

Article

The Zooarchaeology of Israelite Religion: Methods and Practice

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Abstract: This essay aims to provide a methodological framework for the application of zooarchaeology to the study of Israelite religion for the purpose of providing an overview of this growing subfield for the non-specialist and for inviting further conversation among practitioners. Definitions of “zooarchaeology” and “Israelite religion” are explored and the aim of reconstructing practices of Yahweh-centric religion is described. A methodology is suggested through a series of questions that may be applied to explorations of faunal remains, including those related to context, excavation technique and analysis, and engagement with the Hebrew Bible. The essay concludes with an illustration from Tel Dan and affirmation of integrated methodologies that critically engage archaeological and textual data to form new syntheses.

Keywords: zooarchaeology; Israelite religion; sacrifice; offering; Yahwistic worship; sacred feasting; faunal remains; animal bones; cult; ritual; Tel Dan; Hebrew Bible

1. Introduction

There has been increasing interest in the field of zooarchaeology and its application to the study of the religious practices associated with ancient Mediterranean peoples in recent years. This interest is due to the recognition of the value of the analysis of faunal remains for approaching questions of religion and has resulted in animal bone studies moving out of the appendices of archaeological reports to become integral components of more robust understandings of ancient peoples. This is especially the case in ancient Greek and Roman contexts ([Ekroth and Wallensten 2013](#); [Ekroth 2013](#)), and this same trend may be observed in various societies from the southern Levant, in general, and ancient Israel, in particular ([Lev-Tov and Kansa 2017](#)).

This essay aims to provide a methodological framework for the application of zooarchaeology to the study of Israelite religion. Definitions and aims are provided before guidelines for a suggested methodology are set forth and problems are considered. Questions of context, excavation techniques and analysis, and the applicability of texts from the Hebrew Bible are explored for the purpose of providing an overview of this growing subfield for the non-specialist and encouraging further conversation among practitioners.

2. Definitions and Aims

At the outset, it is important to define the terms employed when we speak of the “zooarchaeology of Israelite religion,” as well as the aims of this subfield. This is especially so in regard to current debates surrounding ancient Israel and its relationship to the texts of the Hebrew Bible portraying its history.

2.1. Defining Terms

By “zooarchaeology,” sometimes known as “archaeozoology” or simply “animal bone archaeology” (see [Hesse and Wapnish 1985](#) and [Gifford-Gonzalez 2018](#) for discussions of the terms), we mean the analysis of animal bones undertaken to explore archaeological questions about the relationships between animals and peoples in the past (cf. [Hesse and Wapnish 1985](#); [Davis 1987a](#); [O’Connor 2008](#); [Reitz and Wing 2008](#); [Sykes 2014](#); [Gifford-Gonzalez 2018](#)). In this application, we are particularly interested in the human side of the relationship. As such, zooarchaeology involves the excavation and identification of teeth and animal bone fragments from common domesticates, wild game, and fish and birds,¹ that are analyzed to address questions related to issues such as herd management and animal consumption, with an eye toward opening windows of insight to the economic, social, and cultic aspects of a given society.

Defining our use of “Israelite religion” is more complex due to the variety of applications, and/or misapplications, of the very term “Israelite” and what such a designation may or may not imply regarding religion. The source of the complexity is disagreement about the degree of the difference between the “Israel” described in the Hebrew Bible (sometimes called “Biblical Israel”; cf. [Davies 2007](#)), on the one hand, and a certain people group named “Israel” that is identified in inscriptions, on the other.²

The discussion is further complicated by new understandings of how people groups form and identify and the growing recognition that the way many think of ethnic descriptors today, especially in light of recent advances in genetics, is very different from the way ancient peoples conceptualized identity (cf. [Barth 1969](#); [Emberling 1997](#); [Finkelstein 1997](#); [Jones 1997](#); [Sparks 1998](#); [Brett 2002](#); [Insoll 2004](#); [Miller 2008](#); [Faust 2006, 2017](#)). As has long been noted, even among contemporary societies, ethnic differences do not necessarily correspond to cultural differences (see, especially [Barth 1969](#); cf. [Eriksen 2015](#), pp. 97–108). Indeed, various ethnicities may share a common cultural identity, and that identity may be more flexible and varied than is often assumed, thus complicating correlations between material culture and ancient peoples. Such groups are defined both internally and externally by comparison with “the other,” and the establishment and negotiation of certain boundaries—or, better, *frontiers* (cf. [Eriksen 2015](#), p. 105, following [Cohen 1994](#), pp. 121–22)—that are established (or emerge) to define “in” and “out.” These frontiers, further, expand and contract over time depending on the interaction with, or isolation from, other groups.

For many ancient societies, “religion” served as a fundamental frontier-defining system, and it retains this power in many societies to this day. Religion—here restricted to certain beliefs, symbols, and practices centered on the worship of a certain deity, or a larger pantheon of deities—often differentiated one group from another, or a conglomeration of groups from others. In the case of ancient Israel, according to biblical texts and epigraphic remains from the Iron Age II (10/9th c.–6th c. BCE), the cult was centered on the deity known as Yahweh, but there is also evidence in both corpora that Israelites worshiped a number of different deities (or venerated their symbols), as well (cf. [Smith 2002](#); [Dever 2005](#)). Due to such diversity, instead of using the term “religion,” some justifiably prefer to speak of “religions” in the plural to represent this reality (e.g., [Zevit 2001](#); [Hess 2007](#); [Stavropoulou and Barton 2010](#)). The way in which Yahweh was viewed in relationship to these other deities is

¹ Other microfauna, such as rodents and reptiles, are beyond the scope of this inquiry in that there is not conclusive evidence that such species were consumed by peoples associated with ancient Israel in the southern Levant during the Iron Ages.

