary.

Chapter 4. “Phytolith Analysis of Ceramic Thin-Sections: First Taphonomical Insights from Experiments with Vegetal Tempering” by Ákos Pető and Luc Vrydaghs” (pp. 57- 73, 5 illust., [4 in color], 1 table, 63 references). The chapter is available online: [https://www.researchgate.net/publication/298784096\\_Phytolith\\_Analysis\\_of\\_Ceramic\\_Thin-Sections\\_First\\_Taphonomical\\_Insights\\_from\\_Experiments\\_with\\_Vegetal\\_Tempering?ev=prf\\_high](https://www.researchgate.net/publication/298784096_Phytolith_Analysis_of_Ceramic_Thin-Sections_First_Taphonomical_Insights_from_Experiments_with_Vegetal_Tempering?ev=prf_high). The authors center on the additives to ceramic fabrics noting that phytoliths are resistant to a broad spectrum of environmental factors (deteriorating agents). The research informs us about plant selection in terms of availability and selection for use in tempering. Using thin-section petrography, they focus on developing a system for describing the phytoliths in these thin sections. This experimental work employs a study of bread wheat in the Hungarian Plain. Methodological considerations and the results of experiments are reported, including the importance of phytoliths within ceramic voids. Chapter 5. “Taking the Rough with the Smooth: Using Automated SEM-EDS to Integrate Coarse and Fine Ceramic Assemblages in the Bronze Age Aegean in the Bronze Age Aegean” by Jill Hilditch, Duncan Pirrie, Carl Knappett, Nicoletta Momigliano and Gavyn Rollinson (pp. 74-96, 11 color illust., 39 references). Peacock cautioned investigators about the dangers of “leaping into elemental analysis without proper grounding in microscopic analysis of local patterns and advocated the importance of moving coherently from macro- to micro- to elemental analysis” (p. 74). The authors focus on ceramic fabric analysis from the Bronze Age Aegean using automated SEM-EDS QEMSCAN and thin section studies of the same specimens of coarse ware and of fineware using OES, NAA, and XRF. Ceramics used in the analysis included Koan, Rhodian, and Cretan fabrics. The reasons for automation and methodology are also discussed. The potential ability to characterize local pottery traditions, clay mixing, tempering levigation, and vessel forming techniques are reviewed. Chapter 6. “Visualisation, Quantitative Mineralogy and Matrix-Inclusion Separation of Pottery using QEMSCAN: Examples of Medieval and Post-Medieval Pottery from Somerset” by Jens Andersen, Gavyn Rollinson and David Dawson (pp. 97-117, 8 illust. [6 in color], 39 references). The authors emphasize best practices for the identification and classification of pottery using mineralogical methods, noting that optical examination is

descriptive rather than quantitative. The need to understand fabric constituents and the interrelations of the clay matrix are reviewed. Background is provided on XRD and infrared spectroscopy and the bulk techniques of analysis (XRF, ICP-AES, and ICP-MS). A pilot project using 20 sherd samples (12 from excavations and 8 from production sites) is detailed. Instrumentation and methodology, thin sections and mineral maps are documented and the results (7 types) reported. They conclude that “QEMSCAN analysis will not replace the need for detailed field or optical analysis” (p. 112) and that it “complements rather than replaces other forms of analysis” (p. 114). Chapter 7. “Non-Destructive Analysis of Samian Ware from Scottish Military Sites” by Richard Jones and Louisa Campbell (pp. 118-136, 6 illust. [2 in color], 3 tables, 1 appendix, 34 references). In recent years XRF analysis has been increasingly accessible to researchers working on archaeological ceramics and other materials due to the affordability of portable XRF machines, which allow quick sampling of archaeological specimens in the field or in museum archives. In this research progress report pXRF analysis is employed the examination of the supply of Samian Ware to Roman military sites in Scotland; 140 sherds from six forts dated 2<sup>nd</sup> and 1<sup>st</sup> centuries AD. The methodology is reviewed and results from three determinations of each of 40 elements quantified; 14 were selected for scrutiny. Three distinct production zones were defined and Cr-Rb plots were significant in these determinations. The authors demonstrate that supplementing typological information on Samian Ware with XRF characterization has potential not only for understanding the supply of pottery to the Roman army but also for refining the chronological framework for the sampled sites. The technique has the added advantage that, unlike ceramic petrography or chemical techniques which require samples of the material, it is non-destructive.

The second group of papers, “Making and Experiencing Pottery,” Chs. 8-13, focus on potters’ skills, creativity, and social implications. Chapter 8. “Fired Fingers: Investigating Pottery Production through Finger Imprints” by Yvonne de Rue (pp. 137-151, 4 illust., 1 table, 21 references; typo: p. 150 Smithsonian *Institution* not Institute). Fingerprints on pottery as a proxy for human behavior and motor habits have long been discussed as having potential for understanding the identity of potters and the scale of pottery production, but there has been little progress in realizing this potential. De Rue attempts to address this omission through study of stoneware manufacture in late medieval Germany at the Aulgasse 38/44 site in production center of Siegburg. Such centers are viewed as communities of practice. A theoretical framework for potting techniques and transmission

involves choices, learning, etic and emic aspects of the learning process, and interpreting technological style. Initial results of this pilot study suggest that it is difficult to discern children from adolescents.

Chapter 9. “Same but Different: Revisiting Ceramic Variation” by Sarah Coxon (pp. 152-169, 9 illust., 1 table, 27 references). This study focuses on Middle-Late Bronze Age Belgiš cremation urns from sites in Serbia; 129 vessels from three sites were analyzed. Coxon explores design principles alongside her investigation of technological repertoires and problems of typological analysis. The principles, technologies, *chaîne opératoire*, vessel shapes, and decorations are reported. “Mental maps of decoration” (p. 130) lead to the recording of 13 motifs but varied configurations and articulation suggesting that the rules of craft were stretched and played with” (p. 167) by the potters. She critiqued conventional analyses of style and considering instead the socially embedded nature of pottery production, therefore presenting a radical and innovative account of creativity in pottery manufacture by identifying the unwritten rules which were reproduced in pottery production, but which left spaces open for creative endeavor on the part of potters. Innovative approaches such as this have great potential for allowing us to understand the humans behind pottery manufacture as creative agents with the capacity to innovate and adapt cultural knowledge. Chapter 10. “A Picture Says a Thousand Words? Decoration, Effect and Medieval Pottery” by Ben Jervis (pp. 170-185, 2 illust. [1 in color], 58 references). Decoration, was a key element of both Coxon’s and de Rue’s contributions, and is explored further by Jervis, who considers the effect of decoration on medieval pottery. The author adopts an approach grounded in non-representational theory which sees decoration as becoming meaningful as pots are drawn into interactions with other objects, people and spaces. He argues that in different contexts the same type of pottery, Saintonge Polychrome Ware (four colors with plant, bird, and shield motifs), produced in southwestern France in the 13<sup>th</sup> and 14<sup>th</sup> centuries when the region was an English possession, could be used in the emergence of different forms of identity, with different connotations and meanings emerging from the differing ways in which people experienced and interacted with these vessels. Byzantine and Islamic influences are possible because of Arab expansion from Iberia. The ceramic was exported to ports such as Southampton and Hull, and he details two medieval households.

Chapter 11. “Experiencing Lustre: Polynomial Texture Mapping of Medieval Pottery at the Fitzwilliam Museum” by Rebecca Bridgman and Graeme Earl (pp. 186-198, 10 illust. [5 in color], 1 table, 9 footnotes, 28

references). The authors focus on how pottery is displayed, perceived and experienced within modern museum environments. They explore how polynomial texture mapping (PTM) technology (which measures surface reflectivity) can be used to create visualizations of 9-19<sup>th</sup> century Islamic ceramic that allow particular qualities of 97 medieval Lustre wares from Syria and Iran (Raqqqa and Kashan) and 22 Minai vessels to be experienced without needing to be in the presence of the vessel. As a research tool, PTM technology can aid interpretation of how these vessels would have looked in different settings, for example depending on the intensity, position and color of lighting. Chapter 12. “Vessel Volumes and Visualisation: Innovative Computer Applications for Ceramicists” by Matt Brudenell, Vicki Herring and Donald Horne (pp. 199-220, 5 illust. [3 in color], 1 table, 32 references). The authors demonstrate how computer visualizations can be used to estimate the capacity of vessels even when they are present as sherds. This is a welcome methodological advance, as it has traditionally been difficult to calculate vessel capacities except in the rare instances where complete vessels are recovered. This novel approach to volumetric analysis is applied to ceramics dating to the 1<sup>st</sup> millennium BC from eastern England. The assessment involved 176 sherds from 56 sites dated to the Late Bronze and Early Iron ages (1100-800 and 800-300 BC) and follows Senior and Birnie’s procedures published in the journal *American Antiquity* 60(2):319-334 (1995) – the bibliographic citation errs in naming the journal *Society for American Archaeology*. Autodesk Maya 3-D graphic software creates JPEG images that are measured. The authors state that refinement is necessary but stereophotogrammetry “is the next best thing to physically handling the pottery” and using rim diameter formulae. Chapter 13. “Pots and Pies: Adventures into the Archaeology of Eating Habits in Byzantium” by Joanita Vroom (pp. 221-244, 8 illust. [1 in color], 3 tables, 9 footnotes, 68 references; typo: p. 242, Vroom (2002), *to* not *tom* Ottoman). Vroom is also the author of *Byzantine to Modern Pottery in the Aegean: An Introduction and Field Guide* (Utrecht, The Netherlands: Parnassus Press, 2005), reviewed in *SAS Bulletin* 35(1):10-11 (Winter 2012). Her dissertation and this chapter were inspired by Peacock’s (1982:6-11) general model in *Pottery in the Roman World*. The chapter focuses on ceramic shapes and behavioral inferences following Dean Arnold’s *Ceramic Theory and Cultural Process* (1985:23). Vroom examines the relationships between *what* was cooked and *how* it was cooked and eaten in the eastern Mediterranean. Case studies involve medieval era coarse cooking jars from Horum Höyüm a frontier site in southeastern Turkey between Byzantine and Islamic world. There is a continuity of meat exploitation focusing on sheep and

goat. Roman and Arabic written documents (“cookbooks”) specify spices and the preparation of stews including frying (related to hygienic concerns) and boiling. Vroom documents modifications in tablewares as related to changes in dining habits in her examination of 12 ceramic assemblages from datable closed deposits from the Early Byzantine through Late Byzantine /Frankish periods (7<sup>th</sup>-14<sup>th</sup> centuries). Vessel volumes, heights, and volumes were calculated and tableware replacement suggests changes from reclining to sitting when eating (verified through dining scenes seen in frescos and miniature paintings). Change in the quality of lead glazes and the appearance of glass and cutlery are also noted. She postulates a shift from roasting to stewing and trend toward watery dishes cooked in their own juices. Mitigating factors include sociocultural issues such as wealth and consumerism, differences between rural and urban consumers, and geographical distinctions (east versus west). Vroom concludes that a great deal of information resides in the relationship between pottery production and use, and that the interpretive potential of pottery in relation to wider economic and social questions is best realized by paying closer attention to this relationship.

