Perforated Astragali in the Levant and Four Babylonian Omens

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Introduction

This article investigates a connection between hoards of astragali (ankle bones) and the ritual use of these bones in the practice of extispicy. A number of sites in the southern Levant during the Iron IIA (10th–9th centuries BC) have yielded very large deposits of astragali, often from cultic contexts. The two prevailing theories explaining the function of astragali relate to games and divination, based on classical textual sources. However, the classical Greek sources are later and from a different region than the archaeological evidence investigated in this article. This study therefore explores this phenomenon against the backdrop of texts from the ancient Near East. Following a discussion of astragali in the archaeological record, and the use of astragali as dice in a game known from the ancient Near East, a translation of an Old Babylonian tablet that features four omens (YOS 10 47 § 65–68), directly connecting the inspection of an animal's astragali to the performance of extispicy, is presented. This connection between divinatory practices and astragali is now made explicit and can be utilized to offer new insights into the interpretation of astragali recovered from the archaeological record.

The millennia-long phenomenon of collecting astragali is well documented in the archaeological record. These bones in many instances have been found bearing modifications, occasionally being perforated artificially with drill holes.[1] Several large groups of astragali have been found at sites in the southern Levant, particularly during the Iron IIA (10th–9th century BC). This includes a collection of 684 astragali found together in an open bowl from a cult room at Megiddo,[2] 140 found in three groups from the "cultic structure" at Taanach,[3] and over 200 in two or three clusters from a temple in Area D at Tell eṣ-Ṣafi/Gath.[4] Recently, in the 2018 excavation season at Tel Abel Beth Maacah in Northern Israel (Fig. 1), over 400 astragali were recovered in a jug from Stratum A1 (Fig. 2), a context dated to precisely this same time period.[5] The jug was found standing on a round, elevated podium above an impressively constructed stone pavement within a public venue.[6]

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[1] Gilmour, "Nature and Function of Astragalus Bones" (1997).

[2] Loud, *Megiddo II* (1948), fig. 102; Hesse, "Pig Lovers and Pig Haters" (1990): 214–15.

[3] Lapp, "1963 Excavations" (1964): 26–32, 35–39.

[4] Dagan et al., "Excavations in Area D" (2018): 31, fig. 6; Aren Maeir, personal communication, 2019.

[5] The excavations are directed by Nava Panitz-Cohen, Naama Yahalom-Mack, and Robert Mullins. Conservation and cleaning of the astragali were performed by Mimi Lavi. Full publication of the astragali will appear in Susnow et al., "Hoard of Astragali." This research was supported by the Israel Science Foundation (grant no. 859/17).

[6] Panitz-Cohen and Yahalom-Mack, "Wise Woman" (2019): 29, 31, 33.

Figure 1—Site location of Tel Abel Beth Maacah, located in northern Israel, on the border between Iron Age Israel, Phoenicia and Aram (Map by Ruhama Bonfil, courtesy of the Tel Abel Beth Maacah Excavations).

In fact, this area of the site, Area A, was precisely the location of multiple strata of cultic activity earlier in the Iron Age I.[7] For example, in the final Iron I stratum (Stratum A2), a large well-constructed building complex—one that included an open-air courtyard with a number of ritual objects and furnishings—was located directly beneath and immediately west of the findspot of the astragali.[8] This Stratum A2 complex was constructed above a series of earlier Iron I strata, which included a multi-roomed cultic structure in Stratum A4.[9] Below the latter was an even earlier Iron I phase, ex-

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[7] Yahalom-Mack et al., "Fortified Canaanite City-State" (2018).

[8] *Ibid*.: 151–52. Ritual-oriented objects and furnishings recovered from the Stratum A2 complex include a cultic stand, a stone altar, benches for offerings, a deer antler, a petalled-chalice, and a large stone that possibly functioned as a *maṣṣebah*.

