Experimental Archaeology

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It is often said that it is easier to learn by doing. This paper explains what experimental archaeology is and shows through examples that it is a viable discipline to be used to increase public appreciation for archaeology and allow a better understanding of what happened in the past. The advantages of applying experimental archaeology in Malta are discussed.

'Tell me and I forget, show me and I remember, involve me and I understand.' (Schindler 2002)

Defining terms

The term 'experimental' carries multiple connotations. It suggests something provisional, 'being tested', perhaps not yet ready for release to the wider public. It is a word haunted by a sense of danger – an indeterminate idea defying simple understanding. On a more prosaic level 'experimental' conveys ideas of laboratories and ultimately perhaps even Frankenstein. The idea of danger returns with the unquenchable thirst for knowledge giving rise to images of mad, bulbous-eyed scientists with long, white hair pursuing all manner of experiments in the name of science, often detrimental to humanity. People are familiar and perhaps more comfortable with the idea of using experiments in core science subjects, but it is conceptually more difficult to understand how experiments can be used to explain how individuals and whole communities chose to make sense of their worlds and even reproduce life and society in ancient times.

Experimental archaeology has been explained as a science, defined as a 'controllable imitative experiment to replicate past phenomena [...] in order to generate and test hypotheses to provide or enhance analogies for archaeological interpretation' (Mathieu 2002, 1). However, the desire for controllability often compromises the realistic nature of archaeological case studies which use substitute modern materials and methods to record and measure specific properties. Such breaches in authenticity result in difficulties imagining how archaeology finds a sense of congruency with the experimental protocol. In fact experimental archaeology was indirectly attacked by the post-processual school for being too much of a science and tool for processualism. However, it was later realised that experimental archaeology includes much more than the simple characterisation of a material's physical properties. Ideas on beliefs, behaviour, and political systems could be revealed by creating measurable experiences allowing experimentalists to consider the possibilities of being human when confronted with specific material conditions manifested in particular ways (Mathieu 2002, 1). This is where, for example, Tilley's phenomenological approaches to replicating how people sense, perceive, and feel their way through the world become so relevant to experimental practice (Mathieu 2002, 4; Tilley 1994).

It is however important not to forget what archaeology is all about. The ultimate aim of archaeologists poring over the intricacies of long-lost artefacts is not the detailed description of

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mysterious objects but the understanding of what it was to be human in times past and places forgotten. Experimenting with architecture, finds, and a range of practices provides us with opportunities to understand ways of being human beyond our everyday experience. By using our archaeological knowledge of some of the physical conditions with which the ancients co-existed, we can start to move towards inhabiting similar spaces and engaging with artefacts in possibly similar manners: rebuilding a Neolithic house based on our archaeological knowledge is to recreate a space that past communities would have inhabited in specific ways (Stone and Planel 1999), facilitating some practices while constraining others. In other words our subsequent practices become conditioned by the structures we inhabit. Winston Churchill (2004, 358) greatly understood this when he said, 'we shape our buildings; thereafter they shape us'. Light a fire in our reconstructed house. Evidence suggests we choose a central place beneath the highest aspect of the roof. Gather friends and we find ourselves encircling the fire. Perhaps our position is itself significant? Immediately, we can think of recreating a past as it could have been.

Authenticity is a central issue. Using original materials, we have already started explaining the past in a way that a textbook could never hope to achieve. It is through the active use of materials that we can start revealing meaning and the choices people make to construct an understanding of the world they live(d) in.

As a discipline, experimental archaeology is not universally embraced. It is greatly used as a feature of heritage centres and museums in northern Europe in contrast with southern and eastern parts of the continent, where it rarely features in museums and is viewed cautiously by the academic profession (Busuttil 2010; Paardekooper 2010). It is the aim of this paper to suggest that experimental archaeology is a viable form of archaeology that should be more frequently embraced by archaeological communities that have traditionally given short shrift to experimental approaches. This paper also aims to highlight the potential for new synergies, that is connections that can serve to facilitate and widen public engagement, and appreciation of archaeology and heritage in diverse contexts ranging from education to tourism.

Figure 1. Testing temperatures and recording data during a copper smelting experiment (photograph by C. Busuttil 2011).

Experimental archaeological theory

Experimental archaeology is rooted in antiquarianism and the beginnings of archaeology as a discipline. It was first used in the early 19th century by Scandinavian archaeologists interested in using scientific procedures to explain human behavioural patterns in the archaeological record. One of these archaeologists, Sven Nilsson, compared Scandinavian stone tools to worldwide ethnographic specimens to identify how they were used and hafted. He experimentally replicated them to complement the ethnography (Trigger 2006, 130). A drought in the 1850s enabled archaeologists to find perishable artefacts in excavated Swiss Lake dwellings, including hafted stone tools, which verified Nilsson's reconstructions (Trigger 2006, 134-35).