The volume closes with two thought-provoking papers; one from a practicing ceramic artist and the other reflecting upon the role of ceramic studies in the various sectors of contemporary archaeological practice. Chapter 14. “The Resonance of Gabbroic Clay in Contemporary Ceramic Works” by Helen Marton (pp. 245-252, 4 color illust., 4 references). Marton’s work as a ceramic artist at Falmouth School of Art is influenced by personal and professional familiarity with Lizard Peninsula, Cornwall gabbroic clays and their material properties. She conducted and reports replication studies and test firings and emphasizes the sensory aspects of working with clay and takes a phenomenological approach to the ways in which gabbroic clay has shaped her own work. Influenced by Knappett (*Thinking through Material Culture*, 2005) she stresses the importance of paying attention to clay materialities in interpreting how past potting practices generated identities and meanings. Chapter 15. “Hold Your Beliefs Lightly’: Innovation and Best Practice in Prehistoric, Roman and Post-Roman Ceramic Studies in Britain” by Jane Evans, Duncan Brown and David Knight (pp. 253-269, 1 color illust., 1 table, 47 references. The chapter is also available online: [http://romanpotterystudy.org/new/wp-content/uploads/2016/06/Evans\\_et\\_al\\_2016\\_Insight\\_from\\_Innovation.pdf](http://romanpotterystudy.org/new/wp-content/uploads/2016/06/Evans_et_al_2016_Insight_from_Innovation.pdf). The “Insight and Innovation” conference provided the opportunity for presentations by authors who represent the three primary societies for archaeological ceramic studies in Britain: MPRG (Medieval Pottery

Research Group), SGRG (Study Group for Roman Pottery), and PCRG (Prehistoric Ceramics Research Group). The collaboration between them has continued after the 2012 conference – another lasting contribution to ceramic studies by David Peacock. The commentaries on contemporary practice in archaeological ceramic analysis reflected how archaeologists currently engage with the ceramic evidence and innovation in ceramic studies. They also discuss the challenges facing archaeologists working within a commercial environment where time and funds are often tightly constrained. Evans et al. argue that it is necessary to emphasize and articulate the value of ceramic studies to the archaeological process as a whole.

In academia, a festschrift (“celebration publication,” a term borrowed from German) is a book honoring a respected person, especially an academic, and presented during his or her lifetime. The content frequently derives from a festschrift conference organized by colleagues or students of the honoree and attended by the honoree. A comparable book presented posthumously is called a gedenkschrift (“memorial publication”). This volume is both and thankfully is a stellar tribute to the honoree and should include a biography, list of all or significant publications, paraphrasing of his/her most important works, personal reflections and anecdotes, and – most significantly -- contributions that illustrate, emend, expand, or otherwise employ aspects of the honoree’s scholarship. Some of these publications have content that is not relevant to the honoree, is outdated, obscure, mundane, or otherwise unsuitable. This is *definitely not* the case with *Insight from Innovation*. The papers are relevant, salient, and frequently build upon Peacock’s work. The contributions presented at the conference reflected the lasting impact of David Peacock’s own work, and the event brought together variety of ceramic scholars who rarely meet in today’s highly specialized and compartmented archaeology. *Insight from Innovation* has innovative techniques for expanding basic thin-section petrography, reanalysis and detailed studies of fabrics, provenancing ceramics, computerizing visualizations for calculating volume, the latest scientific analyses (XRD, XRF, SEM-EDS, ICP-MS, etc.), and the blending of archaeometry and materiality, agency, human behaviors and studies, and *chaîne opératoire*. Collectively these papers are diverse yet relevant, well-organized and edited, and demonstrate a passion for ceramic studies instilled by the contributors’ mentor and colleague David Peacock. The volume is certainly the best festschrift that your reviewer (who has contributed to festschriften and been honored by them) has had the pleasure of reading in quite some time. It is a valuable contribution to ceramic studies.

*Exploring the Neo-Assyrian Frontier with Western Iran: The 2015 Season at Gird-i Bazar and Qalat Dinka*. Karen Radner, F. Janoscha Kreppner, and Andrea Squitieri (eds.). Peshdar Plain Project Publications 1. Gladbeck, Germany: PeWe-Verlag, 2016. 128 pp., figures, tables. ISBN-13: 978-3935012201, ISBN-10: 3935012209, \$49.00 (hardcover), also in a German edition; online edition in English gratis <https://epub.ub.uni-muenchen.de/29236/>. The volume has six sections A-F) with 15 chapters. The monograph's "Bibliography" (pp. 120-128) has 171 entries. There is no index. This review focuses on the archaeological context and ceramics. A brief "Preface" by Karen Radner and F. Janoscha Kreppner (p. 9) provides salient background. The 2015 field season at Gird-i Bazar brought together an international team of experts from Austria, Canada, France, Germany, Italy, the Kurdish Autonomous Region of Iraq, Rumania, Syria, the UK and the USA, many of whom have contributed chapters to this volume. Stephan Kroll, Christian Piller and Michael Roaf shared their expertise on Western Iranian pottery and archaeology.

"A. Introducing the Peshdar Plain Project" by Karen Radner (one chapter, pp. 11-14, 5 figures) also available online at [https://www.academia.edu/27921035/Exploring the Neo-Assyrian Frontier with Western Iran The magnetometer survey of Qalat-i Dinka](https://www.academia.edu/27921035/Exploring_the_Neo-Assyrian_Frontier_with_Western_Iran_The_magnetometer_survey_of_Qalat-i_Dinka). The Peshdar (also Pishdar and Pizhder) district is part of the province of Sulaymaniyah in the Kurdish Autonomous Region of Iraq. In the east, it is situated directly on the border with Iran. In the west, it adjoins the administrative districts of Raniyah (also known as Raparin district; to the north of the Lesser Zab) and Dokan (to the south of the river), likewise parts of the province of Sulaymaniyah. In the north, the Peshdar district borders on the province of Erbil, specifically the districts of Rowanduz and Choman. The Peshdar Plain Project was inaugurated in 2015 with the goal of investigating the region in the Neo-Assyrian period. Work currently focuses on two sites in the small Bora Plain, a sub-unit of the Peshdar Plain: tiny Gird-i Bazar (36° 8' 18" N, 45° 8' 28" E; henceforth also Bazar), a shallow mound (altitude: 539 m) of only 0.5 ha and the more impressive Qalat-i Dinka (36° 8' 12" N, 45° 7' 57" E; altitude: 579 m; henceforth also Dinka), looming high over the Lesser Zab on the imposing terminal outcrop of a crescent-shaped mountain range along the northern river bank. The team consisted of: Mark Altaweel (University College London, UK): mapping and offsite archaeology; Andrei Așandulesei (Alexandru Ioan Cuza University of Iași, Romania): geophysics and mapping; Barzan Baiz Ismail

(Sulaymaniyah Directorate of Antiquities, Raparin district): government representative; Peter V. Bartl (Freie Universität Berlin, Germany): supervisor of the Western Trench; Jörg Fassbinder (Bayerisches Landesamt für Denkmalpflege, Munich, Germany): geophysics; Christoph Forster (Fa. Datalino, Berlin, Germany): data base creation and photogrammetry; Tina Greenfield (University of Manitoba, Winnipeg, Canada): bioarchaeology; Jean-Jacques Herr (École pratique des hautes études, Paris, France): head of pottery processing; Alice Hunt (University of Georgia, Athens, USA): material sciences; F. Janoscha Kreppner (Ludwig-Maximilians-Universität Munich & Freie Universität Berlin, Germany): field director; John MacGinnis (University of Cambridge, UK): supervisor of the Eastern Trench; Ibrahim Manla Issa: cook; Anke Marsh (University College London, UK): geoarchaeology; Karen Radner (LMU Munich, Germany): project director and epigrapher; Hero Salih Ahmed (Sulaymaniyah Directorate of Antiquities): pottery processing and deputy supervisor of the Eastern Trench; Aziz Sharif (Sulaymaniyah Directorate of Antiquities): driver; Andrea Squitieri (LMU Munich, Germany): mapping, data base management and documentation; Adam B. Stone (University of Cambridge, UK): supervisor of the Connecting Trench; Muhamad Kahraman Walika: pottery drawing; Eleanor Barbanes Wilkinson (University of Durham, UK): small finds and deputy supervisor of the Western Trench; and 12 workers, mostly from the village of Nuruddin. Lastly, the scope of the volume is detailed.

"B. Approaching the Peshdar Plain" (four chapters, pp. 17-42, 21 figures, 1 table). Radner begins with an analysis of the textual sources available for the Peshdar Plain in the Neo-Assyrian period, which indicates that as part of the Border March of the Palace Herald it was situated directly at the Assyrian Empire's frontier with Mannea and Ḫubuškia. The landscape and geoarchaeology of the Bora Plain are detailed by Altaweel and Marsh. Jessica Giraud presents an evaluation based on the most recent results of the MAFGS survey. Both studies strongly suggest that Gird-i Bazar and Qalat-i Dinka were part of one extended settlement that the team calls the "Dinka settlement complex." The environmental setting of the Bora Plain, artificial irrigation by qanat (*karez*), and regional geomorphological processes. Continuity in occupation from the Chalcolithic to the modern period are discussed, as are hydrological structures around the Dinka settlement complex, and connections with the settlement at Gawr Miran. The section concludes with a discussion of the Fassbinder and Așandulesei 2015 geophysical survey at Gird-i Bazar and Qalat-i Dinka. "C. Excavating Gird-i Bazar: the 2015 season" (five chapters, pp. 43-76, 19

figures, 1 table). The excavation methodology developed for Gird-i Bazar by Kreppner, Forster, and Squitieri is evaluated as are the digital documentation system and the collection registration system. Absolute chronology and <sup>14</sup>C dating (by Radner) and relative stratigraphy (by Kreppner and Squitieri) are reviewed briefly. The bulk of this section presents the results of the work conducted in the eastern part of the site (by MacGinnis and Kreppner), in the Connecting Trench (by Stone) and in the western part (by Bartl). Notably, Square 269929 has a kiln with 206 diagnostic sherds. The period of abandonment and degradation are also discussed.

“D. Samples and finds from Gird-i Bazar, 2015” (3 chapters, pp. 77-108, 19 figures). Tina Greenfield introduces the bioarchaeological sampling strategy and details the plant and animal remains, zooarchaeological samples, palaeobotanical specimens, and human remains, as well as discussing future research. Section D2. “The pottery from Gird-i Bazar, 2015: A preliminary study” by Jean-Jacques Herr (pp. 80-99) is the focus of this part of the monograph. The author begins with clear statement about the research questions, periodization and its terminology, the chronological classification of pottery as “Neo-Assyrian,” the archaeological phases of the Neo-Assyrian period (NA I, 10<sup>th</sup> -9<sup>th</sup> centuries BC; NA IIa, 8<sup>th</sup> century BC; NA IIb, 7<sup>th</sup> century BC; and NA III, 7<sup>th</sup> /6<sup>th</sup>-5<sup>th</sup> centuries BC), and the designation “Iron Age IV” in the Iranian Zagros region. Iron Age IV is chronologically delimited by the end of Level II at Godin Tepe c. 650 BC and the appearance of “Clinky Ware” or “Cinnamon Ware” in the Middle Parthian period (c. 150 BC to first century AD). At the site of Gird-i Bazar and in all the areas surveyed by the MAFGS, there is an absence of the “Grey Ware” typical of Iron Age II (1250-750 BC) in northwestern. Further notable absentees are the “Triangle Ware” and “Festoon Ware,” which are hallmarks of Iron Age III (750-600 BC) in Western Iran and Iron Age IV (600 BC to first century AD) in the north-western Zagros Region.