[9] Yahalom-Mack et al., "An Iron Age I Cultic Context" (2019), 234–40. At least two rooms have been uncovered in Stratum A4, where finds include an equid burial, a possible dog burial, numerous

Figure 2—The amphora with astragali, still *in situ*, as it was being excavated during the 2018 season at Tel Abel Beth Maacah. Note the many ankle bones that immediately began to emerge from the broken side of the vessel (photograph by Robert Mullins, courtesy of the Tel Abel Beth Maacah Excavations).

posed in the 2019 season, composed of a series of pits, one of which contained a *maṣṣebah*. Although further study and excavation is required, the significant continuity of ritual in and the increasingly public nature of Area A raises the question of whether the Stratum A1 public venue, within which the astragali were found, may too have functioned in some cultic capacity.[10] In any case, this emerging Iron IIA phenomenon in the southern Levant of large hoards of astragali found in cultic (or cultic-adjacent) contexts invites the question: how were these large hoards used in cult? Initial observations of the Abel Beth Maacah astragali offer an opportunity to answer that question.

The Astragali from Tel Abel Beth Maacah: Initial Observations

As part of the preliminary study of the Abel Beth Maacah astragali, zooarchaeological analysis was conducted on

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maṣṣebot, a bull figurine, raised benches, and a number of cooking installations.

[10] It is a well-known phenomenon that sacred space often exhibits long-term continuity in ritual use. This in no way proves that the context at hand was necessarily cultic, but it is interesting to point out that this phenomenon—the continuous reuse of the same location for constructing temples or conducting ritual—is well attested elsewhere in the region. For general remarks on this, see Kamlah, "Temples of the Levant" (2012), 511–14. For specific examples, see Megiddo, Hazor, Pella, Tell el-Hayyat, Tel Kitan, and Nahariya, among others, in Loud, *Megiddo II* (1948), 57–105; Dothan, "Excavations at Nahariyah" (1956); Yadin, *Hazor* (1972); Eisenberg, "Temples at Tell Kittan" (1977); Falconer and Fall, *Bronze Age Rural Ecology* (2006); Bourke, "Six Canaanite Temples" (2012).

the bones by Nimrod Marom and Ariel Shatil in order to identify the different types of animals represented in the assemblage. They showed that the astragali derived from sheep, goat, and deer, with none from cows or pigs. It was also determined that the bones came from both the right and left sides of the animals (222 from the right, 184 from the left) and that they were mainly adult, both from males and females. The bones and the formation process of the hoard were analyzed by Matthew Susnow. Working with an optical microscope, it was observed that many of the samples show evidence of anthropogenic modifications and occasional use wear, indicating that the collection was not simply a byproduct of the slaughter process for immediate consumption of the animals. That is, some of these bones were handled, perhaps even used, prior to their deposition. An important observation relevant to the current study was that twelve of the astragali had holes drilled into them (Fig. 3), one of which had the intact remains of iron metal in the hole, while dozens of other astragali had what appear to be natural perforations (Fig. 4).

The Special Nature of Astragali

In the case of astragalus hoards, a combination of four factors suggests that astragali were not simply byproducts of routine slaughter related to consumption: the contexts of these finds seem to be cultic; modifications were often made to the astragali; handling wear evident on many of the bones indicates their prolonged use prior to the final deposition; assemblages of extremely large numbers of the same bone collected and deposited together signals the importance of this specific bone. This suspicion is strengthened by the observation that this particular bone has been collected and favored over other bones (i.e., we do not tend to find large hoards of any other type of animal bones) for some unclear reason cross-culturally over millennia and until the present day.[11] At other sites (local and non-local) and in different time periods (earlier and later), astragali have been found, sometimes grouped together in the hundreds (or more) and in a variety of different types of contexts: houses, temples, palaces, cult corners, burials, and granaries, to name a few.[12] These archaeological contexts on their own cannot clarify the function of the astragalus hoards. However, some contexts do indicate that these bones held symbolic meaning, particularly those found in burial

Figure 3—An example of an astragalus that has two drill holes, one in the dorsal side and one on the opposite ventral side (photograph by Matthew Susnow).

and cultic contexts, while a number of imitations of astragali from other materials (bronze, glass, marble, limestone, ivory, and faience) similarly suggests the special nature of these bones, so much so that time, precious material, and artistic expertise, were all invested into mimicking their appearance.[13] Further, a number of bones were found inscribed with the names of deities, directly connecting these objects to the realm of cult, particularly during the Hellenistic period.[14] In what follows, this article sheds light on the integration of textual data into the interpretative process of this archaeological phenomenon, to better understand the meaning and use of large numbers of astragali found together.

