

Fire for Zeus: Using Virtual Reality to explore meaning and experience at Mount Kasios

Keywords

Virtual Reality, Phenomenology, Experience, Atmosphere, Awe, Ugarit, Hittites, Greek, Roman, Levant, Mediterranean

Abstract

From the Bronze Age onwards, summits of mountains in the East Mediterranean were sacred; many to the Greek sky-god Zeus—making a symbolic connection between the abstract sky and the physically highest point. In some cases, sacredness extends through to the Christian period, such as at Mount Kasios, which sits on the Syrian-Turkish border, and which is inaccessible for archaeological research.

In this paper, we explore interactions with and representations of Mount Kasios by different groups at different times, and how these sources can help reconstruct ancient meanings and experiences of the mountain. Myth, archaeology, and landscape are mobilised to inform the construction and interrogation of two digital models in GIS and Virtual Reality (VR) designed to elicit a feeling of awe. Such ‘virtual phenomenology’ offers a means to explore a contested contemporary landscape, and to engage with ancient experiences and atmospheres of this holy mountain.

Introduction: A Mountain of Violence

Mount Kasios (also known as Sapanu and Hazzi: Fig. 1), ‘overhanging Syria’ (Apollodorus, *Bib.*, 1.6.3), witnessed the major part of the great celestial battle between the sky god of the Greeks, Zeus, and his greatest foe, the monster Typhon: a mass of hissing vipers for his lower body, taller than mountains; whose head, all unkempt hair and beard streaming in the wind, ‘brushed the stars’; and whose mouth jetted fire. Typhon is so prodigious that Zeus first throws thunderbolts at him from a distance; but when they engage in hand-to-hand combat on Kasios, Zeus is overcome. Typhon cuts the sinews of his hands and feet and dumps him into the Corycian cave,¹ a huge limestone sinkhole on the coast of Turkey, where an underground river roars in the darkness (Fig. 2). But Hermes steals back his sinews, and Zeus recovers his strength; further battles ensue until Typhon is secured under Mount Etna, where he still occasionally protests against his fate with jets of fire (Apollodorus, *Bib.*, 1.6.3). The ferocity, violence, tumult, and fury of the battle are unparalleled in the ancient world, and although Zeus prevails, he comes face to face with death and is temporarily entombed in the earth itself.

The mountain where this battle took place is still a place of contestation, sitting as it does astride the Turkish-Syrian border (Map 1). The archaeological remains of a huge altar on the mountaintop were briefly investigated in the 1930s, with broader survey of the mountain conducted in the 1980s, but Kasios has been under military control for some time now, which has precluded more recent access. In the past decade, the war in Syria has transformed it into a highly strategic location. The construction of an access road and military base on the summit in 2012 has obliterated the archaeological remains there (Collar 2020—and see Fig 3)—an irreparable loss—but also continues the landscape’s long association with conflict. The contemporary situation local to the mountain and more broadly caused by the COVID-19 pandemic makes it impossible to conduct fieldwork on Kasios, and has encouraged us to respond to these situations creatively, leading to the experimental approach to landscape phenomenology and atmosphere in Virtual Reality taken here.

In the spirit of this themed issue and at the risk of stating the obvious, we argue that, as with objects or other non-human beings, landscapes also alter and prescribe human action, shape being, behaviour, experience, memory, emotion and outlook for the people that lived with them. The meanings ascribed to Mount Kasios were acquired through the sensory mediation of these many different people at different times. We follow Peirce’s contention that meaning and representation are irreducible to arbitrary symbols alone, but also encompass embodiment, the sensuous, and the immediately experienced (see Swenson and Cipolla, this volume) and are powerfully generated by affect and awe.

1 A location of immense spiritual importance from at least the Hittite period onwards.

It is this perspective which guides the approach taken in this paper through the use of Virtual Reality. Because VR is an embodied experience, it allows (but does not demand) the participant engages with all three levels of Peircian categories: firstness—the visceral, ‘pure feeling’ generated by the experience; secondness—the relational, reactive engagement of the user with the experience; and, after the VR experience is over, thirdness too—the interpretive level (see Swenson and Cipolla, this volume). In our study we show that VR provides an alternate representational medium that can afford approximations of how past landscapes were felt and made intensely meaningful.

In this paper, we demonstrate the possibilities for multiplicity offered by VR to build experiences of the mountain from different times, places and perspectives. However, before we look at the *in silico* encounters we created and consider how VR can permit thinking about landscape and atmosphere in the past, we first outline the different ways that Kasios was represented by and made meaningful for different groups throughout its long history. We also examine how this depth of time and engagement play a role in the continued affective force engendered on and by the mountain. Kasios was a highly distinctive and important landscape feature in the east Mediterranean (and beyond²), and a range of textual and archaeological evidence offer snapshots of the role the mountain played for different people in different locations at different times.

2. Mount Kasios: Bones of a Biography

Although we have no idea how or if the mountain was meaningful in the Neolithic period, there are rich resources about Kasios in the Bronze Age documents from the Hittite capital Hattuša, in central Anatolia, and the coastal Levantine city of Ugarit, destroyed by fire c. 1190 BCE: both relate myths about the deities of the mountain and ritual prescriptions of their cults (see Map 1). Later texts supplement and develop these stories. Each of these communities assigned specific meanings and narratives to the mountain, which, when considered together, give shape to the distinctive place and meaning that Kasios had in the minds of the people of this part of the world (and beyond it) and the nature of the worship they conducted about and on the mountain.

