

From snout to tail

Exploring the Greek sacrificial animal
from the literary, epigraphical,
iconographical, archaeological,
and zooarchaeological evidence

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ABSTRACT

Animal sacrifice fundamentally informed how the ancient Greeks defined themselves, their relation to the divine, and the structure of their society. Adopting an explicitly cross-disciplinary perspective, the present volume explores the practical execution and complex meaning of animal sacrifice within ancient Greek religion (c. 1000 BC–AD 200).

The objective is twofold. First, to clarify in detail the use and meaning of body parts of the animal within sacrificial ritual. This involves a comprehensive study of ancient Greek terminology in texts and inscriptions, representations on pottery and reliefs, and animal bones found in sanctuaries. Second, to encourage the use and integration of the full spectrum of ancient evidence in the exploration of Greek sacrificial rituals, which is a prerequisite for understanding the complex use and meaning of Greek animal sacrifice.

Twelve contributions by experts on the literary, epigraphical, iconographical, archaeological and zooarchaeological evidence for Greek animal sacrifice explore the treatment of legs, including feet and hoofs, tails, horns; heads, including tongues, brains, ears and snouts; internal organs; blood; as well as the handling of the entire body by burning it whole. Three further contributions address Hittite, Israelite and Etruscan animal sacrifice respectively, providing important contextualization for Greek ritual practices.

Keywords: Greek animal sacrifice, anatomy, division, butchery, body part, multi-disciplinary approaches, zooarchaeology, iconography, epigraphy, texts, cross-cultural comparisons

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2. From the butcher's knife to god's ears

The leg and tail in Greek sacrifice

Τὸ πάλιν κατ' εἶδη δύνασθαι διατέμνειν κατ' ἄρθρα ἢ πέφυκεν, καὶ μὴ ἐπιχειρεῖν καταγνύναι μέρος μηδέν, κακοῦ μαγείρου τρόπῳ χρώμενον

Being able to cut it [a speech] up again, form by form, according to its natural joints, and not try to break any part into pieces, like an inexperienced butcher.

Plato, *Phaedrus* 265e 1–3 (transl. Rowe 1986)

Abstract

This paper argues that, throughout the process of Greek sacrifice, the leg and tail formed a single integrated unit that was both practical and deeply religious. It has long been accepted that thighs and tails were burned on altars in ancient Greece and that this act was where communication with the gods took place, thus forming one of the most important elements of ancient Greek sacrifice. However, up to this point the leg and tail have not been treated as elements of a single holistic unit. Through re-interpretation of textual and iconographic evidence, combined with my study of butchery and an extensive experimental archaeological project involving the burning of thighs and tails, the thigh and tail are shown to form a single sacrificial unit from the butchering of the sacrificial animal, through being burnt on the altar, until they conveyed communication with the divine.

Keywords: Greek animal sacrifice, experimental archaeology, butchery, leg and tail unit, femur, wrapped thighbone, burning, fire, altar, sign

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In ancient Greek animal sacrifice, the interaction between man and the gods took place at the altar, where the thighbones, tails, and *splanchna* were roasted. This paper focuses on the leg and tail of the sacrificial victim and argues that

throughout the process of Greek sacrifice, the leg and tail formed a single integrated unit from the stages of butchery, through the preparations for the rituals at the altar, the burning on the altar, and the way that the leg and tail expressed communication with the divine. Throughout this process, the leg and tail will be shown to be elements of this holistic unit due to both practical and religious concerns.

Textual, iconographic, and zooarchaeological evidence

Homer (*Il.* 1.460–461, 2.423–424; *Od.* 3.457–458, 12.361–362) first discusses the burning of fat-wrapped thighbones on the altar as a key component of sacrifice. Aeschylus (*PV* 496–499), Sophocles (*Ant.* 1005–1011), and Aristophanes (*Av.* 1230–1233) attest to the practice of burning fat-wrapped thighbones on altars continuing through the Classical period. Bolstering this textual evidence, three vases have been identified as depicting a priest placing a fat-wrapped thighbone on an altar, and one as depicting a wrapped thighbone already on the altar (*Fig. 1*).¹

¹ Priest placing a fat-wrapped thighbone on altar: Frankfurt, Archäologisches Museum VF B 413, c. 450–440 BC, *BAPD* 275463; van Straten



Fig. 1. Left: Attic red-figure bell krater, c. 450–425 BC, Painter of London E 494. London, British Museum E 494. Photograph: © Trustees of the British Museum. Right: after van Straten 1995, fig. 124.