Texts Relevant to the Interpretation of Astragali

While the archaeological discoveries of these bones make it clear that they were imbued with special importance and function, textual evidence may offer further insight into what those functions may have been. To date, the primary textual data for the use of astragali have been classical Greek sources, which indicate two different traditions: one related to religion, and the other, to games. For example, according to Pausanias (2nd century AD), astragali were used in divination by throwing them onto a surface in front of a statue of Heracles (*Pausanias* VII 25.10). On the other hand, in Herodotus's *History* (5th century BC), it is clarified that astragali were also

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[11] Gilmour, "Nature and Function of Astragalus Bones" (1997).
[12] *Ibid.*: 167–71.

[13] *Ibid.*: 170.
[14] Amandry, "Os et Coquilles" (1984), 348, 370; Bar-Oz, "An Inscribed Astragalus" (2002).

Figure 4—Photo of two astragali from the Tel Abel Beth Maacah hoard, with a natural perforation in the center of the dorsal side (photograph by Matthew Susnow).

used in games as dice (*History* I, 94). While useful for the understanding of astragali discovered in Greek contexts, how these descriptions relate to *la longue durée* of the ancient Near East (ANE, hereafter) at large, and to the earlier Iron Age southern Levant in particular, is unclear.

It seems more pertinent to inquire whether any ANE textual sources might have valuable data to contribute to the matter. While the Hebrew Bible, a local text closest in time to these events, does not mention any particular use of the astragali of domestic animals, a short narratival pericope in 2 Samuel 20: 14–22 does mention the site of Abel Beth Maacah in relation to possible divinatory practices, specifically those of a "wise woman."[15] In particular, verse 18 states:

> Then she said, "They used to say in the days of old, 'Let them inquire (שאלו ישאלו, root *š-a-l*) at Abel,' and thus they settled things."

The verb used in this verse, *š-a-l*, relates to inquiry in general, but can more specifically connote "inquiring of God," i.e. divination, attested in a number of instances elsewhere in the Hebrew Bible (for example, Deuteronomy 18:11).[16] Similarly, the Akkadian cognate *šâlu* has

both the same general semantic range and also the more specific meaning of inquiring of a god.[17] Unfortunately, the limited number of contemporary extrabiblical texts from the southern Levant offers no further information on astragali.

Astragali in Cuneiform Texts

Other relevant ANE evidence can be found in cuneiform texts. The word associated with this astragalus bone in Akkadian is *kiṣallu*. CAD K, published in 1971, offers many examples of the term *kiṣallu* with the following meanings: 1) ankle bone, 2) astragal, and 3) "(an ornament, probably in the shape of an astragal)." These examples occur in a wide variety of texts and in a wide range of genres attesting to a number of special uses for this type of bone. Imitations made from other materials are included in this list as well, such as an astragalus made of lapis lazuli in a Late Bronze Age inventory from Qatna (RA 43 156: 185), and an astragalus with gold inlay that was sent as a wedding gift from the King of Mitanni to the Pharaoh in a Late Bronze Age inventory from Amarna (EA 22 ii 54).[18] These would seem to be imitation astragali of the same type found in archaeological excavations that were noted above. Other examples of *kiṣallu* given in the dictionary come from medical texts, dream omens, incantations, and a hymn to the goddess Ištar where her *kiṣallū* (plural) are associated with Akkadian *keppû*, "a skipping rope" of the goddess. In one particular instance, the Games Text (RT 19 59: 17 = HS 1893), which details over seventy activities that can be regarded as children's games, this connection between *kiṣallu*, the goddess Ištar, and games is clear.[19] Anne Kilmer makes the strong argument that this connection between the goddess and games, including the use of the *keppû* and *kiṣallu*, is not just a matter of jestful play but has a direct association with the cult of Ištar.[20] Furthermore, the occurrence of Ištar together with *keppû* and *kiṣallu* in a number of instances suggests that *kiṣallu* may additionally denote a type of dance performed by the goddess

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[15] Panitz-Cohen and Yahalom-Mack, "Wise Woman" (2019): 29, 31, 33.

