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FROM THE EDITOR

THOMAS R. FENN

Fall is here and winter is fast arriving, and I always think of changes accompanying the seasons this time of year. There also are some changes in the *SAS Bulletin* to report this issue. We bid farewell to our esteemed and greatly appreciated Associate Editor for Archaeological Chemistry, Ruth Ann Armitage. Her service, since 2010, has been an important part of the *SAS Bulletin*, as we all are aware of the connections between archaeological sciences and chemistry. Thank you, Ruth Ann, for your service, time and effort; we will miss you in this role. However, with the departure of Ruth Ann, there is a vacancy in the position of Associate Editor for Archaeological Chemistry, so 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.

While we say goodbye to one Associate Editor, we say hello to two new Associate Editors. First, please join me in welcoming our newest Associate Editor, and our newest subsection within the *SAS Bulletin*, Dr. Ophélie Lebrasseur as Associate Editor for Archaeogenetics. We also welcome another new staff member, Jesse W. Tune as Associate Editor for Geoarchaeology. We hope that our members will enjoy the exciting news and information from their current and future contributions in the *SAS Bulletin*. Welcome to you both! Finally, I also want to let our readers know that we are seeking to fill another position at the *SAS Bulletin*, that of Associate Editor for the Meetings Calendar. 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.

IN THIS ISSUE

OBITUARY

Martin Aitken FRS FSA FRAS FInstP
11 March 1922– 15 June 2017

Martin Jim Aitken was born on March 11 1922, son of Percy Aitken and Ethel Brittain, and educated at Stamford School, Lincolnshire. He went up to Wadham College, Oxford, to read Physics, but his studies were interrupted by the Second World War, in which he served as a Technical Radar Officer in Ceylon (Sri Lanka) and Burma (Myanmar). After completion of his Oxford doctorate at the Clarendon Lab he undertook research in nuclear physics using a small electron synchrotron.

In 1957 he joined the University's newly formed Research Laboratory for Archaeology and the History of Art (RLAHA) as its second Deputy Director, founded two years earlier by Teddy Hall with the support of archaeologist Christopher Hawkes and the physicist Lord Cherwell (the first Deputy Director was Dr Stuart Young). He began to apply magnetic methods to both the dating and location of archaeological kilns and hearths. In 1958, at the invitation of the archaeologist Graham Webster, he undertook the first archaeological proton

magnetometer survey, on the Roman city of Durobrivae, near Water Newton, Cambridgeshire, detecting a kiln amongst other features. His instrument was a version of the device that had been tested by the Army for the detection of plastic mines.

Also in 1958, the Oxford laboratory published the first volume of the journal *Archaeometry*, originally subtitled the '*Bulletin of the Research Laboratory for Archaeology and the History of Art, Oxford University*', but including international contributions from volume 3 onwards. He was an editor until 1989. His first book, *Physics and Archaeology*, was published in 1961. In 1962, Martin organized a day meeting for archaeologists who had purchased proton magnetometers, which became an annual meeting. The scope of the meetings broadened in 1969 to become the "*Symposium on Archaeometry and Archaeological Prospection*", held in Oxford until 1975. In 1976, with the meeting in Edinburgh, it became the *International Symposium on Archaeometry and Archaeological Prospection*", and in 1980 (Paris) the "*International Symposium on Archaeometry*", which continues to this day as a bi-annual international conference.

As well as proton magnetometers, he also developed the use of fluxgate magnetic gradiometers for the detection of buried remains, and was involved (with Derek Walton) in the development of the first SQUID cryogenic magnetometer (a device capable of measuring extremely subtle magnetic fields) to be used in Britain. From the 1960s he was involved in the development of thermoluminescence dating (TL), to date ceramic materials such as pottery, brick and tiles. He further developed the method by using blue/green light or infrared radiation instead of heat. This optically stimulated luminescence (OSL) dating has become one of the most powerful methods for the dating of sediments in both archaeological and environmental contexts.

He published a book on thermoluminescence dating in 1985, and an introduction to optical dating in 1998. His best-known book, *Science-based Dating in Archaeology* (1990), became the standard undergraduate text on the subject.

He became a Fellow of Linacre College, Oxford, in 1965 and Professor of Archaeometry in 1985. He continued his interests in archaeomagnetism and luminescence dating up until his retirement in 1989, publishing, in addition to his books, more than 150 scientific papers. He won the Gemant Award from the American Institute of Physics, and the Pomerance Award for Scientific Contributions to Archaeology of the Archaeological Institute of America. In recognition of his scientific achievements, he was elected a Fellow of the Royal Society in 1983- a tribute not only to his outstanding ability as a scientist who chose to work in archaeology, but also a recognition of the fact that science in archaeology had come of age. He has almost single-handedly promoted the view that archaeology is part of a wider scientific endeavour, perhaps best encapsulated in his contribution to the 1981 Smithsonian round table discussion on "*Future Directions in Archaeometry*", which he entitled "Archaeometry does not only serve archaeology". He married Joan Killick, with whom he had four daughters and a son. In retirement he and his wife moved to a house near Clermont Ferrand in France.

An account of his contribution to the subject was published in 1990, following his retirement from RLAHA in 1989 (Sayre, E.V., and Tite, M.S., 1990, On the retirement of Teddy Hall and Martin Aitken, *Archaeometry* **32**, 3–6). He was truly one of the 'founding fathers' of archaeometry.

A.M. Pollard
July 2017

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SAS STUDENT RESEARCH INTERNATIONAL TRAVEL AWARD WINNER

Household Identity and Domestic Activity Areas at Courtyard D-4, Chan Chich, Belize

By Gertrude Kilgore, Department of Sociology, Anthropology, and Social Work, Texas Tech University. July 2017.

Abstract

As the first explicit study of domesticity and everyday life at the ancient Maya site of Chan Chich, this project uses multi-elemental analysis of interior plaster surfaces alongside artifactual and architectural data to determine domestic activity areas. The aim of this project is to understand how the inhabitants of this Late Classic residential group physically and ideologically shaped and reconfigured their structural, courtyard, and extramural spaces. This research contributes some of the first information about the functional and sociocultural relationship between domestic spaces, activities, and individuals at Chan Chich.

In the summer of 2017, the author conducted fieldwork at a residential courtyard group in the ancient Maya site of Chan Chich in northwestern Belize as part of her master's thesis research. This project endeavors to understand the functional and sociocultural relationship between domestic spaces, activities, and individuals. By applying

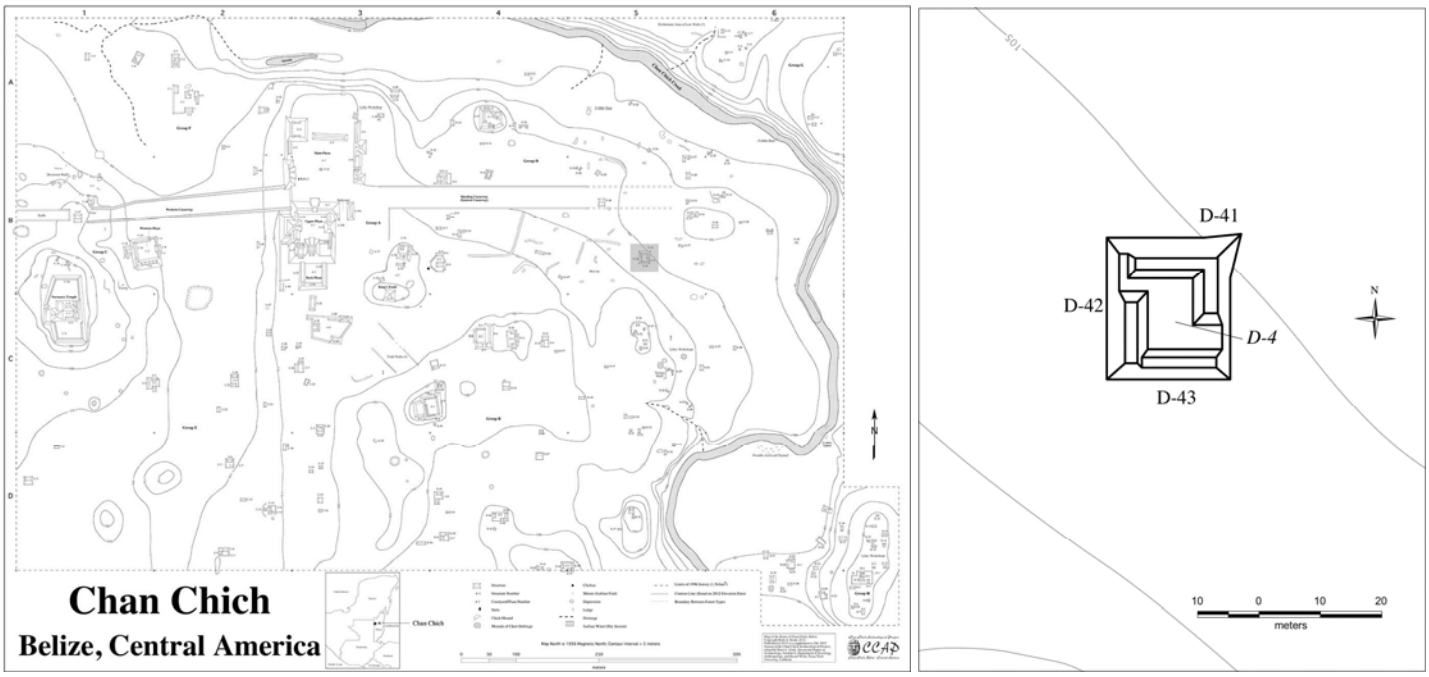

Figure 1: (left) Map of Chan Chich with Courtyard D-4 highlighted in gray square; (right) Plan map of Courtyard D-4.

archaeological and soil chemical data to a relational approach, one can develop a better understanding of the practical, social, and cultural relationships between people and their different domestic spaces. This provides greater insight into the quotidian activities and experiences of people associated with Courtyard D-4, hopefully urging further household studies around Chan Chich. Due to the time constraints of master's research, this project focused primarily on the functional and sociocultural relationships between domestic spaces, activities, and individuals associated with the final occupation. The research objectives firstly endeavor to establish the function of both the courtyard group generally and its activity areas specifically. Explorations of function considered architecturally defined spaces as well as courtyard and extramural spaces to understand the division (or lack thereof) of space for specific activities.

Households represent a foundational element of any society. The everyday activities that occur within domestic spaces construct and reinforce the social, economic, and political framework upon which societies are built. Repetition of quotidian activities forms social identity and memory within households in a quasi-ritualized manner (Hendon 2010). Relational identities, between people and their objects or spaces, within domestic activity areas demonstrate how the inhabitants consciously chose to portray their identity and memorialize it in objects (Hutson 2010; Mixter 2017). Spatial analysis of artifacts in context with the architectural features and spaces allow insight into the everyday activities and ways that residents conceptualized their role in the wider social environment.

Courtyard D-4 is located approximately 550 meters east of the Main Plaza at Chan Chich. It consists of three structures oriented slightly east of north on a raised platform and centered around a shared courtyard space (Figure 1). Ceramic and radiocarbon methods date the final occupation of this residential courtyard group to the Late Classic period (AD 600 – 800). Excavations conducted at Courtyard D-4 comprised of three main contexts: structures (Structures D-41, D-42, and D-43), the courtyard surface, and extramural shovel testing. We developed this tripartite research design to gather multiple lines of evidence and provide a more well-rounded interpretation of the quotidian activities in different areas within Courtyard D-4. A total of 24 suboperations and 48 posthole shovel tests were excavated during the two-month long field season this summer. We analyzed the use of structural, courtyard, and extramural spaces by using soil chemistry, artifactual, and architectural data recovered from these contexts.

Excavators uncovered complete interior plaster surfaces in both rooms of Structure D-42 and one room of Structure D-41. Because relatively few artifacts were recovered from these contexts, chemical analysis of plaster surfaces in architectural spaces allow archaeologists to delineate between different activity areas by studying the levels of phosphate in samples. Phosphate is a vital element anthropogenic and botanical biochemical processes, and appears in greater

concentrations as a result of repetitive human alteration of their environment. When combined with analysis of the distribution of architectural, artifactual, and osteological remains, studying spatial patterning of phosphate concentrations can reveal areas used for storage, refuse, sleeping, eating, cooking, and ritual activities (Terry et al. 2000). Excavators systematically collected point samples of the plaster surfaces inside two rooms in Structure D-42 and one in Structure D-41 according to a 0.5-meter staggered lattice following to the guidelines outlined by Wells (2010). However, multielemental analysis of data sampled from plaster surfaces inside three rooms on two of the structures is still being processed.