A battle between a sky god and a terrible foe (sometimes a monster, sometimes the sea) appears with different protagonists in the *Enûma Eliš*, a Babylonian epic probably composed at some point in the 18th-16th centuries BCE, and preserved in the Neo-Assyrian king Aššurbanipal’s 7th century BCE library at Nimrud in Iraq (King 1999). The scene is set at Kasios in later tellings found in the Baal³ Cycle from LBA Ugarit (Ras Shamra). In these epics, the mountain Sapanu (Kasios) is the place of the battle, between their storm-god Baal/Ba’lu/Haddu and the sea-god Yammi.⁴ It is also Baal’s home, and divine in its own right: ‘Ba’lu was seated, as immovable as a mountain / Haddu r[ested] like the ocean / on his mountain, the divine Sapanu’ (KTU 1.101, *obv.*, translation de Moor, 1987).

Sacrifice was a standard method of engaging with deities, and the texts in the Ras Shamra archives outline appropriate offerings: birds, cows, bulls, rams, ewes and bulls’ livers. In terms of the economic investment the people made in their deities, Baal of Sapanu receives by far the most offerings—561 in total. Most of these rituals for Baal of Sapanu and the mountain Sapanu itself occurred in the city, not on the mountain. However, in one tablet, RS 24.643, sacrifice is offered to ‘the gods of Sapanu’. Present understanding of the text suggests this ritual period extended for two months, following the winter solstice (between December and February—Pardee, 2002: 44), and because Sapanu is the home of Baal, not all the gods, this rite to the ‘gods of Sapanu’ indicates a moment when these deities assembled there (Pardee 2002: 102).

Pardee argues that this assembly was linked ‘with Ba’lu’s vicissitudes when he was defeated by Môtû [death] and buried on Mount Sapunu. [...] it is not difficult to imagine a rite that would have brought the gods together to commemorate Baal’s demise at the winter solstice’ (Pardee 2002: 102). A second text referring to festival in December-January (‘Iba’latu) includes a prayer (RS 24.250) which describes a journey—‘to the sanctuary, O Ba’lu, we shall ascend.’ These two texts can be taken together to hypothesise a midwinter sacrificial festival that took place at the mountaintop of Sapanu: in

2 See Collar 2017 for a discussion of the mountain as a landmark for sailors and of its contribution to mental mapping in the east Mediterranean.

3 A title meaning Lord; his name was Haddu or Hadad.

4 The tablets date from c. 1200-1185 BCE and the final destruction of Ugarit by fire, but the stories are much more ancient.

the location of the drama itself participants (perhaps international⁵) may have witnessed the death and entombment of the sky god. The presence of Hittite dignitaries in the Ugaritic court, and the suggestion that Ugarit was at its demise part of the Hittite Empire, means that it is likely that Sapanu was a place where different names and representations of deities were used and interpreted, where complex international politics and ritual forms may have been negotiated and performed.⁶

Support for the international significance of Bronze Age festivals on the mountain itself are found in contemporaneous Hittite texts from Hattuša (Güterbock 1948), which show that although the mountain is called Hazzi and the storm-god Teššub, it is again both Teššub's throne and place of his victory over the sea and an enormous stone monster, Ullikummi (CTH 345.2A = KUB 33.113 i 10). Some of these hymns—the Song of the Sea, and the Song of Ullikummi—were probably performed on the mountain itself (Rutherford 2001: 605), a practice familiar from Hittite ritual elsewhere (Popko 1994: 156-7; Popko 1999). Indeed, the ascent of Hazzi is written into the Song of Ullikummi: Teššub ascends the mountain to witness the birth of Ullikummi, who grew so fast the sea reached his waist and his head touched the sky (CTH 345.2A = KUB 33.113 i 10).⁷

At Hattuša, a mock battle took place at the autumnal festival for Teššub (KUB XVII.35.iii. 1 ff; Gurney 1977: 27, 31, 40); can we imagine a similar spectacular re-enactment at Hazzi, in the physical theatre of the myth, as between the deities Marduk and Tiamat in Babylonian festival? (Gurney 1977, 40). Such festivals were witnessed by many, both Hittite officials and foreign dignitaries, in part to demonstrate the power of the king and to generate international prestige (Rutherford 2019: 232-233). Hazzi's location at the boundaries of the Hittite empire, with commanding views of Cyprus and the coast, may have made it exceptionally politically appropriate in this context: politics and ritual are key features of the repeated performance of Hittite territorial boundaries (Sørensen and Lumsden 2016).

Later texts continue the narrative of the battle between the sky and a monstrous adversary. Given the international character of the mountain, Greeks settling at the port of Al Mina on the Orontes at the foot of the mountain in the early Iron Age must have been invited to attend festivals, hear the songs and perhaps participate in the rituals, even if the political character of the region had changed with the destruction of the Bronze Age cities. It is the Hittite story they took back to Greece and which the Euboean poet Hesiod retells; and the Hittite name, Hazzi, that was translated in Greek to Kasios (Eissfeldt 1932; Koch 1993; Lane Fox 2009). Hesiod, who wrote c. 750-650 BCE, describes Typhon⁸ like a volcanic thunderstorm: 'From his shoulders grew a hundred heads of a snake [...] dark, flickering tongues [...] fire burned from his heads [...] voices in all his dreadful heads uttered every kind of sound unspeakable' (Theogony 823-835). Other retellings follow—by Pindar, Aeschylus, Apollonius of Rhodes, and Strabo.

