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The zooarchaeology of cult

Perspectives and pitfalls of an experimental approach

Abstract

A broad variety of ritual behaviours involve the killing and/or consumption of domestic as well as game animals, and are functionally assigned to most important social procedures and ceremonies such as religious worship, activities of public administration or funerary rites and very often also to subsistence-oriented sacrifice. Material remains indicative of these ceremonies reveal specific aspects of the ritual procedure, but their significance is always dependent on the degree of scrutiny that has been spent during archaeological excavation and more so in the analysis of the finds. Focusing on ritual patterns in Mediterranean antiquity, the remains of burnt offerings and agglomerations of caprine horn cores are attested frequently by the zooarchaeological record. Even when literary descriptions of all of these sacrificial activities are available, obvious uncertainties about the actual procedure of burning *meria* and *osphys* and of the consecration of goat horns made experimental efforts necessary. Experimental approaches characterize a well established methodological tradition in archaeological and historical research, not only enhancing our understanding of poorly handed down evidence of ancient life, but also allowing the feasibility of reconstructive suggestions to be judged. On the other hand, obtaining evidence by means of experimental studies always has to take into account potential and maybe biasing phenomena of convergence. Talking in terms of evolutionary biology, the phenotypically similar appearance of archaeological findings and experimental results has to be understood as the outcome of two distinctly evolved and necessarily different processes.

Methods: surveying pitfalls

When Robert Ascher stated in 1961 that "... the imitative experiment is the keystone of experimental archaeology", he added that the experimental approach "... has failed to receive general acceptance because the evaluation of the procedure and results of such experiments are ambiguous", thereby not only introducing the term "experimental archaeology" in the scientific thesaurus for the first time, but also addressing a main problem of this method.[1] In the second half of the 19th century various experiments, in particular by American scholars, had been undertaken in order to improve the understanding of prehistoric techniques, such as Stone Age flint technology or production of ground stone axes and hammers, primitive metalwork or simply the making of pots.[2] Obviously, the vast majority of experimental attempts were linked with subjects of prehistory, often carried out by amateurs in terms of archaeology, yet skilled experts in technical disciplines such as metallurgy or ceramology.

In part due to a lack of academic coordination and also to various experiential activities through re-enactment and role playing that became known for their flawed methodology, scholarly acceptance of experimental archaeology remained, and apparently still remains, reserved, if not disapproving. An obvious confusion between experimental and experiential archaeology, regarding the scope, scale and goals of the two subjects, has hindered the contribution of experimental archaeology towards the study of history, prehistory, and human evolution substantially. Scholars like Julian Thomas expressed their displeasure clearly by mentioning "something of a craze for experiential archaeologies which assume that past people's encounters with landscapes and architecture would have been much the same as our own".[3] In fact, normally experiential archaeology does not answer any question on particular social, economic or technological features of bygone societies. Instead, it serves as a tool for educating the public, students, and also professionals, an intention which constitutes a reasonable goal. Frequently, experiential archaeology might also provide the necessary skills for future experiments or questions dealt with in experimental archaeology. However, referring to relevant considerations by Carolyn Forrest,

[1] Ascher 1961, 793 and 794.
[2] Holmes 1890; McGuire 1891; Cushing 1894.
[3] Thomas 2000, 148.