Concerning tails, Aristophanes (*Pax* 1054–1055) portrays a sacrificial scene at an altar, in which the character Trygaeos refers to what is roasting on the altar and says “the tail is doing nicely”. van Straten has convincingly demonstrated that images on vases of a curled object on an altar depict a tail “doing nicely”—namely, curling back on itself while being roasted on the altar (Figs. 2 and 3).² The zooarchaeological evidence from excavations of altars and sanctuaries, including the ash altar on Mt Lykaion in Arcadia, the altar of Aphrodite Ourania in the Athenian Agora, the Artemision at Ephesos, and the Sanctuary of Apollo Hylates at Kourion in Cyprus, demonstrates that ancient Greeks were burning thighbones and tails on altars as part of sacrificial ritual.³

Experimental archaeology

To better understand the rituals performed at the altar, I conducted experiments attempting to recreate them. At the American School for Classical Studies at Athens, along with

my colleague Daniel Diffendale, I built an *eschara*, a ground level altar.⁴ Using training in butchery which I acquired during my ten years working as a professional cook, I removed the thighbones and tails from legs of lambs between 8 and 18 months old and then studied how they burned. There have been previous attempts to explore sacrifice from a practical perspective.⁵ However, my project addressed new research questions and was designed to build up a larger body of data through repetition. Over 22 events between 8 December 2012 and 13 May 2014, I burned 38 lamb thighbones, 36 lamb tails, and two oxtails.

First phase of the butchery process

After the sacrificial victim was killed, the first step in the butchery process was to open up the chest cavity and take out the internal organs, including the *splanchna* (the heart, lungs, liver, spleen, and kidneys⁶) and the omentum (a sheet of fatty membrane that hangs down from the stomach). Organ removal

1995, 178, fig. 126. St. Petersburg, State Hermitage Museum 774, c. 440–420 BC, *BAPD* 215154; van Straten 1995, V204, fig. 127. Paris, Musée du Louvre G 496, c. 425–400 BC, *BAPD* 215758; van Straten 1995, V200, fig. 152. See Forstenpointner 2003; Ekroth 2013a; Morton 2015.

² van Straten 1988; 1995, 118–128 with catalogue of images of tails on p. 120.

³ Mt Lykaion: Starkovich *et al.* 2013; Starkovich 2014. Aphrodite Ourania: Reese 1989. Artemision at Ephesos: Forstenpointner 2003. Kourion: Buitron-Oliver 1996; Reese 2012. For a discussion of the importance of zooarchaeology for understanding sacrificial rites, see Ekroth 2017.

⁴ For discussion of the *eschara*, see Ekroth 2002, 25–59, esp. 58–59. For the image closest to the altar we built, see the Attic red-figure Panathenaic amphora by the Kleophon Painter (440–420 BC), Darmstadt, Hessisches Landesmuseum A 1969.4 (478), *BAPD* 215188; van Straten 1995, V173, fig. 146.

⁵ See e.g. Jameson 1966; 1986; Buikstra & Swegle 1989; Forstenpointner 2003; Forstenpointner *et al.* 2013; Ekroth 2009; 2013a; 2013b; 2017.

⁶ Arist. *Part. an.* 3.3.665a28–672b8 defines and discusses the *splanchna*. See Bednarek and Pirenne-Delforge in this volume, *Chapters 9 and 10*.