² The name is first attested in the Merneptah stela at the end of the 13th c. BCE and while some question the reading of *ysri3r* as “Israel,” the r/l interchange between Egyptian and Semitic languages is expected (cf. [Hoch 1994](#), p. 430) and the use of the hieroglyphic determinatives following the appellation makes it quite clear that the reading identifies a foreign, unsettled people group, as opposed to those centered in city-states, such as Ashkelon and Gezer also mentioned in the inscription (cf. [Kitchen 1994](#), p. 76; [Stager 1985](#), pp. 60*–61*). The name is again mentioned in inscriptions from the 9th c. BCE, namely in the Mesha Stela and the Tel Dan inscription discussed below, and, though some question the equation of these terms, that they are related to each other is likely. For a full discussion of the various views associated with these debates, see ([Moore and Kelle 2011](#)).

complicated by a range of opinions regarding the incorporation of the Hebrew Bible and the dating of certain religious traditions, as well as by how one understands the epigraphic remains. That said, our earliest inscribed monuments from the period of the Hebrew kingdoms (9th c. BCE), i.e., the Mesha Inscription (Tebes 2018) and the Tel Dan stela (Younger 2018), both associate these kingdoms, northern Israel and southern Judah (or, more specifically, “the House of David”), with the worship of Yahweh and no other deity, explicitly in the case of the former and by association in the theophoric names of the kings mentioned (though in broken contexts) in the latter. In that both monuments were commissioned by adversaries, in them we have an etic association with Yahweh that is in concert with the emic association of Yahweh portrayed in the biblical texts, whatever their dates of composition. Thus, regardless of any diversity among the religious expressions within ancient Israel in regard to the worship of other deities or their representative icons, the association of Yahweh with the Israelite kingdoms (Israel and Judah) was understood and officially projected in such a way that, at least by the 9th c., it served as a frontier to differentiate Israel from Moab and Aram-Damascus, in these instances, as well as in others elsewhere (cf. Faust 2017).

In this paper, then, we take “Israelite religion” to be those beliefs, symbols, and practices centered on the worship of Yahweh during the Iron Age and Persian periods in the southern Levant, while the diversity of religious expression that would have included other deities alongside of Yahweh is fully recognized (cf. Albertz 1994; Miller 2000; Zevit 2001; Smith 2002; Hess 2007; Stavrakopoulou and Barton 2010, among others). In this regard, and in light of the above discussion of ethnicity, while the designation of “Israelite religion” is retained, rightly understood, our endeavor may be more accurately defined as the zooarchaeology of *Yahweh-centric* religion.

2.2. Defining Our Aim

Even with such definitions established, our aim must be somewhat restricted in that “beliefs” of ancient peoples are particularly difficult to ascertain and are often confined to the realm of speculation, especially in the absence of epigraphic remains. Further, our modern conceptions of “what religion is” differ from culture to culture today, let alone from culture to culture in the past, and individual perceptions are biased towards one’s own religious frameworks (Renfrew 1994; Zevit 2001). That said, behavioral characteristics and sequences of ritual practices associated with worship may contribute to understanding beliefs and this *practice* of a particular religion, i.e., the “cult,” is accessible through archaeological methods in a way that belief is not. Indeed, various paradigms have been established through which excavated materials may be explored in order to identify cultic activity. For example, following Renfrew’s well-known “indicators of ritual” (Renfrew 1985; 1994; Renfrew and Bahn 2016, pp. 413–21) that have been adapted for the context of ancient Israel in a number of studies (e.g., Gilmour 2000; Zevit 2001; Davis 2013), ritual practices may be reconstructed where we identify architecture or material culture that: 1. may be associated with particular deities or deities’ dwellings; 2. focuses attention; 3. establishes boundaries between levels of holiness; and/or 4. suggests offerings, either votive or sacrificial.

Here zooarchaeology can play a special role, especially with regard to this last identifier of remains that suggest offering in that many offerings consist of meat, whether symbolically destroyed, buried, or consumed by officiates or other participants. Indeed, food is central in the practice of religion, and meat, in that its procurement requires animal death, is often elevated in its importance. Regardless of the way such meat is handled, bones are often all that remains and the analysis of these remains can shed light on the full spectrum of religiously-charged eating events, which arguably includes *all* consumption, from the most seemingly mundane everyday meal to the highest holy feast.

Indeed, zooarchaeology has been applied intensively to particular dietary habits associated with religious prescriptions regarding meat for everyday consumption in ancient Israel, especially regarding the question of pork prohibition (e.g., Harris 1985; Hesse 1990; Faust and Lev-Tov 2011; Sapir-Hen et al. 2013; Sapir-Hen et al. 2015; Sapir-Hen 2016; Faust 2018)—notably, far more complex of an issue than is often assumed (Hesse and Wapnish 1997; 1998)—and also those dietary laws

concerning birds and fish (Altmann forthcoming; Altmann and Angelini forthcoming; Altmann and Spiciarich forthcoming). Explorations of tomb offerings have also been enriched by faunal analysis (Horwitz 2001; Lev-Tov and Maher 2001), and such results, though underutilized, may play a key role in ongoing discussions about the existence, nature, and extent of a cult of the dead in ancient Israel (cf. Bloch-Smith 1992; Schmidt 1996; Hays 2015). Faunal analyses have been particularly central to studies of sacrifice and have provided keys to unraveling ritual sequences (Hesse et al. 2012), and also for evaluating potential congruences between faunal data and sacrificial practices described in the Hebrew Bible (Wapnish and Hesse 1991; Greer 2013).

Thus, our aim for a zooarchaeology of Israelite religion, as described above, is to reconstruct practices—more specifically, those practices related to eating, offerings, and sacrifice—that may be associated with Yahweh-centric worship, and then to integrate these findings with other data sets, such as those from analyses of architecture, artifacts, and, if possible, textual witnesses, to form syntheses that engage the phenomenological, social, economic, and/or historical import of such practices.