The deep history of the mountain's myths and sacred status continued to generate a powerful affective force into the Roman period, pulling in both locals and high-status visitors keen to participate in ritual experiences—the emperors Trajan and Hadrian ascended around 113-15 CE to sacrifice to Zeus Kasios (Birley 1997), and Hadrian went again in 129 CE, in a thunderstorm during which a lightning bolt killed the priest and the sacrificial animal (Spartian, *Vita Hadriani*, 14.3). The source is untrustworthy, but the continuation of the affective force, divine power and political importance of the mountain is clear. The latest accounts from antiquity are by the Cilician poet Appian (2nd century CE) who brings in important and highly localised myth-elements (Lytle 2011), and Nonnus, in the *Dionysiaca* (4th/5th century CE), in which the hero Cadmos plays music to trick Typhon (l. 410-515). As Christianity spread in the first centuries CE, communities perceived the political and spiritual need to (re-)claim

5 International festivals with participants from Egypt, the Hittite court, and the Aegean are suggested at Ugarit (Rutherford 2019: 234).

6 At earlier times, it may have been a place of contention or competition between different groups—if so, were different festivals performed at different times, or in different places on the mountain? Or was there a coordinated *entente cordiale*, to celebrate festivals together on the mountain as a 'neutral zone'?

7 These tales of rock and sea monsters may represent folk-memory of the eruption of Thera, 600km away, in the 1600s BCE—Greene 1992. More recent plinian eruptions at Krakatoa or Mount St Helens demonstrate that pillars of volcanic material reach 40km into the stratosphere, and would have been visible across hundreds of kilometres. The wind carried the ash far to the east: tephra from Thera has been found deposited in inland lakes in Anatolia—Sullivan 1988.

8 Lending support to the characterisation of the festivals as multilingual, this name is suggested to be the Greek rendering of the Ugaritic name of the mountain, Sapanu-Saphon, see Bachvarova 2016: 258.

ancient sacred places, and a monastery to St Barlaam⁹ was built in the 6th century, destroyed by the Mamluk Turks in the 10th.

Tying the fabulous richness of these narratives into physical features of the mountain offers some challenges. The Ugaritic sources tell us Baal's home was in a silver and lapis lazuli temple, but there are as yet no known Bronze Age structures on the mountain. Indeed, archaeological data from Kasios is very limited, gathered by Wachtang Djobadze's survey team in the 1980s. They detailed the remains of the Barlaam monastery and discovered indications that rock was quarried from outcrops at the summit. A few inscriptions to ΔΙΟΣ ΚΑΣΙΟΥ (SEG 36:1 301, ab, c) and fragmentary evidence indicate there was a Hellenistic temple and temenos to Zeus, probably under the monastery (Djjobadze et al., 1986). Earlier excavations of the 'Hittite' ash altar (Sinclair 1990) on the summit in the 1930s were halted due to perilous weather conditions; the mound was 180 feet wide and 26 feet deep. Six feet were excavated, only reaching Hellenistic levels (Lane Fox 2009). Excavations were never resumed, and, in an act of extreme negligence, to our knowledge no further investigation took place prior to the construction of a Turkish military base in 2012 which destroyed the ash altar completely (Collar 2020: 42-45). If six feet corresponds to c.500 years of sacrifice¹⁰ and the altar was 26 feet deep, it is plausible to assume that burning rituals had been taking place at the summit of Kasios since at least 1700 BCE, if not earlier. Of course, there may have been episodes of more or less intense activity, or periods of non-use, but nonetheless, parallels for mountaintop ash altars in the Mediterranean where excavation has been possible demonstrate ritual activity extending into the Middle Bronze Age and earlier.¹¹ With the evidence lost, this is unlikely to be confirmed at Kasios, but as we have seen, texts provide contextual support for this assumption.

As the mountain is inaccessible for fieldwork for the foreseeable future due to the military situation and COVID-19, remote sensing via satellite imagery offers one of the only opportunities for gathering information about the mountain and the remains there. This technique has enabled the tentative reconstruction of processional routes to the summit (see Collar 2020). However, satellite imagery photographed prior to 2012 is rather low resolution, and this approach would benefit from ground-truthing to ascertain approximate dating and further contextual information.

The remote observation of rhomboid features divided by horizontal walls near the summit of Kasios whose closest apparent parallel are the storage magazines surrounding the temples at Hattuša (Collar 2020: 56) may suggest that festivals were large enough to warrant permanent structures at this altitude, to store the wine, grain and oil needed to perform rituals and feed many participants—the filling and emptying of storage vessels in the autumn and spring respectively were a typical feature of Hittite cult (Gurney 1977, 31). Unfortunately these features on the mountain have also been partially destroyed by the bulldozing of the new road to the mountaintop (Fig 4); there may nevertheless be material remains that could be salvaged which might help to date them.

3. Atmosphere, affect and awe as ways to explore representation and meaning

The sources reveal how Kasios was the stage for the performance of rituals, spectacles, and myth-history for different groups, their self-representation, and the representation of their relationships with their deities. These various sources highlight the intertwining elements of movement, ritual action, narratives, social memory, landscape and ownership in the creation, re-creation, and representation of the mountain as a sacred place which connected the present into deep, mythological, ritual time. To begin to engage with this powerful sense of sacredness, to the ancient experiences on and of the mountain, and to explore the meanings that the mountain possessed, we need to think phenomenologically about the landscape and its uses: the mountain itself is an overwhelming physical presence in the

9 St. John Chrysostom (344/354-407 CE), a native of Antioch and Bishop of Constantinople, tells us Barlaam was a local Christian martyr forced by the city governor to hold burning incense in his hand over a pagan altar, as a means to coerce him into offering sacrifice. However, he did not drop them until his hand was completely burned away (Mayer, W., St John Chrysostom, *The Cult of the Saints: Select Homilies and Letters Introduced, Translated, and Annotated* (Popular Patristics Series; New York: St Vladimir's Seminary Press, 2006), 177-189). St. Barlaam also appears in Indian Christian tradition.