Although architecturally defined spaces are important, recent developments in ancient Maya household archaeology emphasize the importance of exterior spaces to domestic activities (Hutson et al. 2007; Robin 2013). Subsurface survey of the extramural areas in a staggered lattice arrangement yielded very few artifacts and failed to identify middens beyond the platform of Courtyard D-4. However, investigations of the courtyard surfaces uncovered three dense artifact deposits in the northwestern, southwestern, and southeastern corners of the courtyard platform, reinforcing the importance of exterior activity areas.

Overall, the architectural and artifactual evidence recovered from Courtyard D-4 do not definitively indicate any strict demarcation of interior activity areas. However, the higher densities of artifacts on the courtyard surfaces reinforce the importance of exterior space for domestic activities. Additionally, the variety of artifacts indicate a mix of quotidian activities, such as weaving and grinding maize, and ceremonies of ritual and symbolic significance. This inextricable relationship between the mundane and the supernatural lay at the heart of everyday life for the ancient Maya (Hendon 2010; Hutson 2010). Further examination of the architectural and artifactual data alongside multielemental analysis from the plaster samples will provide more evidence for interior domestic activities.

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ARCHAEOGENETICS

Ophélie Lebrasseur, Associate Editor

Hello Readers! I am delighted to be joining the SAS Bulletin team as Associate Editor of Archaeogenetics. As a zooarchaeologist specializing in ancient and modern DNA, my main research interest lies in the global dispersals of animals through time, and the impact human-animal relationships have had on animal genetic diversity and the environment. I am particularly interested in the last 500 years where the advent of transoceanic travel made the rapid translocation of animals across long

distances possible. My other passion lies in South American native and introduced fauna.

I am based at the Palaeogenomics & Bioarchaeological Research Network (PalaeoBARN) led by Prof. Greger Larson at the University of Oxford, UK. In addition to wrapping up the AHRC-funded '*Chicken Project'* and the GCRF-funded '*Going Places'* project (the latter focusing on women and chickens in Ethiopia), I am currently working as a postdoctoral research assistant on the ERC-funded '*UNDEAD'* project (Unifying Domestication and Evolution through Ancient DNA). If you are interested in knowing more on these projects, the links are below.

I look forward to bringing you some of the highlights of palaeogenetic research, conference reviews and interviews with leading researchers in the field. Please do not hesitate to get in touch if you have any ideas, comments, suggestions, questions or contributions you'd like to make. You can find me at ophelie.lebrasseur@arch.ox.ac.uk or on Twitter @ArchaeOphelie.

Ophélie Lebrasseur

Projects:
Cultural & Scientific Perceptions of Human-Chicken Interactions (The Chicken Project)
Link: http://www.scicultchickens.org

Going Places: Empowering Women, Enhancing Heritage and Increasing Chicken Production in Ethiopia
Link:
http://gtr.rcuk.ac.uk/projects?ref=AH%2FP009018%2F1

Unifying Domestication and Evolutionary Biology through Ancient DNA (UNDEAD)
Link: http://www.palaeobarn.com/unifying-domestication-and-evolutionary-biology-through-ancient-dna-undead

ARCHAEOLOGICAL CERAMICS
Charles C. Kolb, Associate Editor

This issue contains three topics: 1) Forthcoming Professional Meetings; 2) Call for Papers; and 3) Book Reviews on Ceramics.

Forthcoming Professional Meetings

The ***American Anthropological Association*** (***AAA***) 2017 Annual Meeting is scheduled for November 29 to December 3, 2017, in Washington, DC, USA. Among the 750+ sessions is "Ceramic Ecology XXXI: Ceramic Ecology Matters!" -- 2:00-3:45 pm on Saturday, 2 December. The co-organizers are Sandra L. Lopez Varela (Universidad Nacional Autónoma de México) and Kostalena Michelaki (Arizona State University); Chair: Sandra L. Lopez Varela. There are six papers plus a discussant: Joanne M. Mack (Emerita Professor, University of Notre Dame) "A New Typology for Siskiyou Utility Ware"; Debra S. Walker (University of Florida) "Ceramic Spheres at the Crossroads: Trading Goods and Ceramic Ideas at Yaxnohcah, Campeche, Mexico"; Anabel Ford (University of California Santa Barbara) and Sheman Horn III (HD Analyticals) "Chronology and Assemblage: Late Classic Period Maya Household Variation in the El Pilar Area"; Jacob Griffith-Rosenberger (Kenyon College) "Reconstructing meaning by replicating function: New research on ancient Mesoamerican *candeleros*"; Amy J. Hirshman (West Virginia University) "Potters' Resources in the Tarascan State: Clay and Temper"; and Sunday Eiselt (Southern Methodist University) Micaceous Pottery and Social Justice: Why Ceramics Matter in Indigenous Land and Water Rights Cases." Chandra L. Reedy (University of Delaware) is the Discussant. Anyone wishing a copy of the *CE31 Abstracts* should send an email to CCKolb.13@gmail.com . The preliminary program lists only one other ceramic-oriented oral presentation: Ann Laffey (University of Florida) "Why do they have bowls over their heads?: Contextualizing archaeochemical data to better understand a distinct Middle Horizon Andean burial practice." Abstracts will be posted on the AAA website
http://www.americananthro.org/AttendEvents/landing.aspx?ItemNumber=14722&navItemNumber=566 .

The ***American School of Oriental Research*** (***ASOR***) 2017 Annual Meeting will be held in Boston, Massachusetts, USA, November 15-18, 2017. The final program is not yet available http://www.asor.org/am/list-of-approved-sessions-2017/. In addition, the ***Archaeological Institute of America*** (***AIA***) is also scheduled for Boston, Massachusetts, USA, January 4-7, 2018; no program is presently available. The ***Society for Historical Archaeology*** (***SHA***) will meet in New Orleans, Louisiana, USA, January 3-7, 2018 https://sha.org/conferences/future-conferences/. The SHA has partnered with Digital Antiquity to preserve meeting abstracts and make the presentations and data used to support them available in tDAR (*The Digital Archaeological Record*), an international digital repository, https://www.tdar.org/about/. Presenting members can access their own record in tDAR, edit the metadata, and upload a PDF copy of their papers, presentations, posters, or other supplementary data (up to

3 files/30MB). At present, abstracts from meeting years 2013 through 2017 are available.

The ***Society for American Archaeology*** (***SAA***) Annual Meeting will be held in Washington, DC, USA, April 11-15, 2018. The final program and abstracts will be available online in February. Lastly, the *42nd* ***International Symposium on Archaeometry*** (***ISA***) will convene in Merida, Yucatan, Mexico, May 20-26, 2018; for information, contact: Jose Luis Ruvalcaba joseluis.ruvalcaba@gmail.com and consult the conference website http://isa2018.mx/. Proceedings of ISA 2018 will be published by *Science and Technology of Archaeological Research* (STAR), an open access journal. The equivalent of 20 euros fee (25 USD) for the publication has been included in the registration fee.

Call for Papers

The Izmir Center of the Archaeology of Western Anatolia (EKVAM) is organizing a symposium entitled "Unguentarium. A terracotta vessel form in the Hellenistic, Roman and early Byzantine Mediterranean" that will take place May 17-18, 2018 at the Dokuz Eylul University (DEU) in Izmir, Turkey. An unguentarium is a small ceramic or glass bottle, found in relatively large quantities in the entire Mediterranean, from Spain to Syria, from Egypt to France, where they were produced from the early Hellenistic (i.e. mid-fourth century BC) to the early Medieval periods (i.e. mid-sixth century AD). The focus of the symposium is to attempt to set out a comprehensive model for the study of terracotta unguentaria, including their definition, typology, chronology, contexts, function, regional characteristics, and distribution patterns in the whole Mediterranean geographies, including whole eastern Mediterranean, Roman provinces in the western Mediterranean, north of Alps (Germania, Britannia etc.) and north Africa. We invite contributions by scholars and graduate students from a variety of disciplines of ancient studies related to this vessel form. The symposium is free of charge. A post-symposium excursion is planned on May 19-21, 2018, to Lesbos, Greece through Ayvalik. For further information, please contact the organizers before January 1, 2018, at gulserenkan@hotmail.com or terracottas@deu.edu.tr.

Book Reviews on Ceramics

The Emergence of Pottery in West Asia. Akiri Tsuneki, Olivier Nieuwenhuyse, and Stuart Campbell (eds.). Oxford and Philadelphia: Oxbow Books, 2017. vi +192 pp., 135 b/w and color illustrations. ISBN: 9781785705267 (hardcopy), $110.00; ISBN: 9781785705274 eBook (epub), from $55.00; ISBN: 9781785705755 eBook (PDF). This monograph is based on an international symposium "The Emergence of Pottery in West Asia: The Search for the Origin of Pyrotechnology" held in Tsukuba, Japan 20-30 October 2009. The editors' note that they have used the designation '*West Asia*' instead of the Eurocentric term 'Near East' to describe the regions partly because of the location of the symposium and because of the "academic stance" of the senior editor (A.T.) (p. vi). Akira Tsuneki is Professor of Near Eastern Archaeology in the Faculty of Humanities and Social Sciences, University of Tsukuba, Japan. He has long been engaged in archaeological excavations in Syria, Iran and Iraq. His recent publications include co-editorship of two monographs: *A History of Syria in One Hundred Sites* (Oxford: Archaeopress Archaeology, 2016) with Youssef Kanjou, and *Ancient West Asian Civilization* (Singapore: Springer, 2016) with Shigeo Yamada and Ken-ichiro Hisada. Olivier Nieuwenhuyse is a Dutch archaeologist affiliated with Leiden University, which has a long tradition of archaeological prehistoric research in the ancient Near East. He has conducted fieldwork in Lebanon, Turkey and Syria, and is currently active in northern Iraq (Iraqi Kurdistan). The prehistoric ceramic traditions of the Middle East have his special attention. He has published extensively, including several monographs: *Plain and Painted Pottery: The Rise of Late Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plains* (Turnhout: Brepols, 2007; reviewed in *SAS Bulletin* 35(1):3-5 (2012), and *Interpreting the Late Neolithic of Upper Mesopotamia* (Turnhout: Brepols, 2013). Nieuwenhuyse is also co-editor of five other volumes. In addition, he is active in international efforts to safeguard endangered archaeological heritage in Syria and Iraq. Stuart Campbell is Professor of Near Eastern Archaeology at the University of Manchester. He has excavated extensively in Iraq, Syria and Turkey with a particular interest in both the chronology and social context of the earliest ceramics of northern Mesopotamia. Campbell is the author of more than 60 refereed articles in professional journals, many in *Journal of Archaeological Science Reports* and *American Journal of Archaeology*.

Over the past five decades early pottery complexes in the wider region of West Asia have hardly ever been investigated in their own right. Early ceramics have often been unexpected by-products of projects focusing upon much earlier aceramic or later prehistoric periods. In recent years, however, there has been a tremendous increase in research in various parts of West Asia focusing explicitly on this theme. It had generally become accepted that the adoption of pottery in West Asia happened relatively late in the history of ceramics. Several regions are now believed to have developed

pottery significantly earlier. Thus, pottery occurs in Eastern Russia, in China and Japan by 16,500 cal. BC and in North Africa it is known in the 10th millennium. However, while the East Asian examples in particular do mark chronologically earlier instances, the picture in West Asia is actually rather more complex, in part because of the tyranny of the Aceramic/Ceramic Neolithic chronology.

The volume has a "Preface" by the three editors and 14 chapters prepared by 13 authors. The "Preface" by Akira Tsuneki, Olivier Nieuwenhuyse and Stuart Campbell (pp. vii-viii) provides brief contextual materials. There is no list of illustrations, no summary of the authors' affiliations or addresses, and no index. Each chapter has its own bibliography. The first and last chapters, respectively authored by Tsuneki and Niuwenhuyse and Campbell, provide valuable summaries of our current state of knowledge about the development of ceramics in West Asia. For the first time, *The Emergence of Pottery in West Asia* examines in detail the when, where, how and why pottery first arrived in the region. A key insight emerges from the papers in this excellent well-edited volume which has splendid color illustrations of pottery and, especially, ceramic cross-sections. The insight is that "we must not confuse the reasons for pottery adoption with the long-term consequences. Neolithic peoples in West Asia did not adopt pottery because of the many uses and functions it would gain many centuries later and the development of ceramic technology needs to be examined in the context of its original cultural and social milieu" (back cover). All of the symposium presentations had color slides and/or actual artifacts and face-to-face discussions among the two dozen symposiasts; hence the published papers have numerous illustrations of the artifacts, pottery cross-sections, and consistent formats of information on the vessel forms, sizes, colors, paste compositions, tempers, decorations and surface treatments, and firing. Three "themes" focus on the appearance of attributes, function, and social innovation.

