The orientation of Smintheion in Troad and its connection to Apollonian Myths

Themis G. Dallas
Department of History, Archaeology and Social Anthropology,
University of Thessaly, Greece

Abstract:
The present research measures the orientation of the Hellenistic temple of Apollo Smintheus in Troad, and notices it aligns with the rising points of Vega and Deneb (in the constellations of Lyra and Cygnus) and commands a superb view of the Hydra-Crater-Corvus constellation group. The animals and objects presented in these asterisms appear in Apollo's fables, which may explain this choice of orientation. In addition, the timing of events depicted in these myths are compatible with the appearance and disappearance of the relevant asterisms in the sky. This connection is also seen in other Apollo temples in Asia Minor, indicating a wider dissemination of this astronomical symbolism.

Keywords: Smintheion, Smintheum, Apollo Smintheus, orientation, Apollonian myths

Introduction

In the southwest of Troad (Fig. 1), near the ancient cities of Hamaxitus and Chryse, we come across the Smintheion (39.5361°N, 26.1177°E), the Sanctuary of Apollo Smintheus (Özgünel, 2015), an important sacred place of the Hellenistic era (Fig. 2 & 3). However, references to the cult of Smintheus start much earlier, as the place is tied to the scene in the opening of *Iliad* (I 37–42). In this story, Chryses, a priest of Apollo, begged Agamemnon to free his daughter and even offered a great ransom. However, the king refused and bullied the man, who in turn implored Apollo for revenge. And so Apollo's wrath fell on the Hellenes. However, there is no documented habitation on the site between the 5th millennium BC (Takaoğlu, 2015) and the Hellenistic temple, suggesting the worship was shifted, probably from the town of Chryse, to the present location in the mid-2nd c. BC.

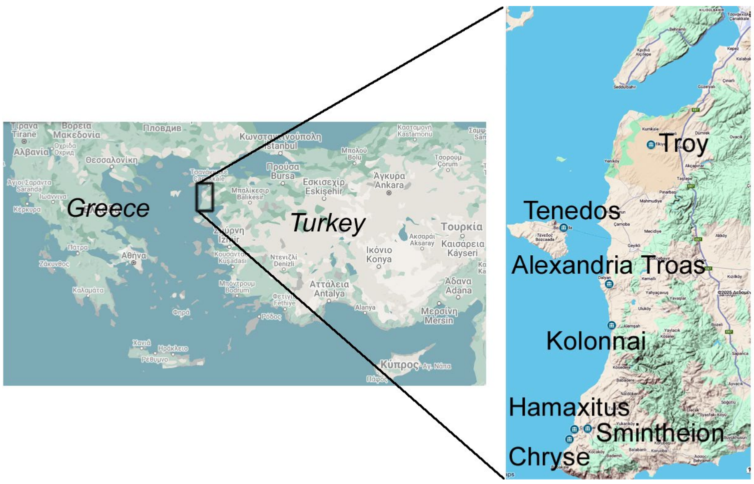

Figure 1. Map of the Troad, with the ancient locations mentioned in the text. Cartographic backgrounds courtesy *Google Maps*.

Figure 2. The temple of Apollo Smintheus at Gulpinar, Türkiye. View from the south. Photograph: Leon Petrosyan; courtesy *Wikimedia Commons*.

Figure 3. The temple of Apollo Smintheus at Gulpinar, Türkiye. View from the northeast (the rear of the temple). Photograph: Armand van Puyvelde.

The association of mice with Apollo has two explanatory myths. The oldest, attributed to Callinus (7th c. BC) and quoted in Strabo (XIII 1.46*ff*), associates the Smintheion with the foundation of Hamaxitus by Cretans at the location where they were attacked by mice. The other is fragment 31 of Polemon (2nd c. BC), dealing with the revenge of Apollo against his priest Krinias, and the god's repenting after receiving the hospitality of the people that suffered from his release of mice. Yet, these two myths may be no earlier than the 3rd c. BC (Palamidis, 2019). In either case, votive bronze mice were present in the temple (Kiernan, 2014). Mice also featured in the cultic statue of Apollo created by the famous sculptor Scopas (4th c. BC). It's shape can be determined from the iconography of local coins (Öğün, 2015), even if only a small fragment may have survived. For example, the reverse of Alexandria Troas coins depict Apollo holding a bow and arrow while making offerings from a patera (Fig. 4 & 5). On the contrary, the plague in Iliad had nothing to do with mice (Bernheim & Zener, 1978). For a further discussion of ancient sources on Smintheus, see Trachsel (2019).