10 Perhaps rather a conservative estimate, given that the Christian monastery was only built in the 6th century CE.

11 Mount Lykaion in the Peloponnese, under excavation since 2004 by an American-Greek team has found evidence from the ash altar at the summit extending into the final Neolithic (4,500-3,200 BCE), with a concentration of activity in the Late Helladic period (1550-1200 BCE) (Romano and Voyatzis 2010).

landscape, and this very materiality generates atmosphere and possesses the raw power to evoke religious awe.¹²

The tied concepts of affect and atmosphere provide a thoughtful new articulation for archaeological approaches to experience, environment and phenomenology. Harris and Sørensen set out inter-related terms to analyse how a material environment affects bodily and sensorial experiences: in particular they describe affective fields as ‘the relationship between agents, where something or somebody is stimulating an emotional response in a causal set of events’, a dynamic process that is closely tied to atmosphere: described as a quality that ‘emerges at the intersection of people, places and things, typically in architectonic settings’ (2010: 152).

Building on this, Eve and Gillings outline computational reconstructions of the atmospheric affordances enabled by the placement of the stone settings in the prehistoric Avebury landscape in the UK. Focusing in on only one sensory modality, vision, they demonstrated how the Avebury stones operate as active agents, with the capacity to ‘focus sensory affordances and affects [...] which served to intensify and shape a particular set of affective atmospheres’ (Eve and Gillings forthcoming). The later stone circles blocked the view of the earliest part of the monument, the ‘founder’s house’, so creating frustration for the participant excluded from the inner circle—both literal and metaphorical—helping to build a ‘more nuanced study of the changing character of place’ (Eve and Gillings forthcoming). Beyond this methodological development which enables us to access the atmosphere of place, Eve and Gillings also stress that computational modelling can reconstruct and evoke affect: that is, to provoke the modern participant into particular emotional responses.

Adopting this perspective, and following Gillings’ earlier work which explored methods of generating affect in the context of digital reproductions within Virtual Reality (Gillings 2005), we created two virtual experiences based on the separate scenarios of the journey to Kasios and the experience of ritual at the mountaintop. These virtual experiences were intended to place the participant in situations impossible to reconstruct in real life, and to enable a deeper phenomenological engagement with the landscape and the substance of the possible rituals performed on the peak. These scenarios, detailed below, allow us to explore how this distinctive and deeply sacred place exploited the power of site- and ritual-specific affective atmospheres to generate a sense of awe. Rather than concentrating on the photo-realistic verisimilitude of the VR experience (an approach usually taken within digital archaeological reconstructions), we instead focused on the evocation of a feeling of presence and awe within VR. Presence can be defined as the psychological response to patterns of sensory stimuli, resulting in the sensation of ‘being there’ while in computer-generated space (Slater et al 1994): presence is vital for a feeling of attunement with the place and experience, an embodied feeling of ‘being in the world’ (Harris and Sørensen 2010).

A recent study by Chirico et al (2018) explored the elicitation of awe within a VR environment. They follow the prototypical model proposed by Keltner and Haidt in 2003, in which they identify two main aspects that are present in all clear cases of awe. The first is perceived vastness, this does not refer only to physical size (such as a wide mountain vista), but can also involve perceived social size (such as fame, prestige or power) or physical phenomena such as shaking ground or loud sounds (Keltner and Haidt 2003:303). To elicit awe, this feeling of vastness has to be accompanied by a need for accommodation—defined as an inability to assimilate an experience into current mental structures (Keltner and Haidt 2003:297)—essentially, the failure of the awestruck person to make sense of something so vast. They put a specific emphasis on the ‘need’ for accommodation which may or may not be satisfied, and which ‘may partly explain why awe can be both terrifying (when one fails to understand) and enlightening (when one succeeds)’ (Keltner and Haidt 2003:304).

Chirico et al designed a series of scenarios, tailored to combine the feeling of vastness with that of the need for mental accommodation or surprise. The scenarios included a forest scene with a waterfall that could only be found by interactive exploration; a mountain scene with the full panorama blocked in certain places by a fence; a scene that allowed the viewing of Earth from deep space; and a neutral [control] environment of a park with very few trees. The results of their user analysis clearly showed the mountain scene elicited the highest levels of awe, along with slightly higher levels of fear and/or joy (Chirico et al 2018:10). Levels of presence were also measured, with the forest and mountain scenes both producing the highest levels of perception of physical presence and engagement.

12 See paper by Swenson in this special issue.

4. Experimental methods for virtual reconstruction of past experiences

Drawing on these and other recent experiments (Parsons and Rizzo 2008; Diemar et al 2015; Marin-Morales et al 2018; Chirico and Gaggioli 2019) within the field of affective computing (Picard 1995), we produced a series of VR experiences designed to elicit the affective responses of presence and awe. We created two separate scenarios to explore the phenomenological experience of Kasios, that seek to press the space between the ancient narratives, the archaeological evidence, and the landscape itself to engage with the representation of meaning at this holy mountain.

Using the Unity gaming engine and following Eve's previous workflow for creating the 'embodied GIS' (Eve 2014), we imported a 1:1 scale digital elevation model of the landscape surrounding Kasios, ensuring enough of the terrain was imported to allow an 'unlimited' view of the surrounding landscape when standing on the top of the mountain. Using the 'SUIMONO' (<https://assetstore.unity.com/packages/vfx/shaders/suimono-water-system-4387>) accurate water plugin we were able to simulate the movement and visual appearance of the sea. Coupling this with the TEN-KOKU (<https://assetstore.unity.com/packages/tools/particles-effects/tenkoku-dynamic-sky-34435>) dynamic sky and weather system we also simulated the celestial movements of the sun, moon and stars at any time during the last 5000 years. In addition, it was possible to control the wind and weather settings, which in turn affected the movement of the sea, the sound of the wind and also the visibility of the user (for instance during simulated rain or snow storms).