3. Toward a Methodology

While there are many manuals describing the methods of zooarchaeology (e.g., Hesse and Wapnish 1985; Davis 1987a; O'Connor 2008; Reitz and Wing 2008; Sykes 2014; Gifford-Gonzalez 2018), as well as many studies that apply archaeology to the study of Israelite religion (e.g., Nakhai 2001; Albertz and Schmitt 2012; Zevit 2001; Dever 2005; Hess 2007; Stavrakopoulou and Barton 2010), there has been less attention on methodologies specifically focused on a zooarchaeology of Israelite religion that integrate these studies and also engage recent developments in faunal analysis and biblical studies. That said, there are some notable exceptions (Horwitz 1999; Wapnish and Hesse 1991) and many zooarchaeologists working in the southern Levant operate along similar lines and incorporate these various subfields in a number of works (Greer 2013; Lev-Tov and Kansa 2017). Here, we aim to provide a methodological framework represented in such works that also incorporates recent developments, while further addressing some of the recurrent problems regarding the use of biblical texts. This framework is presented by a series of questions that may be posed by investigators approaching animal bone remains in order to understand ancient Israelite religion.

3.1. What Is the Context?

Central to any archaeological inquiry is the question of context. In the case of explorations of the practice of Israelite religion, an immediate problem is that there was not any clear division between “secular” and “sacred” in the way that may exist in many post-Enlightenment modern societies today. Indeed, all practices were religious in one way or another and are represented in the household, public spaces, and tombs, as well as in shrines and temples. That said, such practices were sacred in different ways and seem to have existed on a continuum of “embeddedness” (Renfrew 1994), that is, a spectrum of variation in the degree to which such practices were embedded in the everyday activities of this world (such as eating a daily meal) or focused in a special way on experiencing the world of the supernatural (such as participating in a temple feast). Traditionally, architecture and artifacts have been the primary identifiers employed within such paradigms, but in recent decades, animal bones have been recognized as equally important (Horwitz 1999). Indeed, the most plausible identifications of cultic contexts engage a variety of data sets.

3.1.1. What Type of Space Is It?

For households or other communal domestic spaces, evidence of religious practice is prevalent especially in so-called “cult corners” (cf. examples in Zevit 2001). Such spaces are usually identified by the high concentration of vessels that are generally associated with cultic practices, such as chalices, censers, and zoomorphic vessels, as well as architectural features such as low benches, which served as resting places for many of the vessels. Animal bone finds in these contexts also show variance with

nearby deposits, though, as will be discussed below, we suggest that greater care should be exercised in determining the nature of the deposit.

Tombs are also inherently ritual spaces, often with sequences conveyed in their layouts and associated epigraphic remains (Mandell and Smoak 2017). Animal bone finds are especially important in such contexts for distinguishing between tomb deposits that may be connected to these rituals and random deposits of non-primary accretions, as tombs were often secondarily used as dumping spots. Here, Horwitz (1987) distinguishes chance animal bone finds from intentional food offerings or sacrifices by evaluating a number of factors including: (1) the degree of association of the bones with a tomb or human remains; (2) a restricted range of species present (e.g., only sheep and goats); (3) evidence of intentional carcass element distribution (e.g., a lack of butchering refuse, such as phalanges, and the presence of heads typical of certain offerings [Horwitz 2001; Lev-Tov and Maher 2001]), that may include (4) articulated units (especially limb portions), and may exhibit (5) side preference; as well as (6) age-based, and (7) sex-based selection. Identification of primary concentrations is essential for determining the nature of the deposit and whether such remains represent a cultic meal *with* dead or a votive offering *for* the dead.

Temples and shrines are set apart by their dominant purpose of the veneration of the deity (or deities) and all of the associated activities, communal and restricted, that comprise worship. Here architectural features that follow particular patterns are often initial indicators (Holladay 1987; Zevit 2001; Mierse 2012), as well as the presence of an altar or a variety of altars. In rare cases, actual images or representative symbols of deities may be uncovered as well. Animal bones from temple contexts are often found in intentionally buried deposits resulting from votive deposits, favissa burials, and pits associated with sacrificial refuse or with the remains of sacred meals (e.g., Greer 2013). Major temples are comparatively rare in the southern Levant during the Iron Age (cf. Faust 2010, 2019), with the notable exceptions of Arad (Aharoni 1968; Aharoni 1993; Herzog et al. 1984; Herzog 1997), Moza (Kisilevitz 2015) and Dan (Biran 1994; Davis 2013; Greer 2013, 2017).

3.1.2. Is It a Deposit?

A problem in a number of publications is the failure to determine the specific nature of the context from which the animal bone sample was recovered. Complications can arise even when the locus may be “secure,” as defined by chronologically homogenous ceramic assemblages, clear site matrix relationships, and/or sharply defined architectural or stratigraphic features. Unlike ceramic remains, faunal remains recovered from “floors,” for example, tell us less than most assume about any associated practices and may represent the activities of subsequent inhabitants when that floor was no longer used as a living space. This is due to the simple fact that animal bones are “trash,” and people generally do not live in their trash. That is, it is unlikely that people, ancient or modern, would consume a portion of an animal, then dump its remains on the floor and leave them there while they rot and fill the space with their stench. Likewise, the discovery of an articulated animal carcass near an altar is neither evidence of a sacrifice left in situ, nor of a sacred meal during which the worshipers carefully picked the meat off each bone without disturbing the articulation. No, animal bones, whether resulting from a highly charged meal in a domestic space or a festival in a temple, were collected and discarded in communal middens, or saved and buried in intentional deposits. It is important to remember, too, that the find spots of these deposits should not necessarily be associated with the spaces of the eating events. Animal bones discovered outside of such concentrations are more likely surface scatter from disturbed deposits, perhaps used as fill and sometimes even as fuel, and are less helpful for approaching questions other than presence and absence of certain species across the stratum. Still, questions of presence and absence can play important roles in dietary differences based on religious prohibitions, rightly understood, as may be in the case of the pig mentioned above.