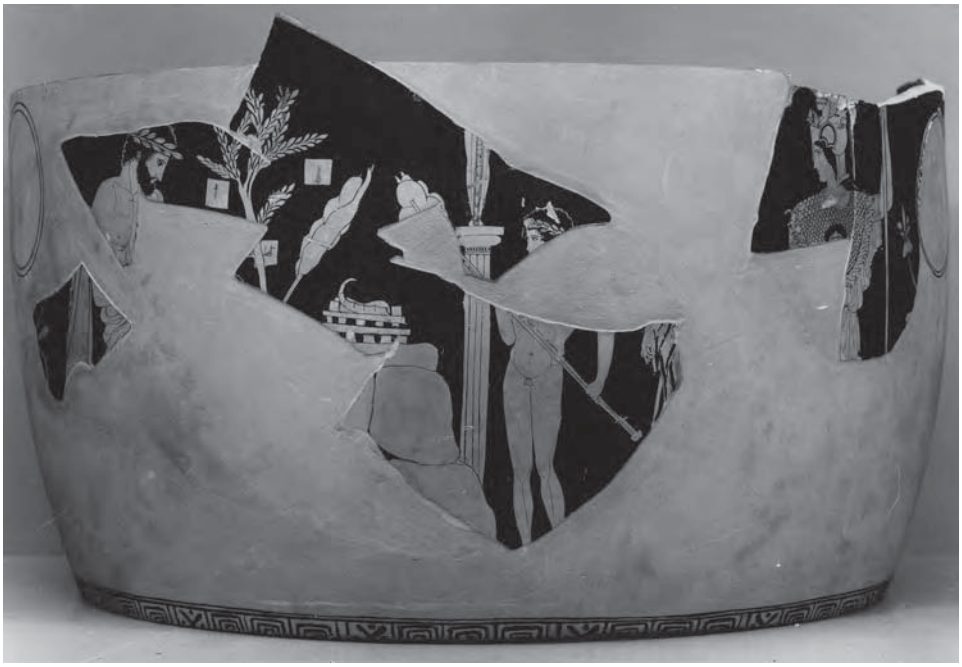

Fig. 1. Osphys *roasting on fire. Attic red-figure bell krater, London, British Museum E 494, Painter of London E 494, 450–425 BC. Photo: © Trustees of the British Museum.*

we have to state that a serious reason for the poor academic standing of experimental attempts might also be "... an elitist attitude ..., in that experimental archaeology is not the sole premise of the academic fraternity but instead is open to, and can be done by everyone with an interest in the subject".[4] Most likely this argument matches in particular the distrust and refusal with which the experimental approach is still regarded by many representatives of Classical Archaeology.

Experimental archaeology usually has two main goals: (1) making things look like ancient artefacts and (2) finding the proper way to do so. Of course attempts are made to achieve at least the former in order to improve our understanding and imagining of significant aspects of Classical civilizations. Architectural history applies the methods of *anastylosis* to visualize ancient buildings by means of virtual reconstructions, bearing in mind the inevitable risk that interpretational errors will result in errors in reconstruction.[5] Processual issues like the dyeing experiments by Deborah Ruscillo and other scholars have contributed valuable knowledge to our understanding of ancient craftsmanship and economy.[6] The clarification of poorly-understood iconographic items has been tackled by means of experimental approach. When in 1966 Michael Jameson gave a short account on his experiments in burning oxtails he provided a comprehensive and subsequently widely accepted explanation of the "peculiar curved object rising from the altar flames"[7] that was well known yet poorly understood as a frequently depicted component of Greek vase paintings showing sacrificial activities (*Fig. 1*). His interpretation of this object as the roasting and increasingly curving tail of the bovine sacrificial victim (*Fig. 2*), additionally supported by very clear literary clues, has been proven and deepened by subsequent studies[8] as well as by the zooarchaeological record[9] and indicates the promising prospects of a well-considered and performed archaeological experimentation.

Fig. 2. Experimentally roasting oxtail. After Jameson 1986, fig. 3.

[4] Forrest 2008, 67.
[5] Nohlen 2004.
[6] Ruscillo 2005.
[7] Jameson 1966, 54; Jameson 1986, 60–61.
[8] E.g. van Straten 1988.
[9] Forstenpointner 2003.

Nevertheless, overlooking the distrust of renowned scholars of the worth of experimental attempts would mean ignoring the existence of both obvious and hidden pitfalls that may dim or even alter the pursued insights. Talking in terms of evolutionary phenomena, whether biological or cultural evolution, the effects of convergence should be considered thoroughly. Convergence describes the generation of morphologically similar or even almost identical features in unrelated lineages, separating analogous from homologous structures, which have a common origin, therefore.[10] A spectacular example of convergent biological evolution is the lens-bearing and adaptable camera-type eye of vertebrates, squids and some jellyfish, the common ancestor of which three animal phyla only possessed simple photoreceptive cell-agglomerations as optical organs. Other striking examples are close morphological similarities of phylogenetically far-distant species, such as the almost identical looking skulls of carnivoral canids and the marsupial *Thylacinus cynocephalus*, the Tasmanian tiger, or the digging claw of moles and mole crickets. Applying these phenomena to archaeology means that an experimentally produced flint tool never can be fully homologous to an archaeological artefact, as the primary aim of the experimental action is the improvement of knowledge, when the original cause for producing a blade was strictly subsistentially or socially based. Naturally, avoidance of this fundamental and causal difference between archaeological evidence and the outcome of experimental studies is not possible, but scholars always should be aware of it.