[16] For more parallels, refer to Brown, Driver, and Briggs, *Hebrew and English Lexicon* (1975), 982a.

[17] See CAD Š/I *šâlu* A s. 1d, including a text from Middle Bronze Age Mari: "I have asked a man and a woman (ecstatic) for signs" (ARM 10 4: 6). See also previously Horowitz and Hurowitz, "Urim and Thummim" (1992): 105–106, for the verb in the context of divination.

[18] Rainey, *El-Amarna Correspondence* (2015), 170–71.

[19] Kilmer, "Oration on Bablyon" (1991); Zomer and Finkel, "No. 4 Games Text" (2019).

[20] Kilmer, "Oration on Bablyon" (1991): 15, 20.

or a priestess, in both battle and the above-noted hymn contexts (Dreambook 329: 9).[21]

More than thirty years after the publication of the CAD dictionary entry, a most interesting textual attestation of the use of astragali emerged in the 2007 publication of a cuneiform tablet offering rules and related information for the ancient Mesopotamian game commonly known as the "Royal Game of Ur" or "Game of Twenty Squares."[22] This tablet from Babylon, now at the British Museum (BM 33333b), is precisely dated by its colophon to November 3, 177 BC. The rules for the "Game of Twenty Squares" are on the reverse of the tablet. The obverse of the tablet, and a duplicate tablet which Irving Finkel discusses in his article under the rubric DLB,[23] gives a diagram with intersecting horizontal, vertical, and diagonal lines yielding a matrix with eighty-four fields. These can further be subdivided into twelve segments of seven fields each, each field giving the name of one of the signs of the zodiac and an associated statement, e.g., "Pegasus: One who sits in a tavern." Similar short statements often occur in contemporary Babylonian astronomical-astrological texts as apodoses of astronomical omens, or in relation to specific stars and constellations.[24]

The material relating directly to the game is found only on the reverse of BM 33333b, and it is here that references to astragali appear. According to the rules of the game, two astragali (written with Sumerogram ZI.IN.GI = Akkadian *kiṣallu*) of different sizes were used as dice in the game, a larger one from an ox and a smaller one from a sheep. Sheep astragali are well attested as dice in the ancient world, but it is unusual for the much larger and heavier ox astragalus to be used in this way. Still, one may assume that the astragali were tossed by players of the game, and the resulting configuration of the sheep and ox astragali would have dictated what moves would have been available to the game player. This now gives a firm context for the example of *kiṣallu*, "astragal," in the list of games noted in CAD K *kiṣallu* s. 2 on the basis of RT 19 59: 17 = HS 1893. Interestingly, the Games Text mentions not only the *kiṣallu* but also (in the very next line) an additional bone, the *kursinnu*,

(CAD K *kursinnu* A, RT 19 59: 18), which CAD translates as "fetlock" or "lower leg," but which AHw and CDA also identify with the ankle. This bone perhaps not coincidentally also appears in both ritual and omen contexts (CAD K *kursinnu* A s. b2′ and b3′).[25] On the role of the *kursinnu* in divination, Andrew George recently published a collection of omens that were taken based on the careful inspection of the lower parts of the sacrificial lamb's legs. One tablet's colophon specifies that the omens are "(f)ifteen (omens) from stumps of front fetlocks (*kursinnū*) and hooves (*ṣuprātum*)," thus confirming this bone's significance in divination, and similar to the *kiṣallu*, a double role in both games and divination.[26]

The fact that the obverse of the BM tablet gives a matrix related to the zodiac, and statements related in some way to astrology, points in the direction of an intersection between games and the realm of fortune-telling activities in the ANE. The fact that astragali are used in such games is all the more relevant, since there is ample evidence cross-culturally that race games (e.g., Senet) and games of chance, often involving the use of dice or other randomizing devices, were intertwined with the realm of cult, in the ANE, ancient Egypt, classical antiquity, and even more broadly in Africa, the Far East, and amongst Native American cultures.[27] Similarly, in

[21] See Oppenheim, *Interpretation of Dreams* (1956), 286, n. 130 (Oppenheim Dreambook 329: 9), with an important discussion of *keppû* and *kiṣallu* on this point.