Fig. 2. Left: Attic red-figure bell krater, c. 425–400 BC, Nikias Painter. London British Museum 98.7-16.6. Photograph: © Trustees of the British Museum. Right: after van Straten 1995, fig. 142.

could be done with the animal lying flat on its back or hanging, but vase imagery indicates that it was likely done with the animal lying on its back.⁷ This step has both practical and religious components: practical, as the organs need to be quickly removed from the animal to avoid spoilage of the meat;⁸ and religious, as the organs can promptly be examined by a seer and the *splanchna* removed and taken to the altar.⁹ In the next step, the skin and head were removed. This was most likely done with the animal hanging, due to the greater ease in skinning a hanging animal.¹⁰ To do this, the victim was first hung upside-down by the gambrel cord or Achilles tendon, the large tendon that connects the calf muscle to the hock. In modern butchery, hooves are removed at this stage as well. However, Greek vase imagery often portrays legs of meat with the hoof still attached, likely to indicate the sacral value of the leg.¹¹ This first stage of butchery is well represented by a photograph of a butcher in action along the roadside near Tbilisi, Georgia (Fig. 4). Note the hooves to the left of the butcher, the hide in the foreground, and the head behind the bucket. The butcher is about to throw



Fig. 3. Attic red-figure kylix, c. 475–450 BC, Pan Painter. Oxford, Ashmolean Museum 1911.617. Photograph: © Ashmolean Museum, University of Oxford.

⁷ See e.g. Bonn, Akademisches Kustmuseum 62, c. 530 BC, *BAPD* 42076; van Straten 1995, V150, fig. 120. Ferrara, Museo Nazionale di Spina T 256 b VP, c. 470–460 BC, *BAPD* 202766; van Straten 1995, V152, fig. 119. Warsaw, National Museum 142464A, c. 475–450 BC, *BAPD* 209851; van Straten 1995, V153, fig. 121. Rome, Villa Giulia, no inv. number (Ricci Hydria), c. 525–500 BC, van Straten 1995, V154, fig. 122.

⁸ Danforth 2014a, 84; 2014b, 90.

⁹ For the use of *splanchna* at the altar, see van Straten 1995, 131–134.

¹⁰ See Yami 2009; Heinz 1991; Danforth 2014b, 86–89 and 206–218.

¹¹ Tsoukala 2009; Ekroth 2013a, 21–22.

internal organs that have been removed from the carcass into the river.

Once the internal organs, head, and skin have been removed, the next step is to cut the carcass in half lengthwise through the spine. From my experience talking with and observing butchers in Greece and Albania, the technique entails hanging mammals of all sizes by the gambrel cord on one leg, grabbing the other leg with one hand and cutting length-



Fig. 4. Roadside butchers near Tbilisi, Georgia. Photograph: Sarah C. Murray.



Fig. 5. Halved pig carcass. From: Jonsson-Ekegårdh & Hallman-Haggren 1949, pl. 20.

wise down the spine with a large knife or cleaver in the other hand.¹² One makes the first cut where the base of the tail enters the body. Then one continues cutting lengthwise through the spine, resulting in a carcass split into two halves, but with the complete tail only on one of the halves. A Swedish cookbook from the 1940s shows half the carcass of a pig split lengthwise along the spine with the entire tail visible (Fig. 5).

An Apulian red-figure vase now in Madrid depicts a butcher with a large knife (Fig. 6).¹³ Even taking into account potential exaggeration on the artist's part, this image depicts a knife large enough to sever a pig's head or cut a pig's head in half (whichever is being depicted)—which indicates the

use of knives more than large enough to go through a spine lengthwise.

At this point, the leg can be easily separated from each half-carcass with a cut just anterior to the pelvis, indicated by the black line just anterior to the base of the tail of the pig carcass in Fig. 5. The separated leg contains the caudal vertebrae (the tail), the hipbone, the femur, the patella, and the tibia (Fig. 7). Everything that was needed for the rituals at the altar, namely the leg, the tail, and the *splanchna*, had now been removed from the carcass. The remainder of the carcass could now be processed as meat for consumption, while the leg and tail unit could be processed for the rituals at the altar.

Second phase of the butchery process

The next stage is to remove the tail and the thighbone from this leg. The first step is to remove the hipbone, as this will both separate the tail from the leg as well as make it easier to remove the femur.

Fig. 8 is of a lamb leg from the side of the animal that did not have the tail. The remaining halved caudal vertebrae are at the top of the image. To remove the hipbone, one first slides

¹² Zooarchaeological evidence supports the idea that splitting the carcass lengthwise down the spine was normative practice in ancient Greece (Michael MacKinnon, pers. comm.; Flint Dibble, pers. comm.). See also the contribution by Dibble in this volume, *Chapter 3*.

