

The Fall of Phaethon in Context: A New Synthesis of Mythological, Archaeological and Geological Evidence

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Abstract

The well-known classical myth of Phaethon must be the earliest recorded cautionary tale about teenage driving: taking control of the chariot of his father, the Sun-god, Phaethon set the world ablaze and endangered the cosmic order, until he was felled by Zeus' thunderbolt and hurled to the earth. It has long been recognised that the tale must reflect some extraordinary astronomical event, recent attempts associating his fall with meteorite impact craters in southern Germany and Estonia. This geographic focus is too narrow. We examine parallels to the myth from ancient Anatolia, Mesopotamia, and the Levant, most previously unrecognised; the tendency of the Greeks to relocalise borrowed myths in the Aegean region or further westwards; and, above all, the unsolved problem aired long ago by Sir James Frazer regarding how remarkably analogous tales are known from as far afield as North America. A proposed impact crater in Iraq may emerge as a suitable candidate for the source of the myth in the Near East. Using developments in the current understanding of comets, meteor, streams and asteroids on earth-crossing orbits, we offer an explanation for both the similarities and differences between the global parallels to the Phaethon story.

Keywords

global comparative mythology – Greece – borrowing – catastrophe – comets – meteorite impacts

Introduction

The Greek story of Phaethon, best known from its detailed retelling by the Roman poet Ovid (*Metamorphoses* 1. 754–2. 400), is an iconic catastrophist myth: this son of the Sun-god famously took his father's chariot too close to the earth, ravaging it with fire until Zeus' punitive thunderbolt struck him down and he plummeted into the river Eridanus. Some traditions associated him with a constellation, into which he was presumably transformed posthumously (for references, see van der Sluijs 2008: 224–225, 239–246; 2009a: 275–276).

Naturally, the myth has long attracted scientific explanations involving meteorites (e.g., Goethe 1823: 27; 1827: 81–84; Kugler 1927; von Engelhardt 1979). Perhaps the first attempt to identify an associated crater was the suggestion of Blomqvist (1994: 14–15; Blomqvist & Wickman 1994) that the source of the story was the creation of the large meteorite crater field at Kaali(järv) lake (on the Estonian island Saaremaa), probably between c. 3000 and 1500 BC. Subsequently, Rappenglück and his team (Rappenglück & Rappenglück 2006; Rappenglück et al. 2010; 2011) proposed that the myth concerns a meteorite impact between c. 2200 and 800 BC which formed the crater field in Chiemgau (southern Germany). The cut and thrust on the geological evidence for the hypothesis has continued (e.g., Doppler et al. 2011; Rappenglück et al. 2011). While we support the view that the myth of Phaethon was partly inspired by a cosmic impact, we offer no judgment on the (evidently complex) geological issues involved in the above proposals. Moreover, our own analysis of the literary sources suggests that a more comprehensive explanation is needed for Phaethon and Phaethon-like myths around the world.

Putting Phaethon on the Map?

Generally, the impact of a bolide can only be expected to be witnessed in a relatively small geographic area, while people at greater distances may experience secondary effects, such as heat from the shock wave, wildfires, atmospheric dusting, and seismic effects like earth tremors and tsunamis.

Geographical questions are of central importance in an evaluation of the Phaethon myth. The proposals of Blomqvist and Rappenglück et al. both imply that the Greeks did not originate the myth, but borrowed it from elsewhere. Are their respective solutions consistent with the geographical clues offered by the sources?

At the outset, the association of Phaethon's fall with Estonia or southern Germany sits uncomfortably with classical information regarding the geography of the myth. In antiquity, the Po (northern Italy) was the most widely preferred location for the Eridanus, beginning with the 5th-century BC playwright Euripides (*Hippolytus* 735–741). Other candidates included a river in Spain (Aeschylus *apud* Pliny, *Natural History* 37. 11. 32), the Rhône (Philostephanus *apud* scholiast on Dionysius, *Periegesis* 289), the Nile (pseudo-Eratosthenes, *Constellations* 37; Hyginus, *Poetic Astronomy* 2. 32; scholiast on Aratus, *Phaenomena* 359), a river in the Underworld (Virgil, *Aeneid* 6. 659; Servius, *Commentary on Virgil's Aeneid* 6. 659), the Ocean surrounding the earth (Hyginus, *Poetic Astronomy* 2. 32; see Nagy 1973: 150–153), a constellation (Aratus, *Phaenomena* 359–360; Hyginus, *Poetic Astronomy* 2. 32) and arguably even the “celestial river,” the Milky Way (Cook 1925: 480–481). A contemporary of Euripides, Herodotus (3. 115), may have been referring to a belief that the Rhine was the Eridanus, but in the context of denying that there ever was a river of that name in Europe. While the Eridanus was evidently a moveable mythical feast, no classical source locates Phaethon's crash in Estonia or southern Germany.

