2018 EAA Session: What we are learning from experimental archaeology?
Session #199 at the European Association of Archaeologists' (EAA) meeting
Saturday 8 September 2018, 14:00h – 18:00h, room UB407

Abstract #: 94

INTRODUCTION: WHAT WE ARE LEARNING FROM EXPERIMENTAL ARCHAEOLOGY?

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Experimental archaeology is fascinating and increasing in popularity. Worldwide, there are over one hundred universities offering education in experimental archaeology; sometimes an immersive week to learn hands-on about material culture, in other cases full PhDs are produced.
Experimental archaeology conferences and sessions are popping up around the world, not only in Europe, but also in North America, South Africa and Australia. In many cases, there is a crossover between experimental and experiential archaeology.
But if we take a holistic approach to archaeology, seeing it as the science of 'everything human' as far as we can learn this through excavated remains and information, is it not about time to see what we can learn from the past through archaeology for our present society? Archaeology would not be the first science, which contributes to making our current life easier.
We can learn lessons from the Pre-Columbian Era about rebuilding after natural disasters, for example, and NASA patented using chain mail for its landrovers, based on archaeological examples. It is a matter of testing / experimenting, followed by application.
Archaeology can make a valid contribution to society, not just by explaining how life was in the past, but what we can learn for the future.

Keywords
experimental archaeology
reconstruction

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Abstract #: 1625

MUD BRICK BUILDING IN ANCIENT EGYPT - AN EXPERIMENTAL APPROACH

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The most impressive ancient Egyptian structures were made of stone. They mostly survive and give the impression of the state in the Nile Valley monumental architecture. However, these structures are not the only building types of those times. Typical of the first Egyptian foundations are monumental mastaba tombs and large administrative buildings, known e.g. from Saqqara, Naqada or Tell el-Farkha, executed without stone elements. The early architecture of Egypt bases on simpler constructions of easily available and effortless in production material – mud bricks. The main question about this kind of material is its economy of manufacturing. It was so common that it must have been easy and quick for preparation, but how easy and quick was it? How much workload did it require? What amount of ingredients did it need? How long did it take to prepare a batch of bricks ready to use in a building process? Finally, how vast was the area necessary to produce and prepare a sufficient amount of bricks?
In the presentation we will refer our experimentally supported attempt to find some answers and possible calculations to bring a closer insight into the mud brick architecture issue. The experiment was based on our experience gathered in the many years long course of research at the Pre- and Early Dynastic (4th millennium BC) site of Tell el-Farkha, located in the eastern Nile Delta in Egypt. The project was carried out using data collected at the site, which gave us a strong reference material in the early Egyptian mud brick problem. To supplement our archaeological knowledge and solve some practical production difficulties local craftsmen familiar with gradually vanishing traditional building techniques also contributed to the experiment.

Keywords
mud brick
ancient Egypt
Tell el-Farkha
enthoarchaeology

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Abstract #: 1248

WHAT GOES AROUND COMES AROUND: LESSONS FROM EXCAVATING AND REBUILDING A RECONSTRUCTED IRON AGE ROUNDHOUSE AT CASTELL HENLLYS, PEMBROKESHIRE, WALES

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The long-term reconstructions at Castell Henllys, Pembrokeshire Coast National Park in Wales, offer opportunities for longitudinal study of decay, repair, and management. In 2017, the roundhouse that had been excavated and then reconstructed on the original site 35 years ago was dismantled, recorded, excavated, and has been rebuilt during 2018 according to a new design modified on the basis of the lessons learnt from this longterm project. The paper's author directed the original excavation and devised the reconstruction design, and worked with James Meek of the Dyfed Archaeological Trust in its re-examination as part of an integrated University and Community-based project. He also modified the proposed replacement reconstruction design. The results highlight the ecological implications of house building and the low-level requirements for continuing maintenance. They also reveal that some adaptations to structure during its life, inspired less by the archaeological evidence and more by modern perspectives regarding materials and structural rules, were inappropriate and ineffective. The lessons learnt have informed the replacement reconstruction, which when combined with the archaeological data should ensure an even more robust structure on the long-term. These lessons also have value when considering green solutions to house-building in the present, and the ways in which over-engineering can be inappropriate when applied to traditional designs. The excavated evidence also revealed how the space within the building was used, and this informs both interpretation of Iron Age data and how contemporary visitors will interact with the new reconstruction.