¹³ Apulian red-figure bell-krater by the Tarpoley Painter, c. 360–340 BC, Madrid, Museo Arqueológico Nacional 1999/127/1. For vase images of butchers using large knives similar in size and shape to the knives used by butchers in Greece today to cut through a spine lengthwise, see e.g. Erlangen, Friedrich-Alexander-Universität 486, c. 500–475 BC, *BAPD* 202524; van Straten 1995, V222, fig. 155. Munich, Antikensammlungen 2347, *BAPD* 208254; van Straten 1995, V239, fig. 156.



Fig. 6. Apulian red-figure bell-krater by the Tarpole Painter, c. 360–340 BC, Madrid, Museo Arqueológico Nacional. N.I. 1999/127/1. Photograph: © Museo Arqueológico Nacional.

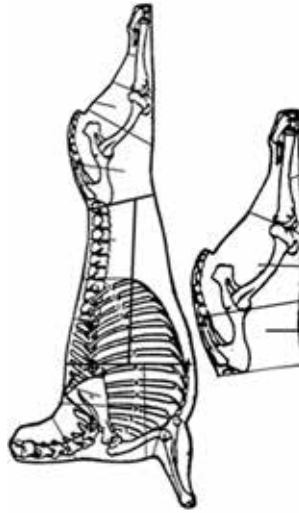


Fig. 7. Leg of lamb including tail. Photograph: Morgan Condell Morton.



the knife along the distal edge of the hipbone, which easily detaches the adjacent muscle from the entire length of the hipbone, a fast and easy procedure. This separates the hipbone from the leg, except for the hip socket in the center (Fig. 9). To separate the hip socket can be the slowest part of the entire process—one has to find where the ball enters the socket and it can be both difficult to see and slippery. One has two options to separate the femur from the hip socket. One can slip the knife into the socket and pop out the head of the femur, which then separates the hip bone from the leg (Figs. 10 and 11). The other option would be to just whack the joint with a large knife or cleaver. This would take off the top of the head of the femur with the same end result—the removal of the hipbone (Fig. 12). One sees evidence of both methods in the zooarchaeological record.¹⁴

Figs. 8–12 show a leg from the side of the carcass without the tail. Separating the hipbone from the femur from the side of the carcass that has the tail employs the same procedure but removes a combined hip and tail unit (Fig. 13). The combined hip and tail unit shown is from a comparatively older animal, which results in each of the bones appearing larger. The arrow indicates where on this hip and tail unit the cleaver first struck the spine at the base of the tail to begin cutting lengthwise

down the spine. One has two options to separate the tail from the hipbone (much as with separating the femur from the hip socket). One can slide the knife through the thin seam of cartilage between the tail and the hip. This step involves skill on the butcher's part as the seam is thin and gets smaller as the animal ages.¹⁵ The other method involves one stroke from a large knife, which can be quickly done even for an older sacrificial victim. The tail is now ready for its ritual use at the altar. The act of removing the tail from the larger leg unit was a fast and easy process, never needing a tool more specialized than the knife that was used earlier to cut the carcass in half.

Third phase of the butchery process

Now that the tail has been removed, the next step is to remove the femur from the leg.¹⁶ Again, there is no need for a special tool, as this could be done with any sharp knife, from a paring knife to a cleaver. One first removes the layer of fat from the outside of the thigh, exposing the seam between the muscles of the thigh. Sliding the knife down the seam to expose the fe-

¹⁴ See Flint Dibble's discussion of this phenomenon in this volume, Chapter 3. I thank Flint Dibble and Michael MacKinnon for discussions on this topic.

¹⁵ I thank Justin Johnston, Production Manager of the Gordon W. Davis Meat Science Laboratory at Texas Tech University for showing me this seam of cartilage and demonstrating to me this method of separating the tail from the hip.

¹⁶ For full discussion of this procedure with photographs, see Morton 2015.