In lieu of any classical mention of Bavarian and Baltic locations, both Blomqvist and Rappenglück et al. cited sources which involve the Celtic lands. The most explicit statement, though very late (5th century AD), is that of the Alexandrian scholar Nonnus (*Dionysiaca* 38. 97–102) that the fall of Phaethon was “a tale which the Celts of the west know well.” One could add Apollonius of Rhodes (*Argonautica* 4. 611–617), who related that the Celts around the Eridanus believed that the amber-drops there were the tears of the Sun-god Apollo, shed because of the death of his son Asclepius. But though Asclepius was also slain by Zeus' thunderbolt, he was a very different character from Phaethon. However, although the Greeks may have labelled locations in Bavaria and conceivably even Estonia as Celtic, far likelier is that they were referring to the same regions where they historically situated the Eridanus, notably the estuaries of the Po and the Rhône.

Both Blomqvist and Rappenglück et al. required the hypothetical relocation of the Eridanus from central or northern Europe to the attested Mediterranean locations, such as the Po and the Rhône. Certainly, the Greek practice of relocalising (often borrowed) myth is well attested (Lane Fox 2008). As the horizons of the Hellenic world expanded beyond the familiar regions of the Eastern Mediterranean, the Greeks increasingly transplanted myths in a westerly direction. In particular, defeated rebels or deities, such as the Titans Atlas and Kronos, were moved to liminal areas in the west, towards the

sunset, and eventually next to or in the stream of Ocean (the Atlantic) itself (cf. West 1971: 40–41). Significantly, Phaethon himself was counted as a Titan by some mythographers (Stephen of Byzantium, *Ethnika* s.v. Erétria; Eustathius, *Commentary on Homer's Iliad* B 537, 279. 31). Other examples are legion, including the transplantation of the legends of Perseus' travels, the Gorgons and the Amazons (see James 1995: 275–278).

The main problem with the hypotheses of Blomqvist and Rappenglück et al. is therefore not so much the requisite relocation of the scene, but their neglect of significant controlling information regarding the origin and meaning of the Greek myth—including a considerable range of ethnographic, literary, and archaeological evidence. On one hand, an extensive body of comparable themes is found in global mythology. On the other, scholars have long sought the origins of the Phaethon tale in the Near East—a line of reasoning we endorse (for references, see van der Sluijs 2006; 2008; 2009a; James & van der Sluijs 2012; van der Sluijs & James 2013: 306–308). We will review the evidence for both categories of data in turn.

Parallels from Global Comparative Mythology

Blomqvist does not seem to have been aware of a Finnish tradition which very likely preserves a memory of the Kaali impact (Veski et al. 2004: 204; Masse 2007: 29). The national epic *Kalevala*, compiled in AD 1849 (yet reliably based on genuine folklore), tells how, at a time when the Sun and the Moon were shut up in a cave, the god Ukko produced a “new created ember” to replace their light. It was entrusted to a maiden to nurture, but she accidentally let it slip, so that it cascaded down through the layers of the cosmos to the ground; “running” and “rolling,” it “burned over vast expanses” before falling into lake Alue which foamed and boiled, hurling the fish onto land (Rune 47, trans. Friberg 1988: 342–344). The legendary lake Alue was most likely Kaalijärvi (Kello 2003: 10–11). In any case, the tradition seems to hark back to the observation of a fallen mock sun, engulfing the world in flames before plunging into water—strongly reminiscent of Phaethon. While other cited Finno-Baltic examples (see, conveniently, Veski et al. 2007: 273; Haas et al. 2003; and, for amber, Viikis-Freibergs 1985) are much less convincing, such sources demonstrate that the memory of a “fallen sun” could once have circulated in European societies unaffected by classical mythology. Yet the narrative composition of the Finnish myth differs so radically from the myth of Phaethon that a “genetic” link between the two through oral transmission seems out of the question.