The ceramic corpus of the 2015 excavations at Gird-i Bazar was studied according to *chaîne opératoire*, fabric and typology. A total of 1700 “diagnostic” sherds were found in 145 collections registered across the entire site. Together with “non-diagnostic” sherds, a total of 125 kg of sherds were collected. To date, the material from 36 collections has been fully studied. The analysis of 666 diagnostic ceramic sherds from key contexts utilized parallels from the Assyrian heartland and western Iran. As of June 2016, 45 samples from the 2015 excavations of Gird-i Bazar have been exported for microscopic and chemical undertaken at UCL by Alexander Sammut under the supervision of Patrick Quinn. Technical aspects

(burnishing techniques, red slipping, and firing process), five Fabric Classes (Fabric class A: “Very Coarse Ware”; Fabric class B: “Coarse Ware”; Fabric class C: “Medium Coarse Ware”; Fabric class D: “Medium Fine Ware”; and Fabric class E: “Fine Ware” are characterized. Vessel shapes included Open Shapes (hemispherical bowls, hemispherical bowls with triangular rims, carinated bowls, and coarse plates [or lids?], and trays; Closed Shapes (jars, pots, and pots with handles); and Miscellanea. Preliminary conclusions and the chronological ranges of the ceramic assemblage are discussed. This section concludes with a discussion of selected small finds from the 2015 excavations by Wilkinson, Squitieri, and Zahra Hashemi (Université Paris 1). The artifacts include: a zoomorphic clay figurine, brick fragment, one iron arrowhead (“bodkin”), pounders and polishers, and stone pendant or weight.

“E. Conclusions and prospects” by Kreppner and Radner (pp. 109-111, 1 figure) presents a summary assessment of the work so far. The first season at Gird-i Bazar has proven the excavation and registration methods to be highly efficient while at the same time tailored to produce detailed, geo-referenced data, including bioarchaeological and geoarchaeological samples that make an entirely new contribution to understanding life on the eastern frontier of the Assyrian Empire. In the summer of 2016, the complete excavation of the kiln structure and of the partially uncovered single-room buildings will serve to further elucidate Gird-i Bazar’s layout and function. Lastly, “F. Appendix: Looking for Muşasir: The 2014 magnetometer survey at Mujeser” by Jörg Fassbinder (pp. 112-118, 6 figures) reports on Mujeser in the Soran district of the province of Erbil, the possible site of the capital of the kingdom of Muşasir. It is also available online at [https://www.academia.edu/27921035/Exploring the Neo-Assyrian Frontier with Western Iran The magnetometer survey of Qalat-i Dinka](https://www.academia.edu/27921035/Exploring_the_Neo-Assyrian_Frontier_with_Western_Iran_The_magnetometer_survey_of_Qalat-i_Dinka). This is a significant informative analysis of the results of the initial season of excavations and preliminary study of the ceramics with a goal of elucidating the Assyrian-Iranian frontier of region during the Neo-Assyrian period.

***Maya Potters' Indigenous Knowledge: Cognition, Engagement, and Practice.*** Dean E. Arnold, Boulder, CO: University Press of Colorado, 2017. 334 pp., 93 black and white figures, tables, endnotes, references, and index. ISBN: 978-1-60732-655-7, \$78.00 (cloth), \$63.00 (ebook). Based on fieldwork and reflection over a period of almost fifty years, *Maya Potters' Indigenous Knowledge* is a sequel to Dean E. Arnold’s classic assessment of pottery production *Ceramic Theory and*

*Cultural Process*, Cambridge: Cambridge University Press, 1985, and a prequel to his other two books on Ticul pottery-making and distribution: *The Evolution of Production Organization in a Maya Community*, Boulder: University Press of Colorado, 2015 (reviewed in *SAS Bulletin* 38(1):2-5, Spring 2015) and *Social Change and the Evolution of Ceramic Production and Distribution in a Maya Community* (Boulder: University Press of Colorado, 2008 (reviewed in *SAS Bulletin* 32(2):24-27, Summer 2009). The first book on Ticul potters (2008) characterized diachronic social change and subsequent modifications in demand, production, and distribution for the period 1965-1997, whereas the second volume (2015) focused on the potters and their families, and units of production 1965-2008. *Maya Potters' Indigenous Knowledge* moves from these topics to the social contexts for the indigenous technology of pottery production. His book *Ecology and Ceramic Production in an Andean Community* (New Studies in Archaeology, Cambridge: Cambridge University Press, 1993) is *not* a part of this quartet of books (I reviewed the Andean volume for *The Old Potter's Almanack*: Joint Newsletter of the Prehistoric Ceramics Research Group and the Ceramic Petrology Group, British Museum, London, 2(1):7-9, March 1994). *Ceramic Theory and Cultural Process*, Arnold notes, "was written to show that pottery was not totally plastic and that the pottery-making process itself also had agency in the cultural patterns necessary in its production" (*Maya Potters' Indigenous Knowledge*, p.25). His studies of the intersection of ethnology and archaeology in ethnoarchaeological research predates the use of the term "ceramic ethnoarchaeology," is grounded in ethnography, and focuses on the ecological contexts for pottery production.

In his new book, Arnold examines the indigenous knowledge of traditional Maya potters in Ticul, Yucatán, Mexico as it is embedded and expressed in Maya language and behavior, and he describes it in terms of materials engagement theory – it is the first book-length treatment using this theory in a pottery-making community (p. xvii, 215). In his thoughtful assessment, Arnold examines craftspeople's knowledge and skills, their engagement with their natural and social environments, the raw materials they use for their craft, and the process for making pottery. Following Lambros Malafouris and Tim Ingold, and to a lesser extent Colin Renfrew, Arnold argues that potters' indigenous knowledge is not just in their minds but extends to their interactions – "engagement" -- with the environment, raw materials, and the pottery-making process itself and is recursively affected by visual and tactile feedback. Pottery is not just an expression of a mental template but also involves the interaction of cognitive categories,

embodied muscular patterns, and the engagement of those categories and skills with the production process. Indigenous knowledge is a product of the interaction of mind and material, of mental categories and action, and of cognition and sensory engagement—the interaction of both human and material agency. While Arnold's previous work has been significant in ceramic ethnoarchaeology, *Maya Potters' Indigenous Knowledge* moves beyond to provide new evidence and opens up new concepts and approaches to understanding cultural processes. Engagement theory has become an important and widespread theoretical approach and "indigenous knowledge" (as cultural heritage) is the focus of much current research in anthropology, archaeology, and cultural resource management.

The front matter includes lists of "Figures" (pp. ix-xii) and "Tables" (pp. xiii-xv) and a "Preface" (pp. xvii-xxx, 4 endnotes), plus nine chapters of varying lengths. The book concludes with 361 "References" (pp. 231-256) listing 41 of Arnold's previous publications, and a conflated double-column "Index" (pp. 257-264) focusing on proper nouns and topics. In Chapter 1 "Introduction" (pp. 3-29, 7 endnotes, Arnold reviews pottery production paradigms and introduces engagement theory, following up with a cogent essay, "Why Engagement Theory? (pp. 9-14), and a review of the components of the theory. He next reviews the behavioral chain (*chaîne opératoire*), the semantic structure of knowledge, customary muscular patterns, feedback, and technological choices. This is followed by a short review of the structure of his book. Chapter 2 "How Was the Data Collected?" (pp. 30-49) presents a fascinating personal account of field research and data collection beginning with work conducted as a graduate student in 1964. The personal experiences as a participant observer, especially in the complex process of firing ceramics in a kiln, sensitized him and expanded his horizons. The late Louana M. Lackey – a professional potter and archaeologist -- has also commented that her fieldwork in Acatlán, Estado de Puebla, Mexico, befitted from working as a participant observer with the potters; see *The Pottery of Acatlán: A Changing Mexican Tradition* (Norman: University of Oklahoma Press, 1991). Arnold also recounts experiences in learning the Yucateck Maya language which enabled him to better interact with the craftspeople. There is a summary of his methodology and its history and a section reviewing the research data collection and the archiving of fieldnotes and photographs.

Chapter 3 "The Potters' Engagement with the Perceived Landscape" (pp. 50-78, 9 figures, 4 tables). In this chapter he examines the potters' perceptions of the landscape and the importance of scheduling activities

(seasonal, monthly, etc.). Here he seeks to understand the engagement of Maya potters with pottery-making by employing two complementary epistemologies: 1) indigenous traditional ecological knowledge, and 2) scientific categories that enable “outsiders and scientists” to understand the potters’ viewpoint more objectively. He focuses on several ecological parameters, notably ethnoecology and the geological context of the Yucatan, sources of raw materials, the forest (*k’a’ash*), and the ethnoecological Zones in the Northern Yucatán. In “Ethnogeology” he characterizes the Yucateck view of fuelwoods used for firing (Table 3.3, pp. 65-68) – a very valuable contribution – then examines specific geological and human-created phenomena: *ch’e’en* (a well or sinkhole), *chultun* (a cistern), *aktun* (a natural cave), *sah kab* (a marl mine), and *tantan lu’um* (a hole in the earth). Lastly, in “Ethnopedology,” he comments on the Maya view of “rocks” (Table 3.4, pp. 77-78), another valuable summary reminding us of Eskimoan linguistic variants for “snow.” Chapter 4 “The Potters’ Engagement with Raw Materials” (pp. 79-129, 13 figures, 9 tables, 19 endnotes). The potters’ engagement with mineralogy (ethnominalogy) identifies variants for “clay”: *k’at* (clay), *sak lu’um* (white earth), *sah kab* (white powder), *sah kab* for construction purposes (natural marl), the sources of “clays” and preparation of *sah kab* for use as pottery temper, including subclasses, temper variability, and native quality tests (salty taste and drying properties). Distinctions of temper versus construction *sah kab* date back to at least the Terminal Classic period (AD 800-1100). *Hi’* temper used in cooking pots has significant technological advantages known since antiquity (Puuc Unslipped Ware, AD 800-1100). Table 4.9 (p. 116) summarizes the categories of temper types. The results of ATR-FTIR and XRD studies are noted. In Chapter 5 “The Potters’ Engagement with Paste Preparation” (pp.121-128, 6 figures), Arnold focuses on how the potters view and engage with the problems of *changing properties* of the raw materials. Preparing the raw materials and paste preparation behavior as material engagement are the primary topics. Potters’ indigenous knowledge factors include: 1) repertoire of vessel shaped, 2) repertoire of vessel sizes, 3) customary muscular patterns, and 4) sensory feedback.

Chapter 6 “The Potters’ Engagement with Vessel Forming” (pp. 129-153, 8 figures, 9 tables, 3 endnotes). The ways in which potters *conceive* the creation of a pottery vessel and that ways in which they produce it, are covered in this chapter. Five forming techniques, four traditional vessel shapes of water transport jars in the 1960s, rim variations and their meaning, and individual variation in rim forms are characterized. More than a half-dozen other traditional shapes are detailed (also in

Arnold 2008120-121). Changes in vessel production since the 1960s are related to the installation of piped water into local households. Chapter 7 “The Potters’ Engagement with Drying and Firing” (pp. 157-197, 16 figures, 9 tables, 11 endnotes). Arnold considers the potters’ perceptions and indigenous knowledge in building traditional kilns and the stages and the substages of firing are documented. The genders of pottery-makers are related to subsistence scheduling (see Arnold 1985:99-108) but tend to be women for fabrication and men for firing. Women prefer to sell pottery unfired or ask a male relative to fire it. There are two types of firing technologies, firing for cooking pottery and firing non-cooking pottery. The construction of kilns in terms of materials and structure are detailed. There is especially valuable information on building beehive-shaped structures in terms of unique mortars and special kinds of rocks, as well as the facing direction of the kiln door due to wind direction, details on kiln parts. Another part of this chapter considers drying pottery prior to firing, slipping, final drying, fuel preparation, kiln loading, and actual firing. The importance of the warming stage (*chokokinta’al*) and final firing stage (*ts’ooksa’al*) are documented as are variations in the firing process and firing accidents.