Bones discarded in communal middens result in high concretions of faunal material in spaces defined by architectural features, from simple pits to slots in between walls from previous strata, as well as in silos and tombs and other abandoned features that are used secondarily as dumping spots.

In that these bones, once religiously charged by their association in cultic activities, are now mixed with the bones discarded from everyday meals (or less religiously charged meals), their usefulness for reconstructing details of those cultic activities is minimal. Bones from concentrated deposits, however, are rich with potential for recovering details about ritual practices and should be the focus of inquiry.

3.1.3. What Type of Deposit Is It?

Even when deposits are identified, far too often such are simply identified as “sacrificial remains” when, in fact, they may represent various types of religiously charged deposits with very different characteristics. Identifying these differences is especially important if one seeks to speculate regarding the cognitive dimensions of the significance of these deposits for ancient peoples.

Deposits resulting from burnt offerings, for example, will consist of fine ash and, if any elements can even be identified, they will be intensely charred and denatured often obscuring their analysis. Such finds are only rarely reported in archaeological reports of the southern Levant, though they have been identified in Aegean archaeology (Forstenpointner 2003). In all likelihood, such deposits are often missed or misidentified in excavation.

Votive deposits, as symbolic offerings that were not consumed, are most readily identified by their articulation with other bone elements. That is, the discovery of a fully articulated limb of a particular animal would render it highly unlikely that it had been consumed in that most elements become disarticulated in the butchering process. Further, even those units that retain their articulation in the butchering process become separated in the final stages of preparation prior to cooking, such as in the disjoining and chopping undertaken to fit portions into a cooking pot, and even more so in the cooking process itself, typically an extended stewing. Such votive portions are most typical in tombs and may be viewed as symbolic portions for feeding the dead, but have also been discovered buried in jars or in pits in the floors of sanctuaries often exhibiting a side preference (Davis 2008; Greer forthcoming).

Most animal bone finds, as mentioned above, are the remains of eating events and when discovered in religiously charged contexts they may be confidently associated with sacred feasting. In contexts where there is an altar structure or other paraphernalia associated with the slaughter of animals, such as in a temple, one may further suggest that such are the remains of sacrificial meals. In contrast to the remains of burnt offering and votive deposits, these bones are often from the meaty portions of the animal, though not exclusively, and exhibit postmortem modifications such as cut marks and breakage patterns associated with the disarticulation and chopping of the portions into smaller units for cooking.

Considering the difference in the type of religiously charged deposits here discussed, we suggest that greater precision should be applied to potential designations of excavated remains as each exhibits different characteristics. Here, too, we suggest greater clarity in speaking about “sacrifice,” in that most sacrifices are evidenced in the form of sacred feasts.

3.1.4. Is the Context Yahwistic?

Associating deposits, whether from burnt offerings, votive offerings, or the remains of sacred meals, with Yahweh-centric worship is a complicated endeavor due to many of the factors discussed in Section 2.1. Our strongest evidence comes from specific mention of Yahweh in any associated epigraphic remains, such as one finds at the gate shrine of the desert caravansary site of Kuntillet ‘Ajrud or in certain tomb inscriptions such as Khirbet el-Qom (Dever 2005). Such may also be suggested by names with Yahwistic theophoric elements that are discovered in close association with other finds that suggest a temple context, such as at Arad (Aharoni 1968; Herzog et al. 1984) or at Tel Dan (Biran 1994), yet this is not as straight forward. Iconography represented in certain artifacts found at an installation, too, may be associated with Yahwistic imagery, most notably, the images of the Taanach cult stands that are often connected to Yahweh and (the) Asherah (Taylor 1993; Zevit 2001; Dever 2005).

The style of particular structures or artifacts and their measurements, such as the field stone altar at Arad (Herzog et al. 1984, p. 11; Zevit 2001, pp. 169–70), have also been associated with Yahwistic worship in the context of other finds. So, too, the presence of an altar kit, including what may be a bowl

for catching sacrificial blood (Greer 2010), as well as the proportions of architectural features (Davis 2013; Greer 2013), and iconographic features (Ackerman 2013) at Tel Dan have been associated with Yahwistic worship. Similar associations have been suggested in the discovery of horned altars, such as at Beersheva (Zevit 2001, pp. 171–74). There are, however, two potential problems with this second category of identification: (1) they are often based on associations with biblical texts (an issue that will be discussed below), and (2) without further epigraphic association with Yahweh, such features may be shared by other non-Yahwistic sanctuaries as well, as exemplified in the architecture of Ain Dara (Monson 2000) or variations of horned altars associated with Philistine and Aegean contexts (Gitin 2002; Sala 2018).

Less helpful are determinations of Yahweh-centric worship made purely on mention of a location that is associated with Yahweh in the Bible in that sites were often the home of various peoples with differing religious allegiances, as the texts themselves describe, and this varied over time. Another problem is that the dating and composition of biblical texts is not straightforward and this can complicate the association of certain sites with Yahweh. Such may be the case with the Mount Ebal site that clearly exhibits evidence of cultic activity (Hawkins 2012), along with evidence of feasting (Horwitz 1986), but seems unlikely to be associated with the altar of Joshua even if historicity is granted in that our earliest textual traditions, evidenced later in the Samaritan Pentateuch and confirmed against the Masoretic text by evidence from readings from the Old Greek traditions and a Qumran fragment, place this altar on Gerizim (cf. Knoppers 2013, pp. 202–3, with references). Determining the religious affiliation of a site based on the presence or absence of certain animal bone remains, such as the lack of pig bones in cult areas at Qeiyafa (Garfinkel 2017, though listing other factors as well), is also insufficient in that worship sites associated with other deities, such as the gate shrine at Geshur, also exhibited these same sacrificial avoidances (Fisher 2005; Greer 2013, p. 100 n. 10), not to mention the complexities associated with the absence of pig remains (Hesse and Wapnish 1997; 1998). While such sites may well have been Yahweh-centric, there is not enough evidence from animal bones alone to determine their affiliation and our strongest cases can be made when evidence from multiple sources—epigraphic, artifactual, architectural, and biblical—is compounded in addition to the zooarchaeological evidence under consideration.