Fig. 8. Leg of lamb. Photograph: Morgan Condell Morton.

mur, one then continues cutting out the thighbone by repeatedly sliding the knife along the bone, freeing it from the surrounding muscle, before slicing easily through the knee, and extracting the femur. Only by this method of carefully cutting along the natural divisions to remove the thighbone will the remainder of the leg form the distinctive shape seen on vases.¹⁷

Zooarchaeological evidence indicates that patellas were often burned with femurs and tails, indicating that ancient butchers cut over the patella, keeping it attached to the femur.¹⁸ In practice, one can cut over or beneath the patella with no change to the butchery technique and no change to the shape of the remainder of the leg.

Out of the leg, we now have the thighbone, the tail, and a significant piece of fat from the top of the thigh. All of the required elements were thus ready for burning on the altar, while the rest of the leg could now be processed for consumption or given as a special share to a priest or other honored guest.¹⁹ The process from slaughter to removal of thighbone and tail was quick, and speed would have been important for logistical reasons, especially dealing with large sacrifices such as a hecatomb, but also to keep the rite moving forward quickly and engagingly for the audience of spectators.

Burning the wrapped thighbone

For my experiments, I built a woodpile on the altar imitating the ones pictured on Greek vases. When the fire was around 600° C, but was putting off no impressive flames, I placed the fat-wrapped thighbone on top.²⁰ Within seconds, small flames began to form around the thighbone, while the fat around the bone started to melt and drip and put off smoke, as the temperature of the fat climbed to 100° C. After roughly two minutes, the flame greatly increased as the temperature of the fat reached 100° C and caught fire. By six minutes from the initial placement, the flames were high above the altar and obscured the thighbone (Fig. 14). This striking burst of flame consistently lasted six–seven minutes. Based on my experiments, a thighbone wrapped with at least 200 g of fat will always produce this burst of flame.

The fact that the wrapped thighbone produces this distinctive surge of flame over the altar every time urges us to view certain depictions of flames surging up over an altar during sacrificial rites depicted on vases as realistic portrayals (Figs. 1–3).²¹ The experience of viewing this rite appears to have focused on the sustained burst of flame emanating from the wrapped thighbone. In contrast, unwrapped bones, bones with an insufficient wrapping of fat, or fleshed thighbones even when wrapped in 300 g of fat, caused no burst of flame or any other kind of dramatic change to the pyre. Additionally, the fleshed bone also takes much longer to be consumed by the fire—more than two hours as opposed to roughly 13 minutes.

Every fat wrapped thighbone I burned put off the sustained burst of flame. However, there is a scene of failed sacrifice in Sophocles' *Antigone* that reveals there was anxiety in antiquity that such a seemingly surefire rite could still fail. In this scene (Soph. *Ant.* 1005–1011), Tiresias says:

At once I was alarmed, and attempted
burnt sacrifice at the altar where I kindled fire; but the fire
god raised no flame from my offerings. Over the ashes a
dank slime oozed from the thighbones, smoked and sput-
tered;
the gall was sprayed high into the air and the thighs,
streaming with liquid, lay bare of the fat that had con-
cealed them.
(Transl. Lloyd-Jones 1998)

¹⁷ See e.g. Munich, Antikensammlungen 2674, c. 500–475 BC, *BAPD* 205009; van Straten 1995, V231, fig. 161. London, British Museum E 62, c. 500–475 BC, *BAPD* 204877; van Straten 1995, V228, fig. 162. Durand 1984, 32; Morton 2015, 70.

¹⁸ Cf. e.g. Starkovitch 2014; Reese 1989.

¹⁹ Tsoukala 2009.

²⁰ Both the fat just removed from the top of the thigh and the omentum have been proposed as the fat used to wrap the femur: both of which were already removed from the animal, look the same when wrapped around the bone, and burn the same in the fire. See Forstenpointner 2003; Forstenpointner *et al.* 2013; Morton 2015.

²¹ See additionally, Athens, National Museum 595, c. 500–475 BC, *BAPD* 9654; van Straten 1995, V158, fig. 153. London, British Museum B 362, c. 540–520 BC, *BAPD* 30320; van Straten 1995, V160, fig. 123.



Fig. 9. The exposed hip joint. Photograph: Morgan Condell Morton.



Fig. 10. Popping the ball of the femur out of the socket with the tip of the knife. Photograph: Morgan Condell Morton.



Fig. 11. Separating the hip from leg. Photograph: Morgan Condell Morton.