Chapter 8 “Ticul Pottery as a “Distilled Landscape” / “Taskscape” (pp. 198-214, 1 figure, 3 tables, 12 endnotes). The author synthesizes some of the data derived from his research and discusses social and religious dimensions of the raw materials and their sources, including clay (*yo’ k’at*), temper for cooking pottery (*aktun hi’*) and non-cooking pottery (*yo’ sah kab*), red slip (*tantan lu’um*), water (*che’en*), and fuel for firing (*k’ash*). Ritual pottery (such as that used in the Day of the Dead rituals) is seen as symbols of a distilled landscape, while ancient ceramics from Ticul represent a “distilled community of practice.” Chapter 9 “Conclusion” (pp. 215-230, 6 endnotes). The conclusion ties together aspects of the previous discussions and Arnold persuasively argues for the importance of understanding the engagement of the potters in the “making process” if we are to correctly understand and interpret the past. He comments of indigenous knowledge, learning, ethnoarchaeology as Cultural Heritage, the implications of his methodology, and reviews what drives changes in indigenous knowledge.

Speaking as an archaeologist, your reviewer has read his published books (and reviewed most), read some of his manuscripts submitted to presses for publication (including the current one), and read many but certainly not all of his articles and book chapters; 70+ are available online: <https://fieldmuseum.academia.edu/DeanArnold>.

Arnold comments that this book is a “pilgrimage” in thinking about pottery production, and notes that his research on Maya Blue, which began as a graduate student for his Masters’ degree, is better informed and he better understood the relationship between palygorskite and Maya Blue from the viewpoint to the Ticul potters. (He is currently working on a book-length manuscript about Maya Blue from ethnographic, archaeological, and archaeometric perspectives.)

He seeks to understand the engagement of Maya potters and their pottery-making by using complementary epistemologies – I believe he succeeds. *Maya Potters’ Indigenous Knowledge: Cognition, Engagement, and Practice* are a capstone to the Ticul “series” volumes and validate his earlier synthesis (Arnold 1985). Ecology remains an important part of his research design and synthesis of diachronic data collected through five decades, but his disillusionment with cognitive anthropology is clear. The result of this volume is that Arnold has created a new way of thinking about artifact production and has built a solid bridging argument or middle-range research that relates objects and the people who made and used them in complex social and environmental relationships. There is much food for thought in this new book that archaeologists should consider in evaluating their own data and characterizing sociocultural information derived from artifact assemblages and archaeological contexts, especially in thinking about indigenous knowledge when examining diachronic changes. This is a cogent, thought-provoking book with compelling data and persuasive arguments, and belongs on any anthropologist’s bookshelf. It is an admirable companion to *Ceramic Theory and Cultural Process* (1985) and secures Arnold’s reputation as among a handful of theoreticians who have written about the interpretation of material culture – and places him at the pinnacle of those commenting on ceramic materials.

***How Things Make History: The Roman Empire and Its Terra Sigillata Pottery.*** Astrid Van Oyen. Amsterdam Archaeological Studies 23. Amsterdam: Amsterdam University Press, 2016. 173 pp., 30 figures, 6 tables, 772 footnotes, references. ISBN 9789462980549, eISBN 9789048529933, NUR 682. \$99.00 / €79,00 (hardcover). Van Oyen received her doctorate at the University of Cambridge in 2013 and in 2016 became an assistant professor in the Department of Classics at Cornell University, Ithaca, NY. She has worked on material sources as varied as terra sigillata pottery in France, grain silos in Spain, and Vesuvian houses in Italy, and has written about questions of postcolonial archaeology, material agency, typology, and morality. Van Oyen is the author of “Historicizing material agency: from relations

to relational constellation,” *Journal of Archaeological Method and Theory* 23:354-378 (2016); “Actor-Network Theory’s take on archaeological types: becoming, material agency, and historical explanation,” *Cambridge Archaeological Journal* 25:63-78 (2015); and “The Roman City as Articulated through Terra sigillata,” *Oxford Journal of Archaeology* 34(3):279-299 (2015). Van Oyen and Martin Pitts edited *Materialising Roman Histories: Beyond Instrumentalism and Representation*, a review of which follows this review.

Terra sigillata a ceramic known for a characteristic bright red surface and dating to the first three centuries CE, is found throughout the Western Roman provinces. Drawing on recent ideas in material culture (especially Actor-Network Theory), she asks a “radically new question”: what was it about the pots themselves that allowed them to travel so widely and be integrated so quickly into a range of contexts and practices? To answer this question, Van Oyen offers a novel analysis in which objects are no longer passive props, but rather they actively shape historical trajectories. She contends that while pottery was produced across a wide expanse of territory, it was not a “neutral template for how the world works.”... “These pots used to be understood as representing Roman identity, because you find them in many parts of the Roman Empire where you didn’t necessarily find them before.” The author asserts that “archaeologists would say, ‘You’ve got these shiny red pots, and this means that these people have become Roman or assumed Roman identity in some way,’ which is very simplistic.” Using the analogy to “Coca-Cola,” Van Oyen, who is Belgian, says that just because she buys the soft drink doesn’t mean she has become “Americanized.” And just because people across the Roman Empire bought the pottery as vessels for food doesn’t mean they had adapted to Roman culture. “These pots do not universally signify Roman identity,” she notes, “they can get interpreted locally in many different ways. But they had become a conceptual category because they were so standardized, omnipresent and recognizable. As a conceptual category, these pots spurred particular historical patterns, such as competition, or consumption that was not determined by class or setting.” (pp. ix, 1-7).

Van Oyen was a member of a team conducting archaeological excavations in Tuscany when a student unearthed stacks of the pots on the last day of the excavation. The discovery was completely unexpected because the team had been looking for artifacts for a project documenting Roman peasant life. The project originated at Cornell and moved to the University of Pennsylvania, under the direction of former Cornell

associate professor Kimberly Bowes. With this large trove of reclaimed pottery, Van Oyen decided to launch her own investigation at the Tuscan location into why the pots were produced on such an isolated rural site. She points out that “Usually it’s assumed that these pots were produced in Italy in cities, with access to a big export market, because they’re kind of an expensive pottery to make,” but since terra sigillata pottery uses a special firing technique that is more costly and consumes more fuel, the production required a higher investment. Another unusual aspect of the site is that the craftsmen there began experimenting with new techniques and forms, but only *decades later* started making the standardized terra sigillata vessels, which she contends would indicate that they were innovators.

The Marzuolo Archaeological Project is conducted in collaboration with Gijs Tol (University of Melbourne) and Rhodora Vennarucci (University of Arkansas). Her team, which includes Kathleen Garland, a graduate student in classics at Cornell, has begun the first phase of excavation at Marzuolo, Tuscany. “Our goal is to document this innovation process,” Van Oyen said, “and to understand it not just by looking at the production facilities, but at the community around it.”

The volume under review has a “Preface” (pp. ix-x) which provides important context, seven chapters, an appendix, 772 footnotes, 538 “References” (pp. 145-166), and a double-column “Index” (pp. 167-173). The clearly-written, detailed narrative is supplemented by 30 figures, six tables. Our reviewer was struck by the fact that there are relatively few color images of the ceramics among the 30 figures, especially given the cost of this volume. Nonetheless, the number of up-to-date citations on the ware is an invaluable resource by itself, let alone the experimentation, innovation and standardization – but only after a lengthy chronological interval. A summary of the chapters’ contents follows.

Chapter 1. “On avoiding retrospection” (pp. 1-10, 1 figure, 62 footnotes). Forms of material agency are discussed, focusing on Actor-Network Theory (ANT). traceable effects on any action, and flat ontologies, with the reminder that “things are not only story-tellers but history makers.” Van Oyen provides initial thoughts on terra sigillata found in the western Roman provinces during the Imperial period (1<sup>st</sup>-3<sup>rd</sup> centuries AD), quantitative analyses of the evidence, and remarks that the ware is a key performance marker for charting the growth and extent of the Roman economy. The goal of this volume is to seek to understand the historical process by which sigillata became a homogeneous and wide-spread category of Roman

material culture and determine its role as a “history-maker.” Chapter 2. “Bright red shiny pots: Is there more to terra sigillata?” (pp. 11-31, 134 footnotes). In seeking how this homogeneity emerged, she provides historical background on this ceramic as significant tableware characterized by sintered slips and “shininess.” Explanations of Samian and Arretine pottery, as well as Eastern Sigillata A (150 BC onwards) and D, Gaulish sigillata production, and kiln-firing to 1050-1100° C are provided. Current studies focused on a shift in clay types from calcareous to non-calcareous (determined by Maurice Picon 1973 ff.), and analyses grounded in technology are assessed, and a history of sigillata scholarship is reviewed: late 18<sup>th</sup>-19<sup>th</sup> centuries, focusing on aesthetic judgment; late 19<sup>th</sup>-early 20<sup>th</sup> century and correlations of traits; and sigillata as a dating tool and the identification of workshops in the 20<sup>th</sup> century. “Sigillata has not always been the same thing!” (p. 30), as current studies document that it has not a standardized homogeneous category.

Chapter 3. “Practice before type: Sigillata production at Lezoux (1<sup>st</sup>-2<sup>nd</sup> centuries AD)” (pp. 33-58, 9 figures, 153 footnotes). Van Oyen provides timelines for 11 sigillata variants, relating these to “prequel” black gloss South Gaulish pottery (Campana A, B., and C) dating to the Republican and later Iron Age in the western Mediterranean period, and pre-sigillata wares. Predating the Roman period, sigillata at Lezoux is characterized as a micaceous ceramic (mode A Sigillata) that did not begin as a homogeneous category; the author describes how it transformed into a homogeneous one. Pre-Roman ceramic production, workshops (AD 10-early 2<sup>nd</sup> century AD), range of forms produced, chemical characteristics, technological choices, and distributions – fluvial commerce -- are documented. For Lezoux sigillata, Van Oyen reviews differences in practice, technical transitions, experimentation with color and firing modes, repertoire standardization and competition, typologies, distribution and the creation and consequences of a “category.” Chapter 4. “Points of redefinition: Distribution, firing lists, and kiln loads (1st century AD)” (pp. 59-92, 9 figures, 179 footnotes). Trajectories of exchange and redefining economic narratives are considered, but the bulk of this chapter focuses on the state of research on firing lists at the production site of La Graufesenque in South Gaul, during the second half of the 1<sup>st</sup> century AD, notably production parameters, distribution, the “patchwork” of practices, sigillata as a commodity, changing parameters and the kiln load model, the organization of production, stamp distribution, and four studies: the commercial Port-la-Nautique (40 BC-AD 70) had 428 stamps from 90 different dies, and the names of 53 potters; the Cala Culip IV shipwreck (AD

69-79) had a stamp distribution similar to La Nautique; Colchester Shops 1 and 2 and their redating (AD 50-55), and the Pompeii crate (AD 79) with 90 unused, decorated sigillata bowls and 37 ceramic lamps from northern Italy. The economic narratives of these four studies are redefined. Chapter 5. “The Question of stability: Sigillata and ‘Rhenish’ wares between Lezoux and Trier (2<sup>nd</sup>- 3<sup>rd</sup> centuries AD)” (pp. 93-113, 8 figures, 137 footnotes). Sigillata and so-called Rhenish “black sigillata” (a misnomer in terms of origin) are discussed in terms of similarities production practices and two distinct differences: colors and vessel forms (liquid containers); the vessel typology of the Rhenish forms is documented. Initial similarities in stamping and barbotine trailing as a technique were replaced by significant divergences. Moving northward to East Gaul, the Trier production area is notable for more than 100 kilns and other structures. The author discusses how the transferring of sigillata production as a category from Central Gaul to Trier required great effort. After the 3<sup>rd</sup> century AD, Rhenish ware produced at Trier had painted mottoes in barbotine, replacing a dotted painting technique. Riverine and overland transportation in distribution of the products, the dissolving of this category of sigillata, and varying technological choices are also discussed.