3.2. *How are Bones Excavated?*

Once a context is established, standard methods of excavation, as they pertain to animal bones, usually entail hand collecting any visible remains of bones and placing them in paper bags marked by area, locus, square, and collection date to be analyzed later by a zooarchaeologist. Many digs now also mandate sieving, either wet or dry, and/or flotation protocols, but usually only as a random sampling technique (one out of every five buckets, for example) or in areas that have been identified as particularly important for one reason or another (a midden, for example). This lack of comprehensive sieving, of course, biases the collection toward larger species—e.g., sheep, goats, cattle, deer, pig, etc.—and significantly underrepresents smaller species that may be present in a particular sample. Such random sampling can, however, indicate presence and absence of fish and birds and certain microfauna (i.e., rodents and reptiles) and even with comprehensive sieving, element counts should not be used to calculate percentages of species due to the inevitable loss via natural taphonomic processes, discussed below, that disproportionately underrepresent smaller species.

Other problems at the collection stage pertain to the selection bias of the excavators, often volunteers with little experience, who may single out certain bones that are larger, such as a whole metapodial, or more interesting to the untrained eye, such as an astragalus. They may further miss the relationship of articulated bones and the importance of associating them together even if in different baskets or even loci. Another problem is that bone elements may be destroyed by a pick or trowel in excavation resulting in the collection of only pieces of shattered bone, sometimes even spread between buckets, or the complete obliteration of diagnostic features of a particular element, thus significantly skewing element counts. With large digs that have been in the field for years, an added dimension

is potential staff turnover in which case one cannot be confident that the same protocol in collection technique was applied equally across the sample.

While these are all very real problems in recovering a sample, a simple counter measure is to maintain the presence of a trained zooarchaeologist on site who can equip volunteers and provide oversight to collection methods. A further advantage to such presence is interaction among the staff onsite regarding particular questions of context that may be examined through faunal analysis; such cannot occur when zooarchaeologists analyze remains without an understanding of the context and, conversely, excavators may make different decisions in the field with a more complete understanding of the animal bone remains.

3.3. *How Are Bones Analyzed?*

As in all archaeological research, samples are analyzed with particular questions in mind. That said, regardless of questions posed, certain features of faunal specimens are typically assessed due to their applicability to a wide range of questions. Such include the anatomical identification, orientation, and size of individual elements, the various taxa from which the specimens likely derive, the age and sex if it can be determined, and the nature, location, and frequency of postmortem modifications to the bone (Hesse and Wapnish 1985; Davis 1987a; O'Connor 2008; Reitz and Wing 2008; Gifford-Gonzalez 2018).

3.3.1. What Is Recorded and How Is It Determined?

The initial identification takes place on the elemental level, in that related taxa and to a large extent all vertebrate mammals, share anatomical similarities (Davis 1987a). The closer the relationship, the more similar the anatomy. Once the element is identified and sided, either left, right, or indeterminate, identification is made regarding the taxa.

Identification of element and taxon is made by a visual comparison of the morphological features of a specimen, often supplemented by metrical data (von den Driesch 1976), with elements in comparative collections derived from excavated and/or modern remains, as well as with elements depicted in various standard manuals (Sisson et al. 1975; Schmid 1972; cf., Niven et al. 2009). While the anatomy of certain domestic species has changed some over the millennia in terms of size due to commercial animal farming, it is not so much as to obscure identification.

Typically, common domesticates, especially sheep, goat, and cattle, dominate the assemblages of the southern Levant, though deer and pig occur in significant numbers in certain regions during certain periods. Of these, sheep and goats are notoriously difficult to differentiate though this can be done with some degree of confidence for certain elements depending on the experience of the zooarchaeologist (Boessneck 1969; Zeder and Lapham 2010). Various bird and fish species are also quite frequent, as are remains from other animals that were not typically consumed, such as donkey and dog. Elements that cannot usually be identified at the species level (e.g., vertebrae, long bone shaft fragments, and rib fragments) are grouped in larger categories based on size and are not typically used for calculating species percentages.

Age at death is estimated by osteological and dental maturity based on the state of fusion in the former (Silver 1969; Zeder 2006) and on the eruption and attrition of teeth in the latter (Payne 1973; Grant 1982; Greenfield and Arnold 2008). The sex of the animal can be determined by certain elements such as the pelvis (Greenfield 2006a), though due to the fragmentary and limited nature of such indicative elements sex-based comparisons are only common for large samples.

Postmortem modifications to the bone, such as cut and chop marks, are also recorded and may be associated with the activities of slaughtering, processing, preparation, and consumption, often based on ethnographic parallels (cf. Binford 1978, 1981; Klenck 1995; Grantham 1995, 2000). Associated practices are also reconstructed through experimental archaeology that seeks to replicate ancient practices in ways that produce similar remains to what was excavated, as has been applied especially for Greek sacrifice (Forstenpointner et al. 2013). Modifications due to gnawing from dogs or rodents (Marean and Spencer 1991), weathering (Behrensmeier 1978), or burning (Shipman et al. 1984) are

also recorded, as well as any deformations of the bone due to sickness and/or injury (Siegel 1976; Baker and Brothwell 1980).