"Chapter 1: The Significance of Research on the Emergence of Pottery in West Asia" by Akira Tsuneki (pp. 1-8, 1 figure, 51 references). The invention of pottery signifies the beginning of genuine pyrotechnology, the most important technological innovation in human history and one that formed the basis of modern industrial technology (e.g. Childe 1951: 76). Without understanding the origins of pottery, we cannot have a clear picture of other technological innovations, such as the metallurgy of copper, bronze, iron and nonferrous metal, or glass working and fine ceramic production. It is clear that these technological innovations went hand in hand with social advancement. Therefore, to provide a complete sketch of human history, the author considers pottery's emergence as an initial "technological advance." Tsuneki discusses previous research on the origins of pottery in West Asia, the dates of the appearance of ceramics, the varied uses of pottery, and efforts to move toward consensus about pottery's emergence. "Chapter 2: The Earliest Pottery of West Asia: Questions Concerning Causes and Consequences" by Marie Le Mière (pp. 9-16, 7 figures, 20 references). If early pottery in West Asia is examined in the general context of the beginning of pottery fabrication in the world, the very early pottery found in eastern Asia, China, Japan and eastern Siberia, dating back to 17,000–15,000 BP (Taniguchi, this volume; Jordan and Zvelebil 2009) must be mentioned. The date of the earliest pottery in West Asia dates to ca. 7000 cal. BC (Campbell, this volume) but raises important questions concerning its origin: was this new material developed in West Asia or was it imported from those eastern regions? The author discusses the earliest known pottery, their surface treatments, and archaeological site contexts. She also considers basic properties of the early pottery, vessel forms, painted decoration, and data from provenance studies. "Chapter 3: The Initial Pottery Neolithic at Tell Sabi Abyad, Northern Syria" by Olivier P. Nieuwenhuyse (pp. 17-26, 8 figures, 1 table, 12 references). Tell Sabi Abyad is located in the gently undulating plain of the Balikh River, a perennial tributary of the Euphrates, 30 km south of the Syro-Turkish border. The site itself is part of a cluster of four prehistoric mounds, each between 1 and 5 ha in size, located in a roughly linear north-south orientation within a short distance of each other. They were occupied from the late 8th to the early 6th millennium cal. BC, although not all of them were inhabited contemporaneously. Initial habitation included all four sites. Nieuwenhuyse discusses the early painted pottery decorations from regional perspectives, the significance of the Neolithic transition, and difficulties in identifying vessel functions. "Chapter 4: Akarçay Tepe and Tell Halula in the Context of the Earliest Production of Ceramics in West Asia" by Walter Cruells, Josep M. Faura and Miquel Molist (pp. 27-42, 22 figures, 34 references). Since the early 1990s, the early chronological horizon in the northern Levant and Euphrates valley, provide poor documentation of the earliest appearance of pottery production. In the Euphrates valley area no site had yet been excavated and knowledge of the few documented settlements was deficient – known only from surface surveys or irregular excavations. These perceptions led to interpretations that postulated a loss of influence of this region compared to former periods or even a displacement of population to neighboring regions such as the coastal region or the Jezirah, suggesting a

break in settlement models. The authors focus on the contexts of the earliest pottery, ceramic fabrics, and typological and morphological studies.

"Chapter 5: The Oldest Neolithic Pottery from Tell Seker al-Aheimar, Upper Khabur, Northeastern Syria" byYoshihiro Nishiaki and Maria le Mière (pp. 43-54, 11 figures, 29 references). Proto-Hassuna in the early Pottery Neolithic has long been considered to be the oldest in Upper Mesopotamia (Le Mière 2000; Matthews 2000; Anatasio et al. 2004). This pottery is known by a variety of names, including the Neolithic Hassuna (Lloyd and Safar 1945), Sotto (Bader 1993), Umm Dabaghiyah (Kirkbride 1982), and Hassuna Ia pottery (Matsutani 1991). It shared a major techno-stylistic feature that is the common production of coarse, plain, plant-tempered pottery with carinated shapes and plastic decoration. This pottery assemblage, dating to the early 7th millennium cal. BC (Matthews 2000; Aurenche et al. 2001; Anatasio et al. 2004), has been repeatedly been found in basal levels of mounds sites in Upper Mesopotamia. This perception was based primarily on evidence from northern Iraq in the 1990s. The Tell Seker al-Aheimar site and excavations are described in detail. Ceramics are dated to two phases of Pre-Proto-Hassuna and Proto-Hassuna, the latter exhibiting sudden changes in subsistence, and social organization. "Chapter 6: The Earliest Pottery of Salat Camii Yani" by Yutaka Miyake (pp. 55-60, 7 figures, 11 references). The Neolithic cultures in the Anatolian Tigris valley were virtually unknown for a long time. However, with the recent progress of the rescue activities in the Ihsu Dam reservoir area, good evidence for this period has been rapidly accumulating. Salat Camii Yanı, one of the Neolithic sites in the Ihsu Dam reservoir, has been excavated by a joint Japanese-Turkish archaeological mission since 2004. The deposit, with a total depth of 4.5 m above the virgin soil, belongs to the Neolithic period, while a number of storage pits dating to the Iron Age and Islamic period were also found. Miyake discusses the site and its stratigraphy, and ceramic ware groups, vessel shapes, their surface treatments and firing treatments. The earliest wares are hypothesized as being for culinary purposes. "Chapter 7: The Emergence of Pottery in the Northern Levant: A Recent View from Tell el-Kerkh" by Takahiro Odaka (pp. 61-72, 5 figures, 3 tables, 46 references). Recent excavations at Tell el-Kerkh, one of the Neolithic "mega-sites" in West Asia, have provided much important new data that may be used to examine manifestations of Neolithic culture in the northern Levant. One of the most notable discoveries in this series of campaigns is the so-called Kerkh Ware, named after the site where it was first found (Tsuneki and Miyake 1996; Tsuneki et al. 1998; Miyake 2003). The excavations brought new insights to the consideration of the development of pottery in West Asia, because this style can be seen as the oldest ware-type of pottery in the region. The author assesses the new ceramic and other evidence, regional relationships, and provides a tentative view of the emergence of pottery in this region. "Chapter 8: The Early Pottery from Shir, Northern Levant" by Olivier P. Nieuwenhuyse (pp. 73-82, 8 figures, 1 table, 33 references). A number of important Neolithic sites from the northern Levant have been excavated and published in detail. However, our understanding of the earliest introduction of pottery remains poor. Pottery came into use in this region probably as early as in many other parts of Western Asia, or perhaps even earlier. But until the excavations at Kerkh and at Tell Nebi Mend began to provide a sound culture-historical framework for the Rouj Valley (Iwasaki et al. 1995; Tsuneki et al. 1997, 1998, 1999, 2000; Tsuneki and Miyake 1996; Odaka 2003) our understanding of when and how this happened relied upon relied upon older data and not published to present-day standards or detail. The site and excavations are described in detail and three early wares identified within the ceramic corpus dating to ca 7,000 cal BC. There is minimal morphological variation and refiring experiments indicate a firing temperature of <750°C. "Chapter 9: Yumuktepe Early Ceramic Productions: Dark versus Light Coloured Wares and the Construction of Social Identity" by Francesca Balossi Restelli (pp. 83-96, 7 figures, 29 references; Typo: Arnord = Arnold 1985, p. 94). The ancient site of Yumuktepe lies at the western end of the Adana coastal plain in modern Turkey. The first excavations of the site began in 1936 under the direction of John Garstang of the University of Liverpool and continued until World War II (Garstang 1953) and for a few years afterwards. Excavations at Yumuktepe were resumed in 1993 by a Turkish-Italian team directed first by Prof. Sevin and then by Prof. Caneva (Caneva and Sevin 2004). The correspondence between Garstang's stratigraphy and that of the new excavations has not been easy to understand because most of the pre-World War II excavation plans were lost during the conflict. The site chronology, stratigraphy, and architecture are described as is the ceramic assemblage from the earliest levels. There are 633 sherds and no complete vessels from these recent excavations while only 10 pieces of pottery were published by Garstang. The author reviews five pottery production steps for three distinctive wares.

"Chapter 10: Merging Clay and Fire: Earliest Evidence from the Zagros Mountains" by Reinhard Bernbeck (pp. 97-118, 14 figures, 27 endnotes, 56 references). Bernbeck discusses the emergence of pottery in the Zagros Mountains, providing a theoretical framework for innovation studies which emphasizes notions of receptivity, implementation as a process rather than an

event, the seat in life of the newly introduced object class, and the potential consequences of a set of new items in a material culture, namely a change in collective subjectivity. He discusses his analytical methods and documents his arguments by analyzing the archaeological evidence from two regions, the western and the southern Zagros Mountains. The sites and excavations are described, Jarmo pottery characterized, and attention paid to pottery decorations. He concludes that pottery studies need to be more attentive to use analyses to be able to account for complex processes such as the emergence of pottery. "Chapter 11: The Emergence of Pottery in Northeast Iran: The Case Study of Tappeh Sang-e Chakhmaq" by Akira Tsuneki (pp. 119-132, 11` figures, 27 references). Northeast Iran has been considered a peripheral area for Neolithisation. The transformation from hunter-gatherer to early farming societies had been achieved through influence from regions to the west, probably the Northern Levant and Zagros (e.g. Harris 1998: 78; Weeks 2013: 67). There is no evidence of early farming settlements in northeastern Iran. Instead of early Pre-Pottery Neolithic tappeh settlements, several caves and rock shelters with cultural sequences dated to the early Holocene have been discovered and excavated in northeast Iran; classic examples include Gar-i Kamarband (Belt Cave), Hotu, and Ali Tappeh caves (Coon 1951, 1952, 1957: 129–204; Dupree 1952; McBurney 1964). The author discusses new AMS dates, structures and ceramics, especially vessel forms (bowls, jars, and husking trays), slips, and painted decorations, from excavations in west and east tappehs at the site. "Chapter 12: Absolute Dating and the Early Pottery of South-west Asia" by Stuart Campbell (pp. 133-153, 14 figures, 72 references). In comparison to Europe at least, pottery appeared at a relatively early date in West Asia, it is far from the earliest in the world. On the basis of current knowledge, the earliest pottery known has been found in 13 sites located in East Asia; southern China, the Far East of Russia, and Japan. Dates may be as early as c.14,900–14,500 cal. BC (Kuzmin 2006; Kuzmin et al. 2009), but recent dates of c.16,000–15,800 cal. BC are associated with sherds in the Yuchanyan Cave in south China (Boaretto et al. 2009). North Africa provides another context in which early pottery emerged. "Chapter 13: The Beginning of Pottery Technology in Japan: The Dating and Function of Incipient Jomon Pottery" by Yasuhiro Taniguchi (pp. 155-166, In 1998, the author began an inquiry about the origin of pottery in Japan through an excavation at the Odai Yamamoto 1 site, in the most northern part of Japan's main island, Honshu. Taniguchi reported 46 small sherds of plain pottery that were excavated together with Mikoshiba-Chojakubo type stone implements, known from the transition from the Palaeolithic to the Jomon period. The calibrated 14C dates from charcoal on the surfaces of the excavated potsherds were c.16,000 cal. BP and the established the fact that pottery had originated during the Last Glacial stage of the Pleistocene Era came to light at Odai Yamamoto 1 site excavations. Chronological dates for Incipient Jomon ceramics derive from the analysis of 118 specimens. He discusses temporal changes in sherd quantities and correlates these to climate change during the Pleistocene-Holocene transition. "Chapter 14: Synthesis: The Emergence of Pottery in West Asia" by Olivier P. Niuwenhuyse and Stuart Campbell (pp. 167-192, 5 figures, 2 endnotes, 113 references). The Tsukuba conference on the "Emergence of Pottery in West Asia" was in many ways a unique occasion. It marked the first time such a large group of dedicated specialists gathered to discuss when, where, how and why ceramics were first introduced in Neolithic societies in West Asia. Arguably, for the first time they were able to do this on the basis of a rich data set now emerging from the field, rather than the patchy, fragmented, selective data that had always formed the specialist's playing ground. Over the past fifty years or so early pottery complexes in the wider region have hardly6 ben investigated as a paramount subject in their own right. The chapter focuses on pottery beginning with bitumen-coated basketry and archaeological meta-narratives and the geographic and chronological boundaries of ceramic wares. The site of Tell Sabi Abyad in northern Syria figures heavily in the discussion. Materiality and technological innovation are detailed as is the early use of cooking vessels in culinary activities. Lastly, the authors characterize future prospects and challenges related to the emergence of early ceramics.