Experimental Scenario 1

Our first scenario sought to explore the experience of movement. Movement was a key aspect of interactions with Kasios: people had to make a journey to reach the mountain to offer (or to witness) burnt sacrifice to the deity, and scaling the mountain was a major part of the experience (Collar 2020). From what is known of Hittite festivals more generally, we can conceive of a procession from a nearby city¹³ to the mountain, perhaps transporting an image of the god, which involved song and sacrifice at a *Huwaši* stone—a stele set up in a natural place such as a grove, spring, or mountain. Festivals in which the king or officials were involved were enormously important; the autumn festival of *Teššub* at *Hattuša* lasted at least 21 days (Gurney 1977, 31). Covering a fairly long distance implies that a procession required stopping points—perhaps of spiritual as well as practical significance, provisions, and may have entailed the physical creation of the processional road itself.

During the ascent and at arrivals in locations of importance on the mountain (in particular, the temple area and the summit), the views that the mountain afforded across the surrounding land and sea-scape would also become more commanding, and there are important elements of ownership implied by such vantage points. Williamson has recently explored the notion of the 'visual region' in her discussion of the political relationship between urban centres and 'country sanctuaries' in western Asia Minor, borrowing the terminology from memory studies and psychology, arguing that visual connections between different locations of importance also serve to compress perception of space, bringing them closer together in the mind's eye, especially along a kinetic linear space such as a road (Williamson forthcoming: 44). In a future survey of the region, the application of such methods holds the potential to shed light on the movement and viewsheds of the mountainous landscape.

Kasios was visible from nearby cities with which it had a strong relationship, such as the Hellenistic foundation of Seleucia Pieria¹⁴ (Fig. 1), but also Ugarit, 59km away (Fig. 5). A least-cost GIS pathway suggested a route from Ugarit to Kasios which travelled through the sea. This posed an interesting hypothesis about the way the people of Ugarit visited the mountain which was not immediately apparent—there are safe harbours at Ras el-Bassit to the south, or Samandağ bay to the north, and the

13 In this case, the MBA city of Alalakh (Tell Atchana) is a possible starting point within the Hittite Empire; Ugarit is also a likely starting point.

14 An image of Kasios or a cult object of Kasios is enclosed in a temple and used on coinage issued by the city of Seleucia Pieria under Trajan.

current directions are predominantly north-flowing along the Levantine coast.¹⁵ Particularly interesting is the fact it brings the seascape into the dominion of the mountain computationally—we already know the mountain and deity of Kasios were important to seafarers.¹⁶

This drove the creation of our first virtual scenario, which aimed to explore the atmosphere generated by the experience of being between sea and mountain. Using a virtual model of an ancient boat—accurate enough for the purpose—we located the model in the sea near Ras el-Bassit on the line of the least-cost pathway. One of the authors (Eve) was able to control and change the experience using a desktop computer interface, the other (Collar) entered VR in order to participate in the experience itself. Collar was given an HTC Vive Virtual Reality headset and told to stand within a clear space of approximately 4m x 4m. The headset was fully tracked in 3D space, allowing 360 degree freedom of movement within the area, and every movement made in the real world was mirrored within the virtual world. As the scenario began, she was instructed to position herself on the virtual deck of the ship and then describe what she was seeing and feeling—she did not have any other prior knowledge about what the experience would contain.

Being on the ship on the water below the mountain immediately provoked a feeling of insignificance—the mountain filled the sky entirely on one side, and the water filled the other (Fig. 6). The model of the boat was hollow, with a plank crossing from mast to stern. Even though it was theoretically possible to move anywhere in the space Collar restricted her movement to this narrow ‘safe zone’ (thereby avoiding falling into the virtual sea), this response is well documented (see for example Krupić *et al* 2021) and is a clear example of the deep immersion evoked by a Virtual Reality experience. Virtual weather controls meant that at the start of the experience, the boat was basking in sunshine with the sound of birds drifting across the water, with a corresponding feeling of warmth and an atmosphere of calm; then all of a sudden, a storm was generated (by changing settings within the experience), with high seas, a wildly rocking boat, and torrential rain. This drastic change in the weather induced a level of panic in Collar and an intense atmosphere of desperation as she attempted to cling on to the boat. Physically, the motion of the boat induced sudden and extreme nausea, and caused her to need to sit down on the floor. The final element of the experience, with waves coming over the side and sinking the boat caused the participant to involuntarily fling her arms up, to attempt to ‘swim’ upwards to escape drowning.

Experimental Scenario 2

Beyond the journey to get to the mountain, sacrifice and ritual were a vital part of the experience for ancient communities: both for the privileged few (or many?) who may have attended sacrifice at the summit itself, and those who gathered in the space below to bear witness to the rituals and fire on the mountaintop. Our second virtual scenario sought to recreate the atmospheres generated by both of these experiences of participating in the sacrificial festivals: one viewing from a distance, the other more closely involved in the ritual action on the mountaintop. Drawing on the textual sources from Ugarit, we built a virtual model of the sacrificial fire on the summit at midwinter when Baal has been slain at the hands of Mot, death, in order to imagine the experience of people sacrificing to the assembly of gods on the mountain to mourn his death and celebrate his rebirth. The texts reveal that ritual at Ugarit was strongly linked to moments of celestial importance, for example, sunrise or moonrise, so the visit was made at night, in order to experience the sunrise in 1186 BCE, the year the tablets were preserved by fire at Ugarit.