[22] Finkel, "On the Rules" (2007).

[23] This is now a lost tablet, formally in the collection of Count Aymar de Liederkerke-Beaufort, hence DLB (Finkel, "On the Rules" [2007], 16).

[24] See, e.g., Horowitz, *Three Stars Each* (2014), 109–10.

[25] Thus see AHw K *kursinnu*, which translates *kursinnu* as "Fußknöchel(bereich)" and CDA 169, which translates *kursinnu* as "ankle" or "astragalus." *Kursinnu* is cognate to Hebrew *qars/ṣol*, Aramaic *qar/ṣsullā*, and Syriac *qurṣᶜlā*, common terms for the ankle in West-Semitic languages. We will return to the *kursinnu* below, p. 93.

[26] Cohen, "Sheep Anatomical Terminology" (2016), 88; George, *Babylonian Divinatory Texts* (2013), 286, Appendix, no. III.

[27] For various general and regional studies on this topic, see David, *Games, Gods and Gambling* (1962); Ahern, "Rules in Oracles" (1982); Culin, *Games of the North American Indians* (1992), 32–34; van Binsbergen, "Time, Space and History" (1996); Graf, "Rolling the Dice" (2005), 60–66, 77; Dandoy, "Astragali through Time" (2006), 132–33, 136–37; Dotson, "Divination and Law in the Tibetan Empire" (2007); Piccione, "The Egyptian Game of Senet" (2007); Beeri and Ben-Yosef, "Gaming Dice" (2010); and Guillaume, "Chapter 24: Games" (2013). On sources (e.g., art, texts) documenting the antiquity of games in ancient Egypt as well as the religious nature of games such as Senet and Mehen, see Crist et al., *Ancient Egyptians at Play* (2016), 1–14, and references therein. Amongst various casting devices in ancient Egypt, astragali were used in board games, in games of skill and in divination, particularly by the onset of the New Kingdom. On this topic, see *Ibid.*, 9–10. In Roman contexts, rules for games using astragali are well documented, as is the overlap between their use in games and as casting devices for divinatory purposes. For examples, see Schädler, "Astragalspiele gestern und heute, Teil I" (1997a) and "Astragalspiele gestern und heute, Teil 2" (1997b); Dasen and Schädler, "Jeu et Divination" (2017): 65. The intersection

our own time simple gambling devices like playing cards or throwing dice can be used to tell what the deity has planned for individuals in the future. Analogously, destinies were determined by deified Fates (Moira) in the classical world, with similar phenomena of fate being controlled by deities in Mesopotamia.[28] Thus, the outcome of both divination and games of chance was in the hands of the divine.[29] However, this discussion is beyond the scope of the current study. A clear example of the use of astragali in divination will now be presented.

The Four Omens

The use of animals for divination is well attested in many cultures.[30] In ancient Mesopotamia, as in the classical world, the main branch of divination that made use of animals was extispicy (Greek haruspicy), i.e., the reading of omens from sacrificial animals' internal organs (e.g., liver, lungs, kidney). An Old Babylonian extispicy tablet known from three separate manuscripts from the series *šumma immeru*, "If a sheep . . . ," recently edited by Yoram Cohen,[31] provides an early example of this type of activity in the region.[32] The tablet opens with the introductory line, "If the sheep—after it is slaughtered . . . ," and then moves on to examinations of the behavior and physical appearance of various body parts including (but not limited to) the eyes, ears, mouth, tongue, jaw, teeth, nose, blood, hoof, leg, sinew, and tail. A range of bodily behaviors are mentioned, and in-

clude the observations of both the simple twitching and the opening and contracting of the anus (54 § 48–49):

[If] the anus keeps contracting, the client's wife who was driven out will return to her house.