Keywords
Reconstruction
excavation
Iron Age
roundhouse

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Abstract #: 321

GROWING THE PAST: PREHISTORIC FOOD PRODUCTION AS A MODEL FOR RESILIENCE IN A CHANGING CLIMATE

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Human population growth and industrialization has placed unprecedented burdens on agricultural production and global food access. By 2050, the risk of hunger and malnutrition worldwide is estimated to increase by approximately 20% due to the impacts associated with global climate change. Drought, the expansion of crop pests, and variable rates of precipitation partly due to global climate change, and agricultural emphasis on a small number of carbohydrate rich seed crops with very little genetic diversity have further contributed to concerns for global food security. Currently, wheat, maize and rice provide two-thirds of food consumed globally. These cereals are low in protein, and using them to provision animals as a source of protein is an inefficient way to produce food for a growing global population. As climate change alters local environmental conditions, diversified farms may become necessary to ensure the economic success of farmers and to maintain global food security. In order to meet the needs of diversified local food systems, we suggest that the archaeological record is an invaluable resource. Our research is focused on the lost crops of eastern North America, a diverse group of annual plants that were cultivated for their edible seeds for thousands of years by Native Americans. We are conducting greenhouse and field experiments with these crops to better understand the archaeobotanical record, and to explore the possibility of re-domesticating these species. We will introduce each of the lost crops and its potential agronomic and nutritional value, then present preliminary results from our experiments. Diverse crop systems today are under threat, but for most of the history of agriculture they were the norm. We can use the archaeobotanical record to prospect for useful plants that are no longer grown and to better understand the social conditions that create and sustain agrobiodiversity.

Keywords
Experimental gardens
agriculture
agrobiodiversity

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Abstract #: 4819

AN EXPERIMENTAL PROJECT TO REPRODUCE IRON AGE IBERIAN KILNS

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This project aims to reproduce and record the reconstruction and firing of two Iron Age pottery kilns so as to deepen knowledge of the development and manufacturing processes of pottery from the Iberian Culture. To carry out this ambitious project, the team of the C.E.P. (Camp d'Experimentació de la Protohistòria) of Verdú opted for controlled and scaled (1:1) reproductions of two previously excavated kilns. Furthermore, given the complexity of the process of construction and comprehension of these types of features, the team chose to reinforce the archaeological evidence with ethnographic data, in particular data gleaned from Berber kilns, a type that is still in operation today in central Morocco in the Errachidia region. The ethnographic records also comprise data collected from local Verdú potters. It is worth mentioning that this alternative line of research adopted by the C.E.P. deepens knowledge of the past, serves as a complement to archaeological experimentation and generates reconstructive hypotheses. The archaeological evidence of the experimentation was obtained from kilns recently excavated at the Iberian settlement of Hortes de Cal Pons (Pontons, Catalonia).
Specifically, the C.E.P. team set out to test the hypothesis of construction of kilns 4 and 6 of the Hortes settlement. The function of kiln 6 was tested by two experimental firings. Broadly speaking, the kilns are of the vertical draught type with a lower circular combustion chamber featuring a central pillar, an axial wall and an upper firing chamber. The lower chamber is most often partially underground to ensure thermal insulation and commonly equipped with a corridor or praefurnium. A good control of the fire is carried out in the corridor or stokehole and not directly in the combustion chamber. This distributes the heat more uniformly through the perforations of the grate. The grate serves, in fact, as a second fire regulator.

Keywords
pottery kilns
Iberian Culture
Iron Age: experimentation

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Abstract #: 1156

EXPERIMENTAL KNAPPING SIMULATIONS AND THE CREATION OF NEW (OLD) BEHAVIOURAL DATA

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Experimental archaeology offers information far beyond the reinvention of techniques and technologies used in the past. Through experimental simulations, we can learn about how artefacts were taught and learned, allowing researchers to infer past mental processes. This presentation will illustrate two case studies: 1) in an experiment simulating different methods by which Palaeolithic stone tool technology is taught and learned (Stade 2017), a pattern of reduced morphological variation (higher standardisation) was identified in high fidelity social learning groups. This supports that highly standardised stone tool assemblages might only be possible with the perceptual and cognitive abilities that are necessitated by complex social learning abilities (like theory of mind and language). 2) In an effort to measure how 'copyable' different knapping technologies are, footage of knapping events was analysed and knappers' gestures broken down into a discrete list. These individual gestures were then assessed for how visually and functionally perceptible they would be to others, allowing for the creation of a 'copyability score'. This copyability score could then be applied to different Palaeolithic technologies, or even individual tools, to support the complexity of social learning that would be needed for their successful transfer. The ability to watch Palaeolithic individuals learning to knap is impossible. Experimental archaeology is invaluable for allowing present people to experience the past, but it is also a significant tool allowing researchers to create otherwise non-existent data, such as recreating these long-lost learning situations.