Fig. 12. The hipbone fully extracted. Photograph: Morgan Condell Morton.

The audience would have realized that the ritual had been set up correctly, as Tiresias had lit the fire, wrapped the thighbones in fat, and placed them on the altar. However, in contrast to expectation, instead of flames rising up from the thighbones, liquid dripped down. More than just a literary device of using opposites for dramatic effect, this passage describes just what threatens to happen in my experiments during the first two minutes after the wrapped thighbone is first placed on the altar, as the fat starts to drip and put off smoke before it then creates the burst of flame. This brief threat of failure adds incredible tension to a ritual that could be expected to work every time, and this tension directly leads to relief and joy for the participants.

Even though in my experiments a properly wrapped thighbone always caused the burst of flame, nevertheless people who watched my experiments often spoke to me afterward about the great tension they felt when the wrapped thighbone was placed on the altar—this would be the one time the rite would fail. They said that they would closely observe every de-



Fig. 13. The tail and hipbone with initial cut mark indicated by arrow. Photograph: Morgan Condell Morton.



Fig. 14. Burst of flame above the altar obscuring the thighbone.
Photograph: Morgan Condell Morton.

tail of the wrapped thighbone for indications of failure until it burst into flames, and were then surprised by their relief. Sophocles' depiction of Tiresias' failed sacrifice tapped into this anxiety built into in the ritual.

Burning the tail

We know from vase imagery that the tail was supposed to curl upward when it is burned on the altar. I burned 36 lamb tails and two oxtails in all seasons and weather conditions, and the tail always curls upward.²² However, how it curls is worth exploring further.

When first placed on the burning altar, the tail lies straight and flat (Fig. 15). The tail then starts moving surprisingly fast, often within 30 seconds. Interestingly, though, the tail always begins moving by slightly contracting and then appearing to curl downward (Fig. 16). That this ritual begins with the tail seeming to do the opposite of what it is supposed to do, and expected to do, adds great tension to the event. But then roughly three minutes after having been placed on the altar, the tail starts curling up, the proper way (Fig. 17); moving dramatically and quickly, it completes the curl within the next

²² Previous studies of curling tails: Jameson 1966; 1986, 60–61; Ekroth 2009, 149; 2013a, 20. Kadletz (1981) speculated that the object depicted curling on the altar was instead a tongue. I burned an ox-tongue and it did not curl, but merely turned into a black lump that took multiple hours' worth of fuel to eventually consume. For the tongues of sacrificial animals, see further Georgoudi this volume, Chapter 8.

three minutes (Fig. 18). The rapid curl, pointing upward in an auspicious way, will have provoked a feeling of release for the audience. Similar to the ritual burning of the thighbone, the initial threat of failure adds increased tension and relief to a ritual expected to work every time. Importantly, the burning tail provides no burst of flame. In Figs. 15–18, the flames are caused by the burning fat wrapped thighbone behind the tail. The tail itself caused no change to the flames.

As discussed above, the initial carving by the butcher, cutting the carcass in half, was at the base of the tail. My experiments indicate that it did not matter where the butcher made the cut, i.e. how much of the sacrum was kept attached to the tail, for the success of the rite. The tail had enough internal stability to curl with or without the sacrum.²³ This irrelevance of the sacrum to the success of the rite could help explain the variable presence of sacra and caudal vertebrae in sites where tails have been burned.

The thigh and tail together

The tail and thighbone were not only removed together from the carcass during the process of butchery, I believe that they were burned together on the altar at the same time. There are two direct artistic representations of this. In Aristophanes' *Peace*, in the sacrificial scene at the altar mentioned above, the thigh and the tail are presented as burning on the altar at the same time: Trygaeos' slave tells him to "place the thighs on the fire on the altar" (Ar. Pax 1039) and then, a mere 14 lines of rapid dialogue later, Trygaeos tells the slave to be careful of the tail on the altar while roasting the *splanchna* and then says "the tail is doing nicely" (Ar. Pax 1054–1055). This strongly implies that the tail and thigh were on the altar at the same time.²⁴ One vase image also depicts the tail and wrapped thighbone on the altar at the same time (Fig. 1); the tail is in the foreground and the wrapped thighbone is understood to be the hourglass shape depicted behind it.