Figure 4. Two coins from Alexandria Troas (Bellinger, 1961, p. 81 № A22 and p. 108 № A193), dated 301–281 BC (left) and 180–182 AD (right). Next to the feet of Apollo is a mouse (left) or a raven (right). Photographs: Münzkabinett Berlin, № 2590195 and № 2379922; courtesy *Wikimedia Commons*.

Figure 5. Two coins from Alexandria Troas, dated 210–213 AD (left) and 222–235 AD (right). Left: The herdsman Orodes; to right, bull jumping; to left, Apollo Smintheus standing atop a cave right, quiver at shoulder, holding bow and patera, sacred spring flowing from within. Photograph courtesy *Classical Numismatic Group, LLC* (https://www.cngcoins.com/). Right: Temple of Apollo Smintheus with the statue in perspective. Numismatic Museum of Athens. Photograph: Francesco Bini, courtesy *Wikimedia Commons*.

Recent research (Boutsikas, 2020; Liritzis et al., 2017) has shown that the temples of Apollo have a variety of orientations. A well-known result is the timing of the Oracle at Delphi with the heliacal rising of the constellation of Delphinus (Salt and Boutsikas 2005). However, not many sanctuaries of Apollo show an association with Delphinus (Boutsikas, 2015). The proposed explanations of their orientations go beyond the obvious mythological (see *infra*) connections with Cygnus and Lyra (Liritzis & Castro, 2013) and are as diverse as the *Shield of Hercules* for the temple at Soros (Bajić & Dimitrijević, 2021) and the aurora for the temple at Bassae (Liritzis & Vassiliou, 2006).

By utilizing the measurements in Boutsikas (2020) and Liritzis et al. (2017), a declination curvigram for 42 temples of Apollo can be calculated (Fig. 6). The only statistically significant peak in the diagram can be associated with the Hydra-Crater-Corvus constellation group or the snake of Ophiuchus (Tbl. 1).

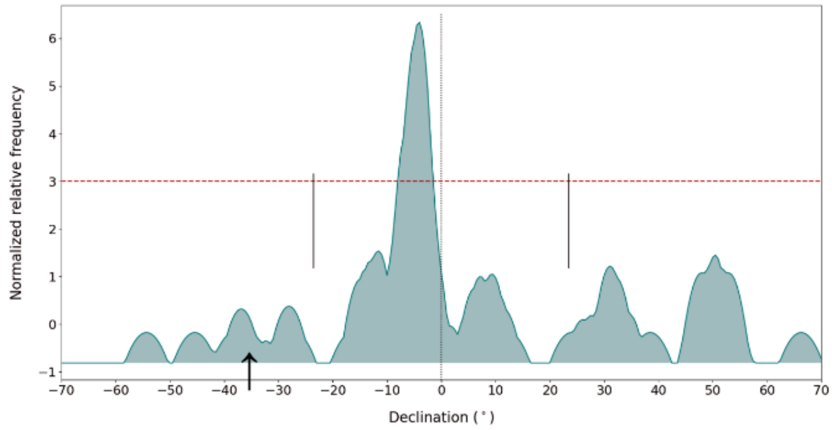

Figure 6. Curvigram of the declination (normalized over a random background) for 42 temples of Apollo looking outside from the entrance. Data from Boutsikas (2020) and Liritzis et al. (2017). Calculations by Maitane Urrutia-Aparicio, using an Epanechnikov kernel with an uncertainty of 1° in declination. The arrow shows the declination of Smintheion.

Table 1. Declination of stars for 150BC (calculated with *Stellarium*).

Star	**Declination**	**Star**	**Declination**	**Star**	**Declination**
α-Oph (Rasalhage)	+16.5°	*α*-Hya (Alphard)	−1.3°	*α*-Crt (Alkes)	−7.9°
ζ-Oph (Saik)	−3.7°	*β*-Hya (Kafanifani)	−22.4°	*γ*-Crt	−6.7°
η-Oph (Sabik)	−10.3°	*γ*-Hya (Cauda)	−11.3°	*α*–Crv (Alchiba)	−13.0°
α-Cyg (Deneb)	+39.0°	*α*-Lyr (Vega)	+38.5°	*γ*–Crv (Gienah)	−5.8°