This is an excellent summary of the topic and should remain a valuable resource for some time for the region. The copious illustrations are first-rate and the narratives clear and provocative. Some translations into English could be polished. The lack of an index and a list of contributors with their affiliations and email addresses are unfortunate.

Mediterranean Connections: Maritime Transport Containers and Seaborne Trade in the Bronze and Early Iron Ages. A. Bernard Knapp and Stella Demesticha with contributions by Robert Martin and Catherine E. Pratt. New York and London: Routledge, 2017. xxi + 263 pp., 2 maps with 7 parts, 49 figures, 7 tables. ISBN-10: 1629583545, ISBN-13: 978-162958354-9. $89.95 / £42.47 / €49.88 / Ca$73.77 / Au $74.63 (hardcover); ISBN 978-131553700-9 (ebook). A. Bernard Knapp is Emeritus Professor of Mediterranean Archaeology in the Department of Archaeology at the University of Glasgow, and Honorary Research Fellow at the Cyprus American Archaeological Research Institute.

He co-edits the *Journal of Mediterranean Archaeology* with John F. Cherry and Peter van Dommelen and is the general editor of the series *Monographs in Mediterranean Archaeology*. Stella Demesticha is Associate Professor of Maritime Archaeology in the Archaeological Research Unit, Department of History and Archaeology, University of Cyprus. She has a special interest in shipwreck amphorae, ancient seaborne trade routes and economy in the Eastern Mediterranean.

In addition to *Mediterranean Connections*, prehistorian Knapp and maritime archaeologist and pottery specialist Demesticha also collaborated as editors of the 12 contributions to *Maritime Transport Containers in the Bronze–Iron Age Aegean and Eastern Mediterranean*, Mediterranean Archaeology and Literature PB 183, Uppsala, Sweden: Åströms förlag, 2016. The papers derive from a special session "Pots on Water: Maritime Transport Containers in the Mediterranean Bronze - Iron Age" held at the 21st Annual Meeting of the European Associations of Archaeology (EAA) held in Glasgow, Scotland, 2-5 September 2016. Chronologically in terms of date of publication, *Mediterranean Connections: Maritime Transport Containers and Seaborne Trade in the Bronze and Early Iron Ages* (2017) follows *Maritime Transport Containers in the Bronze–Iron Age Aegean and Eastern Mediterranean* (2016,) but the 2017 book provides important background, context, and overview for the more technical conference papers.

The book under review here consists of six chapters and a lengthy appendix on volumetric and capacity measurements, "References" (pp. 185-249) incorporates nine "Ancient Sources" (Aristotle and Herodotus for example) and an astounding 900 published **"**References. An extremely detailed double-column Index" (pp. 250-263) integrates topics and proper nouns as well as citations to figures and tables. The "List of Illustrations" (p. vii-ix) includes 7 monochrome maps (and smaller sub-maps) all of which illustrate site locations, 49 figures, 7 tables, and "Acknowledgments" (p. xi-xiii).

Chapter 1. "Introduction" (pp. 1-3). Within the field of Mediterranean archaeology Maritime Transport Containers (MTCs) have a long and dynamic history of study and these vessels facilitated the large scale or "bulk" transportation of goods in ships. One MTC form, Canaanite jars, was initially defined in 1956 but the likely production provenance of these was unclear. The authors raise three issues that are considered but not necessarily resolved by the essays in this volume or by the 12 contributions in the 2016 conference monograph. These are (pp. 2-3): 1) "To what extent can maritime transport containers inform us about patterns of seaborne trade in the Mediterranean over nearly 2500 years covered in this study?" 2) "Did social factors such as mobility, communication and maritime experience outweigh constraints such as the availability of resources, the (reputed) seasonality of seaborne trade .., or the distance to specific ports or markets… ?" 3) "How are any culture's sociopolitical and economic institutions – together with source of wealth and prestige – related to its maritime trade patterns?" The individual chapters that follow attempt to answer these questions. Chapter 2. "Maritime Matters: Shipwrecks and Harbors" (pp. 4-29, 3 figures). The authors discuss the better-known shipwrecks and provide citations to the literature. Six categories of evidence are documented (Neolithic through Late Bronze Age): 1) Depictions or rough outlines of ships or "ships' graffiti"; 2) Bronze Age ships' models; 3) Early-Middle Minoan and later seal-stones; 4) Wall-paintings of Cycladic or Aegean sailing ships, oared vessels, and harbors; 5) Egyptian plank-build boats from the Early Bronze Age; and 6) Stone anchors, widespread through the Bronze-Iron Age Aegean, Cyprus, the Levant, and Egypt. There are discussions of maritime trade, coastal or caboage sailing versus long-distance and open-sea sailing, and ship types, but the remainder of the chapter focuses on harbor locations, characteristics, and examples beginning with the Early Bronze Age: Kommos, Plaka, Avaris, Zawiyet Umm el-Rakham, Enkomi, Kition, and Minet el-Beidha (Ugarit), among others. There is a lengthy section on Early Iron Age ports and harbors: Byblos, Tabbat el-Hammam, Tel Dor, Alit, Pharos, Sidon, Tyre, and Al Mina; Iron Age ports in the Aegean are not well known or studied (p. 26) but major ones were located at Kynos and Mitrou. Not every coastal or near-coastal site with imports had a usable harbor (p. 28). "Burning questions" include to what extent proto-harbors or anchorages were harbors, how shipwrecks related to the movement of Bronze Age MTCs, and what sorts of goods were shipped by sea in MTCs? Chapter 3. "Connectivity, Seaborne Trade and Maritime Transport Containers" (pp. 30-35). The authors comment on the mobility of people and goods and vectors of trade that combine commercial, sociopolitical, and ideological interests. Four spheres of interaction are defined: 1) coastscape, 2) maritime small world, 3) regional / intracultural, and 4) interregional / intercultural. Lastly, the meager documentary evidence is summarized.

Chapter 4. "Maritime Transport Containers" (pp. 36-127, 47 figures, 4 tables) forms the bulk of the narrative. Eight topics are reviewed: characteristics of amphora and related MTCs and the relationships between vessel shape and function are summarized with numerous citations to the literature. Typical contexts for transport and storage vessels include kiln sites, distribution stations, temporary

storage points, and ships' cargo. One archaeological indicator that typifies MTCs is the distribution at some distance – near or far – from their place of manufacture. The design of transport jars takes into account protection of the contents, utility for transport and distribution /consumption, and market communication (p. 41). A major question is when do MTCs enter the archaeological record and how do these containers change through time? "Maritime Transport Containers: The Bronze Age" (pp. 42-46), ca. 3600-3500 BC, was a time when horticulture was well underway. Numerous sites are referenced and NAA and thin section petrographic studies and shape and size data are summarized for EBI, II, II-III, and III in the Levant and Egypt. "The Levant: Canaanite Jars" (pp. 46-66), beginning ca. 1950-1750 BC were defined in 1976. These containers, spanning the Middle and Late Bronze Age, have a complex typology and a shift from flat bottomed to more rounded bases and their tapered bodies reflect a major MTC design change for ease of transport dating to the MB II period. Documentary evidence (Herodotus) and a wealth of archaeological data are cited and significant results summarized along with the results of NAA studies. NAA and petrographic research as well as organic residue analyses (ORA) and some AAS data are presented in the provenance studies. "Egypt: Egyptian Jars /Amphorae" (pp. 66-70) dating to the New Kingdom are related to Canaanite jars. The section titled "The Aegean: Cycladic Narrow-necked Jars, Oval-mouthed Amphorae (OMA's), and Transport Stirrup Jars (TSJs)" (pp. 70-88) covers a variety of important forms. Vessel sizes and shapes, petrographic analyses, diachronic changes, and distributions from MB II into the Late Bronze Age are reported. TSJs apparently had a very short use period. Provenience for these types is documented through coordinated typological, chemical (NAA and AAS), and petrographic analyses. "Other Bronze Age Transport Containers" (pp. 88-101) including Cypriot *pithoi*, Cretan Short-necked amphorae, Southwestern Anatolian reddish-brown burnished jugs, and Sardinian *olle a colletto* (collar-necked) vessels – all four were *likely* to also have been transport containers. Ethnographic research, size and shape distinctions, petrographic analyses, and geographic distributions are documented. The section "Maritime Transport Containers: Into the Iron Age" begins with a report by Robert Martin "Iron Age Levant: Background and History of Research" (pp. 102-130), IA I (ca. 1200-900 BC) and IA II (ca 900-700 BC). His report includes details on Levantine MTCs' typologies, chronologies, and distributions; and Phoenician MTCs' shipwrecks, typologies, and distributions. Stella Demesticha summarizes "Cyprus" (pp. 130-132) with special reference to Cypriot Basket-handled Amphorae) while "The Aegean" (pp. 132-14 is reviewed by Stella Demesticha and Catherine E. Pratt. The latter focuses on the characteristics and distribution of Protogeometric Amphorae (with four subtypes); Geometric Amphorae; Athenian SOS Amphorae, and Corinthian Amphorae; as well as a discussion of Geometric Amphorae trade and contexts of vessel uses from *The Odyssey*. There is very little chemical and petrographic data mentioned for the Iron Age section of this chapter. Chapter 5. "Maritime Transport Containers, Bulk Transport and Mediterranean Trade: Discussion" (pp. 148-163, 1 table). The earliest MTCs date to the Early Bronze Age, initially in the Levant and later in the Aegean, while Levantine vessel types continued almost without interruption into the Iron Age. Textual and archaeological evidence is cited and the chapter emphasizes the organization of local and long-distance trade in MTCs with a short second section describing the political setting of Late Bronze Age-Early Iron Age trade in MTCs. In Chapter 6. "Conclusions: MTCs and Mediterranean Connectivity" (pp.164-171) the authors review vessel proliferation, changing technologies in fabricating and moving the MTCs, shipwreck data (only four of 11 ships could be classified as bulk cargo carriers engaged in long-distance exchange), specializations in wine and olive oil production, the timing of sailing voyages, and vessel origins and destinations as discerned from chemical and petrographic analyses. The "Appendix: Volumetric Analysis and Capacity Measurements of Selected MTCs" (pp. 172-184) prepared by Stella Demesticha represents an especially valuable contribution to the study of MTCs. Her assessment include a consideration of MTC capacities, procedures for measuring capacities, and comparisons of capacities of MTCs from different regions and time periods in order to discern common standards, if any, for transporting goods by ship. Table A "Calculated Capacities of Maritime Transport Container Types" (pp. 175-179) details 34 specimens by chronological dates (Early Bronze through Iron II/Geometric), vessel types, capacities (up to top and up to base of neck in liters), capacity averages, published dimensions, estimated dimensions, and references to the published literature. Data on Egyptian Jars, Canaanite Jars, and Transport Stirrup Jars are discussed and compared (Table A2 and Fig. A1).

The volume examines the highly complex but critical formative stage in the long Mediterranean transport container tradition and provides assessments of regional economic traditions and the dynamics of eastern Mediterranean exchange. The authors have analyzed an incredible amount of detail and provided an exceptional synthesis that should be valuable for scholars of Mediterranean and maritime archaeology for many years. Data and analysis of the well-known Canaanite jar has

now been augmented by studies of a half dozen or more related Bronze and Early Iron Age MTCs. Splendid scholarship!