Recent scientific advances have transformed the field in terms of providing new data sets for exploration (Gifford-Gonzalez 2018). The most common of these applications include advances in microscopy applied to differentiate between different cut marks and the technologies that produced them (cf. Shipman 1981a; Greenfield 1999, 2006b), isotopic analysis applied to determine grazing contexts and migration patterns (Gifford-Gonzalez 2018, pp. 503–10; Arnold 2018), and studies of ancient DNA applied to bring greater precision to species identification (Gifford-Gonzalez 2018, pp. 511–30), among others.

3.3.2. How Are Bones Counted and Compared?

Before bones can be counted and compared, one must first determine how well the excavated sample represents what was deposited in the past, i.e., understanding and accounting for the taphonomic processes that contribute to the creation of certain deposits and the modification and eventual destruction of their contents over time (Shipman 1981b; Hesse and Wapnish 1985; Lyman 1994). Such differences must then be evaluated as to the statistical probability that the observed difference was created by intentional processes and may not be explained by random selection (Lyman 2008).

Once taphonomic realities have been considered, bones are then quantified, and discussion continues about the best way to count bones that is both reliable, i.e., replicable, and valid, i.e., that it measures what it aims to measure (O'Connor 2008, pp. 54–67). The two most frequently employed procedures are those that base their analysis on raw counts of identified specimens, recorded as NISP (number of identified specimens), and those that seek to estimate the minimum number of individual animals present in a sample, recorded as MNI (minimum number of individuals). There are strengths and weaknesses to both in that each assumes a different context (Hesse and Wapnish 1985, pp. 112–16; Gifford-Gonzalez 2018, pp. 385–412): NISP assumes that the specimens derive from a large number of animals that have all been processed at different times and places, and deposited in mixed contexts (such as in a midden), thus rendering it unlikely that two or more bones derive from the same animal; MNI assumes the opposite scenario, i.e., that the bones are likely to have come from a small number of animals killed and deposited at the same time (such as a tomb). The once-common practice of weighing bone material is no longer employed in most workflows for faunal specialists due to inherent problems with its validity (Chaplin 1971; Casteel 1978).

Assessing the frequency of bone element representation in certain analytic categories has also been important in the application of zooarchaeology to the study of Israelite religion. Such analyses of carcass part distribution—that is, distributions based on differences between the representation of bones associated with certain groups of elements, such as the “head” (crania and teeth), “trunk” (vertebrae and ribs), “limbs” (scapulae, humeri, radii, ulnae, femora, tibiae, and long bone shafts), and “feet” (phalanges)—can indicate the syntax of butchering procedures, and has been applied to cultic settings (Hesse et al. 2012). Of special importance has been the difference between deposits that indicate a dominance of right or left sided portions in cultic contexts across the ancient Mediterranean (e.g., Davis 1987b, 2008; Marom and Zuckerman 2012; Greer forthcoming).

3.4. What Are the Results?

Most questions that relate to a zooarchaeology of Israelite religion are informed by assessing differences between certain assemblages, once they have been excavated and analyzed. Differences are often observed in terms of species representation, age at death groupings, carcass part distributions, and other factors of comparison, and are then evaluated statistically. Such assessments of difference take place at the regional level, for example in the presence or absence of pig remains at certain sites (but see above), or at the local level concerning very specific contexts, for example the contents of one pit compared to another in the courtyard of a temple (see below). Trends over time are also assessed, such as in a comparison of the percentage of sheep and goats to cattle during different phases of settlement history at a particular site or in comparison to other sites.

3.5. How, If at All, Do the Results—Understood in Context—Relate to the Bible?

For better or worse, archaeologists working with remains from the Iron Age and Persian periods in the southern Levant are forced to, at least in one way or another, engage the Bible. For some this engagement is dismissive and for others it is intensive, but to ignore it completely would be irresponsible and, indeed, even though certain recent works may claim distance from it, it is impossible to ignore (cf. [Miller 1991](#)). This is not a negative reality, however, for any archaeology in this region that would jettison the Bible in such endeavors would be out of step with other archaeologies that take place in regions where written sources exist, e.g., ancient Greece or Mesoamerica. For, whatever the date and ideology of a certain textual tradition, such works provide rich resources of comparative material for an archaeologist. Indeed, a major difference with the Bible is that it still serves as an important religious text for a wide array of contemporary Jewish and Christian faith communities and, thus, the results of research often have bearing on the way such communities understand these texts to function as Scripture.

Even if it may be agreed that the Bible *should* be engaged (or *is* engaged, regardless of claims to the contrary), the question is *how* it should (or is) engaged, and much ink has been spilled over this question (e.g., [Mazar 1992](#); [Dever 2001, 2017](#); [Silberman and Finkelstein 2002](#); [Grabbe 2008](#); [Levy 2010](#); [Ebeling et al. 2017](#), to name a few). By and large, the discussion takes place in terms of certain historical claims that the Bible is understood to make, ushering in the “did it happen or not” sorts of debates, whether about the exodus, “conquest,” or the extent (or existence) of a Davidic or Solomonic kingdom (cf. [Moore and Kelle 2011](#)). In many ways this rationalistic—even positivistic—approach has been encouraged by the incorporation of the hard sciences and an over confidence in the assured results such techniques can provide. Often missing from the discussions is an examination of the ancient genres employed in the biblical works and how they functioned, accompanied by a nuanced understanding of the claims that are being made and the purpose for which such events are recounted ([Halpern 1996](#)).