[If] the anus keeps op[ening] its mouth and then the tail *fornicates* with its mouth. [. . .] . . . *will lea*[*ve* and the wif]e of the client will be caught in the act of fornicating.

The text then moves on to a consideration of bones: the left and right hip bone, then the ankle bone (astragalus), and finally the metacarpal, before again resuming with a more general consideration of an assortment of body parts including the hoof, breast, xiphoid, neck, ribcage, vertebrae, etc.[33]

The four omens of interest that relate to astragali appear in YOS 10 47 § 65–68. For the convenience of the reader these lines are presented here:

§ 65: *šumma*(DIŠ) *ki-ṣa-lum ša i-mi-tim pa-al-ša-at aš-ša-at awīlim*(LÚ^lim) *a-na ḫa-ri-mu-tim uṣ-ṣi*
If the right ankle bone is perforated, the client's wife will become a prostitute.

§ 66: *šumma*(DIŠ) *ki-ṣa-lum ša šu-me-lim pa-al-ša-at na-ṣi-ir-ti*^lú*nakrika*(KÚR^ka) *te-le-qé-e*
If the left ankle bone is perforated, you will take the treasure of your enemy.

§ 67: *šumma*(DIŠ) *i-na ki-ṣa-lim ša i-mi-tim e-ṣi-im-tu wa-ta-ar-tum i-ta-ab-ši a-pil šarrim*(LUGAL) ^giš*kussiam*(GU.ZA) *i-ṣa-ba-at*
If an extra bone is present in the right ankle, the king's heir will seize the throne.

§ 68: *šumma*(DIŠ) *i-na ki-ṣa-lim ša šu-me-lim e-ṣi-im-tu wa-ta-ar-tum i-ta-ab-ši la be-el*^giš*kussêm* (GU.ZA) ^giš*kussiam*(GU.ZA) *i-ṣa-ba-at*
If an extra bone is present in the left ankle, a person with no right to the throne will seize the throne.

Thus, the omens are binary in nature, right and left, and relate to two different deformities in the astragalus, as shown in Table 1:

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between games and divination can further be seen in contemporary Mongolia and Central Asia, where, for example, astragali from various species are used in traditional games with deep roots in the region. For examples of these same astragali being used as amulets and good luck charms in the form of metal imitations, see Choyke, "Bone is the Beast" (2010), 201, 204, fig. 18.8.

[28] In a few instances, the Akkadian *šimtu*, "lot, portion, personal fate," was itself similarly deified (see CAD Š/III s.v. *šimtu* s. 2d).

[29] Lévi-Strauss (*Savage Mind* [1966], 30–32) demonstrated the inherent overlap and structured similarities between ritual and games, particularly with attention paid to set rules. This connection becomes particularly lucid when considering the nature of the ancient mind of man as *homo religiosus*, e.g., in Smith, *Imagining Religion* (1982), 36–52.

[30] For example, it is well attested in the classical world: see Burkert, "Signs, Commands, and Knowledge" (2005), and Struck, "Animals and Divination" (2014).

[31] One of these manuscripts is the aforementioned tablet YOS 10 47.

[32] Cohen, *Babylonian* šumma immeru *Omens* (2020). We would like to thank Yoram Cohen for kindly providing us with an advanced copy of his edition, which we make use of here.

[33] Refer to the detailed discussion of the use of body parts in the *šumma immeru* omen series in Cohen, "Sheep Anatomical Terminology" (2016).

Perforation	Right	Unfavorable (the client's wife will become a prostitute)
	Left	Favorable (you will take the treasure of your enemy)
Extra Bone	Right	Favorable (the king's heir will seize the throne)
	Left	Unfavorable (a person with no right to the throne will seize the throne)

Table 1—Omens of YOS 10 47 § 65–68.