Maritime Transport Containers in the Bronze–Iron Age Aegean and Eastern Mediterranean. Stella Demesticha and A. Bernard Knapp (eds.). Studies in Mediterranean Archaeology and Literature PB 183. Uppsala, Sweden: Åströms förlag, 2016. ix + 241 pp. ISBN13: 978-91-7081-211-8. €63.60 EUR, $67.63 USD (hardcover). The maritime transport of goods in bulk provides a clear indicator of many facets of trade, from networks and merchants to individual economic transactions. One of the key material factors involved is what we term the Maritime Transport Container (MTC), examples of which include the Canaanite jar, Transport Stirrup Jar and Phoenician amphora, or more generally transport amphorae. Although studied systematically during later periods, the early phases in the development of MTCs are relatively obscure, because their maritime function and attributes are often overlooked. This volume provides an overview of these early stages – from the Early Bronze to Early Iron Ages in the Aegean, on Cyprus and in the Levant – in the emergence and development of MTCs, and their diverse roles in trade throughout the Aegean and eastern Mediterranean. By reconstructing the early stages of their production and use, we gain important insights into the initial aspects of seaborne trade in the Mediterranean, and can see how maritime transport containers serve as markers of trade mechanisms of different scale, and of economies that more or less depended on seaborne trade. A majority of the contributions to this volume derive from a special session "Pots on Water: Maritime Transport Containers in the Mediterranean Bronze - Iron Age" held at the 21st Annual Meeting of the European Associations of Archaeology (EAA) held in Glasgow, Scotland, 2-5 September 2016. The volume contains 12 chapters, each with its own "Bibliography," plus a single comprehensive "Index" (pp. 233-241) primarily of proper nouns but including references to the book's figures and tables. A number of these contributions involve the measurement of vessel capacities while some others employ thin section petrography in the task of discerning provenance. No residue analyses are reported.

Chapter 1. "Introduction: Maritime Transport Containers in the Bronze and Iron Age Aegean and Eastern Mediterranean," Stella Demesticha and A. Bernard Knapp (pp. 1-16, 2 figures). The editors provide an overview of 22 types of MTCs and rubrics dating from the Bronze and Early Iron Ages (early third millennium BC – end of eighth century BC) from the Aegean and eastern Mediterranean. Definitions of MTCs, functions (storage or transport vessels developed from domestic transport jars), and the low-cost of the production of great numbers of vessels are documented. Details on vessels from the EBA, MBA, LBA, and EIA are noted and MTC capacities (in liters) and vessel sizes are reviewed. Trade is seen in the context of a centralized administration. Chapter 2. "Dawn of the Amphora: The Emergence of Maritime Transport Containers in the Early Bronze Age Aegean," Peter M. Day and David E. Wilson (pp. 17-37, 5 figures). The authors note that the EB II period was the point of time in which collared jars, the first MTCs, appeared. The authors provide geographic and temporal data and evidence of the social practice of drinking and feasting in public and private spheres. Three case studies elaborate the bulk movement of perishable goods. Early EB II Poros-Katsambas (Crete) and its relationship to Knossos was a time of unparalleled production of jar fabrics and finishes, documented by numerous sources from throughout the Aegean. Akrotiri (Thera) during the Final Neolithic and EB periods is reviewed; 1)ceramic data on the western and central Cyclades is from fill deposits (no closed deposits have been located); 2) the bulk of the imports come from western sources; and 3) Ayia Irini (Kea) dating to EB II when most vessels were made from local red-brown ware. EMN (Estimated Minimum Numbers) can be calculated. Some vessels were yellow-slipped but monochrome white to yellow and orange-buff painted jars with sandy fabrics also occur. The authors discuss eight wares of EB II western Aegean transport jars and production centers: Keian red-brown, Attic white-slipped, Talc, Melian dark-painted, and ceramics from Naxos, Thera, Amorgos, and Ios/Seriphos. Chronologies, vessel functions, social practices, and maritime exchange routs are also considered. Chapter 3. "Trade and Capacity Studies in the Eastern Mediterranean: The First Levantine Trade amphorae," Cydrisse Cateloy (pp. 39-55, 5 figures). Levantine amphorae were suitable for transport in the holds of commercial ships. She discusses vessel terminology, their origins, and the development of MBA II and all LBA forms. Aston's type A1, A2, and A3 vessel capacities and calculation methodologies are reviewed; manual methods (water or polystyrene beads) are contrasted with computerized methods (Amphoralex, Pot Utility, CReA-Patrimonie, and AutoCAD). Preliminary results of a case study are reported involving 60 type A3 vessels from within four time periods (MB II-LB II), discerning three distinct classes. There was a high level of vessel standardization. Chapter 4. "Canaanite Jars and the Maritime Trade Network in the Northern Levant during the Transition from the Late Bronze Age to the Early Iron Age," Tatiana Pedrazzi (pp. 57-77, 7 figures). LBA through EIA jars are reviewed with the author providing theoretical background and

morphological observations on ovoid conical storage or transport jars (Shape 1). Angular shouldered jars were used in restricted maritime trade networks; bellied amphorae (4-4 and 4-2) held honey or resins. She compares morpho-functional characteristics, capacities (using CAD software), contents (liquids and semi-fluid substances), and geographical distributions. MTCs and multiple trade networks in the northern Levant during the LBA-EIA are reported with various trade patterns differentiated and the roles of merchants considered.

Chapter 5. "'Measure for 'Measure': Connecting Text to Material through Late Bronze Age Shipping Jars," Chris M. Monroe (pp. 79-96, 4 figures, 1 table). Monroe integrates textual and archaeological evidence of LBA MTCs (c. 1300 BC), focusing on wine and olive oil transport from three sites: Uluburun, Ugarit, and Deir el-Medina. Liquid measure standards (22 liters), measures and labeling of *kadu* (amphorae or jars), and the analysis of 54 textual occurrences of "jars" in Ugarit tablets are detailed. Winemaking is discussed and the data suggest that there were separate systems for weights and volumetric measures and, lastly, he reviews price calculations in Egypt and Ugarit. Chapter 6. "Distributers and Shippers: Cyprus and the Late Bronze Age II Tel Abu Hawam Anchorage," Michal Artzy (pp. 97-110, 4 figures). Salvage excavation data at Haifa Bay, Israel from 2001-2002 revealed local ceramics and imported fine and utilitarian wares from Cyprus and the Syro-Lebanese coast dated ca. 1350-1230 BC. Site and excavation history are documented and there is a description and quantification of the pottery. Thin section petrography was undertaken and mineral content is defined; two color figures illustrate MTC section profiles. Six distinct wares are documented from 3,406 sherds; 82% of the vessels were jars typical of the Carmel coast. The cultural setting and significance of the Tel Abu Hawam anchorage as a shipping point for agricultural products is reported, a second anchorage at Akko operated at the same time, and Artzy concludes that local mariners were engaged in international trade. Chapter 7. "The Development of Canaanite and Phoenician Styles Maritime Transport Containers and their Role in Reconstructing Maritime Exchange Networks," Robert Martin (pp. 111-128, 3 figures). There is a diachronic overview of the evolution of "Canaanite" and "Phoenician" MTCs produced in the Levant during EBA II-III through EIA II periods (ca 300-2450 BC to eighth century BC). The author focuses on bulk liquid staples transported in ceramic vessels exported to Egypt. MBA Canaanite jars evolved from large "Combed Ware" jars produced in the Levant during the EBA II-III period. He also discusses vessel standardization, expansion of trade networks, and provenance determined by NAA, PIXE Gamma Ray, and PIGME analyses. A proliferation of MBA jars and the functions of LBA jars are noted. IA I and II "Phoenician" MTCs renewed internationalization; the overview is incomplete, see the accompanying review of Knapp and Demesticha (2016). Chapter 8. "Seaborne from the Beginning: Transport Stirrup Jars," Halford W. Haskell (pp. 129-144, 3 figures, 2 tables). Transport/Storage Stirrup Jars (TSJs) were specialized long-range bulk commodity vessels. The author provides a new assessment of TSJ vessels and analogous Cretan, Egyptian, and Canaanite amphorae in terms of use and movement in the eastern Mediterranean. The earliest TSJs were from Kommos, Crete produced during MM II and MM II/Late Minoan IA times. Spout horns facilitated the lashing of stoppers and these forms were more difficult for potters to construct than standard amphorae. There is an analysis of specimens from a dozen archaeological sites dated to LB IIIC and a discussion of variants and decoration (an octopus motif and inscriptions). Distributions and imitations made on the mainland are also reported. The TSJ vessels were especially popular in the Aegean LB IIIA-IIIB era and were shipped beyond the Aegean to Sardinia and Sicily in the west and Cyprus and the Levant to the east.

Chapter 9. "Transport Stirrup Jars in Late Mycenaean Tiryns: Maritime Containers and Commodity Movement in Political Context," E. Kardamaki, P. M. Day, M. Tenconi, J. Maran, and A. Papadimitriou (pp. 145-167, 9 figures). More than 400 SJTs and Canaanite jars (whole vessels and sherds) were examined macroscopically and by thin section petrography with some OES and AAS for supplementary analyses. Chronologically, these span the periods LH IIIB to LH IIIC, with the majority dated ca. 1200 BC. Provenance was the Argive Plain of central Crete with distribution to Mycenaean palatial centers. Provenance relationships to specimens from Chania, a port in western Crete, and the importance of Tiryns are also noted. New evidence from LH IIIB1 to LH IIIC is presented in this report. Two types of Cretan MTCs, oval-mouthed amphorae and coarse ware TSJs are detailed. The ceramic analysis, sampling strategy, and four major problems are reviewed: 1) a lack of analytical comparatives, 2) the targeted sampling of specific TSJ "canonical" shapes, 3) a lack of macroscopic fabric criteria, and 4) a frequent lack of excavation contextualization. Six color photomicrographs illustrate ceramic fabric variations. The authors provide comparisons of provenance data on Chanian material and prior analyses of specimens from Tiryns. Sand-tempered pottery from western Mesara, a central Cretan source at Tiryns, variations in quality, documentation of three sizes, and decorations are also documented. Chronological and political implications, jar inscriptions,

and maritime shipments are reviewed, and the authors reconsider the dates of ITSJs and TSJs at Tiryns, and suggest a new picture of inter-Aegean relations and exchange systems. Chapter 10. "Maritime Transport Containers: The View from Phoenician Tell Keisan (Israel) in the Early Iron Age," Paula Waiman-Barak and Ayelet Gilboa (pp. 169-194, 9 figures, 1 table). The EIA, mid-twelfth-mid-ninth century BC, ceramic containers from Tell Keisan in the Akko Plain are studied by optical mineralogy in order to discern provenance. Three chronological horizons, sample selection (n = 51 vessels), research methods and methods of presentation are documented. The periods include the LB/Ir transition, early and late Ir1a, and the Ir1a/b transition. The analysis focuses on flasks, carinated jars, and "Philistine-looking" wares among others. Chrono-stratigraphic data is presented in a detailed table that includes information on vessel sample numbers, vessel types, wares, strata, Phoenician horizon, volume, petrofabric, and references to illustrations. Eight petrofabric groups were identified and illustrated with color images of sherds and photomicrographs: AZ, A3, B, C, C/D, D, D/F, and F. The authors discuss their interpretations and provenance data (25 of the 51 vessels are non-local in origin) and specific identifications are presented for Phoenician flasks, carinated jars, oval jars, collared-rim *pithoi*, Phoenician Bichrome Ware, and Philistine table wares. Lastly, the authors discuss maritime trade networks. Chapter 11. "Greek Commodities Moving West: Comparing Corinthian and Athenian Amphorae in Early Archaic Sicily." Catherine E. Pratt (pp. 195-213, 6 figures, 3 tables). Greek involvement in nascent trade networks of the early Archaic Period (ca. 750-600 BC) is assessed and Pratt challenges assumptions regarding Corinthian supremacy in the amphora trade to Sicily. The author presents a diachronic comparison of amphora distributions and a review of "assumptions" about "colonial" Greek settlements in Sicily – countering with MTC "realities." Athenian SOS and Corinthian A amphorae evolution (eighth-seventh and seventh-sixth centuries BCE), diachronic distributions, caveats, and the greater prevalence of SOS forms are detailed. Local and regional oil and wine transport and amphorae production are related. She determines that the domestication and pressing of wine grape in Sicily took place before the arrival of Greek colonists. Data derives from five sites related to the 8^{th}-7^{th} century BCE, eight sites to the 7^{th}-6^{th} century BCE, and 23 to the 6^{th}-5^{th} century BCE. Corinthian fine ware ceramics comprised 90+% of the imported pottery and she discusses the need and desire for central Greek liquid products in Sicily. Chapter 12. "Maritime Transport Containers of the Bronze and Early Iron Age as Viewed from Later Periods," Mark Lawall (pp. 215-231, 1 table). Lawall comments on a wide range of behaviors related to the MTCs in different socioeconomic contexts. Two basis assumptions are reviewed: 1) the existence of a surplus to be packaged, and 2) anticipated profit. The range of variation in surplus goods is reviewed and he considers shipwreck data, primary and secondary vessel contents, and transaction costs. Jar shapes and provenance, spheres of exchange, elite power shifts, and the focus on shipments of wine rather than costly meat are discussed. Lastly, he comments on the importance of multidisciplinary research in the study of MTCs.