While evaluation of such historical claims, rightly understood, is important and indeed an essential backdrop for our discussion as it pertains to the existence of an Israelite presence in the southern Levant, it is not our focus here and, beyond establishing presence, such has less relevance for a discussion of religion and, thus, for assessing how the results of zooarchaeological studies relate to the Bible. This is due to the fact that the relevance of biblical texts for the study of Yahwistic religion is less bound by discussions of dates and events in that many elements of the practice of religion, in general, are remarkably stable across cultures. Such stability is likely to have been the case for ancient Israel, as may be paralleled in Mesopotamia (cf. [Linssen 2004](#)), even if meaning of particular rituals changed ([Altmann forthcoming](#)). That is, whether aiming to reconstruct Yahwistic practices from the Late Bronze/Iron I, Iron II, or Persian/Hellenistic periods that may be related to zooarchaeology, many of the general elements may have looked the same regardless of time period, whether sacrifice, rituals, or sacred meals that would have generated faunal remains, and these would have paralleled practices in the cultures around them.

3.5.1. How Do Ancient Near Eastern Practices Relate to Practices Described in the Bible?

Parallels to biblical cultic practices have been observed in Egyptian, Hittite, Mesopotamian, Ugaritic, and other contexts, demonstrating numerous points of contact while undoubtedly also illustrating differences on both the intercultural and intracultural levels (e.g., [Weinfeld 1983](#); [Milgrom 1991](#); [Hess 2007](#); [Knohl 2015](#)).

In terms of methodology, then, any zooarchaeological inquiry into the practice of Yahwistic religion should be informed by a comparative exploration of these ancient Near Eastern texts and images, as well as the Bible, in ways comparable to other studies that integrate written and visual materials alongside of zooarchaeological and other excavated data, so that such similarities and differences may be assessed (cf. [Wapnish and Hesse 1991](#); [Wapnish 1993](#); [Lev-Tov and McGeough 2007](#); [Popkin 2013](#); [Ekroth and Wallensten 2013](#); [Greer 2013](#)).

3.5.2. How Do Critical Methodologies Applied in Biblical Studies Affect the Understanding of Texts?

When seeking to understand how zooarchaeological finds relate to the Bible, the same rigor that is applied to archaeological methods should be applied to textual studies. Just as it would be inappropriate for a text-centric inquiry to tack on a general reference to archaeology that ignores all of the complexity of stratigraphy, taphonomy, and radiocarbon dating, for instance, so too it is less than responsible to make general assertions about “what the Bible says” or the dating of certain traditions without carefully engaging source and redaction critical issues, textual criticism (especially in light of recent developments in Qumran and Septuagint studies), and literary studies, particularly in terms of genre. The Bible is a complex, multilayered ancient collection of textualized traditions from the Late Bronze/Iron Ages through the Persian/Hellenistic periods that needs to be engaged critically and carefully by researchers with broad training and in consultation and collaboration with specialists outside one’s area of expertise before one should attempt essential syntheses.

4. An Illustration: Faunal Remains from Area T, Tel Dan, Israel

An application of this methodology may be briefly illustrated in recent work on faunal material from Tel Dan by applying the series of questions outlined above (see [Greer 2013](#) for the full discussion, elements of which are summarized here).

4.1. Determining Context

Tel Dan (Tell el-Qadi) is one of the northernmost sites within modern Israel, close to the Lebanese and Syrian borders, with remains from the Neolithic through early modern periods ([Biran 1994](#)). It is situated on the largest spring in the region, fed by snow melt from nearby Mt. Hermon, that forms one of the headwaters of the Jordan River. Due the abundant source of water and the site’s location in the upper Hula Valley, a series of local and international ancient routes passed through Dan over the millennia resulting in periods of dense occupation by various peoples ([Ilan 2019](#) *fc*; [Thareani 2016](#)). Evidence of religious veneration at the site, especially in the vicinity of the spring, is attested in archaeological material as early as the Late Bronze Age and well into the Hellenistic Period. The architectural remains from the Iron Age IIA-B (10th/9th–8th centuries BCE) in Area T above the spring are especially prominent and are associated with high concentrations of animal bone remains.

4.1.1. What Type of Space Serves as the Context for the Faunal Remains?

The architectural remains from Area T have many features that line up with Renfrew’s “indicators of ritual” ([Renfrew 1985, 1994](#); [Renfrew and Bahn 2016](#), pp. 413–21; cf. [Gilmour 2000](#); [Zevit 2001](#)), and such have been applied specifically in this case ([Davis 2013](#)). Indeed, the area has all of the hallmarks of a major, regional temple complex. Construction features associated with the 9th–8th c. BCE, Strata III and II in [Biran’s \(1994\)](#) assessment, include fine ashlar masonry with slots for cedar beams typical of palaces and temples, a massive substructure for a large, elevated building, and parallel casemate side-chambers on the western and eastern boundaries of the precinct. The decorative techniques and other features, too, emphasize monumental display resonating with garden motifs typical of temples ([Ackerman 2013](#)). In the center of the complex, the base of a large altar was discovered as well as a single horn that, when compared to proportions from other altars, allows for a reconstructed altar of 4.75 × 4.75 m and, thus, apparently the largest altar ever discovered in the region.

The artifact remains, too, support the identification of the space as a temple as evidenced in the discovery of several smaller altars, seven-spouted oil lamps, perforated “incense” cups, cultic stands, metal implements associated with animal slaughter and processing, and even what has been identified as an altar kit found in situ consisting of a bowl, pair of shovels, incense pan, possibly a meat fork, and a sunken pot with charred animal remains ([Greer 2010](#)).

Evidence from the architecture and available artifacts, especially when combined with the discovery of massive concentrations of animal bone remains both in charred deposits and in deposits

from the remains of meals, leaves little doubt that the space functioned as a major temple during the Iron Age IIA-B especially during the 9th–8th c. BCE (cf. Greer 2013, 2017; Davis 2013).