Here, two categories of anomalous appearances are listed in the protases (perforations and extra bones in the ankle), with a favorable or unfavorable outcome given in the apodoses depending on which side of the bone bears the anomaly. Thus, the small group of four omens is actually two sets of paired omens: one set for perforations and one set for the extra bone—each pair with one omen relating to the right and left ankle.[34] These four lines demonstrate, quite explicitly, that by the Old Babylonian period (the Middle Bronze Age in the southern Levant), there was already an established tradition of checking an animal's astragali for anomalies.[35] Admittedly, there is a long time interval between the Old Babylonian omens and the Iron IIA contexts from which the astragali of focus here derive, but there is some roughly contemporary evidence for a continuation of the practice of checking the ankle and/or adjacent bones in Iron Age divination contexts in Assyria. A few such examples occur in queries to the Sun god from Nineveh which include omens relating to perforations of the sacrificial animal's *kursinnu*, a bone discussed above in the context of the Games Text.[36] Thus, these examples of the inspection of astragali as a part of extispicy provide an intriguing possibility for understanding how, within a cultic context, astragali could have been used as objects for divinatory practices.

Interpreting Ritual Practices associated with Astragalus Hoards

Combining the textual evidence presented above and the archaeological finds suggests that large collections of astragali could have been used for divination. In the case of the Iron IIA astragalus hoards, the contexts were also of importance, as they were mainly (if not exclusively) cultic. As mentioned above, besides the unique context at Abel Beth Maacah, the hoard also included significant amounts of perforated specimens. Astragali with holes drilled into them have also been found in the contemporary assemblages from Megiddo and Taanach.[37] It has been suggested that these holes were either (to be) filled with metal to weigh down the bones or for personal ornaments as jewelry to be hung from a necklace.[38] Indeed, one of the drilled astragali from Abel Beth Maacah, as mentioned above, contained the remnants of metal, perhaps the fragment of a necklace. This study has brought to light the direct connection between perforated astragalus bones and divination. It is possible that artificially-made holes in the astragali were related to these divinatory acts.

Considering the abovementioned archaeological contexts which point in the direction of cult, and in light of the classical and ANE texts relating astragali to the realm of divination and cult, it is suggested here that a large hoard of astragali could indeed have functioned as a conduit for performing an act of divination. The question remains, how did it work? The text mentioned above from Pausanias prescribes for the one who inquires of the god to take four dice from which there is a plentiful supply of bones already placed in front of a statue of Heracles (*Pausanias* VII 25.10). Thus, the situation would have required a large assemblage of astragali to have been placed in an open vessel, considering that the ritual required easy access to the bone collection. Interestingly, the large hoard of astragali from Megiddo was recovered from a large open bowl, a vessel from which one could easily remove the contents.[39] This is not the case with the Abel Beth Maacah hoard. Given the jug's relatively small neck diameter, if one were able to insert his or her hand into the jug, the process of removing astragali as a sort of lot as described by

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[34] Cohen (*Babylonian* šumma immeru *Omens* [2020], 75) offers an interpretation of the reasoning behind these omens. On the occurrence of an extra bone as a possible real phenomenon, see Cohen, "Sheep Anatomical Terminology" (2016), 82–83.

[35] Although omens of this nature are not extant until the Old Babylonian period (see, e.g., Koch, *Mesopotamian Divination Texts* [2015], 68–74), extispicy as a practice is attested already as early as the late third millennium BC, with a famous example in Gudea Cylinder A (ca. 2100 BC), and at Ebla. Cf. Richardson, "On Seeing and Believing" (2010), 226–33.

[36] SAA IV 51 rev. 9, 301: 10 (restored), rev. 4, 313: 1. We thank Seth Richardson for bringing these examples to our attention. See above discussion on *kursinnu*.

[37] Gilmour, "Nature and Function of Astragalus Bones" (1997): 168.

[38] Dandoy, "Astragali through Time" (2006), 133–34.

[39] Loud, *Megiddo II* (1948), fig. 102.

