EAC ’14
8th UK Experimental Archaeology Conference
10th & 11th January 2014
Merton College & the Research Laboratory for Archaeology and the History of Art
Oxford

Programme and Abstracts

EXARC
MERTON COLLEGE OXFORD
UNIVERSITY OF OXFORD
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EAC’14 Committee

Coordinators:
- Chelsea Budd
- Christophe Snoeck

Oxford team:
- Victoria Cullen
- Rowena Henderson
- Rachel Hopkins
- Amber Hood
- Amy Jeffrey
- Edward Peveler
- Francisca Santana Sagredo
- Dr Jean-Luc Schwenninger
- Petra Vaiglova

EXARC team:
- Ruth Fillery-Travis
- Roeland Paardekooper

Sponsors

We would like to extend our thanks to the following for their support:

• Merton College, Oxford

• Oxford Radiocarbon Accelerator Unit

• Archaeopress (http://www.archaeopress.com/)
Thursday 9 January 2014

| From 6 PM | For those arriving in Oxford on Thursday, join us at the Royal Blenheim (http://royalblenheim.co.uk/) to sample some excellent Oxfordshire ale, and for food if you wish. |

Friday 10 January 2014 – TS Eliot Theatre, Merton College, Oxford

<p>| 9.00 AM | Registration |
| 9.40 AM | Opening – Mark Pollard (Director of the Research Laboratory of Archaeology and the History of Art) |
| 9.50 AM | Session 1 |
| 9.50 AM | James Bailie Russell – Measurement of Earth Circumference using only materials and techniques available to Neolithic peoples |
| 10.10 AM | Stephen Blakely &amp; Gregory Blakely – Demonstration of a Full Scale Egyptian Pulley |
| 10.30 AM | Martin Smith – Fantastic Plastic? Investigating the potential of polyurethane bone substitutes in ballistic experiments |
| 10.50 AM | Information about workshops and library/museum visits – Christophe Snoeck |
| 11.00 AM | Coffee Break |
| 11.40 AM | Session 2 |
| 11.40 AM | W. James Stemp &amp; Mason Andruskiewicz – Quantification of surface wear on experimental obsidian blades: First results of the Ancient Maya Blood-letting Project |
| 12.00 AM | Elpidia Giovanna Fregni – Getting hammered: An analysis of comparative wear on Late Bronze Age hammers and modern replicas |
| 12.20 PM | Meaghan Dyer &amp; Linda Fibiger – Knocking Heads: a smashing investigation of the Thames Beater |
| 12.40 PM | Lunch in Merton College Hall |
| 2.00 PM | Workshops (1) and Merton College Old Library Tours |
| 2.00 PM | Metin Eren – Knapping Q&amp;A |
| 2.00 PM | James Russel – Display of Neolithic tools and measuring equipment |
| 2.00 PM | Rachel Hopkins – Medieval shoe making |
| 2.00 PM | Francisca Santana Sagredo &amp; Christophe Snoeck – Experimental approach to stable isotopes (Part 1) |
| 2.00 PM | Amber Hood – Merton College Old Library Tours |</p>
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<td>E. Morero, J. Johns, H. Procopiou, R. Vargiolo &amp; H. Zahouani – Reconstruction of the carving and polishing techniques of Fatimid rock crystal ewers (10-12th cent. AD.)</td>
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Saturday 11 January 2014 – Research Laboratory for Archaeology and History of Art, Oxford

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<td><strong>Francisca Santana Sagredo &amp; Christophe Snoeck</strong> – Experimental approach to stable isotopes (Part 2) + Visit of the Research Lab</td>
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<td><strong>Golnaz Hossein Mardi</strong> – An Experimental Approach to Studying the Decoration Technology of Pottery</td>
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<td><strong>Tine Schenck &amp; Peter Groom</strong> – Experiments with aceramic birch bark tar extraction</td>
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<td>If you are staying in Oxford, follow us to another excellent Oxford pub.</td>
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Oral Presentation Abstracts

In order of presentation
Session 1: pp. 10–12

James Bailie Russell – Measurement of Earth Circumference using only materials and techniques available to Neolithic peoples

Stephen Blakely & Gregory Blakely – Demonstration of a Full Scale Egyptian Pulley

Martin Smith – Fantastic Plastic? Investigating the potential of polyurethane bone substitutes in ballistic experiments

Session 2: pp. 13–15

W. James Stemp & Mason Andruskiewicz – Quantification of surface wear on experimental obsidian blades: First results of the Ancient Maya Blood-letting Project

Elpidia Giovanna Frgni – Getting hammered: An analysis of comparative wear on Late Bronze Age hammers and modern replicas

Meaghan Dyer & Linda Fibiger – Knocking Heads: a smashing investigation of the Thames Beater

Session 3: pp. 16–18


Enora Gandon, Reinoud J. Bootsma, John Endler & Leore Grosman – A Cautionary tale: experimental evidence for ceramic shape uniformity through culturally distinct motor traditions

Amber Hood & Jean-Luc Schwenninger – The minimum extraction technique: Applying optically stimulated luminescence dating to ceramic objects housed in museum collections

Session 4: pp. 19–21

Bernard Gilhooly & Brendan O’Neill – Working with Felsite: An Experimental Approach to Identify Stone Tool Working on the Shetland Islands

Metin I. Eren & Alia N. Gurtov – Lower Paleolithic bipolar reduction and hominin selection of quartz at Olduvai Gorge, Tanzania: what’s the connection?