In reality, traditions resembling the Greek story of Phaethon or evoking the notion of cosmic impact enjoy an almost universal geographical distribution.

Long ago, the eminent classicist Sir James Frazer (1921: 388–394), largely relying on the work of the ethnographer Franz Boas, cited a number of strikingly close parallels to the Phaethon story from British Columbia, Canada. For example, a myth of the Kwā'g'uł (northern Vancouver Island) features L!ē'sElag'ielā (“Born-to-be-the-Sun”), alias Mink, as the orphan offspring of the Sun by a mortal woman who, upon being teased by a peer for having no father, resolves to find him—like Phaethon (Ovid, *Metamorphoses* 1.751–756). Appointed by the Sun as his successor, the protagonist ignores his father's words of caution and, Phaethon-style, abandons the track, incinerating “the whole world”; his father casts him into the sea (Boas & Hunt 1908: 80–88; Boas 1895: 157; 1910: 122–127). In versions of the same myth from the closely related Tlatlasikwala and Bella Coola, the Sun-god tears his son to pieces before hurling him onto the earth (Boas 1895: 173, 246), somewhat like the shattering of Phaethon's chariot. And just as Phaethon's misadventure burnt the “Ethiopians” black, so in Heiltsuk tradition the fire of Gyālastā'komē, son of the Sun, scorches the mussels (Boas 1895: 234) and, according to the Bella Coola, T'ōt'k'oa'ya, son of the Sun, blackens all animals except the mountain goats (Boas 1895: 246).

Frazer (1921: 394) noted the considerable dilemma raised by such parallels:

Whether the remarkable resemblances between the Greek and the Indian versions of the tale are to be explained as due to independent invention or to European influence, is a question which, so far as I know, there is no evidence to determine, and on which therefore it would be rash to pronounce an opinion.

The parallels outlined above have continued to evade an explanation.¹ A shared tradition inherited from common ancestors is unlikely, as the last common node between Pacific and eastern Mediterranean peoples was tens of millennia ago—a timespan so long that traditions of this complexity would certainly have eroded (*contra* Witzel 2012). Nor can a later direct diffusion—be it in remote or recent times—be assumed in the absence of compelling archaeological proof. Without going into the familiar problem of folklore collectors inadvertently feeding cues to their informants (see van Beek 1991),

1 An analogous problem concerns the striking similarities between the Homeric story of the war between the Pygmies and cranes (*Iliad* 3. 1–10) and tales from British Columbia and elsewhere (Scobie 1975; Berezkin 2007).

as far as we can discern no one has ever seriously argued that these striking parallels are due to classically educated Europeans relating a good story that was reculturalised by native Americans. Two considerations militate against such a possibility: the occurrence of such deeply embedded traditions (basically identical in structure but with considerable variation) among a number of different nations in the same region (British Columbia) and the occurrence of striking parallels as far afield as New Mexico—in a Tewa (Pueblo) myth the Sun entrusts his “shield” to his younger son who comes too close to the earth and scorches it (Parsons 1996: 180, 212).

Our own research is enabling us to catalogue for the first time countless traditions worldwide which mirror individual aspects of the myth of Phaethon or combinations of these. Examples include:

- a son of the Sun or some other lad travels towards the Sun in the east, sometimes because he is taunted (e.g., Nelson 1899: 483–484 for the Yup'ik of Alaska; Boas 1917: 43–44 for a myth from British Columbia; McClintock 1992: 496–497 for the Blackfeet; Powell 1879: 799 for the Ute; Risser 1941: 224–225 for the Zuñi; Parrinder 1967: 30 for the Chaga of Kenya; Turner 1884: 200 for Samoa; Grimble 1972: 132–133 for Kiribati, Micronesia);
- the appearance of two “suns” (e.g., Lofts 2004 for the Ngarinyin of Australia; Mason 1865: 175 for the Karen of Burma; Riordan 1989: 184 for the Udege of southeastern Siberia) or indeed seven, nine or ten “suns” (e.g., Evans 1913: 433 for the Dusun of Sabah; *Huáinánzǐ* 8. 6, trans. Major et al. 2010: 275–276; Cheng et al. 1985: 175–176, 217, 221 n. 49; Watson 2013: 14 for China), all of which are annihilated except for the Sun seen today;
- the sky or earth set afire by a deity or “sun” (e.g., Emory 1939: 12 for Tuamotu, Polynesia; Gusinde 1937: 1145–1146 for the Yaghan of Chile; Wilbert & Simoneau 1987: 83–84 for the Nivaklé of Paraguay—for discussion see Masse & Masse 2007: 193);
- the Sun formerly having been too hot or too close to the earth (e.g., Powell 1879: 799 for the Ute of Utah; Eells 1889: 680 for the Twana of Washington State; Stevenson 1891: 276 for the Diné of the Four Corners Region; Reichel-Dolmatoff 1985: 32, 36 for the Kogi of Colombia; Gusinde 1937: 1145–1146 for the Yaghan);
- the Sun being snared or accosted by a hero (e.g., Turner 1884: 200 for Samoa; Grimble 1972: 132–133 for Kiribati);
- the Sun being lost and restored (e.g., Nelson 1899: 484–485 for the Yup'ik);
- a “fallen sun” (e.g., Métraux 1946: 34–35 for the Mocoví of Argentina; Alvarez 1926: 106; Giménez Benítez et al. 2000: 337 for the Toba of the Gran Chaco—for discussion see Barrientos & Masse 2014: 178–179; Masse & Masse 2007: 193, 195);

- and the transformation of a former anomalous sun into a star or its disappearance (e.g., Gusinde 1937: 1146 for the Yaghan).

For the strongest parallels to Phaethon, independent story-telling based on observations of the same or similar events in the sky is the most feasible solution. Not all such partial analogues to the myth of Phaethon need to have stemmed from impact events, let alone the same one. For example, a different origin is likely in cases where the “sun” is associated with notions such as appearing to be stationary or being placed in the sky for the first time, as a part of the mythical creation of the world.

Parallels from Ancient Near Eastern Mythology

In disentangling this nexus, it is surely best to first examine the Phaethon story as told by the Greeks in its more immediate historical and geographical context. Unfortunately, Blomqvist and Rappenglück et al. displayed no awareness of the massive revolution that has taken place in our understanding of Greek myth in terms of its Near Eastern antecedents since the mid-20th century. This revolution has been largely due to the archaeological discoveries at Ras Shamra (Ugarit) on the coast of northern Syria and Boğhazköy (Hattuşa) in central Anatolia. The archives from these sites provide a treasure trove of West Semitic and Hittite/Hurrian religious and mythological traditions of the Late Bronze Age. It is now a commonplace among classicists that these records demonstrate the enormous debt the Greeks owed to ancient Near Eastern myth and religion (e.g., Walcott 1966; Burkert 1992; West 1997; López-Ruiz 2010: 84–129), even if they handled this material in a uniquely Greek way (Haubold 2010; 2013; López-Ruiz 2010: 5, 7, 16).²

A key example is the divine succession myth (Ouranos-Kronos-Zeus) contained in the *Theogony* of the 8th-century BC poet Hesiod. Such a double succession is almost unparalleled in global mythology except for Near Eastern instances—notably those contained in the Hurrian series of songs customarily

2 Unlike the transfer of scientific knowledge beginning in the 6th century BC, the Greeks of historical times retained only a very limited awareness of this earlier process of diffusion of mythological and literary themes, for reasons not yet fully understood; in some cases the intervening “dark age” of the early Iron Age may have much to do with this relative ignorance, while it is an obvious stylistic fact that poets, playwrights and liturgists rarely name their sources. We do not share Haubold’s (2013: 52–54, 71–73, 181) scepticism about the utility of “literary genealogy, or precise geographical routes of transmission,” sympathising more with López-Ruiz’ (2010) enthusiastic approach in this area.

known as the *Kumarbi Cycle*, of which both the overall scheme and numerous details closely resemble the Greek counterpart (van Dongen 2010; 2011; López-Ruiz 2010: 87). In both the Greek and Hurrian versions, the authority of the newly-established sky god (Zeus/Tešub) is challenged by various rebels. One of these episodes is contained in the Hurrian *Song of Silver*, which relates the story of a failed upstart of that name. Here we find the familiar motifs of the allegedly fatherless child being teased by his peers and searching for his father, who turns out to be a great celestial god—in this case Kumarbi, ex-ruler of the heavens and father of the new incumbent Tešub. The parallels continue. When Silver seizes power in heaven he antagonises Tešub, wreaks havoc and, in an episode of cataclysmic proportions (Haas 2006: 150), drags both the Sun and Moon down to earth. Like Zeus, Tešub is urged to wield his thunder against the pretender, who is duly removed from his temporary dominance of heaven. The names of the protagonists are also conversant. Phaethon's name literally means "shining, radiant." while Silver speaks for itself (James & van der Sluijs 2012: 243–244).