Pausanias would have been significantly more difficult than from an open vessel.[40]

As such, a slightly different action might have been performed, namely lot-casting. The casting of lots was well-attested in the ancient world, in classical contexts, in the biblical world, more broadly in Mesopotamia, and even in Hittite ritual.[41] Related to the divine determination of destiny and fate, the outcome of the casting of lots was decided by deities. In Akkadian, both *pūru* and *isqu* refer to "lots," the latter being the more common term (CAD I/J *isqu* A; CAD P *pūru* B). In many cases, the active verbs for manipulating the lots relate to "throwing" (*nadû*), "falling" (*maqātu*), or "casting" (*ṣalāʾu, karāru*). Likewise, the verb "to jump out" (Akkadian *šaḫāṭu* and Hittite *ûatku-*) were used as well.[42] "Jumping out" may suggest divination rituals where lots were placed in a vessel (a bottle or jug) with a narrow neck and small opening which was then turned upside down and/or shaken to allow one or a small number of lots to come out.[43] Thus, in the case of the Abel Beth Maacah astragali, a similar rite could have been performed. Whether the astragalus that emerged was perforated or not would have determined the answer to the diviner's inquiry. Such binary inquiries and answers are typical of Ancient Mesopotamian divination practices, as is the case—on the right or on the left—in the Old Babylonian omens translated above (YOS 10 47 § 65–68). If this was the case, the fact that some of the astragali were intentionally perforated (regardless of the original in-

tent of the human perforator) would have changed the ratio of perforated to non-perforated astragali, and accordingly the probability of selecting astragali of one type or the other.

While the *Sitz im Leben* of the YOS 10 47 omens was unquestionably extispicy and thus conducted immediately following slaughter, the transformation of the astragali into devices that bore continued oracular portent was quite practical. In contrast to the quick rate of decomposition and putrefaction of internal organs, the taphonomic properties of bone allow it to survive unchanged for a very long time. For this reason, bone can be stored, used, and altered for various purposes. Astragali in particular were exceptionally small, making them easily storable and mobile; they were ideally suited for a process that involved the collection of large amounts of the same item, more so than any other larger bone that would have been too cumbersome for such a practice. Therefore, while the four Old Babylonian omens establish the very early roots of astragali bearing oracular significance, the durability and small size of the bones allowed for their continued oracular use through the ages. The database of textual and archaeological evidence confirms this.

Conclusion

The arguments above provide a new line of inquiry for examining the meaning and function of astragalus hoards. As individual objects, each astragalus had its own unique biography. The modifications and handling wear evident on many of these bones proves this. However, the final deposition of astragali in large groups within what appear to be cultic contexts, as occurs in the Iron Age IIA in the southern Levant, suggests a different function when these bones were brought together. Using cuneiform texts, this study has suggested an interpretation that relates the function of these hoards in particular divinatory practices, drawing a connection between the astragalus omens of extispicy in YOS 10 47 and the occurrence of astragalus hoards in the archaeological record. This does not necessarily negate previous theories of the meaning and function of these special bones but rather enriches the understanding of their complexity and enduring intrigue.

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[40] Neither of the male authors was able to successfully insert his hands into the vessel, while the female author with smaller hands and wrists was able, confirming that it was possible to do so.

[41] See Hallo, "The First Purim" (1983); Taggar-Cohen, "Casting of Lots among the Hittites" (2002); Beeri and Ben-Yosef, "Gaming Dice" (2010): 422–26; and recently, Lieberman et al., "Rolling the Dice in Aelia Capitolina" (2019): 225.

[42] On Akkadian *šaḫāṭu*, refer to Horowitz and Hurowitz, "Urim and Thummim" (1992): 100–101. On Hittite *ûatku-*, see Taggar-Cohen, "Casting of Lots among the Hittites" (2002): 99–102.

[43] See von Soden, "Die erste Tafel des altbabylonischen Atramḫasīs-Mythus" (1978): 55, who suggested that lots were cast from a bottle in the division of the cosmic regions among the great gods of Ancient Babylonia (An, Enlil, and Enki/Ea) in the prologue to Old Babylonian Atrahasis (lines 11–12): "Sie faßten die (Los-)Flasche an ihrem Hals ('Backe'), warfen das Los, (und nun) teilten die Götter." This is *contra* the earlier reading of Lambert and Millard who suggested a different rite for casting lots: "The gods had clasped hands together, had cast lots and divided (the cosmic regions)": see Lambert and Millard, *Atra-Ḫasīs* (1999), 42–43. Lambert and Millard's description raises images of modern gamblers arranged in a circle and throwing dice.

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