Adrian Wrona – The carburization of iron objects in a pottery kiln

Session 5: pp. 22–24

David T. Altoft, Yastami Nishida, Karine Taché & Oliver E. Craig – Integrating experimental archaeology in organic residue analysis of pottery

Golnaz Hossein Mardi – An Experimental Approach to Studying the Decoration Technology of Pottery

Tine Schenck & Peter Groom – Experiments with aceramic birch bark tar extraction
Measurement of Earth Circumference using only materials and techniques available to Neolithic peoples

James Bailie Russell

j.russell@precastfoundations.org.uk

Member of the Institution of Engineers of Ireland, Graduate member of the Institution of Civil Engineers

ABSTRACT – This article has been written to explain one of two methods to establish the circumference of the earth, using a little understanding of how the Earth moves in space with respect to the Sun and stars, and only materials available to Megalithic People. Only five measurements need to be taken.

The “vertical method” depends on the establishment of the elapsed time of stars passing through two vertical planes viewed towards the South from fixed eyepieces exactly North of two vertical rails at the same latitude a known distance apart. It is done at night to minimise optical distortion and thermal movements in the apparatus.

If we know the distance between two points along this line and the time taken (seconds/pendulum swings) for a fixed point (Star) to pass directly overhead between the points, and we know the time for a full rotation (24 x 60 x 60 seconds), the circumference of the earth along the line of latitude is:

\[
\text{Circumference along line of latitude} = \frac{\text{Distance between sightrails} \times \text{No of swings in 24 hours}}{\text{No of swings between star overhead at each sightrail}}
\]

\[
\text{Great Circle circumference} = \frac{\text{Earth Circumference at observer's latitude}}{\text{Cosine of Latitude}}
\]

The unit of time for a modern experiment would be the second, a Neolithic experimenter could have used pendulum swings. A handheld pendulum should have an accuracy better than 15 minutes per day i.e. 1%.

REFERENCES

- Early experimental results published by Chris Knight in "Before the Pyramids"
Demonstration of a Full Scale Egyptian Pulley

Stephen Blakely & Gregory Blakely
blakely@illinoisalumni.org
815 Brookmead Drive, O’Fallon, MO 63366, United States

ABSTRACT – Egyptologists believe the Old Kingdom Egyptians, builders of the Great Pyramid, understood the pulley but could not fabricate a robust one because they, being in the Early Bronze Age, lacked the requisite metal for a high strength pulley axle. But it is contended that the Egyptians likely fabricated a rudimentary, robust pulley of limestone, granite, or copper -- a polished cylinder which rotates in an open cradle with a polished, mating surface (involving only compressive loading) -- the “Egyptian Pulley.” The portion of the cylinder contacting the rope is grooved and roughened to prevent rope slippage and to maintain rope cross-sectional integrity. Except for this circumferential groove around the cylinder, lubrication, for example, flax oil, is utilized on the mating surfaces. The Egyptian Pulley would have allowed the rope pullers to be positioned on the top, horizontal surface of the Great Pyramid during construction. The small size and weight of the Pulley means multiple Pulleys could have been utilized to meet the stone lifting rate required for construction of the Great Pyramid – and readily disassembled for rapid repositioning. An Egyptian Pulley was used in a recent, instrumented demonstration in lifting a 5,000 pound weight, demonstrating the plausibility of its use for the construction of the Great Pyramid (www.egyptianpulley.com).

The full scale Egyptian Pulley (described in the abstract) is currently on display in the Egyptian Gallery of the Spurlock Museum, Urbana, Illinois, USA.

REFERENCES


Fantastic Plastic? Investigating the potential of polyurethane bone substitutes in ballistic experiments

Martin Smith
mjsmith@bmth.ac.uk
Bournemouth University, UK

ABSTRACT – Recent years have seen growing interest in the study of weapon related trauma to the skeleton in archaeological samples and forensic casework. In order to recognise particular types of trauma accurately, comparisons need to be made with experimentally observed signatures relating to specific mechanisms of injury. In archaeological samples violence related trauma is most commonly observed in the cranium, not least because this is the part of the skeleton where such patterns are most easily recognised. Due to the unique proportions and dimensions of the human brain, animal crania are poor proxies for those of humans, whilst the enclosed nature of the cranium renders flat areas of animal bone less useful as experimental substitutes. A possible solution is presented by the appearance of polyurethane bone substitutes designed originally to train orthopaedic surgeons and purported to be appropriate for ballistic testing. This paper presents the results of a range of experiments impacting polyurethane replicas of different broad types of bone with a variety of mechanisms of trauma (including modern firearms, black powder muskets and crossbows) in order to assess the extent to which this material offers a reliable comparator in attempts to identify mechanisms of skeletal injury in humans.