In the case of Smintheion, the temple has its entrance to the SW, outside the solar sunset arc. Digital modeling revealed that the cultic statue of Apollo inside the temple was almost perpetually in shadow (Eckhardt, 2021, pp. 245–251 & 273–274). The sunlight reached through the entrance the rear of the cella and struck the feet (and perhaps mouse) of Smintheus only in the afternoon around the winter solstice. As there are no traces of preceding structures, this choice of orientation is unclear. In addition, sometime between the mid-19th and the mid-20th c. AD, an olive workshop was built directly atop the temple (Weber, 1966), obliterating the superstructure and paving of the cella. If the statue's visibility was required, the light study suggests a winter ritual, but this is incompatible with cases where the cult image should be shielded from outside eyes (Eckhardt, 2021, p. 258). As no primary sources describe the rituals or the timing of the Smintheion festivities, this investigation is inconclusive.

We used *Google Earth Pro* to calculate the azimuth (by averaging measurements from different satellite photographs of good quality) and horizon altitude of the temple. In order to take into account the intrinsic errors of *Google Earth*, the standard error in azimuth was increased by 1°, while the error in horizon was set empirically at ½° or ¾° (Rodríguez-Anton et al., 2017; Romain, 2022; Dallas, 2024). Then we computed the declination with the help of Clive Ruggles' online calculator (Ruggles, 1999). The error in declination was determined by error propagation (Ku, 1966). The results (Fig. 7) reveal connections with Apollo myths.

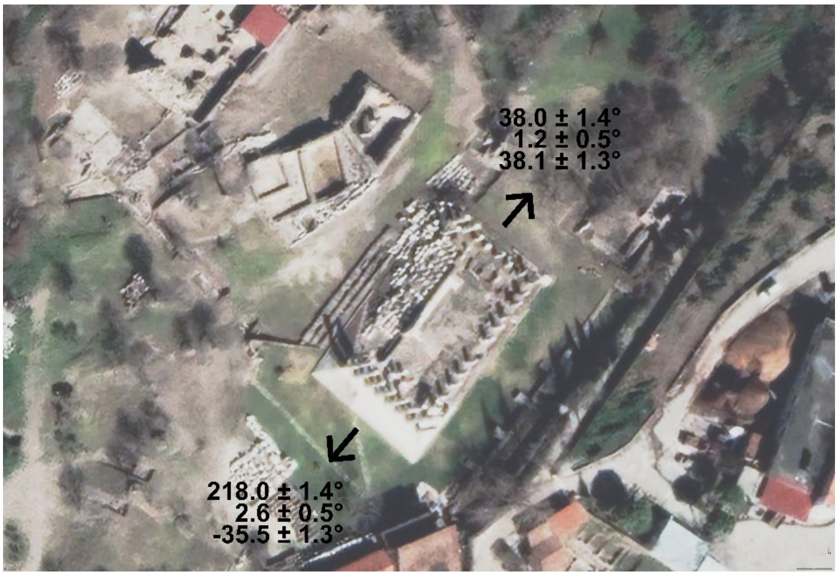

Figure 7. The temple of Apollo Smintheus and its orientation. Data from top to bottom: azimuth, horizon altitude, declination. Satellite photo courtesy *Google Earth*.

The Crow and the Snake

The orientation of the temple entrance towards SW does not point exactly to an asterism that may be connected to Apollo. Nevertheless, the view to WSW is towards the setting of Hydra, Crater and Corvus constellations (Fig. 8) all connected with Apollo. The myth (*Catasterismi* 41; Ovid *Fasti* II 243*ff*) is as follows: Apollo was preparing a feast for Jupiter, so he ordered the raven to fetch water in a krater. The bird noticed a loaded fig tree; but its fruit was still unripe, so it waited until they sweetened to eat its fill. On the way back, the raven snatched a water snake and blamed it for his delay. Of course, Apollo knew better, so he hurled the bird, the bowl and the snake to the sky, for a perpetual memorial of this incident.