Williamson has recently drawn attention to the use of even, open concentric spaces in sanctuary settings, in order to encourage participants’ focus on a ‘central ritual action or performance such as a sacrifice’ (Williamson forthcoming: 44). The area of the temple to Zeus, c. 300m below the summit, provides such a level platform area with clear views up to the summit (Fig. 7). Although not (apparently) enclosed by architecture, the landscape drops away on all sides, enclosing this area in space itself. In addition to providing a platform for visually encompassing and compressing in a concertina fashion the landscape around and below into a ‘visual region’, the drop also creates a natural edge akin to

15 The coastline around Kasios is treacherous, with rocks sheering into the water and a sea depth of 1000m just offshore, making anchoring difficult. On the currents in the area, see El-Geziry and Byden 2010: 39-46; Gerin *et al* 2009.

16 The mountain was compared to a ship and Baal of Sapanu was believed to protect sailors. The mountain was clearly a landmark and was still referred to as ‘the throne’ by seafarers in Late Antiquity. See discussion in Collar 2017.

a theatre. This concentric area for community viewing of ritual acts on the summit would have helped to generate collective memories and social cohesion, especially if the rituals observed were dramatic or created a strong emotional response (see discussion in Williamson forthcoming: 44-51). Witnessing the fire for Zeus from the temple area is likely therefore to have been spectacular, and very emotionally and sensorially intense—as we know was the case in LBA and EIA rituals in the local Syro-Hittite context (Gilibert 2011). However, although the fire itself was clearly visible on the summit in our model, despite the darkness of the thunderstorm (Fig. 8), this communal element of ritual participation and social emotion was entirely absent from the VR experience, as the participant was present in the model alone—a point to which we will return in our conclusion. The scenario was set up in the same way as scenario one, Collar was given the VR headset and instructed to stand in the middle of the space, again with little prior knowledge of what the experience would entail.

Within the VR model it was snowing,¹⁷ dark, and the wind was blowing strongly: given that excavations on the summit were abandoned because of adverse weather conditions, we can imagine that participation in midwinter sacrifice was an extremely physically challenging event. Because the impossible can be played out in VR, the participant (Collar) was able to watch the sun rise at midwinter in 1186 BCE, and to stand beside the huge sacrificial fire (Fig. 9). Such a combination of affective extremes—midwinter, the height of the mountain, the night with the sun rising, and proximity to fire—fostered an atmosphere that prompted feelings of awe, humility and reverence. The participant was overwhelmed by the skyscape, the stars and the views from the mountaintop as the sun began to rise, revealing the rest of the coastline. The atmosphere was strange: quiet and calm, whereas the atmosphere that would have been created in the past by a gathered crowd, either at the elevated and exposed temple area or close to the sacrifice on the summit, would have been very different, and probably highly emotionally charged.

The god of Kasios continued to play a role long after the fall of Ugarit and the collapse of Bronze Age civilisation in the area, indicating that social memory and presumably, some level of ritual continuity were important in maintaining cultic significance and participation. The building of the temple to Zeus in the Hellenistic period indicates continued devotion and emphasises this place's gravitational pull, its affective power to drag in new groups and participants—'the echoes [...] reached out across space and time to shape practices in the present [...] as a consequence of the web of performances and relations of which they are part' (Gillings and Eve 2020: forthcoming)—and suggests that this temple may have been monumentally commemorated as a place of earlier cult significance, but only excavation could confirm this suggestion. At the turn of the millennium, Strabo tells us that the people of Antioch held a festival to honour Triptolemus on the mountain (16.2.5). Although Triptolemus was a wandering Argive hero, he was also a chthonic deity, suggested by the Hellenistic writer Pseudo-Apollodorus to be the son of Earth and Ocean (Bib. I V.2). This snippet suggests that perhaps the people of Antioch may have retained an affective folk-memory of the Hittite myths of the earth-born rock-monster Ullikummi and his battle with the storm god on their sacred mountain.

5. Conclusions: Windows on Absence

This paper has outlined how a combination of different methods—historical, archaeological, digital, and virtual—can explore ideas about the kinds of experience engendered by Mount Kasios, and so too how the mountain was conceived as meaningful, through the concepts of atmosphere, affect and awe.

This experimental approach has allowed us to explore and play with thoughts and ideas which would be impossible in 'real life' phenomenology—such as the creation of the sacrificial fire, or the experience of being in a sinking ship in a storm—and in thinking through what is possible, has enabled us to recognise multiple absences both in what we know about Kasios and the meaning the mountain held, but also in what a virtual reconstruction can offer.

We note in particular the major absence of sensory inputs. Attending to the aspects of the virtual experience that cause 'breaks in presence', that is, moments of 'unreality', we are given an important window onto absences in this virtual experience which highlight elements that might otherwise be missed in our reconstructions. We recognised this during the process of modelling and attempted to plug these sensory gaps where we could: during the experience at sea, Collar was sprayed with water and had

17 Snow remains on the summit of the mountain until April (see Fig. 1).

pieces of seaweed thrown at her; we employed a desk fan to simulate the wind in both experiences; and in the mountaintop experience, a heater was used to mimic the heat from the sacrificial fire. However, although we paid attention to sensory absences, there were nevertheless breaks in presence caused by the computer providing erroneous birdsong while in a storm at sea; or the lack of olfactory 'background noise' such as the smells of mountain herbs or trees. In addition, a participant cannot move naturally in a virtual experience, being fundamentally restricted by the physical space in the real world, by the cables that connect the headset to the computer, and of course, by being indoors.

Augmented Reality—the merging of virtual elements within a real-world setting, and having this mediated through various devices—offers the possibility to regain some of these sensory inputs. An AR experience would be delivered on the mountain itself, with all the attendant natural smells, experiences and so on. Virtual objects such as the fire or sacrificial sheep could be viewed in situ, and, at the very cutting edge of technology, the olfactory delivery device called the Dead Man's Nose (Eve 2014; 2017a; 2017b, and in action at <http://www.heritagejam.org/2015exhibitionentries/2015/9/25/dead-mans-nose-stuart-eve>) could be added to offer the user the experience of culturally specific smells that may have been present: tablets from Ugarit reveal that oils scented with myrrh or spices, honey, kidneys, and wine were all present at rituals (RS 1.003/RS 18.056), and the smell of fresh blood and cooking meat would certainly be evocative, and would afford additional experiences that would add to the generation of a particular atmosphere. Future directions for this research could involve all of these elements, were fieldwork again possible at Kasios.