The problem is that both these representations could be thought to be narrative compression of events for artistic purposes. Vases are not photographs and comedic sources can be difficult to interpret. Looking again at Fig. 1, the fire is por-

²³ So much so, that once I placed the tail upside down on the altar and it flipped itself over to be able to make the proper auspicious curl.

²⁴ I burned ten sets of *splanchna* over the altar in my experiments. The *splanchna* roast to an edible state in eight–ten minutes in the burst of flame from the wrapped thighbone. This supports the idea that the *splanchna* could have been roasted at the same time as the thigh and tail were on the altar, as portrayed in this passage, and on vase images of *splanchna* being roasted over curling tails on the altar. See the discussion of images of *splanchna* roasting over altars in van Straten 1995, 133–135. For the cooking of the *splanchna*, see also Pirenne-Delforge in this volume, Chapter 10.



Fig. 15. Initial placement of the tail on the altar. Photograph: Morgan Condell Morton.



Fig. 16. The tail begins curling the wrong direction. Photograph: Morgan Condell Morton.



Fig. 17. The tail curling the auspicious direction. Photograph: Morgan Condell Morton.



Fig. 18. The tail completes its curl. Photograph: Morgan Condell Morton.

trayed leaping above the tail and wrapped thighbone as it does over the thighbones in my experiments. In other vase images (Figs. 2 and 3), flames are shown leaping over curling tails but with no thighbone depicted.²⁵ A burning tail alone, however, makes no such burst of flame. I propose that these images of leaping flames over curling tails were meant to indicate the implied presence of the wrapped thighbone lying next to the tail on the altar and generating these flames.

This would have been possible due to the same time intervals involved in the ritual processes for both the thigh and the tail (See Table 1). When I put the wrapped thighbone and the tail on the fire on the altar at the same time, for the first couple of minutes each of them would generate tension in the audi-

ence by giving the impression that the ritual might not work: the tail begins curling the wrong way and the fat wrapped around the thighbone starts sputtering, melting, and putting off smoke. But then over the next three or so minutes, the tail would make its auspicious curl and the flames would start to surge above the altar. When the tail was placed on the side of the thighbone facing the spectators, the burst of flame from the thighbone would not obscure the tail. For the following few minutes the tail would be curled on the altar with the flames rising above as pictured on these vases. These scenes would then be a veristic reflection of the sacrificial rite.

Issues of woodpile structural stability add another reason one would burn the thighbone and tail at the same time. In Aristophanes' *Peace*, Trygaeos arranges the woodpile on the altar and asks the chorus "Wouldn't you say that I'm arranging the firewood in a mantic way?" (Ar. *Pax* 1026), likely implying some sort of physical gag, such as piling up the wood in a particular way to make fun of *manteis* (seers). This in turn

²⁵ See additionally Athens, National Museum 595, c. 500–475 BC, *BAPD* 9654; van Straten 1995, V158, fig. 153. London, British Museum B 362, c. 540–520 BC, *BAPD* 30320; van Straten 1995, V160, fig. 123.

	First 2–3 min	At 2–3 min	At 6 min	Next 6–7 min	At ~13 min
Wrapped thigh-bone	Fat sputters and melts	Flames start to surge	Flames create distinctive surge	Flames sustain their surge above altar	Flames die down
Tail	Begins curling downward	Starts curling upward	Completes curl upward	Stays curled	Is thoroughly charred

Table 1. *Timing of events on the altar.*

strongly suggests that there would have been an expected size and shape for the woodpile on the altar. Indeed, woodpiles on altars as depicted on vases display a consistent size and shape (Figs. 1 and 2).²⁶

For my experiments, I built woodpiles that reflected the images on the vases. Practically, this shape works, in that a wood pyre built in this manner always burns at a sufficient temperature to ignite the wrapped tailbone and curl the tail. However, there is a limited time of structural stability for a burning woodpile of this size and shape. Burning the leg and then the tail in succession, in either order, can take long enough that the woodpile starts to collapse, which can send what is on the woodpile tumbling off; this would surely have seemed inauspicious and to be avoided. These factors strongly suggest that the thigh and tail were burned together on the altar. More than the tension each generated individually, their combined behaviors in the fire would have made for a dramatic confluence of events.