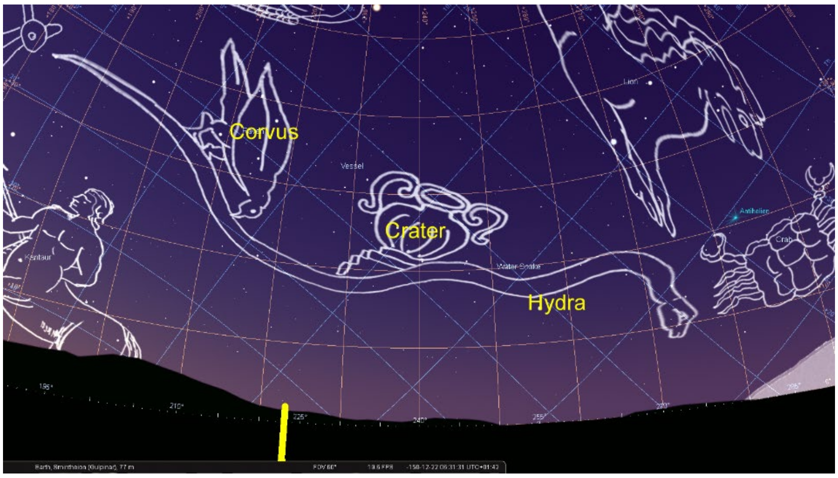

Figure 8. Hydra, Crater and Corvus setting, as seen from the entrance of the temple in 150BC. Sky simulation via *Stellarium*. The yellow line is the temple's axis.

Corvus was invisible from mid-July to the end of September in Smintheion, during the fig-producing period (Vasilakakis, 2004, pp. 578–581). The period of invisibility of Hydra is from June to October, a time of activity for snakes (Cesaretli & Ozkan, 2010, fig. 2). In addition, there is correlation to the movement of the stars, as they are seen setting in the afternoon in early summer and rising at dawn in autumn, as if descending to earth and ascending to the sky, respectively. Thus, the raven is pictured coming down to earth with the crater to gather water as the figs begin to develop fruit and departing with the serpent once the fruit has been harvested. One of the important finds in Smintheion is the remains of a huge marble krater, over 1m in diameter (Kaplan, 2022).

The Aeolian Lyre and its Seven Strings

The opposite direction, beyond the temple, or the view from *opisthodromos*, is a far more obvious connection with Apollo, as the temple is aligned to the rising point of Vega and the constellation of Lyra, as well as Deneb and the constellation of Cygnus (Fig. 9). According to the myth, lyre's inventor was Hermes (*Homeric Hymn to Hermes* 25*ff*; *Catasterismi* 24), but offered it to Apollo in reconciliation after a quarrel. Thus, Apollo became the musician of Olympus, playing his lyre for the entertainment of the gods. The music of the lyre had magical powers and could command the forces of both nature and supernatural. Apollo and Amphion employed it to build the fortifications of Troy (Aristophanes *Thesmophoriazusae* 109) and Thebes (Pausanias 9.5.7*ff*), respectively. When pirates threw Arion overboard, a dolphin enchanted by his music rescued him and brought him safely back to Corinth (Herodotus I 24). Of course, we have the most famous myth of Orpheus, who not only used his lyre's power to help the Argonauts on numerous occasions (Apollodorus *Bibliotheca* I 9.25), but also his competent lyre playing allowed him to enter and return from the underworld (*idem* I 3.2). Apollo is also credited with the addition of more strings to the lyre, to a total of seven (Callimachus *Hymns* IV 249–255), because the swans that sang at the god's birth, circled the island of Delos seven times.

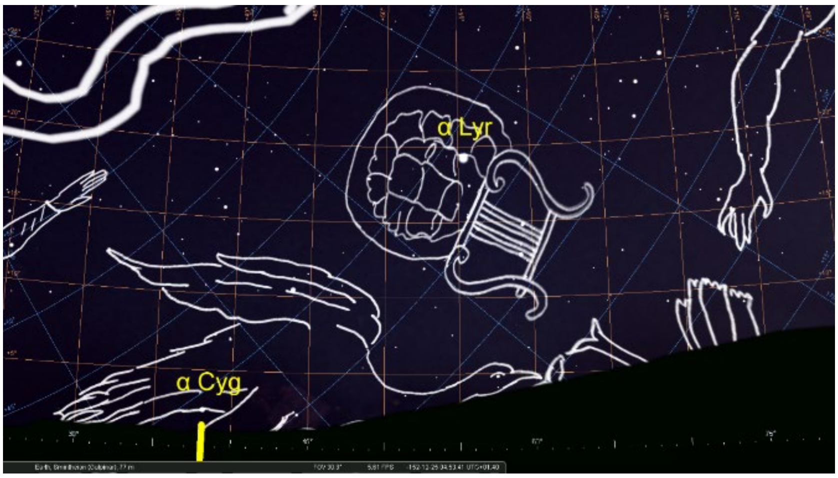

Figure 9. Lyra and Cygnus rising, as seen from the rear of the temple in 150BC. Sky simulation via *Stellarium*. The yellow line is the temple's axis.