REFERENCES
Quantification of surface wear on experimental obsidian blades: First results of the Ancient Maya Blood-letting Project

W. James Stemp¹ & Mason Andruskiewicz²

jstemp@keene.edu

¹Dept. of Sociology/Anthropology, Keene State College, Keene, NH, 03435-3400, United States. ²Surface Metrology Lab, Mechanical Engineering dept., Worcester Polytechnic Institute, Worcester, MA, United States

ABSTRACT – It is widely accepted that the ancient Maya practiced sacrificial blood-letting to communicate with their dead ancestors and the gods. Implements to draw blood included a variety of tools, including stone blades made of obsidian. Evidence for blood-letting is based on ethnohistoric accounts provided by the Spaniards, ethnographic observation of modern Maya rituals, iconography depicting blood-letting, hieroglyphic references, and the recovery of artifacts from ritual contexts. However, evidence for blood-letting based on the surface wear on the obsidian blades themselves is inconclusive and difficult to identify. Recent work for quantifying use-wear on stone tools using laser scanning confocal microscopy (LSCM) and scale-sensitive fractal analysis, based on relative area (RelA), has led to an experimental program to quantitatively document wear patterns on replicated stone tools. Three obsidian blade segments were used to cut raw beef as a proxy for blood-letting. Our results demonstrate that: 1) surface roughness can be documented using RelA; 2) discrimination of the used from the previously unused surfaces was not always possible; and 3) the original surface structure of an obsidian blade plays a role in wear formation and subsequent documentation based on RelA.

REFERENCES


Getting hammered: An analysis of comparative wear on Late Bronze Age hammers and modern replicas

Elpidia Giovanna Fregni
gfregni@comcast.net

University of Sheffield, Sheffield, S1 4ET, UK

ABSTRACT – In Archaeology by Experiment, (1973) John Coles outlined the ways in which experimental work is a valuable asset to the study of archaeology. It can be used to test hypotheses pertaining to early technology, in that replicas can be made, tested, and assessed against original archaeological artefacts (Mathieu and Meyer 2002, 75).

Earlier studies have used experimental archaeology to evaluate the performance of bronze axes (Mathieu 2002, 3), and to compare wear on replica axes to damage on archaeological artefacts (Roberts and Ottaway 2003).

For this study, replica metalsmithing tools were made based on the analyses and examination of Bronze Age tools in museums. These tools were then used in a series of experiments designed to replicate Bronze Age metalsmithing activities that would assess their durability and performance. The experiments included using a bronze hammer to sharpen an axe, forging a bronze bowl, and breaking metal objects.

After the experiments were completed, the replica tools were compared to the original artefacts using a schematic designed to quantify wear.

The comparative wear analysis provided insight into how bronze hammers and other metalsmithing tools were used, their durability and limitations, in addition to gaining knowledge of the practice of Bronze Age metalworking.

REFERENCES


Knocking Heads: a smashing investigation of the Thames Beater

Meaghan Dyer & Linda Fibiger
meaghan.dyer6@gmail.com
School of History, Classics, and Archaeology, University of Edinburgh, UK

ABSTRACT – A notable level of inter-personal violence characterized the Early Neolithic in Britain, though the context and mechanism of this violence is often heavily disputed. Much of the trauma record from this period manifests as blunt force cranial injuries. The distinct problems identifying Neolithic weapons have prevented the attribution of much of the record to particular tools of violence. This research is the first time a particular weapon will be tested to try and attribute some of the traumatic record from the period.

The Thames Beater, a wooden club, presented as an ideal choice of testable weapon based on its preservation, temporal and geographic context, and ethnographic considerations. A too-scale replica of the Thames Beater was used in experiments with both synthetic skull material and pig crania to try and produce blunt force fractures. The resulting fracture patterns were then compared with the archaeological record of the Early Neolithic to look for similarities. It is hoped this research will demonstrate the multi-purpose use of artifacts from the Early British Neolithic as both opportunistic weapons and daily tools; as well as provide the framework in which further experimental research can be carried out on other possible weaponry.