Keywords
stone knapping
social learning
Palaeolithic
cognition

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Abstract #: 2472

EXPERIENCE IN RECONSTRUCTION AND USING OF SINTASHTA CULTURE ARROWHEADS.

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Sintashta culture of the Southern Urals is the most technological and militarized culture of the Bronze Age in steppes of Northern Eurasia.
More than 20% of the Sintashta burials have a military context. The culture is known for finds of the details of the world's oldest chariots (near 2100 B. C.), fortification traditions (23 fortified settlements), found details of bows, details of the armour made of elk horns. Privileged estate consisted of warrior-shepherds guarding cattle, for them and intended advanced weapons. Despite the developed complex of metal weapons, the main weapon of the ancient warrior-shepherds was the bow. Researchers found bone details of composite bows. The collection of arrowheads of Sintashta culture is more than 200 examples, which many times exceeds the indices of other cultures of the Southern Urals in the Bronze Age. In the quiver set of Sintashta archers were presented stone, bone and very technologically advanced bronze arrowheads.
Stone types of arrowheads had a wide variety of shapes and sizes. We conducted an experimental study of the manufacturing process and use of all types of arrowheads. The most massive stone arrowheads are made of thin biface with the technology of jet pressing. They are found mainly in elite burials (with a chariot, a bow). In the materials of the settlements there are many finds of preforms of these stone arrowheads. Tests of this type of arrows have demonstrated that their lethal force is higher than that of the tips made of the flake-plate.
In the manufacture of bronze arrowheads, we completely repeated the entire technological process from mining ore to casting the product. Tests of bronze arrowheads have shown that they successfully pierce armor from the elk's horn, to which stone and bone arrows are not capable.

Keywords
Bronze Age
warfare
sintashta culture
arrowheads

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Abstract #: 3957

RED ALERT? THE COLORS OF HEAT-AFFECTED QUARTZITE

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Thermally altered rocks are known from numerous contexts around the world and can contribute much information to our understanding of fire-related behaviour. I report on two pilot studies to examine how heat exposure affect the colours of quartzite from the Eastern Cape, South Africa. Locally sourced quartzite samples were heated on an open fire, and some of the samples were subsequently submerged in water. The colours of the samples were recorded visually, with the Munsell colour chart and by digital photography before the experiments and between each heating episode. The software package R was used to convert Munsell colour values to numerical values for statistical analysis, and principal component analyses (PCA) were conducted on converted Munsell colour values as well as digitally recorded values. The experimental samples displayed colours, cracks and breaks similar to those recorded in rocks used for cooking. A comparison of the colour recording methods show that the digitally recorded colour values best described the differences between unheated samples and samples heated three times. It was also to a certain extent possible to distinguish between heated samples and samples that had been heated and water-exposed. These results have implications for the understanding of heat-exposed quartzite and cooking techniques in the global archaeological record.

Keywords
Fire
quartzite
cooking
thermally altered rocks
quartzite

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Abstract #: 1785

WHAT HAVE WE LEARNT AFTER 27 YEARS OF EXPERIMENTAL ARCHAEOLOGY AT L'ESQUERDA?

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L'Esquerda's archaeological founds motivate us to jump into experimental archaeology projects. The excavation of the medieval granary in 1986 and the collaboration with Dr. Peter J. Reynolds (Butser Ancient Farm) encourage us in 1990 to start sowing ancient grains of the same specimens recovered from the excavation (Triticcum dicoccum, Hordeum vulgare, Secale cereale, Vicia faba, Vicia sativa). Since then, we had been experimenting with the grains (sowing and harvesting), the full-scale construction of a medieval granary and a smithy using ancient techniques, iron forging and bronze melting till the construction in 2015 of a full-scaled Carolingian wooden watchtower. Through 27 years of Experimental Archaeology Projects, we had gathered a great amount of data and results. But after all these experiments, recorded data, analysis, many questions appear: what have we learned from all these experiments? Are they really useful for archaeological research? Can we use experimental archaeology for teaching scholars? And can we use it for diffusion and cultural promotion? Is there any difference between an archaeological experiment and a demonstration?
In this paper we want to present what have we learned from all these experiments along 27 years, opening a discussion about it. What is the real difference between Experiment and Experience, between theory and practice, between the objectives and the results, between Reconstruction and Science?