The Swan and the Sun

In our epoch swans migrate to the area of Evros Delta National Park from north Europe —or even Siberia— around December; and they leave to return to their breeding pastures in March (Vangeluwe, 2016). Swans' lifecycle seems reversed for Greeks: in spring they vanish, in winter they return. It is amazing that Deneb rose heliacally at Smintheion in early December, followed by its cosmical set in March. The cosmic Cygnus switched from being visible setting (arriving to the temple) at the start of the winter migration season, to being visible rising (departing from the temple) as the birds were preparing to leave for Hyperborea.

The Hyperboreans are holy people in an earthly paradise (Pindar *Pythian* 10.31–34). You cannot reach their lands unless you can fly (*idem* 10.29). The link between them and the cults of Apollo is well attested in antiquity. Nowhere is this clearer than in the tradition that Apollo himself travelled to and from the land of the Hyperboreans in a swan chariot; actually, the swans are the chariot (Alcaeus *Fragments* 307c; Himerion *Oration* 48) and he drives not a swift horse, but a winged swan (Nonnus *Dionysiaca* 38.206).

The swan makes a clear sense as a solar bird in Scandinavia, as its departure heralds the winter and its return the summer. In Greece, the situation is opposite, as they spend their winter, to disappear to the north once spring commences. The swan comes into prominence as a bird linked to solar cults in the Urnfield and Hallstatt phases of European prehistory (12th to 6th c. BC), and diffused to northern Europe and Greece (Sprockhoff, 1954; Bilić, 2016). The Apollo-sun interaction was present in Greek ethnographic context at least from the mid-6th c. BC (Bilić, 2021a). Yet, as most of the Mycenaean amber originated in the Baltic, ideas that led to the association of Apollo with swans and the sun may have travelled on this trade route as far back as the 16th c. BC (Ahl, 1982).

Figure 10. The votive chariot from Dupljaja, second half of 2nd millennium BC. Belgrade National Museum, Serbia. Photograph: Petar Milošević; courtesy *Wikimedia Commons*.

The relevant iconography is most aptly described in the Dupljaja chariot (Bilić, 2021b). In this case, the chariot is not just drawn by swans but is made from three swans and driven by a human decorated with solar motifs (Fig. 10). In Greek context, we have the famous iconography of Apollo riding a winged tripod —red figure hydria attributed to Berlin painter: Gregorian Etruscan Museum, Vatican, № 16568; Beazley Archive № 201984 (Mannack, 2003a)— as well as riding a swan —red figure bell krater attributed to the Meleager Painter: British Museum, London, № 1917,0725.2; Beazley Archive № 217933 (Mannack, 2003b). For a general discussion within the Indo-European mythology, see Valent et al. (2021, pp. 18–20).

Five myths record Apollo's journeys to Hyperborea (Tbl. 2). Three of the versions of Apollo's travels cannot be connected to birds' seasonal migrations or to astronomical phenomena. For example, Alcaeus (7th c. BC) describes the return of Apollo from the Hyperboreans to Delphi in the middle of summer after a full year of absence, which makes little sense in terms of seasonal bird migrations. However, the two most recent myths have astronomical connotations.

Table 2. Tentative dates of Apollo's Hyperborean travels (after Bilić 2021b, p. 274).

Apollo's	**Delphi (Alcaeus)**	**Delphi (Plutarch)**	**Athens**	**Delos**	**Hecataeus**
birth	Apellaios / Hekatombaion July	Bysios 7 February / March	Thargelion 7 late May	Targelion 7 late May	—
departure	Apellaios / Hekatombaion July	 November 8 or December 27	(?)	Hekatombaion (?)	 March 26
arrival	Apellaios / Hekatombaion July	Bysios 7 February / March	Thargelion 7 late May	Targelion 7 or Hieros / Bysios late May or February / March	 May 8
absence	1 year	3 months	< 1 year (?)	6 months	1½ month every 19 years
destination	Hyperborea	Hyperborea	?	Lycia	Hyperborea