Experimental archaeology is relevant across all time periods, embracing diverse sub-specialities from zooarchaeology to landscape approaches, and encompasses all aspects of archaeological endeavour from strictly empirical studies to theoretical reconstructions. It is not something that 'occurs' at the end of an archaeological study simply to test hypotheses put forth by post-excavation specialists. To limit experimental archaeology to just a science omits the number of wide-ranging studies that have been conducted in its name (Mathieu 2002). Identifying the use of an artefact and understanding site formation by studying the erosion of reconstructed buildings are just two examples of archaeological experimentation (Reynolds 1999). In the 1960s, New Archaeology closely allied experimental archaeology to the scientific method with studies conducted using

a series of objective and controlled experiments to test a hypothesis. Experiments are defined as the testing of hypotheses in controlled environments, which means controlling most if not all variables that regulate the outcome of the experiment to explain what is happening (Ingersall *et al.* 1977, xv). Another aspect is repetition of the experiment by experimenter and peers to show that the initial result was representative. Detailed recording is required for others to repeat and test the experiment with the aim of augmenting data (Coles 1979, 9). There exists a tension between active engagement and participation in an experiment and the process of structured recording that makes observation and recording a challenge (Fig. 1). Anyone who has attempted to produce pottery will immediately understand this issue, since the ability to record is often compromised by the viscous adherence of clay.

Archaeological experiments can be categorized into four classes offering differing qualities for various studies. The best known class involves the replication of excavated material. The degree of authenticity achieved depends on the experiment and can range from visual replicas satisfying only the visual need, to more expensive full replicas produced using authentic materials and methods faithful to the original making of the artefact. This class tests hypotheses on the creation, production, and use of the artefact (Mathieu 2002, 2-3). The second class consists of 'behavioural reproductions' frequently derived from full replicas since certain behaviours are associated with using such a replica. Objectivity is needed when carrying out experiments: the way we chop down a tree using a modern axe may not be the same as when using stone tools. Comparing different experiments often provokes discussion and contemplation on the different aspects of function, use, and behaviour. A third class of archaeological experiment involves studying natural and cultural processes of site formation to understand how artefacts or buildings weather and decay over time to become what archaeologists later excavate (Ingersall *et al.* 1977, xv). The last class, 'ethno-archaeology', involves an ethnographic expedition to look at the relationship between human behaviours, the 'material culture and the physical environment in a functioning observable setting' (Ingersall *et al.* 1977, xv).

Scrutinising experimental practices through the medium of our bodies requires us to reconcile our sense of being in the world with established ideas of how we represent the world. In arguing that perception is a two stage process, anthropologists Edmund Leach and Mary Douglas established a disciplinary approach that considered perception as an ultimately cerebral act encasing cultural information within a process of mental representation (Ingold 2000, 158). This perspective limits perception and cultural representation to a concern of the mind: knowing that the body is divorced from the world which is mediated by the brain.

However, as Ingold (2000, 166) states, 'what we perceive must be a direct function of how we act', and the skills and habits one's body learns do not come from mental contemplation but from habitually performing the same tasks in particular ways and gestures over and over again. Bourdieu (1990) defines this as the 'Habitus', the cultural knowledge generated by going about a daily, mundane life leading people to acquire specific concepts that give a certain perspective to the world they move in. These patterns are transferred from one another within a society and are enduring, changing over long periods of time or in relation to a particular context. Therefore, bodily movements become signs for a viewer to recognise and understand as they are left to us from the past through material contexts. By analysing artefacts and understanding how they were made and what they were made from, we begin to read these signs.

Whither experimental archaeology?

Whenever the archaeological record is interpreted in the field or at a desk, theories evolve as ideas flash across the mind. Sometimes the function of an artefact is explicit, while at others its understanding is camouflaged in an ambiguous haze of form and function. Archaeology is notoriously abstract and consistently presents interpretive challenges, many restricted to archaeological evidence or authoritative assertions of experts. Experimentation offers a fresh way of looking at old and new problems alike, the opportunity to have a valuable, easily forgotten, encounter with a material reality shared by our forebears.

Experimental archaeology is multidisciplinary, focusing diverse skills on particular areas of archaeology. It can combine the use of craft skills such as ceramics or carpentry, and the harder sciences of chemistry along with the analytical capabilities

of instrumental characterisation. Experimental archaeology lends itself to interdisciplinary collaboration, but more than that it also acts as a bridge between science and the more human-centred practices that typify the humanities. This totality of knowledge should be brought to bear on the understanding of our own heritage for this is surely a better way to understand and appreciate the magnitude of our species' development and achievement. People outside the field should be encouraged to work within archaeology as they offer valuable perspectives on the diversity of human practices.