REFERENCES

Stone vase manufacture in the Eastern Mediterranean during the Bronze Age: an experimental approach

Elise Morero, H. Procopiou, R. Vargiolu & H. Zahouani

elise.morero@orinst.ox.ac.uk

Khalili Research Centre for the Art and Material Culture of the Middle East, University of Oxford, Oxford, OX1 2LG, UK

ABSTRACT – The second millennium is characterised in the eastern Mediterranean (Aegean, Egypt, Levant) by the emergence of the palatial system. This phenomenon was accompanied by the development of luxury craft productions and specialised craftsmanship. Among these productions, the stone vase industry was one of the most flourishing, mainly in Minoan Crete and in Egypt. The development of trade and contacts allowed the spread of ideas and objects, but also of craftsmen and their know-how, which are deeply connected to political, diplomatic and cultural relationships between centres.

To identify lapidary techniques and their spread, a multidisciplinary approach was developed with the RLAHA in Oxford, which associates tribology (LTDS of Lyon, France), field experiments and experiments under controlled laboratory conditions. Data from ethnographical studies of traditional workshops (ANR - CNRS, France) were also considered. In order to identify ancient techniques we compared the manufacturing traces of a group of archaeological stone vases to the experimental ones. The reconstruction of ancient techniques also yields information on technological transmission processes and on workshops organisation.

REFERENCES


A Cautionary tale: experimental evidence for ceramic shape uniformity through culturally distinct motor traditions

Enora Gandon, Reinoud J. Bootsma, John Endler & Leore Grosman

gandon.enora@gmail.com

Computerized Archaeology Laboratory, Institute of Archaeology, Mt. Scopus, 91905 Jerusalem, Israel

ABSTRACT – The shape uniformity in ceramic assemblages is classically interpreted as a sign of cultural uniformity e.g. the same production site. Indeed, in a traditional organization of production, potters produced vessels that fit into cultural prototypical shapes. Potters would have culturally inherited specific gestures which are adapted for the production of cultural shapes and also guides the potters’ ability to reproduce an unfamiliar shape. Here we question this hypothesis, inviting expert potters from two distinct cultural settings (France and India) to reproduce a common simple model shape (a sphere). We quantified the number and durations of the hand positions utilised by the potters. In addition, we geometrically characterized the vessels produced to assess their degree of similarity. From the total of 62 different hand positions identified, 44% were culture-specific and only 27% were shared across cultures (29% were idiosyncratic). Yet, this cultural difference on the operational aspect of the skill did not give rise to noticeable differences in the geometrical features of the vessels. In other words, the French and Indian motor traditions lead to an equivalent outcome, i.e. shape uniformity. This equivalence of distinct motor traditions introduces a cautionary caveat to the relation classically established between the uniformity of ceramic shapes and that of cultural groups. The question remains to know if this motor equivalence appears for more complex and cultural ceramic shapes.

REFERENCES


The minimum extraction technique: Applying optically stimulated luminescence dating to ceramic objects housed in museum collections

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ABSTRACT – Optically stimulated luminescence (OSL) is one of the most useful and accurate scientific dating techniques available for archaeological ceramic material. This paper seeks to introduce the minimum extraction technique (MET), a newly developed and innovative sampling methodology designed to carry out OSL dating on ceramic objects housed in museum collections. The need for using museum objects in OSL dating arises when in situ samples cannot be collected from the field, usually due to restrictions on the exportation of archaeological material for scientific analysis from its country of origin.

The benefit of the MET is that it requires only a minimal quantity of material for analysis, thus ensuring that the aesthetic and structural integrity of a museum object is upheld at all times. Although the MET is still classified as destructive analysis, in most circumstances it only requires the removal of a 2mm x 4mm sample which is usually extracted from an inconspicuous location on the object.

The MET is a new sampling method and is currently considered experimental. This paper will outline MET sampling strategy and protocols, obstacles to be overcome, and finally, it will present preliminary results obtained from an assemblage of Egyptian and Jordanian ceramics.

REFERENCES


ABSTRACT – During the Shetland Islands’ Neolithic period, polished stone axes, adzes and knives were produced from dyke sourced felsite.

In June 2013, a field survey team, headed by Professor Gabriel Cooney of UCD and funded by National Geographic Northern Exploration Fund, spent three weeks mapping individual felsite dykes and quarries, identifying Neolithic stone tool workshops and characterising specific knapping instances. Following attempts to positively identify worked surface material and morphologically distinguish debitage from axe/adze production, it became apparent that the extent of weathering, particularly freeze/thaw weathering, on the felsite would need to be address.

To this end, a suite of experiments has been designed to –

1 - Investigate if frost shattered felsite displays distinct morphological features, distinguishing it from worked felsite.

2 - To begin a process of replication to address questions of timing, levels of expertise needed and difficulties in producing Neolithic felsite axes/adzes/knifes.

3 - To provide a reference collection of worked felsite in order to characterize specific morphological traits to aid in the identification of material on site.

This paper will outline the methodology being employed within this project, highlight the benefits for utilizing an integrated suite of experiments and provide initial results from the first phase of experiments.