Chapter 6. “Before meaning: Reproduction and consumption of terra sigillata and ‘Rhenish’ wares in Essex 2<sup>nd</sup>-3<sup>rd</sup> centuries AD)” (pp. 114-130, 2 figures, 2 tables, 95 footnotes). The focus of this chapter is on how sigillata’s definition as a category set additional possibilities for how production knowledge could be transferred, and how the vessels could be consumed. She considers the conditions for (re)production, commenting on reproducing this category and reproducing the skilled production process. Essex provides a valuable case study for the consumption of Rhenish ceramics and Central and Eastern Gaulish sigillata pottery. Assemblages from urban Colchester, less nucleated communities, rural villas, and rural lower status sites are reviewed and related to the three loci. Van Oyen argues that the archaeological pattern of terra sigillata was not due to the result of traders selling it or the people consuming it; terra sigillata made its own archaeological pattern, and sigillata definition as a category shaped the archaeological pattern. Chapter 7. “Things in history/things a history” (pp. 131-135, 1 figure, 11 footnotes). She summarizes that this book challenges linking material culture and large-scale historical narratives. Terra sigillata is defined as a homogeneous and bounded category on production practices (Lezoux, 2<sup>nd</sup> century AD). As a category it is defined by a number of traits: calcareous clays, oxidation firing, shiny slips, etc... Van Oyen notes that a thing’s trajectory is not the same as a thing’s biography, and she

differentiates trajectory versus retrospection. As an aspect of material agency the defining question is “how” not “why” or “who.” Sigillata was maintained as a homogeneous category (Chapter 2) and became a category in practice in terms of production, distribution, and consumption (Chapters 3-6). Typologies do not prove useful in her assessments but do play a role in pointing out incongruities. Hence, this book focuses on “how” and specific cultural and economic processes. The final section of the volume provided detailed data: Appendix I: “Stamp Assemblages” (pp. 137-143, 4 tables tabulating quantities of die entries). Table 1: La Nautique (89 entries), Table 2: Cala Culip IV (58 entries), Table 3: Colchester First Shop (22 entries), and Table 4: Colchester Second Shop (31 entries).

***Materialising Roman Histories: Beyond Instrumentalism and Representation.*** Astrid Van Oyen and Martin Pitts (eds.), University of Cambridge Museum of Classical Archaeology Monograph 3, Oxford and Philadelphia: Oxbow Books, 2017. xi + 242 pp., 40 color and black-and-white figures, 3 tables, bibliography. ISBN-10: 1785706764, ISBN-10: 1785706764 (paperback), £ 40.00; eBook (epub) ISBN: 9781785706776, £ 20.00; eBook (PDF) ISBN: ISBN: 9781785706790, £ 20.00. There is no index. Astrid Van Oyen is Assistant Professor in the Department of Classics at Cornell University. Specializing in theoretical and empirical approaches to material culture in Roman archaeology, she has worked on varied material sources such as sigillata pottery in France. She is author of *How Things Make History: The Roman Empire and its Terra Sigillata Pottery* (2016). Martin Pitts is Senior Lecturer in the Department of Classics and Ancient History at the University of Exeter. His research concerns quantitative approaches to material culture and consumption in Iron Age to Roman northwest Europe, and the application of globalization concepts to the Roman world. He is co-author, with Miguel John Versluys, of *Globalisation and the Roman World: World History, Connectivity and Material Culture* (2014) and with Dominic Perring, of *Alien Cities: Consumption and the Origins of Urbanism in Roman Britain* (2013).

This work contributes to theory-building in Roman archaeology and the potential for new approaches to materiality and practice following Van Oyen’s 2016 book. *Materialising Roman Histories* has an introductory essay and four parts with a total of 15 chapters, and a common “Bibliography” (pp. 217-242) with 613 reference for the contributions; unfortunately there is no index. The content for this book derives from the 2015 Laurence Seminar at the University of Cambridge and the 2013 TRAC [Theoretical Roman Archaeological

Conference] held at King's College, both of which were organized by the editors of this volume. Chapter 1. "Introduction" by Van Oyen and Pitts (pp. 1-19). The editors discuss the "discredited culture-historical paradigm" and focus on the need to rethink models of material culture in Roman archaeology. The contributions take a "representational approach" but with Kevin Greene's (2005) cautionary observations with a need to "disconnect individual artifacts and the bigger ideas they stand for." Hence, the papers follow Greg Woolf (1998) and Andrew Wallace-Hadrill (2008), among others." Material agency and its modalities are not the primary concern of this volume which the need to expand and diversify interpretations of material culture via artifact "biographies" and networks as well as trajectories, entanglements, and globalization. Therefore, the production, distribution, and consumption of terra sigillata are the focus but with the aim of 1) refining, and 2) exploring what these objects *did* in the Roman world. The contributions pose new questions and how archaeological tools and methods lead to historical insights from a representational approach.

**Part I: Representation Reconsidered** (Chapters 2-5). Chapter 2. "Writing power: The material culture of literacy as representation and practice" by Hella Eckardt (pp. 23-30, 2 figures). The author examined a collection of ca. 450 bronze inkwells focusing on size and volume; comparing these data with information generated from glass and sigillata inkwells, and, lastly, exploring relations between writing, literacy, and graves. In Chapter 3. "Soldiers in life and death: Material culture, the military, and mortality" by Rob Collins (pp. 31-45, 2 figures, 2 tables) the emphasis is on deceased officer and soldier burials and grave goods in order to discern military identities, migrant ethnicity versus local elite. The data is assembled from Late Roman burials/inhumations from the Lankhells site (783 graves but only 28 with military equipment). There was a paucity of ceramic vessels and sherds; contrasts are seen when comparing continental evidence. Chapter 4. "Gallo-Belgic wares: Objects in motion in the early Roman northwest" by Martin Pitts (pp. 46-64, 3 color and 3 monochrome figures). Gallo-Belgic [GB] wares have a broad repertoire ca. 25 BC-AD 65. The most common is the orange-red indigenous oxidized terra rubia similar to terra sigillata, as well as terra negra, a reduction-fired version, with multiple production loci near urban centers. These ceramics supplemented terra sigillata in many military communities. The author focuses on what did the GB wares do: ceramic diffusion (Hawkes and Hull 1947) or production via entrepreneurial immigrants (Niblett 1985). Pitts argues for GB as exemplifying non-state economic networks and "object-scapes." The

finewares from 20+ sites included tablewares (platters, butt beakers, cups, dishes, beakers, and bowls). "Rooted" styles and cultural innovation in a global context led to standardization on the production of the platters and cups. However, GB pottery was eclipsed by dishes and beakers made in northwest European fabrics. He examines these data in relation to previous interpretations of standardization and concludes that GB is *not* a unified category of ceramics. "Roman archaeology is poorly served by the arbitrary separation of the study of cultural and economic phenomena" (p. 64). These four contributions are reviewed in Chapter 5. "Discussion: Reflections on the representational use of artefact evidence" by Martin Millett (pp. 65-71). He critiques the presentations and points out those variations in the composition of the ceramic assemblages were not just a function of chronological differences but reflected other factors, i.e. "big issues."

**Part 2: Standardisation** (Chapters 6-9). Chapter 6. "Standard time: Typologies in Roman antiquity" by Alicia Jiménez (pp. 75-84). The contribution focuses on the synchronization of production *en masse* during Roman colonization/conquest calling for increased connectivity and problems of heterogeneity. She discusses how standardization is created, what ubiquity means in cultural terms, and style typologies: isochrestic style, iconological style, skeuomorphs, model attributes, the mass production of objects, and the evolution of ceramic types (1<sup>st</sup> century BC to beginning of the 1<sup>st</sup> century AD). The importance of molds and dies and synchronization led to the standardization of certain Roman objects fabricated outside of Rome. Chapter 7. "Different similarities or similar differences? Thoughts on *koine*, oligopoly and regionalism" by Jeroen Poblome, Senem Özden Gerçeker and Maartin Loopmans (pp. 85-100, 3 color and 3 monochrome figures). The chapter focuses on local and global and similar and different Roman artifacts as well as regional differences in assemblages when balanced against the integrative force of the Roman commonwealth. The mixing of cultural elements did not always work as exemplified in the authors' study of Late Roman D Ware and analyses of Late Roman C Ware and African Red Slip Ware. *Koine* (a common language) helps explain why a classification that did not exist could have been meaningful in antiquity. The results of SRSW (Saglassos Red Slip Ware) studies of 22 specimens by XRF and thin section microscopy are reported as are EDS and thin section analyses on Eastern Sigillata D. Production costs, oligopoly, regionalism, time, space, and meaning factor into the conclusions. Chapter 8. "Rethinking standardization through late antique Sagalassos ceramic production: Tradition, improvisation and fluidity" by

Elizabeth A. Murphy (pp. 101-122, 7 figures). Murphy reports on Roman slipped tablewares including ITS (Italian Terra Sigillata), GTS (Gaulish Terra Sigillata), ARS (African Red Slip Ware), and SRSW (Saglassos Red Slip Ware). She notes that there is a universe of alternative outcomes from clay pit to waste dump, but focuses on wheel or mold to kiln, particularly in SRSW), providing background on theoretical approaches: Lemonnier and Schiffer through Miller (2009), Hicks (2010), Thomas (2015), and Ingold (2010). Emphasis is placed on specialized production and the outcomes of the production process, craft tradition and learning, and the vertical transmission of knowledge. Part I of the chapter focuses on wheel-throwing improvisation and forms, formal divergences and failures, repairs and simple fixes, archaeological typologies, intra-form variability, and the fluid nature of standardization and innovation. Part II documents moulding relief-decorated wares (moulds made from local clays), stamping, individual properties of moulds, stamping temporality, figurine making, post-mould figurine reworking, and specialized visual reference in workshops. These contributions are reviewed in Chapter 9. “Discussion: Material standards” by Robin Osborne (pp. 123-129). Osborne discusses material standards, the standardization of forms and practices, and the limits of local standardization. He also notes that standardization was newly adopted in the 3<sup>rd</sup>-2<sup>nd</sup> century BC a period of political independence.

**Part 3: Matter** (Chapters 10-13). Chapter 10. “Finding the material in ‘material culture’: Form and matter in Roman concrete” by Astrid Van Oyen (pp. 133-152, 2 color and 2 monochrome figures). Van Oyen explores different models of material history using a case study of Roman concrete (*opus caementicium*) a composite material used during the Roman Imperial period, and considers alternatives to material and cultural models following Ingold (2000, 2010) and Barat (2003). Four types of concrete walls are discussed focusing on Central Italy and the diachronic changes that took place in concrete building and architecture, notably innovations in vaulted spaces and domes. She concludes that material histories are relational, performative, and emergent during this period. Chapter 11. “Design, function and everyday social practice: Artefacts and Roman social history” by Ellen Swift (pp. 153-166, 2 color and 4 monochrome figures, 7 endnotes). Swift focuses on design theory using case studies of Roman dice and finger rings with engraved motifs. The discussion of motifs on finger rings used to seal documents receives minimal attention. Affordance (perceived properties of an artifact) is related to the social experience of gaming, gambling, and divination and she examines dice as a luxury material made from amber and rock crystal for the elite and from

ceramic and stone for commoners. Chapter 12. “Object ontology and cultural taxonomies: Examining the agency of styles, material and objects in classification through Egyptian material culture in Pompeii and Rome” by Eva Mol (pp. 169-189, 6 color and 1 monochrome figures, 1 endnote). Mol considers the agency of objects in cultural and stylistic classifications (taxonomies) and the differences between modern and ancient categorization for the interpretation, use, and perception of objects in the Roman world. The analysis of Egyptian artifacts in Roman houses and “Egyptomania” are considered in the categorization of Egyptian objects and Roman classification schemes, notably sphinxes and wall painting. Historical implications are reviewed and these objects’ significant role in mental classification systems. Chapter 13. “Discussion: object-scapes: Towards a material constitution of Romanness” by Miguel John Versluys (pp. 191-199). Versluys comments on the fact that Roman history and archaeology have focused on the relationships between objects and people (human agency) moving beyond representation toward what the objects *did* – object agency and object-scapes.