4.1.2. Were the Animal Bones Found in Intentional Deposits?

While thousands upon thousands of animal bones were discovered as scatter throughout the complex, the analysis (Greer 2013) focused on seven deposits: two from the western chamber complex and five from the central courtyard around the altar. Each was identified by the excavators as an intentional deposit based on architectural features, such as a slot created by two walls in one case or as clearly defined pits in other cases (one even ringed with small stones), or architectural features that were used secondarily as a deposit location, such as an olive press basin from an earlier stratum reused as a bone repository in the subsequent stratum.

4.1.3. What Type of Deposits Are Represented?

Though deposits of charred material were discovered elsewhere in the precinct, these seven deposits were interpreted as the remains of eating events based on the lack of extensive burning and patterns of cut marks and chop marks associated with the preparation and consumption of meals (cf. Binford 1978, 1981; Grantham 1995, 2000; Klenck 1995). Associated artifacts, such as metal and flint blades as well as cooking pots and eating vessels, also suggested that these pits contained the remnants of meals.

4.1.4. Can the Context Be Associated with Yahwistic Worship?

Primary evidence that the sanctuary may be associated with Yahwistic worship comes in the form of an 8th c. seal impression with the name 'Immadiyaw, a theophoric name meaning "Yahweh is with me," found on a vessel fragment in a chamber attached to the precinct (Biran 1994, pp. 199–201), complemented by other Yahwistic names discovered elsewhere on the site associated within this time period, though names in and of themselves are not definitive. Secondary evidence includes the association of certain artifacts with those employed in Yahwistic worship as described in the Hebrew Bible as well as distribution patterns of animal bone remains that correspond with biblical prescriptions described below, though evidence in this category parallels practices in other cultures. Also at the secondary level are several traditions in the Hebrew Bible that identify the site as a Yahwistic worship center, albeit heterodox if not idolatrous in the eyes of the biblical writers: Judges 17–18; 1 Kgs 12:28–33; Amos 8:14. The convergence of these pieces of evidence—epigraphic, artifactual, faunal, and biblical—have been argued to suggest that the temple was Yahwistic in nature (Greer 2017).

4.2. How Were the Bones Excavated?

The faunal remains from these deposits were collected according to standard procedures of the Biran period of excavation (cf. Wapnish and Hesse 1991). Such included hand collecting bones and storing them in paper bags and boxes marked by area, locus, square, and collection date that were later analyzed by zooarchaeologists (Wapnish and Hesse 1991; Greer 2013). No sieving was carried out, thus biasing the collection toward larger species.

4.3. How Were the Bones Analyzed?

After the anatomical identification, orientation, and size of individual elements was recorded, the taxa from which the specimens likely derived, as well as the age and sex (if possible) and any postmortem modifications to the bone were determined.

4.4. What Were the Results?

Our research questions, tempered by the collection bias toward large animals, then led us to focus our study on sheep and goat remains from these intentional deposits. When these remains

were compared among the various deposits, several statistically significant, non-random patterns of distribution were identified. Highlighting one for illustrative purposes here, it was noted that the percentage of bone elements from *right-sided* meaty longbone portions was about double the percentage from left-sided portions in the western chambers, but that this pattern was reversed among the courtyard deposits where the percentage of bone elements from *left-sided* meaty longbone portions was about double the percentage from right-sided portions.

4.5. How, If At All, Do the Results—Understood in Context—Relate to the Bible?

Biblical scholars will be quick to notice the correspondence of a different treatment for right-sided and left-sided portions and the prescriptions in biblical Priestly texts that allot right-sided portions of the “fellowship offerings” to ancient Israelite priests (cf. Exod 29:27–28; Lev 7:32–33). The correspondence is obscured somewhat, however, by evidence of side-preference across the ancient Near East and complicated further by text-critical issues among the extant versions, namely the Masoretic Text, the Qumran texts, and the Greek/Septuagint manuscripts, and even more so by internal differences within each textual tradition concerning which portion is allotted to the priests (cf. [Greer forthcoming](#)). That said, when complications are engaged and differences are distilled, what remains is archaeological evidence for a preference for right-sided limb portions discovered in the context of a Yahwistic temple of the 9th–8th c. BCE and a congruence of this discovery with one of the dominant traditions represented in the biblical texts among various versions. This, then, may have significance for the composition, date, and regional orientation of traditions now contained in the Priestly source of the Pentateuch (see, further, [Greer forthcoming](#)).

5. Conclusions

The future for a zooarchaeology of Israelite religion is bright indeed thanks to pioneering archaeological methodologies developed by a previous generation that are maintained and built upon with new developments in scientific techniques, as well as more and more data from textual sources that may be compared and contrasted with biblical texts coming to light and an increasing nuance to the critical engagement of these texts that has been developing in biblical studies. This essay has sought to outline these trends and to encourage the integration of archeological and textual studies centered on the topic of Israelite religion. It has suggested a methodology that may be outlined by a series of questions:

- What Is the Context?
 - What Type of Space Is It?
 - Is It a Deposit?
 - What Type of Deposit Is It?
 - Is the Context Yahwistic?
- How are Bones Excavated?
- How are Bones Analyzed?
 - What Is Recorded and How Is It Determined?
 - How Are Bones Counted and Compared?
- What Are the Results?
- How, If at All, Do the Results—Understood in Context—Relate to the Bible?
 - How Do Ancient Near Eastern Practices Relate to Practices Described in the Bible?
 - How Do Critical Methodologies Applied in Biblical Studies Affect the Understanding of Texts?

With new samples of faunal remains coming from previously unknown and recently excavated sites of Israelite cultic practice, such as Tel Moza, as well as from numerous examples of household cults, and from new analyses of materials from sites excavated by a previous generation, we anticipate a sustained and enduring impact of integrated methodologies and look forward to new syntheses.

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