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Lower Paleolithic bipolar reduction and hominin selection of quartz at Olduvai Gorge, Tanzania: what’s the connection?

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ABSTRACT – Numerous researchers have noted that at Lower Paleolithic sites in East Africa, hominins largely exploited quartz toolstone with the bipolar reduction technique. The choice to pursue bipolar knapping on quartz is often attributed to raw material constraints. Thus, at some East African Lower Paleolithic sites the abundance of bipolar knapping may have simply constituted a response to the local absence of lithic resources other than small quartz pebbles. However, at Olduvai Gorge, Tanzania, where a variety of other stone raw materials were available, the hominin use of bipolar reduction is still predominately tied to quartz. While quartz raw material constraints may explain the use of bipolar reduction on quartz at Olduvai, what they do not explain is the virtual-absence of bipolar reduction on non-quartz toolstones. Thus, we ask here two separate, but related questions: (1) why did hominins use bipolar on quartz?; and (2) why did hominins avoid bipolar on non-quartz? To begin to understand this tight technology-toolstone connection, we formulated two simple hypotheses, which we tested via experimental stone tool replication: (1) Quartz bipolar reduction produces flakes that possess “superior” functional characteristics to those produced via non-quartz bipolar reduction; (2) Bipolar reduction is more expedient on quartz than on non-quartz toolstones. Our experimental tests indicated that while quartz and basalt bipolar reduction yield flakes with similar attributes, bipolar reduction on quartz is significantly more expedient than it is on basalt. As such, the close technology-toolstone association between quartz and bipolar can be explained by constraints and advantages of both quartz and basalt alike. Since bipolar reduction is already widely-acknowledged to be an expedient technology requiring little to no skill, by applying bipolar reduction exclusively to quartz, hominins at Olduvai appear to have only enhanced this reduction strategy’s features. Overall, our experimental results are consistent with the widely-held notion that Lower Paleolithic hominins recognized the differences in the physical properties of different types of raw material, and that it is the interplay between raw material and reduction strategy that governed hominin association between bipolar reduction and quartz at Olduvai.
The carburization of iron objects in a pottery kiln

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ABSTRACT – Case-hardening was probably the most common way of iron carburization in ancient and medieval times. The procedure however is highly time- and fuel-consuming, as attested by descriptions from Theophilus Presbyter or Giambattista della Porta, is however highly time- and fuel-consuming. But the blacksmith's hearth is not the only place where this process could be carried out. During long-time observation of firing pottery in an ancient type kiln, the idea arose to try to use this as a carburizing device. Very long periods of firing operation, during which almost half of the time temperature inside kiln achieves about 900°C, create perfect conditions for the conducting of case-hardening process. This paper presents results of a few experiments of iron carburization in a pottery kiln, in both reduction and oxidation atmosphere firing. In the first case, the iron items were placed inside the vessel and covered by charcoal dust and other organic materials which were sources of carbon. In the second experiment, the artifacts were deposited directly in the oven and the carburizing agent was the carbon monoxide gas filling the oven's chamber. A clue indicating a possibility of using this method in antiquity might be vessel fragments with reduced internal surface, that occur often within the archaeological record.

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Integrating experimental archaeology in organic residue analysis of pottery

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ABSTRACT – This paper presents results from extensive organic residue analysis of replica Incipient Jōmon pottery that has informed recently published research (Craig et al. 2013) on one of the world’s earliest innovations of pottery in Japan (Jordan and Zvelebil 2009). A large collection of modern terrestrial and aquatic animal species from across the Japanese archipelago was collected and experimentally cooked in the replica Jōmon pottery in Japan and the resulting food residues absorbed into the matrix of the pottery were extracted and identified at the University of York.

The isotopic composition of fatty acids and other lipid biomarkers (Evershed 2008) from the lipid residues acted as a reference dataset to aid the identification of residues from foods in archaeological Incipient Jōmon pottery. In addition, the dataset was used to determine the best procedures of experimental cooking and organic residue analysis for the identification of food residues absorbed in pottery.

The application of experimental archaeology has greatly benefitted this important research; however, similar applications of experimental archaeology have been rarely made in other organic residue analyses of pottery (Evershed et al. 2008). The authors hope that this paper will demonstrate the benefits of integrating experimental archaeology in organic residue analysis of pottery.

REFERENCES


An Experimental Approach to Studying the Decoration Technology of Pottery

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ABSTRACT – The early Middle Chalcolithic pottery tradition of Seh Gabi Tepe in Iran is called “Dalma tradition” (ca. 5000-4800 BC.). Among different types of Dalma pottery, I have focused on monochrome and bichrome ceramics in this paper to see whether or not similar motifs were depicted with different techniques. My study is narrowed down to brush strokes and order of decoration, and other technological aspects such as types of pigments and tools (e.g. type of brush) are not investigated here. In my study, I used experimental analysis along with an examination of actual pottery and reading publications to answer the questions. Here I did not replicate the whole manufacturing process of pottery, and instead of making complete vessels, I made clay slabs to test the decoration on them. Since there is little information about the decoration technology in previous studies on Dalma ware, my interpretations are mainly based on my own observations and experiments as well as general sources about pottery technologies. The analysis suggests that the motifs were mainly painted with similar techniques. Nevertheless, some variation in the decoration of some ceramics was present as well.