Another more crucial, yet in parts avoidable element of uncertainty is a starting point with too many inherent biases. Obviously, along with a proper question, every reasonable experimental set-up depends on a clearly formulated and well-based hypothesis which inevitably—and deliberately!—creates anticipations, yet, it has to be tested in terms of verification and falsification, which means that the very result cannot be foreseen and has to be accepted, whether positive or negative. In short, archaeological experiments, just like their hard science-based relatives have to obey certain conventions in order to be judged equivalent. Therefore, experimental archaeology performs experiments, *sensu stricto*, only if a valid hypothesis has been established, such as for instance "fire causes bone modifications which morphologically are subject to various quantifiable factors".[11] The subsequent analyses of results are obligatory, and we compare these with the questions we posed before carrying out the experiment, as well as with the expected outcome. Of great importance is a comprehensive basing of the hypotheses on available arguments.

In terms of zooarchaeological experiments the question "how to determine the identity of that peculiar curved altar-placed object on Greek vase paintings?", followed by the statement that "a roasting oxtail curves upwards and looks like the curved object",[12] established a quite valid hypothesis, due to the significant morphology of the object and verified by the result. Supported by iconographic, morphological and osteological evidence, the conclusion that "the curved object on the altar depicts a burning oxtail" bears a very high degree of probability. However, questioning "how to interpret an indistinct lumpy object held by a person over the flames of an altar?" (*Fig. 5*) and answering—tentatively, of course—"this object looks like a bovine gall bladder" (*Fig. 6*) establishes an unsuitable hypothesis.[13] In spite of the object's poorly diagnostic morphology, it widely foresees the result, does not allow or expect any falsification and therefore anticipates the conclusion too much. Michael Jameson's literary considerations on this proposal are reasonable, mainly based on Sophocles' *Antigone* 1010, when Teiresias mentions the gall bladder to be part of the god's portion. However, even if he holds a really huge bovine gall bladder, such as would come from a 1,000 kg ox and which is not comparable to the normally rather skinny cattle breeds of Classical Greece with withers heights between 1.10 and 1.30 metres, even if so, the object in the offering person's hand is still much larger than Jameson's simulacrum. Anyway, in this case a valid hypothesis might state that "an indistinct lumpy object held by a person over the flames of an altar looks like various ritually significant body parts of sacrificial victims, as to be assessed in terms of probability", which might be tested by a "look-alike test", either by means of a series of newly conducted experimental actions or by meta-analysis of available studies, and probably produce suitable results for a conclusion.

The too-much-anticipating, foregone concluding and therefore biasing experimental approach very much resembles the emotional condition of a person strolling around some landscape. The sociologist Lucius Burckhardt who established *Promenadologie* ("strollology") as an academic subject in the early 1980s characterized the perception of landscape by the statement that "Alles dieses lag schon im Kopfe bereit, ehe der Spaziergang begonnen wurde" ("everything had been mentally got ready and stored before starting the stroll") and the stroller notices only "... die Dinge, die er pflichtgemäß in dieser Gegend hätte sehen sollen" ("details of this landscape that he should have duly perceived").[14] More

[10] On biological convergence, see, for example, Morris 2003, 106–108; on cultural convergence, see Jenkins 2006.
[11] Iregren & Jonsson 1973; Gilchrist & Mytum 1986; Buikstra & Swegle 1989.
[12] Jameson 1966, 54; Jameson 1986, 60–61.
[13] Jameson 1986, 61–62.
[14] Burckhardt 2006, 257–258.