**Part 4: Reflections** (Chapters 14-15). Chapter 14. “On theory-building in Roman archaeology: The potential for new approaches to materiality and practice” by Andrew Gardner (pp. 203-209). Gardner notes that theory in Roman archaeology has developed its own trajectory of theoretical innovation and has expanded further within its Roman studies. The annual TRAC (Theoretical Roman Archaeology Conferences) and this volume have demonstrated new ways of comprehending material transformations, and this book has provided new insights on artifacts shaping an alternative future for theory building. Chapter 15. “Roman things and Roman people: A cultural ecology of the Roman world” by Greg Woolf (pp. 211-216). Woolf comments on the relationships between the experiences of people and that of things over time. Representational relationships men moving beyond representation and instrumentality.

The contributions to this volume come from historians and archaeologists concerned with the assessment of material culture and the people who made and used these objects (ceramic ecology). Relationships between this volume and van Oyen’s *How Things Make History: The Roman Empire and Its Terra Sigillata Pottery* become clear. Certainly the Roman period witnessed massive changes in the human-material environment, including monumentalized cityscapes to the standardization of “low-value” objects such as pottery. The varied approaches exemplified in *Materialising Roman Histories* illustrate new perspectives in understand this Roman “object boom” and its impact on Roman history. The

contributors question the traditional dominance of “representation” in Roman archaeology, whereby objects have come to stand for social phenomena such as status, facets of group identity, or notions like Romanization and economic growth. The essays in this volume examine what it means to materialize Roman history, focusing on the question of what objects *do* in history, rather than what they represent. In challenging the dominance of representation, and exploring themes such as the impact of standardization and the role of material agency, this work is essential reading for scholars of material culture from the Roman world and well beyond. The material culture is examined using a variety of theoretical concepts in the representation and standardization of fabricated objects and how archaeologists employ classificatory/taxonomic systems (Part 2). Researchers who strive for culture historic interpretations of large quantities of ceramic materials and especially diachronic assessments should find a great deal of food-for-thought in this book.

***From Cooking Vessels to Cultural Practices in the Late Bronze Age Aegean***, edited by Julie Hruby and Debra Trusty, 2017, Oxford and Philadelphia: Oxbow Books, xvi + 173 pp. figures, tables, references, and index. ISBN 978-1-78570-632-5, £38.00 (paperback), eBook (epub) ISBN: 978-1-78570-633-2, £ 19.00 / \$55.00, and eBook (PDF) ISBN: 978-1-78570-635-6 - £ 19.00. The papers in this monograph derive from a symposium, chaired by the editors, at the Archaeological Institute of America Annual Meeting in 2014. Julie Hruby is assistant professor of Classics at Dartmouth College, where she teaches Greek archaeology. She has been working on plain-ware pottery from the pantries of the Palace of Nestor at Pylos since 2002 and has several other ongoing research projects, including the study of population attributes of human fingerprints on archaeological objects, replication of the technical processes of ceramic production, the reconstruction of Mycenaean feasting and culinary culture, and a longitudinal photographic survey of the decay of modern mud-brick vernacular architecture in the Peloponnese. Debra Trusty is a doctoral candidate at Florida State University. Her dissertation focuses on the ability of cooking vessels to identify specific characteristics of the Mycenaean political economy. Additional research interests include stylistic forms of ancient and modern Greek cooking vessels, ancient foodways and their significance in Mycenaean culture, scientific analyses of ceramics, and early state political economies.

Late Bronze Age Aegean cooking vessels illuminate prehistoric cultures, foodways, social interactions, and communication systems. While many scholars have

focused on the utility of painted fineware vessels for chronological purposes, the contributors to this volume maintain that cooking wares have the potential to answer not only chronological but also economic, political, and social questions when analyzed and contrasted with assemblages from different sites or chronological periods. The text is dedicated entirely to prehistoric cooking vessels, compiles evidence from a wide range of Greek sites and incorporates new methodologies and evidence. The contributors utilize a wide variety of analytical approaches and demonstrate the impact that cooking vessels can have on the archaeological interpretation of sites and their inhabitants. These sites include major Late Bronze Age citadels and smaller settlements throughout the Aegean and surrounding Mediterranean area, including Greece, the islands, Crete, Italy, and Cyprus. In particular, contributors highlight socio-economic connections by examining the production methods, fabrics and forms of cooking vessels. Recent improvements in excavation techniques, advances in archaeological sciences, and increasing attention to socioeconomic questions make this an opportune time to renew conversations about and explore new approaches to cooking vessels and what they can teach us.

The volume contains a “Preface” (p. vi); a list of the 17 “Contributors” (p. vii) with academic addresses but no emails; 12 chapters; a valuable set of 575 “References” (pp. 151-168), including three in Greek; and a double-column “Index” (pp. 169-173) – a rather basic and brief topical and proper noun compilation. Chapter 1. “Approaches to Bronze Age Greek cooking vessels” by Debra Trusty and Julie Hruby (pp. 1-5, 5 endnotes). The author discuss the definition and classification of cooking vessels, the importance of thermal shock resistance, ancient recycling practices, and the importance of excavating domestic contexts rather than palaces and tombs. Vessel form and function, constructing typologies, and the need for larger data sets are also documented.

Chapter 2. “Undervalued and overlooked: the study of Minoan and Mycenaean cooking vessels in the Bronze Age south and west Aegean” by Debra Trusty (pp. 6-14, 5 figures, 1 endnote). Trusty reviews previous studies by Schliemann (1880), Blegan (1921), Wace (1921), and Furumark’s (1941) landmark classification of Mycenaean ceramics. The 1950s to 1970s was a period lacking cooking ware studies but the 1980s and 1990s saw a restoration of such studies, and the 2000s witnessed extensive efforts by Bronze Age archaeologists to actively use cooking vessels as a primary source of information and the implementation of scientific approaches and analyses. By 2010 and beyond,

conferences and symposium publications exemplified by Spataro and Villing (2015) and Karageorghis and Kouka (2011) opened new studies and publications. See *Ceramics, Cuisine and Culture: The Archaeology and Science of Kitchen Pottery in the Ancient Mediterranean World* by Michela Spataro and Alexandra Villing (eds.), Oxford and Philadelphia: Oxbow Books, 2015, reviewed in the *SAS Bulletin* 39(3-4):8-12. (Fall-Winter 2016). Chapter 3. “Finding haute cuisine: Identifying shifts in food styles from cooling vessels” by Julie Hruby (pp. 15-26, 18 figures, 15 endnotes). Hruby focuses on how taste emerged as a social force, and documents cooking equipment: 1) griddles (three distinct shapes and evidence of use or not); the importance of perforations and indentations, replication studies, and actual use; and 2) “souvlaki trays” found in elite contexts (experimental use as grilling or broiling pans and the purpose of supports). These vessel types first appear during the Late Helladic III period.

Chapter 4. “Mycenaean cooking vessels from Iklaina” by Joann Gulizio and Cynthia W. Shelmerdine (pp. 27-38, 13 figures, 3 tables, 1 endnote). The authors review information on coarse ware cooking vessels (three types of supports, excavation data, and identification of eight fabrics) for Middle Helladic II-III through Late Helladic IIIA1-B2. Punch marks on upper and lower griddle cooking surfaces, the development of tripod supports and rim forms, and diachronic changes in vessels from earlier to later phases are detailed, and related to possible social factors: the transition from autonomy to palatial control. Chapter 5. “Mycenaean cooking pots: attempt at an interregional comparison” by Bartłomiej Lis (pp. 39-45, 5 figures, 1 table, 6 endnotes). Lis focuses on four major aspects of cooking pottery and diachronic changes: 1) forms of the most common vessels, 2) composition of the assemblages, 3) presence of specialized cooking equipment, and 4) methods of cooking. Three chronological periods are assessed using ceramic data from excavated sites (Mitrou and Menrilaia Tsoungiza): Early Mycenaean (LHI – LHIIIA1/2) a short-lived period with low production output and low level of specialization); Palatial period (LHIIIA2 – LHIIIB) with the appearance of kitchen beakers and shoulder-handled jars; and Post-Palatial period (LHIII) which saw societal change and assemblages dominated by rim-handled jars. Table 5.1 provides a summary of similarities and differences among the cooking wares. Increased human mobility is inferred for the early 12th century BC.

Chapter 6. “Aeginetan Late Bronze and early Iron Age cooking pottery” by Walter Gauss, Evangelia Kiriati, Michael Lindblom, Bartłomiej Lis, and Jerolyn E. Morrison (pp. 46-56, 3 color and 10 black-and-white

figures, 1 endnote). The authors have prepared a brief report on their interdisciplinary investigations and raise three questions: 1) is there a continuity in the use of raw materials from MH to LH and EIA period? 2) can fabric subgroups be delineated?; and 3) do subgroups reflect changes over time, across space in workshop traditions, or a combination of factors? They focus on Aeginetan cooking pots excavated at Kolonna, Tsoungiza, Kalaureia, Asine, and Mitrou. A diachronic analysis (macroscopic and petrographic) of 226 vessel fragments from the five sites and 84 new samples from Kolonna, as well as 140 specimens of Archaic and Classical date suggests four phases and vessel shape variants, with progressive vessel shape standardization in a context of increasing number of raw material resources. Chapter 7. “Aegean fusion cuisine: Ayia Irini, Kea as cultural ‘middle ground’” by Evi Gorogianni, Natalie Abell, and Jill Hilditch (pp. 57-71, 6 figures, 1 table, catalog, 7 endnotes). Connections between cultural or ethnic identity and foodstuffs have not been extensively explored. Exchange and interaction networks focusing on Aegean Bronze Age cooking pot shapes is examined for the periods spanning Final Neolithic through Early Helladic; Table 6.1 summarized finding from eight periods and 15 phases. The authors contend that tripod vessel cooking ware is quintessentially Minoan and discuss vessel shapes: tripod jugs, jars, circular trays, and flat-bottomed trays. Chronological relationships and continuities are discussed for Minoan and non-Minoan cooking vessel shapes, and they posit that vessels from different regions do not necessarily provide evidence of different culinary traditions, more likely multiculturalism. The catalog documents vessel shapes for 30 tripod jars and jugs, 36 baking trays, and 17 non-Minoan cooking jars.