Interpreting the signs

The ritual burning of the thigh and the tail was designed to succeed in a reliable and predictable manner and to do so with clear visual confirmation of that success: the burning thigh-bone and the tail each gave a distinct and unambiguous sign. Importantly, these signs are easily recognizable to a non-specialist and do not rely on any specific interpretation. In fact, there is nothing to interpret; there is a clear thing that happens: the tail curls upward and the burst of flame appears.²⁷ Either the ritual worked or it failed. This is different than many other aspects of Greek religion where interpretation was needed and the communication with the divine was ambigu-

ous. For instance, the study of the sacrificial entrails needs a specialist's interpretation. There are also the easily misunderstood oracles from Delphi, the priests who interpret sounds at Dodona, and signs from birds and dreams.²⁸

What the ritual with the thigh and tail tells the worshipper is whether the offering has been received by the gods—the burning of the thigh and tail is the first stage in communication between the divine and the sacrificer. While the prayer is made before killing the victim, the successful completion of the rites at the altar is the first indication that the gods are even listening. Once this first step in the communication between men and gods is achieved, then the next step—the request or prayer—has the possibility of being heard and then accepted or denied.²⁹ This relationship between the sacrificial rite and the prayer itself is well illustrated in an episode in Apollodoros' *Bibliotheca*.³⁰ In this passage (Apollod. *Bibl.* 1.7.2), Deucalion, after surviving the flood, sacrifices to Zeus, who, in response to receiving the sacrifice, sends Hermes down to see what Deucalion wants. Deucalion's sacrifice thus acted as an opening of the communication between man and the gods, which, when accepted, led to the request stage of the interaction. However, if this sacrificial rite failed, then the line of communication was closed. The passage from *Antigone* discussed above illustrates the situation in which the first step of communication failed and there was then no possibility of any prayer being heard.

The audience of spectators at a sacrificial rite would have together witnessed the potential failure and shared the clear success of the successful rite.³¹ Additionally, each member of the audience would have been able to interpret the rite as successful—no intermediary was needed to explain it to them. The unambiguousness of the interpretation of the rite effectively made all the witnesses into participants as well.

²⁶ van Straten 1995, 167.

²⁷ Pindar mentions μάντιες ἄνδρες ἐμπύροις τεκμαιρόμενοι, “mantic men divining through fire-watching” at Olympia (Pind. *Ol.* 8.2); however, it is unclear from the poem what these men did and their peculiarity to Olympia appears to be stressed. Hesychius' definition of πυρκόοι (s.v. πυρκόος) is likely a reference to this Pindaric passage, although it mentions Delphi. Linear B tablets PY Ep 705 and Eb 884 (securely restored) likewise offers an opaque reference to fire watching in the personal name *pu-ko-wo* (*Purkows*/), who is a “slave of the god” (*te-o-jo*, *do-e-ro*); see Aura-Jorro 1999, s.v. *pu-ko-wo*. I thank Kyle Mahoney for pointing these examples out to me, and for extensive discussion on the topic.

²⁸ On divination in general, see Johnston 2008; 2015. For Delphi, see Fontenrose 1978. For Dodona, see Parke 1967 and Eidinow 2007.

²⁹ On different methods of communication between men and gods during sacrifice, as well as the gods' potential denial of prayer requests, see Naiden 2013, 39–40, 109–122 and 131–182. I thank Fred Naiden for discussion on this topic.

³⁰ I thank Vinciane Pirenne-Delforge for showing me this passage.

³¹ For the performative nature of Greek ritual, see Pilz 2011.

Conclusions

From separation from the carcass through destruction by fire and communication with the divine, the thigh and tail are linked, both by physical proximity and by how they transmit communication with the gods: the leg and tail were removed from the whole carcass together; this leg and tail unit then supplied all the components for the rituals at the altar, and these components were quickly and easily extracted; the tail and leg were burned on the altar at the same time. Each rite contained a threat of failure but, when it was correctly performed, always worked: the tail always curled and a wrapped thighbone always produced the desired surge of flame. The rite was easy to understand and interpret for everyone who could see it, and as a result the thigh and tail enabled everyone at a sacrifice direct communication with the gods.

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