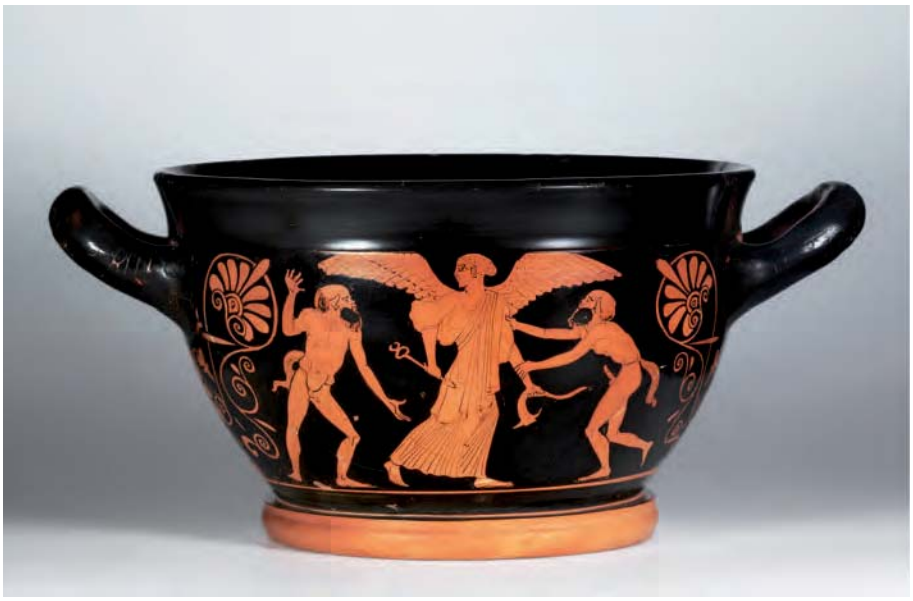

Fig. 3. Iris carrying osphys. *Attic red-figure skyphos, Penthesileia Painter, 475–450 BC. Antikensammlung, Staatliche Museen zu Berlin, inv. F 2591. Photo: © Johannes Laurentius / SMB Antikensammlung.*

in terms of scientific methodology and also more drastic, Adolf Schopenhauer stated on hypotheses, "eine gefaßte Hypothese giebt uns Luchsaugen für alles sie Bestätigende, und macht uns blind für alles ihr Widersprechende" ("a formed hypothesis sharpens our sight for any corroboration and it makes us blind for all discrepancies").[15]

The validity of many experimental attempts that deal with the zooarchaeology of cult is severely flawed by the aforementioned basic methodological default and within the following sections we will try to apply methodological assessment to a few examples of cult-focused experimental zooarchaeology.

Emulating Prometheus

Michael Jameson's identification of a burning curved object on offering scenes of Greek vase paintings as depictions of a heat-affected oxtail[16] and its literarily proven interpretation as ritually burnt *osphys*[17] have been mentioned before and represent a widely successful application of experimental analysis. Mainly due to the scrutinizing source research by Folkert van Straten, the final determination of the curved object could be ascertained even more precisely: iconographic evidence in the form of a red-figured Attic skyphos, and also a kylix of the Brygos Painter, shows the curved object quite clearly, this time not lying on an altar but held in the hands of Iris and eagerly desired by satyrs.[18] The paired processes on the basal end of the object prove that the *osphys* comprises not only the tail but also the *os sacrum*, the sacred bone, *osteon hieron* and the last lumbar vertebra (*Fig. 3*). Additional endorsement is supplied by the zooarchaeological record from burnt offering sites like the Ephesian Artemision which yielded charred and calcined fragments from mainly bovine lumbar, sacral and caudal vertebrae, as well as from a simple look-alike test that we performed (*Fig. 4*).

Fig. 4. Bovine sacrum and tail, experimentally defleshed. Photo: G. Weissengruber.

[15] Schopenhauer 1859, 254.
[16] Jameson 1986, 60–61.
[17] van Straten 1988.
[18] Berlin, Antikensammlung, Staatliche Museen zu Berlin, F2591; Forstenpointner 2003, 212, fig. 21.7. London, British Museum E 65; van Straten 1995, V402, fig. 128.