Chapter 8. “Food and cultural identity on Kos during the Bronze Age: a typological, technological, and macroscopic fabric analysis of the storage and cooking pottery assemblage” by Salvatore Vitale and Jerolyn E. Morrison (pp. 72-97, 2 color and 10 black-and-white figures, 6 tables, catalog, 13 endnotes). The authors focus on the Late Bronze Age, the evidence and limitations, detail site locations, and 22 local Kosan pottery classes (EBA, MBA, and LBA plus subclasses) as well as entangled Minoan and Mycenaean classes. The catalog lists 52 analyzed vessels in terms of shapes, dates, forming techniques, and macroscopic studies of fabric subgroups. Table 8.4 provides data on fabric mixes and chronological interpretations relationships of the fabrics, shape and potting traditions, and manufacturing techniques (as a rule fully handmade) are documented. Storage vessels followed local traditions and there is cooking vessel continuity throughout the Bronze Age,

with a shift from Minoan traditions toward Mycenaean types and the reintroduction of tripod cooking pots. Chapter 9. “Late Minoan kitchens at Mochlos, Crete” by Jerolyn E. Morrison (pp. 98-115, 13 figures, 1 endnote). Morrison reports on domestic food preparation and foodstuffs (hunted and herded animals, wild and cultivated crops, and maritime coastal shallow water foods). Four forms of tripod cooking pots occur in LMI as well as cooking dishes and tray, a possible ceramic oven in the Artisan Quarter is also documented, and LMIB deposits had a variety of preparation and serving vessels. Cooking practices and resources are documented, and she states that Mochlos LMII-III inhabitants were essentially Minoan but were influenced by Mycenaean ways of cooking. Chapter 10. “Cooking vessels and cooking installations in the Mediterranean Bronze Age: a comparative evaluation of household practices in LM IIIC Crete and LBA Italy” by Elisabetta Borgna and Sara T. Levi (pp. 116-126, 2 color and 11 black-and-white figures, 4 endnotes). The authors examine the convergence of Aegean and Central Mediterranean (Italian) household cooking traditions. Special cooking vessels, the contexts of cooking equipment, and indoor cooking activities are documented. “No special shape was adopted exclusively for cooking” (p. 116), and there is a lack of substantive evidence for Aegean influence in Italy, but foreign behaviors in Aegean households was more substantial. Cooking pots in LMIIIC Crete (the Phaistos site among others) had two fabric groups (Group 1 reddish paste, and Group 2 with a variety of colors) used to fabricate globular tripod cooking jars, flat-bottomed cooking jars, and handled amphoras and/or jugs. Vessels, hearths and ovens (stone enclosure, sunken hearths, and pit ovens) in Crete, Greece, and Italy show substantial continuity with the past.

Chapter 11. “Cooking vessels from late Bronze Age Cyprus: local traditions, western and eastern innovations” by Reinhard Jung (pp. 127-145, 22 figures, 2 tables, 9 endnotes, “Results of Chemical Analysis” by H. Mommsen, pp. 143-145). Jung focuses on the Cypriot LBA because of a “remarkable change” in the production and use of cooking vessels at the transition from LCIIIC to LCIIA at the beginning of the 12th century BC. Mycenaean-type cooking pots replaced traditional Cypriot vessels; some regional variability is also noted. Cypriot tradition (LCI-IIC) vessels were handmade, had coarse fabric with numerous inclusions, formed into round-bottomed wide-mouthed deep vessels with one or two handles, and highly fired. Mycenaean pots (LCIIIA-LCB) were wheel-made and totally replaced kitchen wares and habits. NAA research by Mommsen on clay recipes used by potters of Mycenaean wares (Enkomi level IIIA) did not correspond to those used by potters of

handmade cooking pots during the preceding IIB level. This typological and technological discontinuity is related to new forming techniques that did not necessitate a change in recipes. Enkomi provides a “master chronology” and there was no continuity in paste preparation techniques; detailed fabric descriptions are provided. Chapter 12. “Mycenaean cooking pots: a North American perspective” by Michael L. Galaty (pp. 146-150). Galaty notes that in 1999 he “could find almost nothing published on Mycenaean cooking pots,” and that data from earlier studies cannot be trusted or must be used with great care. That situation is quickly changing and researchers need to define our research questions before and not after the fact. He uses data from Eastern North America as a comparative example and defines a set of methodological goals, and references four problems with using the Type-Variety System of pottery classification: 1) types, varieties, and wares are poorly defined; 2) regional typologies are not reproducible and applicable; 3) it is unclear what types, varieties, and wares represent; and 4) there is ignorance of ceramic-ecological contexts. Galaty sets an agenda with five goals and urges the use of ceramic ecological middle-range theory and methodology defined initially by Matson (1965) and refined by Dean Arnold, Charles Kolb, and others, which employs an awareness of the natural environment and the use of a variety of scientific methods to document provenance and chronologies.

The excellent assessment of cooking vessels and culinary practices is more focused than Spataro and Villing’s edited compendium *Ceramics, Cuisine and Culture: The Archaeology and Science of Kitchen Pottery in the Ancient Mediterranean World* (2015). The comparative analyses of Minoan and Mycenaean cooking wares is a valuable addition to research on cooking wares and Galaty’s thoughtful and thought-provoking discussion suggests further refinement of field and laboratory research and publication.

#### BIOARCHAEOLOGY

*Rebecca Gibson, Associate Editor*

Hello fellow archaeologists, and welcome to this edition of news from bioarchaeology. There will be four sections—reports from the recent Anthropology Matters themed American Anthropological Association annual meeting, and from the Society for Historical Archaeology annual meeting, upcoming conferences, upcoming field schools, and interesting recently published cases in bioarchaeological science.

### Previous Conferences

At the *American Anthropological Association* (AAA) annual meeting, many people demonstrated excellent innovations in and uses of archaeological science:

Kathryn Krasinski, an assistant professor at Adelphi University, co-authored a presentation with Alexander Bautista (Adelphi), William Vincent, III (Adelphi), Lauren Rojas (Adelphi), Charles Holmes (University of Alaska Fairbanks) and Barbara Crass, titled “Dene Moose Butchering at Swan Point, Tanana Valley, Alaska,” in which they examine various ways in which moose meat was defleshed, prepared, rendered, and consumed. They evaluate not only the observable physical remnants, such as a moose meat deflesher, but also the microscopic remnants, using chemical element analysis.

Oystein LaBianca, professor at Andrews University, discussed how archaeology must change in response to the growing influence of human beings on the planet, known as the Anthropocene period. Discussing the “great transformation” a time period when humans switched from human and horse power to coal and steam power, LaBianca emphasizes that the “great acceleration” must be accounted for when examining archaeological remains. Such changes leave signatures in artifacts—increase in coal related byproducts, as well as nuclear fallout are some things which we must keep in mind as archaeology progresses to include time-periods within the Anthropocene.

Sara Wingert, an undergraduate at Kutztown University of Pennsylvania, reported on her experimental archaeology on non-stone projectile points, in a paper titled “Missing the Point: Identifying Perishable Projectiles in the Archaeological Record from Bone Damage.” Wingert used various types of materials, from fire-hardened wood to stone, to see if the damage inflicted on bones differed in meaningful, replicable ways. She then used this new data to reexamine archaeological conclusions about projectile use in the American northwest.

Ashley Sharpe of the Smithsonian Tropical Research Institute, with co-authors Kitty Emery (Florida Museum of Natural History) and John Pfeiffer (University of Florida) took a look at the freshwater mussels of the Mayan archaeological site of Ceibal, Guatemala. DNA analysis allowed Sharpe, et al., to examine shifts in human usage of the mussels over time, and to compare modern use with uses determined by examination of the archaeological record.

In “Collective Social Identification as Multiple Relations at the Intersection of Mississippian and Oneota Worlds”

Andrew Upton, a doctoral candidate from Michigan State University, uses the technological language of nodal methodology to map nuanced identities onto ceramic assemblages. Usually used to describe social or biological interactions, nodal methods show “...how communities of agents negotiated multicultural regional cohabitation.”

Chelsi Slotten, a doctoral student at American University, presented “Excavating Modern Bias and the Archaeology of Disability.” Slotten challenges the long-held bioarchaeological conceptualization of disability as being burdensome, and the equating of impairment with disability as seen in the skeletal remains of individuals. Using case studies, she critiques the archaeology of disability studies and prods us to further examine the funerary context of such assumed disabilities for symbols of rank and status.

Ann Laffey, a graduate assistant at the University of Florida, uses archaeochemical data to analyze a certain type of grave good—the bowls placed over the heads of women of the Middle Horizon Andes period (600-1100 AD). Finding that the bowls most likely contained an alcoholic drink during their use life, and also finding the potential for psychoactive substances that were used to “promote a state of transcendence” during life, Laffey posits that the bowls were used as a way to continue speaking with the dead—or that the offerings were for the dead women themselves, to reinforce the connection with the community and family.

Presenting “The Excavated Woman: An Exploration of Intersectional Feminism in Bioarchaeology” Krista Calvo, a student at Hunter College, explores how to reinvigorate bioarchaeological research in regard to how women are seen in the record. Stating that women are still subordinated in the study of remains and artifacts, and reminding us that the practice of archaeology is both young, and heavily influenced by the last few centuries of gendered thought, Calvo calls for a reevaluation of both skeletal sexing and the idea of gender specific artifacts. This, in turn, would return agency to the excavator and excavated alike.

Co-authors Elizabeth Wakefield and Carlina de la Cova of the University of South Carolina discussed how to create an ethical use of 3D scanned human remains. This use of technology in bioarchaeology is still relatively new, and could create entire collections from remains which could then be repatriated/reburied. However, Wakefield and de la Cova are careful to mention that while it is vital to study remains, that study is ethically fraught regardless of whether one is using 3D replicas.

The important scientific contributions must be weighed against the rights of the dead and their descendant populations.

Similarly, the *Society for Historical Archaeology* highlighted several interesting studies in bioarchaeology: One session hosted an open discussion regarding the development of technology in archaeology, looking to the development of non-invasive techniques for exploration and preservation. This session sought to be proactive rather than reactive, in creating the necessary technology.

Authors Tilna M. Väre, et al., in their paper “Geophysical Survey of the Old Church Yard (c. 1640-1890s) in Tyrnävä, Northern Ostrobothnia, Finland” do a search for buried human remains and the forgotten footprint of the church via GPR and surface surveying, with the intention of re-scanning via 3D technology.

Finally, Terrance Martin from the Illinois State Museum and Michael J. Meyer from the Missouri Department of Transportation collaborated to perform zooarchaeological analyses on various 18<sup>th</sup> century sites containing “poteaus-en-terre” or earthen pit features, in downtown St. Louis.

### Upcoming Conferences

There are several interesting conferences upcoming in the field of bioarchaeology—the biggest of which is the AAPA annual meeting, this year being held in Austin, TX, during the dates of April 11-14. While the program has not yet been released, I can report that there will be a panel on structural violence as seen in the bioarchaeological record during the Industrial Era, and there will be a presentation on archaeological assemblages from the historical period in Northern Indiana. Information can be found here: <http://physanth.org/annual-meetings/annual-meeting-2018/>.

The AAPA hosts a number of sister-conferences around and during the main meeting, and those are the Human Biology Association (April 11-12); the Paleopathology Association (April 9-11); the Paleoanthropology Society (dates not given); the American Association of Anthropological Genetics (dates not given); and the Dental Anthropology Association (dates not given).

The Skeletal Biology in the Carolinas conference will be held at the University of North Carolina Charlotte on Saturday, February 10<sup>th</sup>, from 9am to 5pm. This is a very good conference for undergraduates or people presenting their first research, with a low-pressure, collegiate environment, and a relaxed, one-room/one-day

presentation schedule. The deadline for abstracts is February 1, and both posters and podium presentations are accepted. You can find more information about the SBIC conference here: <https://anthropology.uncc.edu/sbic-conference>.

Finally, there is a conference being held at the University of Birmingham, in England, titled “The Material Body, 1500-1900: A Conference of Archaeologists and Historians” on the 4<sup>th</sup> and 5<sup>th</sup> of July. This would be of interest to any bioarchaeologists who work during this time period, specifically if they include historical documentation in their work. Information can be found here: <https://www.birmingham.ac.uk/Documents/college-artslaw/history/2018/16468-Material-Body-Poster-AW2-LOW-RES.pdf>.