However, this 'tangle of sensory impacts' (Gillings and Eve: forthcoming) that are absent do not necessarily matter—what is important is not exactly what was seen or heard or felt, but rather that we as archaeologists think about them. For example, there are some parts of the ancient experience which cannot be regained: the communal feeling of participation in procession, special clothes, storytelling, sacrifice or spiritual engagement. Again, future work on this project should involve expanding the study to include a larger set of participants, to begin to counter the strange, eerie loneliness of the solo experience: filling a modelled experience with a group of colleagues would allow for the creation of some semblance of *communitas*, which could then be investigated further through post-experience interviews. The collaborative opportunities offered by VR represent a truly powerful new direction for research into phenomenological experience.

Responding directly to the call made by Swenson and Cipolla in the introduction to this volume that archaeology must devise new ways to analyse the materially mediated representations of past subjects, we contend that VR offers a powerful embodied medium to achieve this, specifically through the capacity of the model to simulate awe and emotionally charged experiences. VR is an extraordinary technology which provides the capacity for re-creation, re-imagination and re-presentation of the past: multiplicity of user experience and multiplicity of possible perspective is built into the scope of the technology. We can imagine the past through all sorts of interpretations and develop multiple possible scenarios.

Working through the medium of VR enables us to be fully embodied in our research: more than that, it *demand*s that we engage with the bodily, the affective dimensions of our research, and with the ways in which our total presence, our immersion in the virtual experience engenders emotions such as awe. Being present in VR requires us to think through the various aspects that made up ancient experiences—in this case, of ritual on the mountain, and beyond. As a research tool, the digital methods used here extend the limits and augment the means of traditional landscape phenomenology: VR has prompted us to think again about the total physical landscape: about seasons, weather and when people made journeys up the mountain; it has made us think about the lived necessities—clothing, food, shelter, sacrificial animals—to enact ritual and festival on the mountain; it also heightened thinking about time and the length of the journeys involved. Perhaps most crucially of all, it is beginning to allow us to explore, albeit tentatively, what may have mattered most to people at sites such as Kasios—the feelings of wonder, awe and spectacle generated by *ritual in place* that even phenomenological methods struggle to evoke and capture. VR is by no means perfect and there is much future work to do on presence and community elements in archaeological research. But it offers us the opportunity to play with the scope of what we can do with our material, to test our ideas and to challenge our limits: and offers a dynamic and exciting new medium to think about representation and meaning in the past.

References

- Bachvarova, M. R. 2012. 'From "Kingship in Heaven" to King Lists: Syro-Anatolian Courts and the History of the World'. *Journal of Ancient Near Eastern Religions* 12: 97-118.
- Bachvarova, M. R. 2016. *From Hittite to Homer: The Anatolian Background of Ancient Greek Epic*. Cambridge: Cambridge University Press.
- Birley, A. 1997. *Hadrian, the Restless Emperor*, London.
- Chirico, A., Ferrise, F., Lorenzo, C., and Gaggioli, A. 2018. 'Designing Awe in Virtual Reality: An Experimental Study'. *Frontiers in Psychology* 8: 23-51.
- Chirico, A., and Gaggioli, A. 2019. 'When Virtual Feels Real: Comparing Emotional Responses and Presence in Virtual and Natural Environments'. In *Cyberpsychology, Behavior, and Social Networking* 22:3: 220-226.
- Collar, A. C. F. 2017. 'Sinews of Belief, anchors of devotion: the Cult of Zeus Kasios in the Mediterranean'. In *Sinews of Empire. Networks in the Roman Near East and Beyond*, edited by E. H. Seland and H. F. Teigen. Oxford: Oxbow.
- Collar, A. C. F. 2020. 'Movement, Labour and Devotion: A Virtual Walk to the Sanctuary at Mount Kasios'. In *Pilgrimage and Economy in the Ancient Mediterranean*, edited by A. C. F. Collar and T. M. Kristensen. Leiden: Brill.
- de Moor, J. C. 1987. *An Anthology of Religious Texts from Ugarit*. Leiden: Brill.
- Diemer, J., Alpers, G. W., Peperkorn, H. M., Shiban, Y., and Mühlberger, A. 2015. 'The impact of perception and presence on emotional reactions: a review of research in virtual reality.' *Front. Psychol.* 6: 26. doi: 10.3389/fpsyg.2015.00026
- Djobadze, W. et al., 1986. *Archaeological Investigations in the Region West of Antioch-on-the-Orontes*. Stuttgart: Franz Steiner Verlag.
- Eissfeldt, O. 1932. *Baal Zaphon, Zeus Kasios und der Durchzug der Israeliten durchs Meer*. Halle (Saale): M. Niemeyer.
- El-Geziry, T.M. and Byden, I.G. 2010. The Circulation Pattern in the Mediterranean Sea: Issues for Modeller Consideration. *Journal of Operational Oceanography* 3.2: 39-46.
- Eve, S. J. 2014. *Dead Men's Eyes: Embodied GIS, Mixed Reality and Landscape Archaeology*. BAR British Series 600, Archaeopress.
- Eve, S. J. 2017a. 'The Embodied GIS: Using Mixed Reality to explore archaeological landscapes'. *Internet Archaeology* 44.
- Eve, S. J. 2017b. 'A Dead Man's Nose. Using Smell to Investigate the Past'. In Henshaw, V., McLean, K., Medway, D., Perkins, C., Warnaby, G. (eds.) *Designing with Smell: Practices, techniques and challenges*. Routledge. 211-218.
- Eve, S. J. and Gillings, M. (2020 in press) 'More than modal? Exploring affect, affordance, invitation and solicitation.' In *Capturing the senses: digital methods for sensory archaeologies*, edited by E. Betts and G. Landeschi. Springer: New York.
- Gerin, R., Poulain P.-M., Taupier-Letage, I., Millot, C., Ben Ismail, S., and Sammari, C. 'Surface Circulation in the Eastern Mediterranean Using Drifters'. In *Ocean Science* 5: 559-574.
- Gilibert, A. 2011. *Syro-Hittite Monumental Art and the Archaeology of Performance*. Berlin: Walter de Gruyter.
- Gillings, M. 2005. 'The real, the virtually real and the hyperreal.' In *Envisioning the Past: Archaeology and the image*, edited by S. Smiles and S. Moser, 223-239. New York: Blackwell.
- Greene, M. T. 2000. *Natural Knowledge in Preclassical Antiquity*. Johns Hopkins University Press.
- Gurney, O. 1977. *Some Aspects of Hittite Religion*, Oxford.