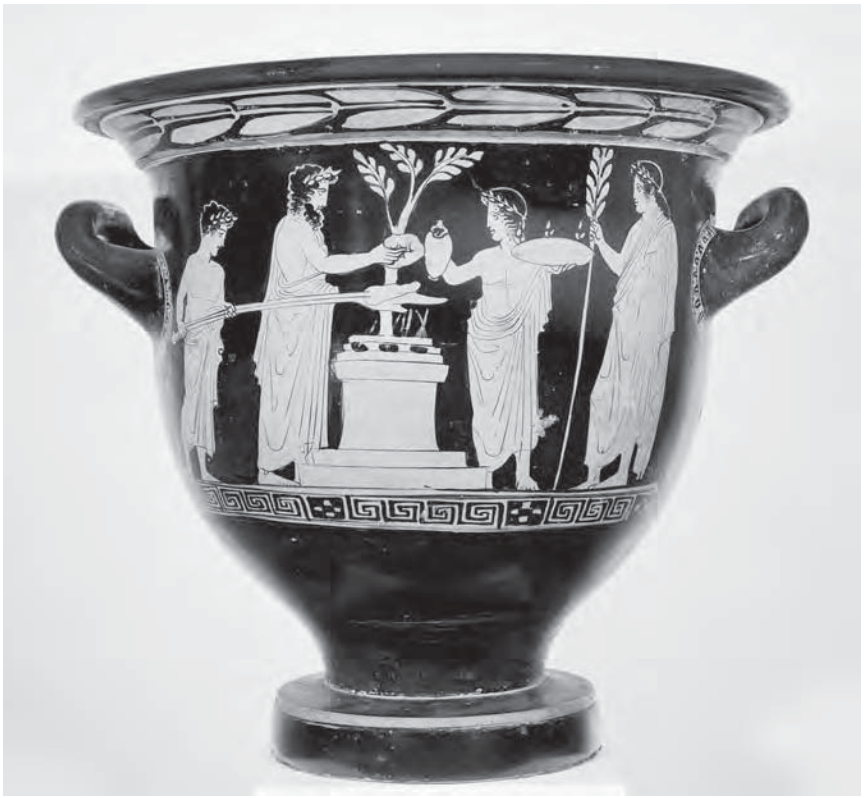

Fig. 5. Man holding object over fire. Attic red-figure bell krater, Paris, Louvre G 496, Pothos Painter, 425–400 BC. © 1973 Musée du Louvre/ Maurice and Pierre Chuzeville.

Michael Jameson determined that other barely recognizable detail of Greek ritual iconography (a lumpy bundle, held by a male person over the burning altar) to be a bovine gall bladder.[19] This object had previously been interpreted as representing a piece of meat, an interpretation that had been well-received; it was also considered that other, as yet unidentified parts of the victim might be indicated by the vase paintings (*Fig. 5*).[20] Again, due to the scholarly efforts of Folkert van Straten, a reasonable identification of these items as *meria* bundles—defleshed thigh bones of sheep or goats, wrapped in layers of fat—was achieved.[21] Authors of older studies have been convinced that the god's portion (*meria*) should have comprised the whole flesh-covered thigh or at least a nice piece of meat, yet the story of Prometheus' trick at Mekone, when "for Zeus he put the white bones (*ostea leuka*) dressed up with cunning art and covered with shining fat",[22] and also sarcastic comments of Attic poets on this still-practised but no longer understood tradition of offerings prove very clearly that only defleshed bones were burnt on the altar. Pherekrates, a contemporary of Aristophanes, makes a god complain about human stinginess in giving to the gods "the thighbones scraped off up to the groin, the *osphys* absolutely defleshed".[23] Euboulos, a poet of the early 4th century BC, even more sarcastically states that "people offer to the gods merely tails and thighs, as though to pederasts".[24] Hints on the nature of their fatty cover are given by the Homeric

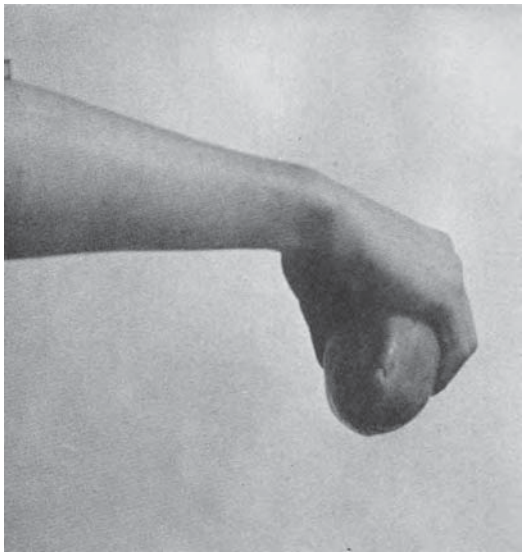

Fig. 6. Hand holding an ox gall bladder. After Jameson 1986, fig. 4.