Keywords: Iran; Chalcolithic period; Dalma pottery; Monochrome and Bichrome decorations; Seh Gabi Tepe; Experimental analysis

REFERENCES


Experiments with aceramic birch bark tar extraction

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"Birch bark tar has been a widely used product in prehistory. From adhesive purposes to waterproofing, it is a versatile agent which also proves to have medicinal properties and may have been used as such. Finds of birch bark tar date as far back as 50 000 BP, in other words the Middle Palaeolithic (see for instance Mazza et al., 2006), but has been in consistent use from the Mesolithic onwards.

ABSTRACT – The production of birch bark tar takes place in a dry-distillation process, which demands strict control over temperature, oxygen exclusion and moisture levels. From the Neolithic onwards, ceramic containers seem to be the preferred mode of production (e.g. Ottaway, 1992), and understandably so as they provide a heat conducting, airtight medium. However, it is clear that birch bark tar was also produced before ceramics entered the material record, amongst others in the shape of numerous lumps with teeth imprints from the Scandinavian Mesolithic (Aveling and Heron, 1999). How this tar was produced is still unclear, and our experiments target the technology behind aceramic production methods of birch bark tar.

One set of exploratory experiments were undertaken in 2009 (Groom et al., 2013), during which we attempted pit firings with little success. However, these experiments led to further questions, and a set of experiments with raised features were conducted in 2013. In this talk, we present the results and discuss their relevance for the prehistoric dry-distillation of birch bark tar.

REFERENCES


Poster Presentation Abstracts

Listed alphabetically
Using experimental archaeology to identify roofed and un-roofed spaces in the archaeological record

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ABSTRACT – Experimental archaeology is a powerful strand of research to be used in the investigation of archaeological site formation processes. Using a micromorphological approach, deposits within experimental structures at Butser Ancient Farm, Hants, and St. Fagans, UK and Lejre Historical and Archaeological Research Centre, Denmark, were examined. The results are compared with data from archaeological deposits within a series of early and mid-Roman (c. 70-80 AD – c. 200 AD) earthen and timber-framed buildings from Insula IX, Silchester, Hants, UK. Clear sedimentary alterations occurred as a result of post-depositional events. Micromorphological characteristics attributed to both trampling as a formation process and post-depositional alteration have been identified in experimental and archaeological sediments at these temperate sites. The locations of trampled sediment in archaeological buildings have been used to identify wet areas of buildings such as doorways or semi-open spaces in the archaeological record; differentiation between the two may be determined by the category of clay coatings. In addition, failing roofs can radically transform occupation deposits within buildings and eventually lead to soil development, which may resemble a ‘dark earth’; this could have significant implications for the identification of structures in the archaeological record.

REFERENCES

Making a Neolithic bead: from procurement to use

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ABSTRACT – In exploring the Neolithic period in Anatolia the social and economic changes that accompanied the beginning of specialized craft production have become an increasingly important theme. The manufacture of beads from stone proliferated during the Neolithic period, however their role as a means of expression and as an increasingly important product has received little attention. There have been a number of studies of the process of drilling of beads but the full experience from procurement to use has yet to be explored.

At the early Neolithic site of Boncuklu Höyük in the Konya Plain, central Turkey, stone beads were produced in and around the houses from a variety of stone types, mostly procured from the local landscape. This poster uses the bead assemblage of this early sedentary site in conjunction with a programme of raw material procurement and experimental bead production to understand the degree of impact that such activity had at the settlement. In so doing it relates genuine possibilities to generalized assumptions and explores the experience of making the objects that had the closest place to the human body. Beads are potentially a key to understanding how individuals viewed themselves in relation to others in such early communities.

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Shaping Shale: experimental production of prehistoric beads and armlets

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ABSTRACT – Shale is a rock found throughout Britain, and a variety of functional and ornamental artefacts have been discovered at a great many prehistoric and Romano-British archaeological sites. Denford (2000) has studies the industry of a particular type of shale - Kimmeridge shale - and has compiled a database of over three thousand artefacts. Little study of other types of shale has taken place, and experimentation has been limited. A Rev. Mr Witt Stoke demonstrated that flint was an effective tool for lathe-turning of Kimmeridge shale (Denford 2000). Flint tools have been found at many sites of prehistoric and Romano-British shale industry. Errington and Johnston (1981) assessed the efficiency of flint for lathe turning and established that they wore down after only three hundred turns. A Romano-British cup has been replicated with and without the use of a lathe (Sloper and Johnston 1986). The aim of this investigation is to attempt to replicate shale beads and armlets of prehistoric provenance, using both lathe-turning and hand-cutting with flint tools. Different types of shale will be used to establish differences in their workability.