Ceramics in America 2016. Robert Hunter (ed.), Milwaukee, WI: The Chipstone Foundation, distributed by the University Press of New England, 2017. xii + 262 pp., 280 color illustrations, 6 tables, detailed index. ISBN 978-0-9827722-8-7, $65.00 (hardback). *Ceramics in America*, an annual now in its sixteenth year of publication, is considered the journal of record for ceramics scholarship in an American context and is intended for collectors, historical archaeologists, social historians, curators, contemporary potters, and decorative arts students. Editor Robert Hunter is an archaeologist who assumed editorship of this annual from its beginning in 2000. The current volume, published on March 7, 2017, contains 14 articles, each with its own notes, and six book reviews, the latter edited by Amy Earls. There is an "Introduction" by Robert Hunter (pp. ix-xii) in which he discusses the importance of private collections as a source of "overlooked nuggets of information" on historic ceramics. The current annual makes use of both private and public collections in chapters that document repairs and alterations to ceramics and the production of "outright fakes." He also remarks about the growing importance of materials science approaches in the analysis of historical materials and points out that the Bernstein et al. article, submitted originally in 2009, is "finally coming to publication in this issue." Your reviewer has written reviews of each annual; these have been published annually in the *SAS Bulletin* since 2002. To my recollection, this is the first annual with numerous (seven) materials science studies (among them pXRF, XRF, FTIR, SEM-EDS, and LA-ICP-MS) accompanying archival historical, and archaeological data. A number of the articles on the development of hard-paste porcelain production in America are interrelated and will delight the reader as a "who-done-it."

Hunter also comments on the contribution by Ivor Nöel Hume which appears in this volume, noting that it is a reconsideration of his 2014 assessment of English pearlware puzzle jugs, written because new information had become available in 2016. Hunter states that Nöel Hume turns this revision into "a triumph of wit, research,

and substance for ceramic historians" (p. xii). I am sorry to report that Sir Ivor – who was recognized in 1993 by Queen Elizabeth an Officer or the British Empire (O.B.E.) for his services to British cultural interests in Virginia, and the author of more than twenty books, as well as the 1991 recipient of the J. C. Harrington Award presented by the Society for Historical Archaeology – passed away at age 89 on February 4, 2017 after this volume of *Ceramics in America 2016* had gone to press. For a biography, see "Ivor Nöel Hume" by Charles C. Kolb, *Encyclopedia of Global Archaeology*, Claire Smith, ed.-in-chief; New York: Springer, 2014, pp. 5295-5297; *Encyclopedia of Global Archaeology*,2nd ed. Online in press.
http://download.springer.com/static/pdf/957/prt%253A978-1-4419-0465-2%252F8.pdf?auth66=1392930578_ff234e09408ccf36d02946ce6e99769e&ext=.pdf

"George Thorpe's Inventory: Virginia's Earliest Known Appraisal" by Martha W. McCartney is accompanied by "Ceramics in Early Virginia," a photo essay incorporated in the preceding, by Bly Straube (pp. 2-32, 31 figures, 43nnotes, 1 Appendix). McCartney writes about the historical context for the earliest known household inventory yet discovered for Virginia. She provides background on Thorpe, the settlement founded in Virginia by the Society of Berkeley Hundred in 1719, and the material culture imported as cargo by two ships, the *Margare*t in 1719 and *Supply* a year later. Among the items in the ships' manifests were China, hard-paste porcelain, Portuguese and English earthenware, Sgrafitto slipwares, Surry-Hampshire borderwares, German Westerwald glazed stoneware, Wesser slipware, and Italian marble slip-decorated ceramics. Locally-made pottery included storage jars and milk pans. Some of the ceramics appear in the household inventory created after Thorpe's death at the hands of Powhatan Indians in March 1622. The inventory was presented to officials in England in 1634 and remained in British archives: a copy appears as an Appendix to this article. Excavations at the Jordon's Journey archaeological site in the 1900s also yielded specimens of these ceramic types. "Norwalk (Connecticut) Slip-Script Pottery, the Potters, and Related Ware" by Richard Miller (pp. 33-37, 45 figures, 34 notes). The author discusses the ceramics included in the Winton estate collection auctioned in 1953. Norwalk pottery produced during the eighteenth and nineteenth centuries included a distinctive slip-script personalized stoneware platters; a similar product was made by Hervey Brooks (1779-1873) in Pennsylvania. The Norwalk census of 1850 lists 19 potters most (if not all) of whom created slip-script wares. Miller also reports on English slip-decorated wares of the same period, including, platters, jugs, and milk pans. There are detailed descriptions and comparisons of the estate's Norwalk specimens with the English products. Among the Norwalk potters whose vessels appear in the collection were Absalom Day (1770-1843), who influenced other local potters including John Betts Gregory (1782-1842) and Asa Smith (1798-1880). Norwalk pottery was consumed locally but also shipped to Massachusetts and New York City. "The Allegory Of Europa In Twentieth-Century American Sculpture" by Tom Folk (pp. 58-75, 14 figures, 22 notes). Russell Barnett Aitken (1920-2002) was a ceramic art sculptor whose work often featured the Myth of Europa which involved the taming of bulls (which dates initially to the Minoans ca. 1500 BCE and appears in a variety of art forms since). Folk compares paintings and ceramic sculpture that features the myth and focuses on the work of Swedish sculptor Carl Milles. Paul Manship, Waylande Gregory, Valerie Wieselthur, Viktor Schreckengost, Charles Yerkes Dusenbury, and Aitken were contemporaries producing this ceramic art form. "Throwing the Potter's Wheel (and Women) Back into Modernism: Reconsidering Edith Heath, Karen Karnes, and Toshiko Takaezu as Canonical Figures" by Ezra Shales (pp. 76-104, 18 figures, 37 notes). Avant-garde decorative artists who produced wheel-thrown pottery included Heath (1911-2005), Karnes (1925-2016), and Takaezu (1922- 2009). Shales appraise their work and the impact the made in made in revolutionizing ceramic art from the late 1940s through late 1960s. "The Most Dangerous Imitations': A Group of Spurious Chinese Export Porcelain" by Ellen Archie, Ronald W. Fuchs II, Jennifer Maas, and Erich Uffelman (pp. 105-117, 9 figures, 48 notes). Modern imitations of Chinese Lowestoff ceramics with American emblems originally produced from 1784 into the 1820s are the focus of this investigation. Lowestoff was a common name for Chinese porcelain during the mid-1920s. The fake export porcelain was made during this period. The authors provide stylistic, physical, and chemical evidence for differentiating the imitations, notably pXRF. Analysis focused on overglaze blue enamels, sepia enamels, and vessel bodies; plates and saucers were typical vessel forms. Zn, Bi, and Cr were anomalous elements in producing the fakes which most often involved adding new American emblems (shields, flags, eagles, etc.) to old porcelains. "A Chinese Export Porcelain Mystery Solved Using Intrusive Surface Analysis" by Shirley M. Mueller and Matthew Bunney (pp. 118-121, 4 figures, 7 notes). The authors review Chinese export porcelain in the *familie verte* style produced ca. 1715 which has gold and silver highlights on service pieces such as platters. They examined pieces that appeared to have "missing" gold and silver and respond to the question: Was this due to production time constraints or error or purposely left

off the pieces, or was the gold and silver simply worn off or rubbed off during use? They employed the Ceramic Trace Model Study Method using 500X magnification and determined that the decoration had worn off. "Simply Riveting: Mended Ceramics in Historical Context" by Angelika Kuettner (pp. 122-140, 25 figures, 58 notes). Kuettner examined ceramic objects with old repairs in the collections of the British Museum in London and the Topkapi Palace Museum. She discusses the need for repairs and types, noting that mending damaged ceramic vessels dates back to at least the 6th century BC. There are five major reasons why ceramics break and provides examples: 1) breakage at the leather-hard or air drying stage of production, 2) when being fired in the kiln, 3) when packing and shipping finished vessels, 4) because of human error or act of nature, and 5) military action. The characterize decisions to repair or not to repair, and details menders and methods. Recipes dating from the eighteenth and nineteenth centuries were used to prepared glues or pastes for repairing broken objects. Typical vessel included punch bowls and sauce boats. Beginning in the seventeenth century, the Chinese used precious metal rivets or staples (mostly silver) for repairs where angled joining holes were made with a bow drill; thread was also used. Teapot spouts and handles were also restored with metal replacing broken or damaged porcelain parts. "Mary Washington's Mended Pots: Understanding Ceramics through the Science of Eighteenth-Century Glues" by Mara Kaktins, Melanie Marquis, Ruth Ann Armitage, and Daniel Fraser (pp. 141-151, 8 figures, 10 notes). The authors provide historic contexts for George Washington's boyhood home at Ferry Farm, Virginia (1738-1774). Seven vessels that had been repaired with glue are discussed in detail, including English-made creamware punchbowls, and white salt-glazed stoneware platters and teapot. Microscopic examination indicated that the ceramics had suffered from "excessive use" but were still important enough to avoid discard. The authors document glues and mending in the written record from this era and provide examples of the recipes, noting that vessels might be home-mended or repairs might be undertaken by a local goldsmith. There is a splendid section on experimental archaeology in which the authors replicate recipes; mastics and gums were made from beeswax, isinglass, pine resin, cheese, and hide-based material. Mended broken "thrift shop" modern porcelain specimens were tested as to the effectiveness of mended pieces subject to burial contexts, temperatures, humidity, pressure, and water retention. Some significant and promising results are discussed. Basic residue analysis was undertaken with mass spectrometry DART (Direct Analysis in Real Time) and FTIR ((Fourier transform infrared). Lime was a major ingredient in most glues and the study also reported difficulty in detecting resin compounds. "Harry A. Eberhardt Repaired Chinese Porcelain Saucer" by George L. Miller and Emily Brown (pp. 151-161, 9 figures, 25 notes). The earliest riveting in America dates to a 1655 Jesuit description and a 1755 advertisement in a Boston newspaper. Archival documents including invoices provide additional information as to costs and correspondence between Eberhardt and Henry Francis du Pont. The process of riveting is described with the use of a bow or pump drill with spindle and brass or silver 12 to 18 gauge wire; German silver was also used. XRF studies were undertaken at the Winterthur Museum. Brown provides ethnographic evidence of twentieth century riveting of porcelain in Uzbekistan. As a sidebar: Your reviewer also witnessed the same repair procedure in Fayzabad and Kabul, Afghanistan in 1965 and 1966.

"Statistical Evaluation of Analytical Data for Eighteenth-Century American and British Sulphurous Phosphatic Porcelains" by J. Victor Owen, John D. Greenough, and Nick Panes (pp. 162-178, 12 figures, 2 tables, 30 notes). Potters Bonnin & Morris (Philadelphia, 1770-1773) and John Bartlam (Cain Hoy, South Carolina, 1765-1769) produced soft-paste porcelain with a sulphurous phosphatic composition and lead-rich glazes. One Bonnin & Morris specimen marked "Philadelphia" and dated to 1773 had a silicious-aluminum-calcic composition. Two London manufacturers, Bow and Isleworth, made soft-paste porcelain with sulphur and/or lead in the paste, dated to the 1740s in Britain. The authors investigate possible influence by British manufacturers on the American producers: Did an ex-Bow employee provide technological expertise to Bonnin & Morris? Samples (sherds or whole vessels) from all four factories were studied and results analyzed using MDS (Multi-dimensional Scaling, similar to Principal Components Analysis) and SYSTAT software. Paste compositions are presented in discrimination diagrams. The authors conclude that their research was limited by the small number of samples and limited number of components analyzed, and variations over time. See a more technical article by Owen and Hunter in *Journal of Archaeological Sciences* 39:333-342, 2009. The reanalysis needs to make use of LA-ICP-MS. "An Eighteenth-Century True Porcelain Punch Bowl" by Robert Hunter and Juliette Gerhardt (pp 179-199, 16 figures, 65 notes). Hard-paste porcelain is produced by mixing kaolin clay with feldspar and quarts and fired to 1400°C. The archaeological excavation of a brick-lined privy in Philadelphia at Third and Chestnut Streets, that had been closed on July 13, 1789, was located on the property of tavern owners Mary and Benjamin Humphreys. The privy produced a wealth of artifacts

(Chinese porcelain, and English enameled creamware, locally fabricated tankards, etc.) including an anomalous, undecorated and fragmented white bowl (originally catalogued as white salt-glazed stoneware). Subsequent analysis revealed that the bowl was a hard-paste aluminous-silicic ware. The specimen contributes to our understanding of the history of true hard-paste manufacture in Philadelphia. The archaeological and historic contexts are reviewed in detail. The authors note that Chinese secrets of porcelain production were observed and written down by a Jesuit missionary (1710-1722). In 1734, Anthony Duché, a Huguenot émigré and "prolific potter," moved to Philadelphia and later, with his son, Andrew, to Charleston, South Carolina, then to New Windsor, Georgia, and back to Charleston, and finally to Philadelphia again. The short-lived American China Manufactory operated in Philadelphia (1770-1773), and produced experimental hard-paste wares; some its first workers had come from the Bow factory in London. Duché's rental property was close to Bonnin & Morris's "ware-house." In 1773, a "young German skilled in making porcelain" arrived in Philadelphia and may have been involved with porcelain production.