Keywords
Experimental Archaeology
Agriculture
Metallurgy
Construct

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Abstract #: 2772

EXPERIMENTAL ARCHAEOLOGY AND EXPERIMENTATION AS A LEARNING TOOL OF THE IBERIAN PERIOD: THE IBERIAN CITADEL OF CALAFELL

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The Iberian Citadel of Calafell is an archaeological site of the Second Iron Age, excavated since 1983, with a time span from the 6th to the 2nd century BCE. A project of architectural restitution using experimental archaeology methodologies has been developed since the year 1992.
From the archaeological remains recovered in this site and in others of the same period and culture of the Iberians, as well as the ethnographic comparison with North African settlements, some of the houses, towers and walls have been built up using the same materials and techniques as the Iberians of 2300 years ago.
Once restored architectonically, the Iberian Citadel of Calafell has fostered various experimental actions and experimentation projects which have been helpful in order to spread knowledge about the culture of the Iberians from several fields. Thus, iron metallurgy, minting, pottery, wine and cordage making have been some of the projects made lately. They have contributed to bring closer to both overall public and especially to students, various aspects of the Iberian culture. Likewise, this way of dissemination of the past can also be a good learning tool so that citizens ponder on this knowledge and relate it to modern times, in terms of efficiency, sustainability or comfort for instance.

Keywords
experimental archaeology
dissemination
reconstruction

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Abstract #: 5183

EXPERIMENTAL ARCHEOLOGY AND ACADEMIC TRAINING AT THE AUTONOMOUS UNIVERSITY OF BARCELONA (UAB)

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Autonomous University of Barcelona (UAB) imparts since 2016 specific training in Experimental Archaeology in its Prehistory, Antiquity and Middle Ages Official Master program. Experimental Archaeology has had a solid presence during the last three decades at UAB, where several seminaries, congresses and workshops had taken place, addressing many topics like manufacturing of lithic and wood tools, food processing, etc.
This work has influenced various research lines in different fields based in Experimental Archaeology, developed in MA dissertations and PhDs.
For us, experimentation is inherent and an integral part of the scientific method (Baena and Terradas 2005). It is the base of scientific research and also, therefore, of archaeological research.
In this communication we would like to present a brief history of the trajectory of these projects in archaeology at UAB, and a selection of experiment proposals from the Master students in the past two academic years.
The different research projects carried out during the Master's degree have focused on technical and functional issues such as the function and production of stone tools, ceramic production and other aspects related to the conservation of plants in the archaeological register. Some of the aspects worked on in the master's degree will allow the students to develop their future research Some of the aspects worked on in the master's degree will allow the students to develop their future research

Keywords
University, experimental archeology, master

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Abstract #: 4807

POSTER: FIRE CONDITIONS IN A CHALCOLITHIC BURNT HOUSE OF MAJDANETSKE (TRIPOLJE CULTURE, UKRAINE) BASED ON ANALYSES OF ARCHAEOLOGICAL AND EXPERIMENTALLY-PRODUCED DAUB

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Pieces of Daub unearthed during an excavation of a burnt house in Majdanetske (Tripolje Culture, Ukraine) were analyzed to infer the burning conditions of the house and the material used as temper. Colors (spectrometric measurements, surface and powder), magnetic susceptibility measurements (surface and powder), mineral assemblage (xrd), and phytolith assemblage and preservation (light microscopy) of the pieces were determined. Statistical analyses prove that the daub pieces recovered in the excavated house show significant differences.
A parallel experiment was carried out with the production of "synthetic daub". The silty/clayey sediment (Löß) that forms the parent material at the site was tempered with chaff and straw of Triticum monococcum L. and mixed with water to produce a kind of plaster. Bricklets of this material were then burned for different times (30min-240min) at different temperatures (550°C-940°C) under both oxidizing and reducing conditions. The synthetic daub samples were measured and compared to the archaeological daub pieces.
Assuming a similar composition of the plaster (e.g. iron content, organic temper), very different burning conditions (temperature, oxygen access) can be deduced for certain parts of the house. Further work is needed to ascertain whether the numerous other houses of the settlement burned down in a similar way.

Keywords
Burnt house
Daub architecture
Experiment
Tripolje Culture