As craft users, it is necessary to either learn the craft or involve someone who has experience in it. Indeed while carrying out a ceramic experiment to throw light on the production of Maltese prehistoric pottery, archaeology undergraduate Helga Borg used local potter Paul Haber's expertise whenever she had a problem. This was vital to her understanding the outcome of her work (Borg 2005; Borg *pers. comm.* 2012). However, many archaeologists and the general public tend to set a divide between craft and thought, believing that manual labour is inferior to, hence less valuable than, cogitation. People forget that before creating something craftsmen bring their insight and experience to bear on how an object will look, be made, what materials to use and even how it will work. All this defines the final object's form and function and is a task worthy of any intellectual. As experimental archaeologists, indeed as archaeologists, much of what we do is manual labour, with our hands literally in the dirt. However, we then resort to academia to communicate the knowledge and results we gain to the rest of the community. Language is used to transmit this knowledge of actions in an understandable context relying on the 'dialectic between theory, practice and experience' (Høgseth 2009, 5), highlighting the need for a combination of both theoretical and practical knowledge.

Parents often tell children not to do something because they might get hurt and repetition sometimes has the effect of awakening the desire to do it anyway and test the outcome. It is at this point that we start to question the reality of life and begin to experiment, try things out and learn from both mistakes and practical experience. This is one of the discipline's greatest points: playing around with materials with an open mind is the best way of learning, trumping teaching or reading a book. Even when not actually testing a particular hypothesis but experimenting for ourselves how to go about flint-knapping, for example, we are learning and gaining an affinity for the past.

Across Europe, particularly in the central and northern regions, experimental centres and open-air museums have been established since the 1920s for visitors to experience the past through reconstructions, demonstrations, and hands-on learning of different crafts and skills to understand how people lived and worked (Eickhoff 2005, 81; Paardekooper 2009, 66). These activities make the past far more understandable than traditional learning, a fact recognised by educational systems. Throughout the year these places are filled with students on fieldtrips to learn history, mathematics, and core sciences and, above all, to have fun learning (Stone and Planel 1999). There is a general tendency to go back to learn more. Some of these places have also set up workshops explaining how archaeological excavation is carried out. The added value of experimental archaeology and these centres is that the general public appreciates past societies to a greater degree, persuading them to provide support and care for heritage (Paardekooper 2009, 66-67).

The experimental archaeological centre of Lejre in Denmark maintains that without its existence since the 60s, Scandinavian archaeology would have much less support and interest as 'there is no Dane younger than 50 who has never been to a historical workshop or medieval centre' (Paardekooper 2006, 95). The open-air museum of Terramara di Montale (Italy) came about as a result of a demand for new methods of exhibiting past cultures combined with a scientific approach and higher level of interaction between visitors and exhibits (Pulini and Zanasi 2009, 17). The life-sized reconstruction of a village based on local archaeological evidence gives an authentic research experience, taking visitors back in time, retracing the steps of an archaeologist from the excavation stage to studying the artefacts in laboratories, while trying out archaeology for themselves (Pulini and Zanasi 2009, 17-18).

Various teaching methods come into play. Reconstructions of buildings, tools, and artefacts demonstrate different traditional crafts, explaining what is happening and why. The traditional-styled museum set-up of display cases with information panels is available for people looking for more information. However, the biggest advantage of reconstructions is when people are given a chance to try things out for themselves – getting their hands

dirty building a dwelling, rowing a dugout canoe, shaping a pot, cooking in a traditional Roman way, and savouring the result, etc. People are sometimes allowed to sleep in the reconstructed houses and live there for a short time, thus keeping the history and indeed the spirit of a place alive. The experiences of participating in these activities dynamically build on what has been learnt at school. They are fun, never forgotten, and far more interesting to children and adults. Saraydar (2008, 4) says that 'through this experience [of felling trees with stone axes], my muscles and my brain learned things [...] that could never be forgotten and no written or visual source could ever adequately convey [...] The people who made and used these tools no longer seemed quite so remote in time and space'.

These may not be experiments in the full sense of the word, but each of the demonstrations or reconstructed artefacts at these places originally derived from an experiment, which is being repeated in a simpler form. Though the research potential of repeating experiments is limited, the experience of carrying out the work for the first time will be remembered, and brings individuals closer to how people lived and worked in the past. This affinity puts into context what is excavated as it becomes more and more understandable. This runs on par with Bourdieu's 'Habitus'. This is not to say that experiments or even demonstrations should not be updated or revised as that would be unethical and would give a false impression to the general public and even archaeologists (Townend 2007).