[19] See n. 12 above.
[20] For example, Metzger 1965, 114.
[21] van Straten 1995, 118–141.
[22] Hes. *Theog*. 540–541; cf. also Pötscher 1995.
[23] Pherekrates fr. 28 (Kassel-Austin), ap. Clem. Al. *Strom*. 7.30.3.
[24] Euboulos fr. 127 (Kassel-Austin), ap. Clem. Al. *Strom*. 7.30.4.

Fig. 7. Thigh bones of a sheep, wrapped by the abdominal net of fat. Photo: G. Weissengruber.

Fig. 8. Hand holding an ovine abdominal net-thigh bones bundle. Photo: G. Weissengruber.

term "double layer of fat" (*knise diptyche*),[25] that can be interpreted as the likewise two-ply and in ruminants very fatty abdominal net of fat that wraps the thigh bones like a double walled bag (*Fig. 7*). An even more striking proof is provided by the already mentioned fragment of Euboulos, assigning the *epipolaion* ([abdominal] net) as part of the god's portion.[26] The zooarchaeological record proves not only the almost exclusive burning of ovicaprine thigh bones and bovine sacra and tails at the majority of investigated sacrificial sites, but also surprisingly early confirmations of this tradition in Protogeometrical Ephesos, dating to the second half of the 10th century BC.[27]

Referring to these strong arguments we also performed a look-alike test, comparing an abdominal net thighbone bundle with the queried depictions and we realized that the visual result was at least as satisfactory as when using a gall bladder (*Fig. 8*). Additionally, it would of course be interesting and desirable to perform experimental burning of wrapped, bare and fully fleshed ovicaprine thigh bones, considering the apparently significant difference of fire-induced crack patterns of fleshed and bare human bones.[28]

In summary, it might be stated that at least some experimental attempts to clarify specific aspects of the Greek burnt offering ritual yielded reasonable results and conclusions. Prerequisite to relevant results that are suitable for elucidation and visualization of this complex evidence is an extremely carefully designed hypothetical background.

Investigating sacred horns

In antiquity the Delian *bomos keratinos*, a "horn altar", dedicated to Apollo and as yet unknown from structural archaeological evidence, was a well-known and popular place for worship. Early literary descriptions, such as that given in Kallimachos' hymn to Apollo indicate an architectural construction, built of the horns of wild goats "with horns builded he (Apollo) the foundations, and of horns framed he the altar, and of horns were the walls he built around."[29] More than three hundred years later Plutarch mentioned the Delian horn altar twice, one quotation describing its building materials as left horns, the other as right ones.[30] This inconsistency caused learned, yet poorly-founded discussions, based on the evidence of only 16 goat horns (eleven left, five right) from a horn altar like structure in a Geometric sanctuary at Dreros (Crete).[31]

Eustathios in his commentaries mentions another well-known and highly esteemed horn altar in Ephesos, *bomos Ephesios keratinos*,[32] and zooarchaeological analysis of faunal remains from Geometric and Corinthian layers of the Ephesian Artemision yielded a total of 2,118 caprine horn cores with an extremely balanced proportion of the two body sides (50.3% left and 49.7% right).[33] A considerable accumulation of these finds was situated near the northern flank of the so-called Hekatompedos. However, only a very low ratio of the finds comprised horns that had been removed separately. In the vast majority the median osseous suture between the

[25] For example, Hom. *Il.* 1.460–461.
[26] Euboulos fr. 94 (Kassel-Austin), ap. Clem. Al. *Strom*. 7.30.3.
[27] Forstenpointner 2005.
[28] Buikstra & Swegle 1989, 252.
[29] Callim. *Hymn* 2, 61–62.
[30] Plut. *Vit. Thes*. 21 (left horns); *Mor. De soll. an*. 983e (right horns).
[31] For example, Deonna 1940.
[32] Eust. *Il.* 8.249 (van der Walk, vol. 2, 575, line 10).
[33] Forstenpointner 2000.