Hecateus of Abdera (4th c. BC) narrative ties the god's journey to Hyperborea with the Metonic Cycle and a specific seasonal event. Thus, we cannot ignore Diodorus Sicilus' description (*Bibliotheca Historica* II 47–49) of the circular temple in the land of the Hyperboreans Apollo visits every 19 years, which has been linked to the megalithic monument of Callanish in Scotland (Burl, 1993, pp. 63–65). The festivities lasted for 1½ month, beginning at the equinox and ending with the Pleiades' helical rising in early May. Recall that the "Seven Sisters" are an important agricultural marker throughout the world (Rappenglück, 2008). Their helical rising is the start of harvest season in Hesiod (*Works and Days* 370). Early May also matches the Celtic feast of Beltane (Hicks, 1985, pp. 71, 76). In the 3rd c. BC, Greeks associate the Celts with the Hyperboreans (Apollonius Rhodius *Argonautica* IV, 611-619); Bridgman (2005) investigates this connection in depth.

Plutarch's Delphic myth (1st c. AD) describes Apollo departing from the oracle to visit the Hyperboreans for three winter months, which is exactly the reverse of what the swan does. This difference may have compelled Plutarch to represent Hyperborea as the country of endless summer, despite the actual climate. Notice how perfectly the dates of Deneb's helical rise and cosmic set (6 December and 3 March, respectively, from the Smintheion during its foundation period) correspond to the dates given by Plutarch, as well as the real swan migratory patterns.

A different connection of the swan with Troad comes via the myth of Kyknos, son of Poseidon, who ruled the town of Kolonnai in south Troad. During the Trojan war, both he and his son Tennes (the founder of Tenedos) supported the Trojans. Achilles slayed them both, but when he came to take away Kyknos' armour, the body had disappeared, transformed into a swan (Diodorus Sicilus V 83, Strabo XIII 1.46, Ovid *Metamorphoses* XII 64).

Further Remarks

The variety of orientations found in the Apollo temples may indicate that there was no fixed perception of their astronomical links in classical Greek religion, but they may be explained on a case-by-case basis. In the case of temples in Asia Minor, we see a relationship with Vega and Deneb not only at Smintheion, but also (Fig. 11) at Alabanda (Aydin-Tavakçu, 2015, pp. 232–234), as well as Didyma and Hierapolis (Castro et al., 2016). However, the latter two temples have oracular functions, which we are not aware of at Smintheion. Thus, this could be a local tradition —possibly originating from the sanctuary at Delphi— rather than a tradition based on the oracular function of the temples, as previously argued (Castro et al., 2016, p. 391).

Figure 11. The temple of Apollo Isotimos at Alabanda and its orientation. Data from top to bottom: azimuth, horizon altitude, declination. Satellite photo courtesy *Google Earth*.

On the other hand, the construction of Smintheion beside a cultic cave and spring (Fig. 4L) which still exist today (Fig. 12) in the driest region of Troas, may allure to its use for divination (Kaplan, 2023). Almost half of the inscriptions found in Smintheion refer to the Smintheia Pauleia wrestling games (Özhan, 2017). However, fragment *IG* XII,2 519 gives a tantalizing mention to a *prophet of Smintheus*, and a 2nd c. AD latin inscription suggests divination by looking at the water (Kaplan, 2023, p. 148; *cf.* inscription *SEG* 42:1065 from Claros). Last, but not least, Menander Rhetor (*Sminthaikos* 17) in the 3rd c. AD evokes the oracular character of the god —with no mention of rodents.

Figure 12. Left: The spring, near the entrance of the archaeological site. Right: The first and largest of the seven cisterns that fed the baths at Smintheion. Photographs: Armand van Puyvelde.

A connection to Hydra and Corvus has been proposed for the Apollo temples at Epidauros, Argos, Messene, Gortyna, Claros, Lairbenos and Notion (Liritzis et al., 2017). Most of these temples are near or associated with Asclepios sanctuaries. This relationship also applies to the temple of Apollo Smintheus in Troad, albeit not in strict astronomical terms. Early traditions about Smintheion mention mice and plagues, which alludes to Apollo's ability to both cause and heal a disease.

Conclusion

The astral connections examined in the present paper (the constellations and their apparent movement in the sky) are consistent with the myths and fables of Apollo, and may be relevant to the orientation of Apollo temples in general. We emphasize the relationship between Hydra's and Corvus' invisibility and seasons of snake activity and fig harvesting, as well as Cygnus' helical rise and cosmic set in accordance to actual bird migration patterns.

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