Actual experiments are of course very much needed as they help verify what archaeologists think and they weed out impossible suggestions that seem quite logical until put into practice. Coles, an archaeologist and advocate of the modern experimental archaeological discipline, said that 'some things work, some things do not, but unless we make the attempt, we'll never discover the most fruitful lines of enquiry' (Paardekooper 2009, 67). Doing it wrong should not be discouraging. The negative outcome is actually positive as it proves that an alternative way should be sought. The important thing is that it has been tried and recorded. Coles argues that the inaccuracies in the 1948 reconstruction of the Viking fortress at Trelleborg and its long survival served as a constant reminder to scholars, pushing them to conduct critical examinations and come up with alternative theories (Coles 1979, 145).

Figure 2. Helga Borg preparing her recreated, ceramic vessels for firing in 2005 (photograph reproduced by courtesy of N. Vella).

Experimental Archaeology in Malta

In Malta there has been little work in experimental practices. A BBC documentary in 1955 on the nature and function of the Maltese cart-ruts looked at how they could have been made (Fig. 3) (Evans 1971, 203). A civil engineering student has also attempted to establish whether the prehistoric temples were roofed or not, using a combination of mechanical tests applied to large limestone beams and computer-generated reconstructions (Xuereb 1999). Few actual research experiments have, however, been carried out. Two Maltese students have recently used experimental archaeology in their theses and a third in a doctoral dissertation.

Clive Vella systematically analysed lithic assemblages using morphology and perceived functionality to create a new classification to better compare the more informal Maltese assemblages to the 'classic' Mediterranean tool type. Experimental archaeology was used to compare the superior imported flint to the inferior local chert that tended

to be unpredictable, breaking into shorter lengths. His experiments were useful as a means of exploring human choices and technology, finding that Maltese prehistoric communities made a conscious choice in flint and chert use that went beyond issues of availability (Vella 2009).

Helga Borg analysed how experimental archaeology and ethnographic studies could shed light on Maltese Neolithic pottery-making techniques (Borg 2005). A ceramic typological development was formulated by studying the development of Maltese prehistoric pottery based on stratigraphic excavations. An experimental exercise was devised to produce, decorate, and fire vessels using local clay and prehistoric technology to recreate Maltese Neolithic ware (Fig. 2). She collaborated with Clive Vella who produced chert tools with which to decorate the pots. The ceramic vessels exploded during the firing process, but despite this Borg remains optimistic knowing that she has extended her knowledge of Maltese Neolithic pottery-making and that of others. Using the results of the experiment she postulated on the decoration techniques used in the Neolithic and presented reasons why her firing failed. Thus a path was laid out for any future experimenters wishing to continue working along the same lines.

In her doctoral research, Cynthianne Spiteri Debono addresses the transition to agriculture before the onset of the Neolithic in the western Mediterranean, using Organic Residue Analysis (ORA) to determine the contents of ceramic vessels by analysing their lipid content and discover whether the pots were used to process or store food. Known plants were cooked in reconstructed cooking pots to obtain their lipid profile, to determine the likelihood of this profile surviving on an archaeological timescale, and determine whether particular, identifiable biomarkers are preserved. A controlled feeding experiment was also set up at the Għammieri Government Farm to establish isotopic signals for the Mediterranean region. The success of her work could lead to a better identification of foodstuffs and understanding of pottery use.

When questioned about experimental archaeology each asserted to varying degrees the importance of testing archaeological theories and determining whether archaeologists' interpretations are realistic and plausible. Vella went further, deeming experimental archaeology both a heuristic device and educational tool owing to its hands-on approach that 'livens' the past. They all believe that experimental archaeology would be invaluable to Maltese archaeology, helping to answer questions, especially about those areas where there is very little outside knowledge. Vella suggested that experimental archaeology should reach the school curriculum since it is a scientifically yielding field that makes archaeology more accessible.

All have plans for future experiments. Borg has been re-reading her work and intends continuing with her experiments. Spiteri Debono says there is still much to learn in ORA and that experiments are crucial to understanding how residues are formed and for detecting commodities processed within ceramics. Vella is now using edge use-wear analyses to determine through experiments the materials that lithics were used on in the past.

Concluding remarks

It may be that experimental archaeology is treated with scepticism in the southern and eastern regions of Europe, as it goes against the traditional archaeology of those areas. The experimental work done in Malta to date is limited compared to northern Europe but the results achieved so far by students are very promising. Undoubtedly, knowledge will change with time as experimentation, demonstrations, and hands-on activities increase, not only within tertiary research institutions but at schools and possibly at experimental centres or open-air museums set up expressly for that purpose. The advantages for education and tourism should be immense.

Figure 3. Slide car used by John Evans in 1954 to experimentally test the origins of the Maltese cart-ruts for the BBC (photograph by C. Bonavia reproduced by courtesy of the National Museum of Archaeology Archives/Heritage Malta)

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