Fig. 9. Removing the horn-bearing part of a goat skull by means of three axe-strikes. Photo: G. Weissengruber.

horns was either still intact or had decomposed long after the victim's death, indicating very clearly that the whole calvaria, the horn-bearing part of the skull, had been butchered off. A small experiment showed that it is very easy to remove the horn-bearing calvaria by means of three axe strikes (*Fig. 9*). A second small-scale experiment was related to the construction of the horn altar (*Fig. 10*). Based on the hypothesis "construction of an upright altar-like structure using goat horns is feasible" we tried to pile up both single and still-joined horn cores, using archaeological specimens. The experiment proved very clearly that a sufficiently stable, load-bearing construction requires the two-horned, fork-like calvaria. Regardless of their side, separated single horns always tend to slide apart.

Representing not faunal remains but artificial simulacra, the so-called "horns of consecration" played a major role as Minoan architectural ornaments and are also frequently found on figurines and vase paintings. Arthur Evans interpreted these objects as an ornamental translation of real bucrania, the horn-bearing skull parts of bulls.[34] Due to the fact that bovine horns and horns of consecration are morphologically dissimilar—as seen on a Mycenaean vase painting featuring two horned bucrania and one pair of horns of consecration (*Fig. 11*)[35]—we established the hypothesis that "also other horn-bearing skulls than bucrania might have served as models for horns of consecration". The comparison of the mentioned vase painting and a similar composition of real skeletal elements (*Fig. 12*) showed a remarkably high grade of similarity between horns of consecration and goat skulls. However, as our underlying hypothesis excludes other non-faunal models completely and the experimental action was restricted to the comparative evaluation of only one alternative species, the conclusion therefore remains flawed. It can be argued that the heads of goats rather than those of bulls

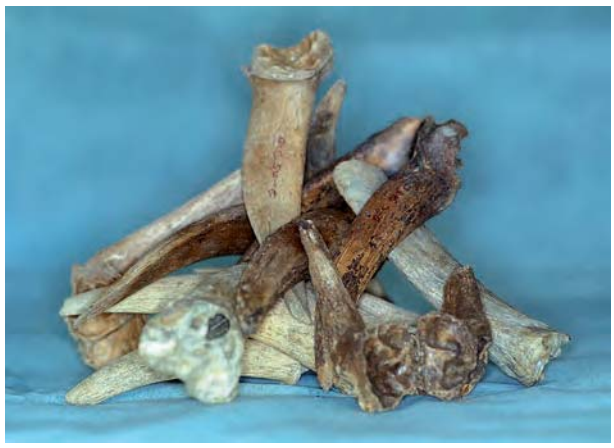

Fig. 10. Experimentally built heap of caprine horn cores from the Ephesian Artemision. Photo: G. Weissengruber.

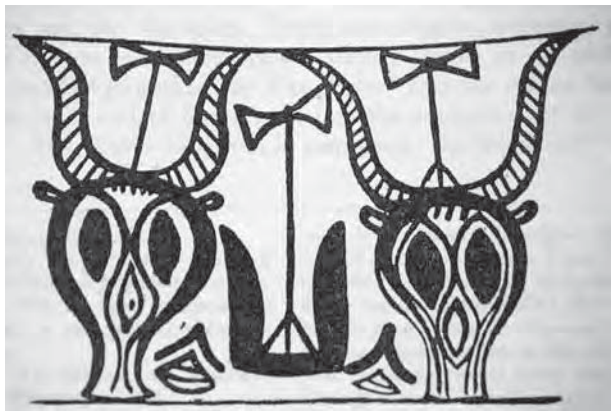

Fig. 11. Ornament of a Mycenaean vessel from Salamis, Cyprus. After Evans 1901, 107, fig. 3.