REFERENCES
Reconstruction of the carving and polishing techniques of Fatimid rock crystal ewers (10-12th cent. AD.)

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ABSTRACT – The art of Fatimid Egypt in the 10th–12th centuries C.E. is well known for luxury arts, and particularly for the production of rock crystal vessels. The techniques used in carving this hard stone were re-considered following the appearance in 2008 of a new ewer – the Francis Mills ewer – which at first sight seemed to belong to a famous group of rock crystal ewers carved in Fatimid Egypt. The best criteria for determining whether or not the ewer is a member of this group, were the identification and comparison of the carving techniques used in the Fatimid period.

To this end, a corpus of 15 artefacts was analysed. The manufacturing traces (mainly from the polishing and carving) were recorded and observed. Then, the reconstitution of these processes required a method based on a multidisciplinary approach, which associates data obtained by tribological analyses, archaeology and written sources, with information from ethnoarcheology (traditional workshops). In parallel, experimental reconstructions of the ancient techniques were realised, partly with the collaboration of a gem cutter.

We were able to identify the techniques and the tool kit used by Fatimid craftsmen, while the attribution of the ewer to the Fatimid group was established.

REFERENCES

Methods of using antler hammer adzes in Mesolithic

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ABSTRACT – The occurrence of antler artefacts on prehistoric European archaeological sites is one of the most interesting evidence of highly developed manufacturing system in these times. Among the wide range of different categories of such artefacts, especially interesting, on account of the way of using, tend to be hammer adzes made of antler which are known from the Mesolithic archaeological sites (e.g. David 2004; Pratsch S. 2011; Kabaciński, David, Makowiecki, Schild, Sobkowiak-Tabaka, Winiarska-Kabacińska 2008). The main goal of our experimental program was to verify the existing theories about the possible ways of use of such a artefacts (e.g. Korobkova 1999), taking into account the three basic functions - utilitarian, combat and prestigious. For this purpose, a series of experiments were carried out including chopping/striking wood, meat, bone etc. The study was complemented with use-wear analysis, which allowed to document and study, all of the use-wear traces occurring during the using replicas of Mesolithic artefacts which have been made. The preliminary results of the selected experiments is the basis of this poster.

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Mesolithic “curved knives” from Polish Lowland. Remarks from use wear analysis and experimental studies

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ABSTRACT – Based on experimental studies and microscopic observations, use-wear research aims to establish a functional classification of flint tools. Yet sometimes, it also preoccupies with identification of objects with traces of use not known from any recognized or classified material. The so-called curved knives identified by the presence of a specific type of polish are such products, previously known only from the Western-European assemblages. They are dated to the late Mesolithic and early Neolithic in the West usually associated with Kongemose, Ertebølle and Linear Band Pottery cultures. This study aims to present the first tools of this type that was recently identified in Polish collections, along with a preliminary analysis of use-wear traces recognized and some remarks of their function based on the results of experimental studies conducted.

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This work was supported by the Ministry of Science and High Education project N° NN109 226140
Reproduction and Use of Sicilian Early Bronze Age Axes

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ABSTRACT – Main aim of this preliminary study is the analysis of the results recorded during the experimental replicas making and use of four bronze axes, within the frame of the archaeological project of prehistoric hut rebuilding in Tornambé (Pietraperzia, Enna). The axes were cast starting from a tin bronze (8% Sn), and following the typical bronze age casting process gathered archaeological evidences, namely working tools and casting structures. Axes were refined through multiple cycles of heating, cooling, hammering and then finally polished with sandstone and fine sands. A database was created in order to compare all the macroscopic and microscopic observations on the used axes (use-wear analysis on the edges and surfaces); data have also been collected taking into account different contingencies (weather, time, worker, kind of activity, etc).

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- Albanese Procelli R.M., Ripostigli di bronzi della Sicilia nel Museo Archeologico di Siracusa, Palermo 1993
The Prometheus Project: using fire to build a Bronze Age log boat

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ABSTRACT – ‘The Prometheus Project’ was an experiment undertaken at Butser Ancient Farm, Hampshire, to investigate the potential use of fire in the construction of Bronze Age log boats. The use of fire in the construction of prehistoric log boats has been discounted by archaeologists due to the lack of evidence of fire in the examples found in the archaeological record. This is in contrast to many historical and contemporary cultures that use fire when building almost identical types of craft. ‘The Prometheus Project’ aimed to show that it was possible to use fire to build a log boat without leaving any evidence of that fire. ‘The Prometheus’ was built using a 2.5m half split oak trunk and was hollowed out using fire and reproduction Bronze Age tools. The experiment showed that by using accurate replica Bronze tools it was possible to successfully remove any evidence of fire being used in the boat’s construction. The potential use of fire in the construction of prehistoric log boats does not only bring into question what we know about construction techniques but also the materials that could be used to make them.