"The Geochemistry of a True Porcelain Punch Bowl Excavated in Philadelphia" by J. Victor Owen, Joe Petrus, and Xiang Yang (pp. 200-219, 11 figures, 4 tables, 31 notes). This article continues attempts to resolve the uncertainty about who first made porcelain in America. The authors focus on Gousce Bonnin and Anthony Morris in Philadelphia (1770-1773), John Bartlam in Cain Hoy, South Carolina (1760-1765) and Andrew Duché in Savanna, Georgia (1737-1738). There is little connection between the three. Compositional data for a reconstructed Philadelphia punch bowl which is 90% complete leads to the suggestion that it was an experimental attempt at producing porcelain. The archaeological context of the Humphrey tavern privy is reviewed. Analytical methods included SEM-EDS studies of the bowl included comparative analyses of chronologically contemporary English porcelains from Bristol and Plymouth, Bow porcelain from London, Bartlam specimens from Cain Hoy, Bonnin & Morris products from Philadelphia, and wasters from Hopewell, Virginia. Two tables detail the analysis of major and minor elements. Rare elements were studied using LA-ICP-MS. There is a detailed discussion of the mineralogy and geochemistry and MELTS and pMELTS yielded a firing temperature of 1221°C for the Philadelphia specimen's 20 micron thick glaze. Compositional profiles of the British and American and underfired Philadelphia bowl. The authors also report that the specimen does not resemble Chinese export porcelains. The evidence tends toward manufacture by Andrew Duché. "A Comparative Scientific Study of James Morgan and the Kemple Family Stoneware" by Johanna R. Bernstein, Arthur F. Goldberg, Jennifer Mass, and Erich Uffelman (pp. 220-225, 6 figures, 9 notes). The authors compared James Morgan (1775-1784) and Kemple family (1746-1778) pottery and clay sources from New Jersey using an XRF analysis of 35 stoneware fragments at the Winterthur Museum Scientific Research Analysis Laboratory. The plots of Zn/Fe and Y/Fe suggest the use of different clay sources and possible clay mixing. Further study employing ICP-MS and XRD are suggested. "A New Bloome" by Ivor Nöel Hume (pp. 226-237, 16 figures, 10 notes). Nöel Hume rewrites the story of the John Bloome's pearlware puzzle jug dating to ca. 1798 initially published in *Ceramics in America 2014*, pp. 2-18. He reviews the previous publication and reinterprets the polychrome painted decoration of the ship *Hopewell*, a British Merchant Navy ship engaged on export trade, in reality named *Hopewell of Wells* for the Wells estuary located on the Norfolk Coast of England. The author discusses definitions of "earthenware," the ships' ceramic cargo, the spelling of "Bloome" as "Bloom," and the 2016 finding of an Admiral Duncan Commemorative Pitcher depicting his flagship *Venerable* painted in the same style as the Bloome jug and firmly dated to 1797. Hence, the puzzle jug undoubtedly dates to 1797 rather than ca. 1798. "The Captain George Russell Presentation Pitchers" by Robert Hunter and Oliver Muller-Heubach (pp. 238-254, 15 figures, 39 notes). These porcelain pitchers are attributed to Limoges, France manufacture (1855-1859) and were shipped undecorated to America where porcelain enamel inscriptions, decorations, and gilt were added. A study of the inscriptions and ships depicted and similarities of molding below the spouts are detailed. The steamship *Louisiana* was on one side of each pitcher and the brig *James B. George* on the other; Russell commanded the steamship and was co-owner of the brig. The history of the ships and Captain Russell precede excerpts of a speech by George B. Herring, a crockery importer in Baltimore, at the Convention of Earthenware Dealers in 1857 which provides evidence for the time and day the pitchers were presented to Russell.

GEOARCHAEOLOGY

Jesse W. Tune, Associate Editor

Let me begin by expressing my excitement to join the SAS Bulletin crew as the new Associate Editor of Geoarchaeology, and providing a little background about myself. I'm an Assistant Professor in the Department of Anthropology at Fort Lewis College in Durango,

Colorado, where I teach courses such as Environmental Archaeology, Lithic Analysis, and Ice Age North America (among others). Much of my research focuses on the earliest archaeological record of North America. I study how Paleoindian lithic technologies (stone tools) were organized as a means to understand how people adapted to local environmental conditions. To that end, I also investigate the geoarchaeological context of early sites. I encourage any of our readers to contact me with any questions about Paleoindian and geoarchaeological research, as well as with any ideas about future SAS Bulletin content.

For my first geoarchaeology column in the SAS Bulletin I want to highlight some of the important research that is currently taking place in Alaska – the late Pleistocene gateway into the Americas. As such, this issue features two short essays by Angela Gore and Josh Lynch about their research related to the earliest human occupation of interior Alaska. Both Angela and Josh are archaeologists and Ph.D. candidates in the Center for the Study of the First Americans, Department of Anthropology at Texas A&M University. Angela's essay presents a summary of her ongoing research into lithic procurement and landuse patterns in the Nenana Valley, central Alaska. Josh's essay discusses his ongoing work to reconstruct early Holocene occupations along the shoreline of Blair Lakes, near Fairbanks, Alaska.

A Brief Note on the Archaeology of the First Americans

The consensus amongst most archaeologists is that the ancestral population for the native peoples of North America migrated east through Beringia from Northeast Asia; whether that initial entry was through interior Alaska or along the Pacific coast is a debate to address in future SAS Bulletins. Research indicates that a founding population settled in North America some time during the late Pleistocene, and brought with them Upper Paleolithic technologies from Asia. While it is widely accepted that ancestral Native American populations came to North America from Northeast Asia, exactly when this migration occurred is still debated. Based on recent genetic studies, a founding population appears to have migrated south from Beringia, and into the Americas, approximately 16,000 years ago. Archaeological evidence generally corroborates the timing of this initial migration as indicated by the genetic evidence.

Raw Material Procurement and Selection in the Nenana Valley, Alaska: A Behavioral and Geochemical Approach

According to archaeological, genetic and linguistic records, Beringia is the point of entry into the New World by the first Americans. While most of Beringia has long since been inundated by post-glacial sea level rise, the eastern margin of the Beringian landmass exists today as Alaska. As such, the archaeological record of central Alaska is crucial for understanding the dispersal of humans into the Americas (Goebel et al. 2008). How did the earliest Beringians adapt to local environments as they arrived in Alaska? How did they respond to fluctuating climatic conditions as they learned new landscapes throughout the Holocene? Can these behaviors be observed in the archaeological record? Answers to these questions remain elusive because much of the previous archaeological research has been descriptive in nature (Goebel and Buvit 2011).

The Pleistocene and Holocene archaeological records of central Alaska are largely dominated by lithics with few sites preserving faunal assemblages. Sites such as Dry Creek, Walker Road, Moose Creek, and others exhibit sizable variability even within specific time intervals, from the time of colonization (14,500 cal BP) to the Younger Dryas (12,800-11,700 cal BP), and the middle Holocene (<5,000 cal BP) (Figure 1). Many researchers have sought to explain this technological complexity in the archaeological record as the result of distinct groups of people migrating from Northeast Asia. Other explanations have focused on site-specific, season-specific, or geographically-specific site functions, or responses to climate change and resource redistribution from the late Pleistocene through the Holocene. Each of these explanations tend to make broad-reaching interpretations for all of Beringia, but exploration, colonization, and settling-in processes were likely much more complicated than any one of these explanations suggests. More studies are needed that take a regional approach to understanding the nuances of colonization behaviors and landscape learning.

Recent geoarchaeological site formation and chronological studies have begun to address questions regarding periods of occupation and abandonment in central Alaska. These studies are important to begin to clarify the record, and are complimented by behavioral landscape studies (Graf et al. 2015). One way to investigate how the first colonizers of Beringia explored and became familiar with the landscapes of central Alaska is to study lithic raw material (toolstone) procurement and selection, which are components of lithic technological organization and provisioning behaviors. Because hunter-gatherers embed the activity of toolstone procurement in the procurement of food resources, learning the source locations of these toolstones and how they were selected to be used in a

group's toolkit can inform on the process of landscape learning and adaptive response to the environment (Andrefsky 2009). How did the first prehistoric Beringians colonize, and settle in to, the landscapes of central Alaska? In an effort to answer that question, I have been conducting fieldwork in central Alaska since 2015 to understand the process of toolstone procurement, selection, and landscape learning in the Nenana Valley.

Fine-grained volcanic rock types such as basalts and andesites dominate many central Alaskan lithic assemblages (Coffman and Rasic 2015). However, geochemical sourcing studies in Alaska have been largely limited to obsidian, which is relatively rare in the majority of Nenana Valley assemblages. Recently, other researchers have been successful in geochemically characterizing central Alaskan rhyolites. However, the geochemical characterization of other fine-grained volcanic materials (i.e., basalts and andesites) has only been studied preliminarily in southwestern Alaska, and not at all in central Alaska. Because quantitative, geochemically-based toolstone studies have been limited to just a few examples focusing on obsidian and rhyolite in this region, there are few specifically known source locations of toolstones. Therefore, little is currently known about how prehistoric peoples provisioned themselves with these toolstones (Graf and Goebel 2009).

Because potential toolstone sources (e.g., basalt dikes in the Alaska Range) are in close geographic proximity to one another, they are equally potential sources of toolstone; therefore, the Nenana Valley is a prime location to test: 1) their relationship with each other, and 2) whether people utilized some, all, or none of these locations as toolstone sources (Graf and Goebel 2009; Warhaftig 1970a, 1970b, 1970c). Furthermore, conducting geochemical analyses of fine-grained volcanic sources is significant because we can then begin to build a regional database for future researchers in eastern Beringia.

My fieldwork was first undertaken to systematically record and sample all available knappable materials within the Nenana River Valley, as a way to document the lithic landscape experienced by prehistoric hunter-gatherers. This landscape includes lithic toolstones available in primary outcrops in the valley, as well as in creek bed deposits located near known archaeological sites. Sa mpling materials to map the prehistoric lithic landscape was completed in the summer of 2017. To further quantify and compare materials procured by prehistoric populations, I used geochemical sourcing techniques to more specifically map fine grained volcanic materials (i.e. basalts, andesites, and dacites). Such methods help explain the adaptive strategies of modern humans dispersing and settling into interior Alaska.