### Upcoming Field Schools

The Blackfriary Archaeology Field School is offering three different programs this summer, spanning the dates of June 18<sup>th</sup> through July 29<sup>th</sup>. Titled “Life and Death in the Friary” this field school will take place in the city of Trim, roughly 45km outside of Dublin, Ireland. Directed by faculty member Dr. Rachel Scott, students will learn basic archaeology skills, and detailed skills for the excavation, recording, and post-excavation processing of human remains. There is also a concurrent course on advanced techniques. This is a residential course, with students staying on location—there is a tuition/fee structure outlined by the field school. Information can be found on the field school’s website here: <http://bafs.ie/summer-2018/> and an application can be requested here: [info@bafs.ie](mailto:info@bafs.ie).

The NSF REU site is holding an eight week field school with the program dates of May 14-July 6. The title is “Immersive Research in the Bioarchaeology of Greek Colonization, Sicily, Italy. The program is being offered in conjunction by the University of Georgia, the University of Northern Colorado, and the Università de Salento, for undergraduate students. The field school requires the planning and implementation of individual independent research projects, and specifies that students will qualify for inclusion as “junior partners of the Bioarchaeology of the Mediterranean Colonies Project.” As this is a funded expedition, students receive stipends and meal allowances, and may be able to received lodging and travel funds. Information can be found here: <http://research.franklin.uga.edu/reu/> and applications are due by February 23<sup>rd</sup>.

The Koobi Fora field school in Kenya is accepting applications now. Hosted by George Washington

University, applications are open to students everywhere. The field school will take place between June 9<sup>th</sup> and July 22<sup>nd</sup>. This year's costs are not yet finalized, but all housing and food costs during the Kenya portion of the field school will be covered. There are academic qualifications for Koobi Fora, as well as required health insurance and various vaccinations and preventative medications which must be dealt with before leaving for Kenya. Certain fellowships are available for GW and AU students, and information about the field school can be found [here](https://cashp.columbian.gwu.edu/information-applicants): <https://cashp.columbian.gwu.edu/information-applicants> GW students should contact [drbraun76@gmail.com](mailto:drbraun76@gmail.com) to discuss potential fellowship awards.

### Recent Cases in Bioarchaeology

National Geographic has just published a forensic reconstruction of a woman from 7,000 BCE. Nicknamed Avgi, which translates to Dawn—for “the dawn of civilization”—this woman's reconstruction is significant for both the technology used, and the differences revealed. Avgi's skull was CT scanned, and then 3D printed, giving the reconstructionist a flawless base from which to work. The current theory, based on many reconstructions from the Stone Age and from modern forensic work, is that Avgi's uniquely rugged facial features could represent the intermediate stage of human facial feature traits, not as rugged as early humans, not quite as refined as those in the historical period.

A recently published study on humeral structure, by Song Xing, et al., titled “Morphology and Structure of *Homo erectus* Humeri from Zhoukoudian, Locality 1” suggests that *Homo erectus* humeri from Asia and Europe are more similar to each other than they are to humeri from African remains. Additionally, that they are more similar to Neanderthals and early modern humans as well. However, difficulties abound in such types of analysis, based on the scarcity of such remains in the record.

Reported in the New York Times, the genome of a six week old girl who died in 9500 BC has been sequenced, making hers the second oldest genome to ever be successfully extracted. Found in the Upward Sun River site, at the Tanana River Valley in Alaska, scientists have recovered mitochondrial DNA, which is passed in its entirety without much mutative change from mother to child. The same mtDNA is also found in current indigenous populations, cementing the link to modern descent groups.

Finally, the website and YouTube channel “BOAS Network” is a collaborative space for anthropologists to share and upload their work, most prominently their

videos. With the tagline “Anthropology made fun and entertaining for the mainstream” the network showcases the work of individual anthropologists as well as collaborations, and has produced a series of informational videos labeled “Biological Anthropology and the Public,” which focus on various public outreach and open source anthropological projects. One video highlights the work of Becca Peixotto, archaeologist in residence at American University, who is one of the Rising Star excavators and discoverers of *Homo naledi*.

### RESEARCH ANNOUNCEMENTS

#### Mini-Proposal Program: NSF-Subsidized Projects in the Archaeometry Lab at the University of Missouri Research Reactor, Columbia MO, USA.

*Twice Annual Proposal Submission Deadlines: April 15<sup>th</sup> and October 15<sup>th</sup>.* The Archaeometry Lab at University of Missouri Research Reactor maintains a continuous program of NSF-subsidized support for research in elemental and isotopic analyses. Our goal is to facilitate access to MURR Archaeometry facilities and research expertise. We offer analytical services and collaborations using neutron activation analysis (NAA), X-ray fluorescence (XRF), and inductively coupled plasma-mass spectrometry techniques (digestion ICP-MS, LA-ICP-MS, and MC-ICP-MS). MURR is one of few Archaeometry laboratories in the world providing in-house access to all of these techniques. We specialize in compositional analysis of archaeological ceramics by NAA, and analysis of obsidian, chert, and limestone by a combination of techniques. We also support geochemical and isotopic research on other lithic types and artifact classes, including sediments, metals, glass, pigments, and ceramic paints glazes.

Investigators interested in applying to the NSF-Subsidy program are required to submit a short application form, a descriptive mini proposal, and a brief curriculum vita for each principal investigator. The proposals must describe an anthropological research project for which chemical analysis is essential. Research questions must be well defined, as does sampling strategy. Proposals are reviewed by an advisory committee consisting of internal and external reviewers. All program participants are required to accept the conditions of the Archaeometry Laboratory's Data Management and Sharing Plan: [http://archaeometry.missouri.edu/data\\_management\\_policy.html](http://archaeometry.missouri.edu/data_management_policy.html). Please contact Jeffrey R. Ferguson (FergusonJe@missouri.edu), Brandi Lee MacDonald (MacDonaldB@missouri.edu), or Michael D. Glascock

(GlascokM@missouri.edu) prior to preparing a proposal submission. For detailed information on Mini-Proposal criteria and guidelines please visit: [http://archaeometry.missouri.edu/nsf\\_program.html](http://archaeometry.missouri.edu/nsf_program.html).

### **Graduate Student Internship Position Announcement**

The Archaeometry Laboratory at the University of Missouri Research Reactor Center (MURR) is seeking a Pre-Doctoral Graduate Student intern in the area of compositional studies of ceramics. The laboratory is a world leader in neutron activation analysis of archaeological materials, and the candidate is expected to assist the Archaeometry program with this research as well as pursue their own research interests. The intern will participate in lab activities including sample preparation and analysis, and statistical interpretation of data. The candidate will also have the opportunity to conduct analyses on their own archaeological materials under the supervision of lab mentors. The laboratory also supports LA-ICP-MS and XRF, and interns will have access to those and other analytical techniques for the duration of their residency. The typical appointment period ranges 4-8 months, and the candidate is expected to maintain residence in Columbia (MO) for the duration of the term. A monthly stipend of \$1,800 will be provided. The starting date is flexible but preferably Fall 2018. For further details on the program, please review the Application Form.

To apply please complete the Application Form, compile supplementary information, and send as a single .PDF file via email to Dr. Brandi Lee MacDonald ([MacDonaldB@missouri.edu](mailto:MacDonaldB@missouri.edu)), MURR Archaeometry, University of Missouri, Columbia.

Review of applications will begin **August 10th, 2018**, and will remain open until the position has been filled. Additional information about the laboratory is available at [Archaeometry.missouri.edu](http://Archaeometry.missouri.edu). The University of Missouri is an EEO/AA employer.

### **Establishment of dedicated Art Characterization research laboratory at STARC as part of the Cyprus Institute in Nicosia**

Advances in Science and Technology have revolutionized the documentation and study of art and archaeology. Issues of style, iconography, technique, provenance and materiality addressed through innovative digital and analytical methods, have transformed the history of art, the archaeological method, the preservation of cultural heritage and their relevance for contemporary societies. Responding to

these developments, the Cyprus Institute in Nicosia (Cyprus) established ten years ago STARC, the Research Center for Science and Technology in Archaeology and Culture. Faculty and staff at STARC study archaeology and cultural heritage using methods from the natural and engineering sciences in cross-disciplinary collaborations with scholars from the humanities and social sciences, leading to new insights into the past and better protection and dissemination of our cultural heritage.

STARC research is conducted in partnership and through joint activities with numerous national and international government agencies, university departments and research units. Its founding partner is C2RMF, the Centre for Research and Restoration of the Museums of France, and strong partnerships exist also with Princeton University, CNR in Italy, the University of Cambridge (UK), and many others. STARC is the Eastern Mediterranean hub in the European Research Infrastructure on Heritage Science (E-RIHS). While part of a national research institute, the research activities of STARC go well beyond Cyprus and focus on the Eastern Mediterranean and Middle East (the EMME region), in four main areas: Digital Cultural Heritage, Built Heritage and Cultural Landscapes, Bioarchaeology, and Archaeological Materials.

Building on STARLab, a successful EU-funded project creating a mobile platform for non-invasive science and technology applications in archaeology and cultural heritage, STARC recently established the **Andreas Pittas Art Characterization Laboratories (APAC Labs)**, to offer a holistic approach to art characterization. Specifically, the labs pursue:

- A) Research, to advance the effective use of heritage science and technology in the characterization of works of art, monuments and related archaeological materials.
- B) Innovation, to develop task-specific service protocols related to material characterization, provenance, condition assessment, and identification of works of art and cultural heritage artefacts.
- C) Training and Education, to offer training events, workshops and seminars to experts and students from both the humanities and the sciences, thus exposing them to interdisciplinary methodologies and approaches.

The APAC Labs comprise an interdisciplinary research pipeline that is based on a broad and multi-scale diagnostics approach, integrating inorganic/organic physico-chemical methods with reflectography, multi-spectral imaging, and surface 2D imaging/3D geometric

characterization. Acquired data are archived in repositories as part of **Dioptra: the Edmée Leventis Digital Library for Cypriot Culture** (<http://dioptra.cyi.ac.cy>) and managed in coordination with CyI's Cy-Tera High Performance Computing Facility.



Digital documentation, spectral imaging and analytical work on Byzantine icons, frescoes, mosaics and paintings by artists such as El Greco, Titian and Giovanni Baronzio have already offered exciting results on aspects of technique and materials used. In addition, they have provided new insights into the history and preservation of these works. Scientific visualization has allowed the virtual reconstruction of heritage-at-risk monuments, such as the church of Christ Antiphonitis, fragments of archaic terracotta statues from Salamis, now dispersed across numerous museums and collections across the world, or fading graffiti in the medieval churches of Cyprus and Venice. Moreover, the use of virtual immersive environments offers tremendous possibilities in the simulation of heritage contexts, such as the historic old city of Nicosia, or the prehistoric World Heritage Site of Choirokoitia.

As part of their research activities and development the APAC Labs will be offering fellowships for visiting scholars and students as well as training and workshops opportunities. For more details, updates and contact information please check the APAC Labs website: <http://apac.cyi.ac.cy/>.

The Cyprus Institute (CyI) is an internationally recognized research institution, created by the Cyprus Research and Educational Foundation (CREF) as part of its vision to help transform Cyprus into a knowledge-based economy, and to advance the welfare of the island and the region. It is carrying out pioneering research

involving cutting-edge technologies, in order to address problems of regional and international significance; much of its research is funded by competitive national and European (FP7 and H2020) grants. At the same time, it provides training for future researchers and scholars through its high quality Doctoral and Master's programs. CyI comprises of three specialized multidisciplinary research centers, developed in partnership with leading international institutions in their respective thematic areas.

**The Energy, Environment and Water Research Center (EEWRC)** partnered with the Massachusetts Institute of Technology (MIT).

**The Science and Technology in Archaeology and Culture Research Center (STARC)** partnered with the Centre de recherche et de restauration des musées de France (C2RMF).

**The Computation-based Science and Technology Research Center (CaSToRC)** partnered with the University of Illinois.

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