REFERENCES

Workshop Abstracts

Listed by session
**Session 1 – 10 January 2014:**

**Metin Eren – Knapping Q&A**

During this Q&A workshop, you will have the opportunity to learn all the secrets of knapping.

**James Russel – Display of Neolithic tools and measuring equipment**

In this workshop, it will be demonstrated how it is possible to make a defined measuring stick with a tolerance of a few thousandths of an inch. The method uses natural materials, to make thousands of copies, over a long time period. There will be some "blank" lengths of timber for visitors to be given the opportunity to make their own accurate copy of a "megalithic yard".

**Rachel Hopkins – Put yourself into King Edward’s shoes – European Medieval shoe manufacture**

At least since the Neolithic – but probably even earlier – shoes have been vital to protect our feet against the ever changing environment, giving us endurance and adaptability. Being made of organic materials, these loyal companions rarely survive. Where their remnants from the medieval period were recovered, they shed light on a vast variety of techniques and design. Their insight into fast changing traditions provides not only high resolution chronologies, but also evidence for long distance cultural exchange and trade. The workshop is designed as a walk-in session and focuses on pattern design and sewing techniques of leather shoes from the 12th to the 15th century AD. The interpretations are based on archaeological as well as historical and iconographic evidence from various medieval European settlements, incl. Greenland. At different workstations you can learn how to make shoe maker’s thread, how to design a shoe your own size, how to choose and cut leather correctly and why shoe lasts look so different. Further information on clothing of the period and shoe design over the last five centuries make sure the knowledge is seen in context. This is a unique opportunity to get some hands-on experience and ask questions that books forget to answer.

**Francisca Santana Sagredo & Christophe Snoeck – Experimental approach to stable isotopes (Part 1)**

Stable isotopes (carbon, nitrogen, oxygen, strontium, etc.) are commonly used in bioarchaeology to reconstruct past diets, climates and migration patterns. After a brief introduction delegates will have the opportunity to donate and prepare a few hairs or nails for isotopic analyses to see if today, when most go to the supermarket instead of eating locally, it is still possible to see what you eat and where you come from. The samples will be analysed overnight and the results shown and discussed in second part of this workshop.

**Amber Hood – Merton College Old Library Tours**

Merton College Old Library is the world’s oldest continuously functioning library for university academics and students.
Session 2 – 11 January 2014:

Elise Morero – Lapidary drilling tools in Eastern Mediterranean during the Bronze Age (3rd–2nd millennium BC)

In the framework of the study presented at the conference: "Stone vase manufacture in the Eastern Mediterranean during the Bronze Age: an experimental approach", an experimental reconstruction of the drilling techniques and tools was performed. In this short workshop a demonstration of the main types of mobile drills used by craftsmen for the manufacture of stone vessels in Egyptians (crank borer) and Minoans (bow drill) workshops, as well as the drilling sequences will be carried out.

Rachel Hopkins – Organic Tupperware – Neolithic Bark Container Manufacture

In Europe the evidence for bark containers goes back at least as far as the Early Neolithic, and their use continues until the present. This workshop gives hands-on insight into the various sewing techniques used for making Neolithic bark containers, and will focus on forms and stitching techniques evidenced at Lake Biel (Switzerland). You will be able to experience first-hand the benefits and drawbacks of local stitching techniques, and learn about bark and bast harvesting and preparation. At the end of the workshop we hope you will be equipped with your own small “bark” container made of cardboard and raffia bast, and the knowledge to be able to make your own real bark container, an organic Tupperware.

Francisca Santana Sagredo & Christophe Snoeck – Experimental approach to stable isotopes (Part 2) + Visit of the Research Lab

After a short tour of the Research Laboratory, the results of the measurements carried out on hair and nails of the delegates will be shown and discussed. Will we be able to discover what you eat and where you come from?

Amber Hood – Ashmolean Museum Tour

Established in 1683, the Ashmolean Museum is the world’s first university museum, recently redeveloped. This tour will start with the Egyptian galleries reopened in 2011. It will then be possible to explore the other galleries going from the Neolithic to the present day. In addition to archaeological artefacts, the Ashmolean Museum contains a vast collection of paintings and casts.

Petra Vaiglova – Pitt Rivers Museum Tour

The Pitt Rivers Museum was founded in 1884 when General Pitt Rivers gave his personal collection to the University containing more than 18,000 archaeological and anthropological objects. There are now over half a million object displayed in the Museum.
The ORAU specialises in archaeological radiocarbon dating and is dedicated to providing high quality services for UK archaeologists:

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