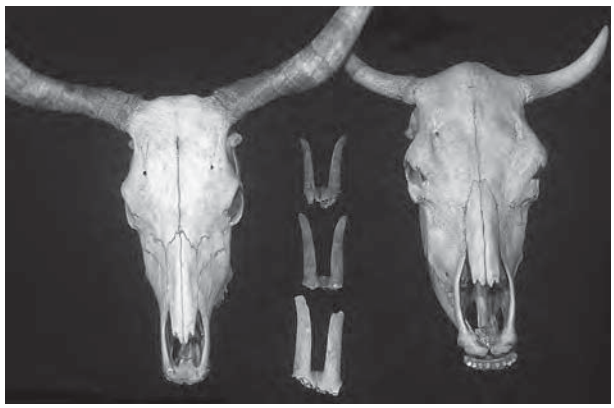

Fig. 12. Experimentally composed bovine skulls and caprine horn cores. Photo: G. Weissengruber.

[34] Evans 1901, 135–138.
[35] Evans 1901, 107, fig. 3.

were the model for the Minoan horns of consecration. This argument is supported by the clear importance of caprines in Minoan ritual culture, as depicted on the famous rhyton from Kato Zakros,[36] as well as by Christos Doumas' find of a small *bomos keratinos* in Minoan Akrotiri;[37] but even so, substantial efforts in archaeological as well as experimentally-focussed investigation will be necessary to provide further support for this proposition.

Ornaments for Artemis

The well-known cult images of the "many-breasted Lady of Ephesos" are adorned with multiple rounded breast-like protuberances on their chests. Traditionally described as accessory breasts, as befits the primary role of the Ephesian Artemis as a mother goddess, more recent studies proposed other interpretations of these objects. Assuming a close ritual context between Artemis of Ephesos and *Megale meter*, the Great mother of Asia Minor, whose favourite sacrificial victim was the bull, Gérard Seiterle was convinced that the offering of bulls also played a central role in the cult of the great Ephesian deity.[38] He interpreted the rounded objects on the chests of the images as the scrota of bulls that had been slaughtered during the rites of sacrifice, and tried to support this proposition by experimentally attaching freshly butchered bovine scrota on a replica of the statue (*Fig. 13*). This experimental attempt gained considerable publicity but its conclusion is flawed, as the hypothesis that "the objects on the chest of the Ephesian Artemis look like bovine scrota" is anticipating and does not refer to available additional data. The zooarchaeological record in particular weakens the hypothesis, as bovine remains comprise only 20% of all ruminant bones from the Artemision, and these almost exclusively represent cows.

Fig. 13. Artemis Ephesia with attached scrota of bulls. After Seiterle 1979, fig. 14.

Conclusions

In summary, it has to be stated that until present and due to methodological inconsistencies quite a lot of experimental work on the zooarchaeology of cult has failed to yield valid conclusions that are suitable for reliable application to the wider scientific context of ritual offering. This unfortunate diagnosis concerns mainly the look-alike experiments that in fact address highly complex bodies of evidence, while simple structured attempts to clarify the technical course of a sacrificial action appear to be more promising. Simple experimental set-ups bear a higher chance than more elaborate ones of evading Murphy's first law of experimentation, which states that "whatever can go wrong, will go wrong,"[39] and hard scientists would do best not to ignore these cogent words. Comparative experiments apparently are subject to Murphy's sixth law, "anything looking too good to be true, most likely is not true". But of course, it is not fair to apply the same high methodical standards to archaeological experiments as to natural science-related ones, for the number of unknowns in archaeological equations is normally incomparably higher than in those of natural sciences. Therefore, the simple-seeming recipe for reasonable success in archaeo-

[36] Bloedow 1990.
[37] Doumas 1999, 79, fig. 77.
[38] Seiterle 1979, 9–16.
[39] Bloch 1977, *passim*.

logical experiments—a proper hypothesis, followed by sound realization and unbiased interpretation—is hard and tricky to achieve. The hypothesis, inevitably anticipating, should be based on all available evidence concerning the problem in order to avoid Schopenhauer's suspicion, and realization as well as interpretation has to face the inescapable biasing factor of convergence, as similar looking outcomes of highly different motivated procedures are being compared.

However, at the end of the day the experimental approach deserves scholarly attention for two main reasons: it not only provides a method that is able to answer sound questions very clearly, but often also can convey archaeological or historical evidence much more effectively to the public than any learned essay.

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