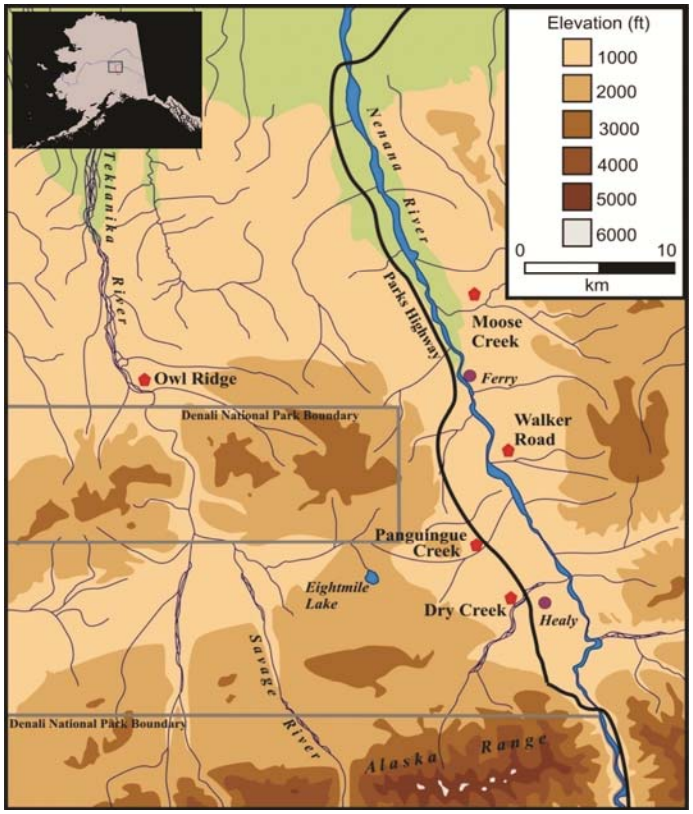

Figure 1. Map of archaeological sites within the Nenana River Valley; pentagons represent archaeological sites and circles represent cities. Adapted with permission from Graf et al. 2015.

My ongoing project utilizes geochemical methods for the characterization of raw materials to identify specific geochemical signatures for basalts, andesites, rhyolites and other volcanic materials for comparison with central Alaskan archaeological collections. Archaeologists have long used multiple techniques to determine the geochemical composition of geologic sources of toolstones to match artifacts to source locations, which enables reconstruction of mobile strategies and exchange routes. One technique in particular, portable X-ray fluorescence (pXRF), is a great asset to studying procurement strategies because it is a non-destructive means of identifying the elemental composition of artifacts, operating costs are low, and in-field use is possible. Once these lithic raw material sources are characterized, we can then compare the geochemical signatures of these outcrop and alluvial sources with the geochemical signatures of artifacts made on these materials in the region to pinpoint the provenance of these local sources exploited by people in the past. To move beyond basic source identification, I am also conducting lithic analyses of twelve central Alaskan late Pleistocene

and Holocene lithic assemblages. This will enable me to comprehensively characterize and explore technological provisioning strategies with regards to toolstone procurement and selection in several multicomponent sites; thus, strengthening our knowledge of changes in behavioral adaptations through time.

This project is unique in that it seeks to further test geochemical approaches to the archaeological record and integrate them with technological analyses. With the completion of this project, we will be able to more confidently assign specific source locations to assemblages containing basalts and andesites, increasing geochemical accuracy in source locations on the landscape, and contribute to the emerging database of geochemically analyzed volcanic samples in central Alaska. The ultimate goal of my research is to understand lithic variability, human exploration, and landscape learning in one river valley in central Alaska as an initial step toward unraveling variability apparent in the regional archaeological record. More broadly, this project contributes to our understanding of the regional prehistory of Alaska, and questions regarding exploring and settling-in behaviors of first Beringians and their descendants through time. The completion of this project will enable the reconstruction of prehistoric diachronic use of the lithic landscape in the Nenana Valley and explain the settling-in process as hunter-gatherers became increasing familiar with the landscape.

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Reconstructing Early Holocene Lake Shore Occupations at Blair Lakes, Interior Alaska

The Tanana Flats region of central Alaska has begun to emerge as an important locality for researching the earliest occupations of Alaska and ultimately, the colonization of the Americas. The most significant early archaeological sites in central Alaska have, until now, been directly linked to deep loess deposits in post-glacial landscapes conveniently close to major Alaskan highway systems. Expanded research in Alaska has begun to assess other landscapes in the Tanana and Nenana River drainages for their archaeological potential. Moreover, the Tanana Flats are perfectly positioned, geologically and archaeologically, to yield new late Pleistocene and early Holocene archaeological sites. One major geological feature in the low-lying Tanana Flats is a set of two large lakes (Blair Lakes) associated with tall ridgelines and large outcroppings of underlying schist (metamorphic) bedrock. The formation of the Blair Lakes during the late Pleistocene represents the creation of large resource patches that would have been a draw for the peoples of central Alaska for at least 14,000 years.

Formation of the Tanana Flats and Blair Lakes

The Tanana Flats is a large, 2,000-square mile floodplain just south of Fairbanks, and characterized by swamps, bogs, and forests. This area is known today for seasonally rich biodiversity, and home to wintering moose migrations. The Tanana Flats was formed from a massive alluvial fan complex originating from glacial activity in the Alaska Range. These alluvial fans consist of sediments that have been washed downstream through mountain streams and deposited in large sheets that often overlap with other nearby sediment deposits. Climatic

fluctuations during the Pleistocene and early Holocene caused alpine glaciers in the Alaska Range to advance and retreat. These fluctuations in glacial conditions created a massive, sloping area of joined alluvial fans, which forced the Tanana River to slowly shift north, and closer to the Yukon-Tanana Uplands where its located today (Péwé and Reger 1983). Previous geomorphic studies across the Tanana Flats indicate that the migration of the Tanana river occurred throughout the Holocene, moving away from the older relic alluvial features that have been capped by periglacial aeolian deposits. Thick, unconsolidated sediment deposits in the lowland areas of the Tanana Flats demonstrate a complex record of alternating silt and gravel deposition and erosion. These glacial outwashes and the rivers they fed carved terraces into the Tanana Flats, which have the potential for the preservation of very early archaeological sites.

The Blair Lakes are located in the east-central Tanana Flats. These lakes were formed during the late Pleistocene as a result of either rapid aggradation of Dry Creek, tectonic faulting, or a combination of the two. Aggradation, or deposition of sediments by streams, would have increased the elevation of the surrounding area, much like may have also occurred during tectonic faulting. The lakes are part of an isolated landform consisting of prominent hills and ridges, outwash terraces, and bedrock knolls of metamorphic Totatlanika schist. These geologic features are then overlain with Illinoisan-period outwash gravels deposited during the middle Pleistocene, and mantles of Fairbanks Loess deposited near the end of the Pleistocene. The highest peaks of the landform are 500m asl, making them clearly visible across the generally flat, lowland area of the Tanana Flats region.

Previous Archaeological Research around Blair Lakes

The late Pleistocene formation of the Blair Lakes means that they were prominent features on the landscape at the same time as the earliest human occupations of interior Alaska. The regional archaeological record indicates colonization of central Alaska occurred around 15,000 years ago. A lithic assemblage consisting of core and microblade technology is dated to ca. 14,800 cal BP at the Swan Point site. This assemblage is similar to contemporary tool kits documented in Dyuktai assemblages in Siberia. Nenana complex sites, characterized by core and flake technology, small, teardrop bifaces, and lack of microblade technology appear in central Alaska during a brief period of time in the Younger Dryas (c.a., 12,900-11,600 cal BP). By the early Holocene, Denali complex sites (characterized by a resurgence in microblade technology) dominate the archaeological record. Following the emergence of the boreal ecological regime, the Northern Archaic complex (characterized by microblade technology and side notched projectile points) spread to cover a majority of Alaska through the middle Holocene. By approximately 1,000 year ago, the late Holocene Athabaskan tradition is visible in the archaeological record with increased use of organic and copper technologies, house pits, and storage caches. Nearly every one of these cultural complexes have now been documented at Blair Lakes.

The initial survey and testing of the north shore of Blair Lake South was conducted in the 1980's (Dixon et al. 1980). Dixon and colleagues' work revealed an extensive, buried Denali Complex occupation, represented by a core and blade lithic industry, that was overlain by distinct Northern Archaic Tradition and late-Prehistoric Athabaskan cultural deposits. All of these archaeological deposits spread for hundreds of meters along the lake shore. The abundance of cultural material at the sites and the re-use of the location through time suggests that it represents early and middle Holocene basecamps, and possibly, a late prehistoric Athabaskan village (Dixon et al. 1980).

On the modern surface, a historic occupation of the lake shore is represented by the 1938-1968 homestead of Walter "Ted" Blair. Historic residential debris, the remains of three log structures, a fallen pole cache, and at least three depressions associated with the homestead extend across the surface of most of the sites defined by Dixon and colleagues (1980).

Dixon and colleagues (1980) also noted a number of large lithic artifacts, including flakes and diagnostic projectile points, representing multiple archaeological complexes in the shallow waters just off the shore of the lake. Erosion of archaeological deposits was noted in exposed areas on the terrace top, and along the cut bank at the shoreline. These sites along the lake and in the surrounding hills make up part of the Blair Lakes Archaeological District.

Current Archaeological Research at Blair Lakes

In 2013-2015, an extensive archaeological testing project by Colorado State University and Texas A&M University, took place along the north shore of Blair Lake South. This project had goals of delineating boundaries for archaeological components and more fully documenting the geomorphology of the lake shore. Test excavations confirmed that intact stratified deposits are present, representing five separate occupations spanning over 10,000 years of occupation, as well as hundreds of artifacts in the shallow water along the lakeshore (Figure 1). Importantly, these recent excavations confirmed the speculation of Dixon that all of the separate sites that

originally comprised the Blair Lakes Archaeological District were likely a single continuous prehistoric site with separate loci and multiple components – designated as Blair Lakes South-1 (FAI-0044).

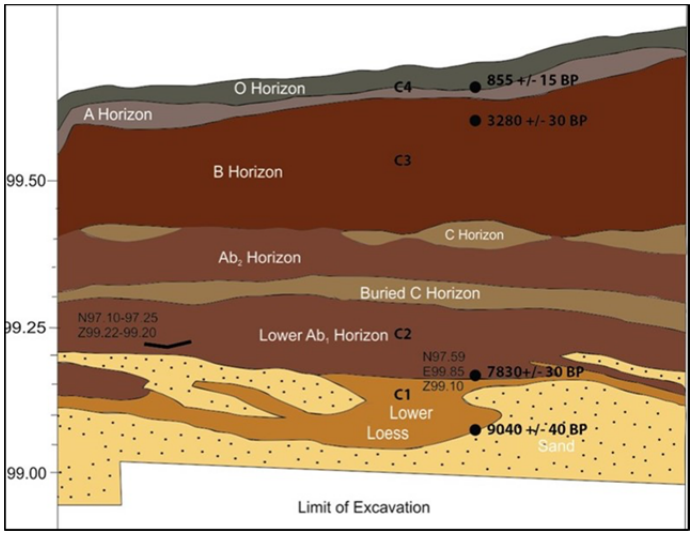

Figure 1. West wall profile of excavation Unit N97 E99 with archaeological components (C1-C4), radiocarbon dates, and possible hearth feature mapped.

The uppermost archaeological component (Component 5) represents the 1938-1968 Blair Homestead with associated structures, features, and debris scatter on the surface. Component 4, the uppermost subsurface component, is a "classic" Athabaskan assemblage with large cobble spall scrapers, bifacial debitage, and fire-cracked rock. An age of 900 cal BP from hearth charcoal gives a late prehistoric age to the assemblage (855 ± 15 C^{14} BP). Underlying this assemblage, Component 3 is within the modern B horizon and represents a Northern Archaic assemblage with notched and lanceolate projectile points, scrapers, and bifacial and core and blade production debitage level. An upper date for Component 3 is 3500 cal BP (3280 ± 30 C^{14} BP). Component 2 features a hearth associated with microblade debitage, mircoblades, core rejuvenation spalls, and two microblade cores. The component is bracketed between about 8800-9800 cal BP (7840 ± 30 and 8720 ± 30 C^{14} BP). The oldest occupation dates to approximately 10,000 cal BP (9040 ± 40 C^{14} BP). This assemblage was found resting at the contact of the lower loess horizon and the bedded sands that make up a basal (culturally sterile) geomorphological horizon all along the shore of Blair Lake south. Component 1 contains a unifacial knife and flaking debris largely produced on a fine-grained volcanic material.

Blair Lakes Going Forward

Archaeological research at Blair Lakes is exciting and ongoing. Teams from Colorado State University, Texas A&M University, and University of Alaska Fairbanks continue analyzing the formation of the lakes, pollen collected from cores extracted from the southern Blair Lake, the geomorphological setting of the archaeological components at the site, and the complete lithics assemblages from each component at Blair Lakes South-1. Blair Lakes, and other major geological features in the Tanana Flats, will continue to help us to better understand the initial colonization of central Alaska, as well as changing landscape use, resource exploitation, and settlement patterns through time.

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