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- Güterbock, H. G. 1948. 'The Hittite Version of the Hurrian Kumarbi Myths: Oriental Forerunners of Hesiod'. *American Journal of Archaeology*, 52.1. pp. 123-134.
- Harris, O. and Sørensen, T. F. 2010. 'Rethinking Emotion and Material Culture.' *Archaeological Dialogues* 17.2: 145–163.
- Keltner, D., and Haidt, J. 2003. Approaching awe, a moral, spiritual, and aesthetic emotion. *Cognition and Emotion*. 17:2.
- King, L. W. 1902-1999. *Enûma Eliš: The Seven Tablets of Creation*, London.
- Koch, K. 1993. 'Hazzi-Safon-Kasion Die Geschichte Eines Berges Und Seiner Gottheiten.' In *Religionsgeschichtliche Beziehungen zwischen Kleinasien, Nordsyrien und der Alte Testament*, edited by B. Janowski, K. Koch, and G. Wilhelm. Göttingen: Vandenhoeck and Ruprecht.
- Krupić, D., Žuro, B., Corr, P.J., 2021. 'Anxiety and threat magnification in subjective and physiological responses of fear of heights induced by virtual reality'. *Personality and Individual Differences*, **169**.
- Lane Fox, R. 2009. *Travelling Heroes: Greeks and their Myths in the Epic Age of Homer*. London: Penguin Books.
- Lytle, E. 2011. 'The Strange Love of the Fish and the Goat: Regional Contexts and Rough Cilician Religion in Oppian's "Halieutica" 4.308-73'. *Transactions of the American Philological Association* (1974-), 141.2: 333-386.
- Marín-Morales, J., Higuera-Trujillo, J.L., and Greco, A. 2018. 'Affective computing in virtual reality: emotion recognition from brain and heartbeat dynamics using wearable sensors.' *Sci Rep*. 8: 1:13657. doi:10.1038/s41598-018-32063-4
- Pardee, D. 2002. *Ritual and Cult at Ugarit*. Atlanta.
- Parsons, T. D., and Rizzo, A. A. 2008. 'Affective outcomes of virtual reality exposure therapy for anxiety and specific phobias: a meta-analysis' in *Journal of Behavioural Therapy Experimental Psychiatry* 39, 250–261. doi: 10.1016/j.jbtep.2007.07.007
- Popko, M. 1994. *Zippalanda: ein Kultzentrum im hethitischen Kleinasien*, Heidelberg.
- Popko, M. 1999. "Berg als Ritualschauplatz. Ein Beitrag zur Kenntnis der hethitischen Religion", *Hethitica* 14, 97–108.
- Romano, D. G., and Voyatzis, M. E. 2010. 'Excavating at the birthplace of Zeus. The Mt. Lykaion Excavation and Survey Project.' In *Expedition: The Magazine of the University of Pennsylvania*, 52: 1.
- Rutherford, I. C. 2001. 'The Song of the Sea (SA A.AB.BA ŠÌR): Thoughts on KUB 45.63'. In *Akten des IV International Kongresses für Hethitologie*, 408 October 1999, Würzburg.
- Rutherford, I. C. 2019. 'Religious networks and cultural exchange. Some cases from the Eastern Mediterranean and Aegean in the 3rd–1st millennia BC'. In *Literary Change in Mesopotamia and Beyond and Routes and Travellers between East and West*, edited by R. Da Riva, M. Lang and S. Fink. Proceedings of the 2nd and 3rd Melammu Workshops. Zaphon, Münster.
- Sinclair, T. A. 1990. *Eastern Turkey: An Architectural and Archaeological Survey, Volume IV*. London: The Pindar Press.
- Slater, M., Usoh, M., and Steed, A. 1994. 'Depth of presence in virtual environments'. In *Presence: Teleoperators and Virtual Environments*, 3.2: 130-144.
- Sørensen, T. F., and Lumsden, S. 2016. 'Hid in Death's Dateless Night. The Lure of an Uncanny Landscape in Bronze Age Anatolia, in *The Archaeology of Anxiety. The Materiality of Anxiousness, Worry and Fear*, edited by J. Fleisher and N. Norman. New York. 67–94.
- Sullivan, D. G. 1988. 'The discovery of Santorini Minoan tephra in western Turkey'. *Nature*, 333, 552-554.
- Williamson, C. forthcoming. *Urban Rituals in Sacred Landscapes in Hellenistic Asia Minor*. Leiden: Brill.