Another potential Anatolian correlate is embedded in a fragmentary Hittite incantation from Boğhazköy. This seems to identify Fire (*paḫḫur*) as a son of the Sun-god (^dUTU DUMU-ŠU), who became angry and blended with or hid in the night like a snake (KUB 43. 62 ii 5–11, ed. Ünal 1992: 496; Melchert 2003: 284–285). The text apparently implies that "on his journey he brought heat everywhere he went, presumably an unnatural, unbearable heat" (Melchert 2003: 285). Some cryptic lines then appear to refer to the earth cracking, perhaps even with a hole appearing in the ground through which Fire reappears (KUB 43. 62 iii 9'–10', ed. Ünal 1992: 496). Should this interpretation prove correct, it is tempting to associate Fire springing from a hole in the terrain with a meteorite impact. A further parallel with the story of Phaethon arises if one follows Melchert's (2003: 285) lexical conjecture that Fire ended up in the sea.

A third striking comparison comes from the Babylonian story *Erra and Išum* (trans. Dalley 1997), the composition-date of which is controversial, with suggestions ranging between the 12th century BC and 700 BC (Frahm 2010: 7; Foster 1993: 771; Cagni 1977: 20–21; Lambert 1957–1958: 396–397). This relates how the malefic god Erra, like Phaethon, ravaged the land and offers many other parallels with the Greek myth. Erra's name most likely means "scorcher" (Roberts 1971: 13 and n. 27). Having "made his finery bright as day, and . . . displayed his radiance" (*Erra and Išum* III: 122; I: 141), he is compared with the fire-god Gerra. His main companion and counsellor is Išum, whose name corresponds to the West Semitic word for fire (e.g., Hebrew *ʿeš*). All of this is evocative of a heat disaster, similar to Phaethon's conflagration (see further Bodi 1991: 251–254 on the significance of the names and the importance of destruction by fire in *Erra*

and *Išum*). In addition, Erra threatens to raise dust-storms, destroy cities, level mountains, and stir up the seas, destroying their produce, while decimating people and animals (I: 48'–57'). He also boastfully compares himself to Šamaš, the Sun-god (I: 117), threatening to “destroy the rays of the Sun” and “cover the face of the Moon” (II: 42'–43'), while Phaethon's adventure resulted in obscuration of the Sun (Ovid, *Metamorphoses* 2. 329–331). Anu, the sky-god, furnishes Erra with seven terrifying companions, the Sibitti, who compare him to “a lisping child” (I: 48) and goad him into action, like the teasing of Phaethon by his peers. Erra takes a journey along “a path” (I: 96) in order to challenge the king of the gods, Marduk (the Babylonian equivalent of Zeus), whom he intends to depose (I: 124; IV: 123),³ just as Silver sets out to find his father Kumarbi and Phaethon travels to the abode of Helios, his father (see James & van der Sluijs 2012: 240). Although implicit, the downfall of Erra—and how it came about—is unfortunately absent from the extant fragments of the text.

Even the puzzling association of Phaethon with amber—said to have been created by the tears of his mourning sisters while they were transformed into trees—finds a likely match. In the story of Erra's conflict with Marduk, great emphasis is given to a mysterious stone called *elmēšu*, associated with the mythical *mēsu* tree. It has been translated as amber (a fossil resin well known for its flammability) and reasonably so, as elsewhere *elmēšu* is described as serving as a celestial lamp. The suggestion that *elmēšu* was an alloy of some kind is not supported by its absence from economic texts.⁴ Interestingly, the Greek term *ēlektron* was used to describe both amber and an alloy of gold and silver (Liddell & Scott 1996: 768, s.v. *ēlektron*).

Assyriologists have tended to interpret the myth of Erra in largely political terms, notably as a reflection of the Šutian raids into Babylonia following 1350 BC (e.g., Foster 1993: 794, 797, 800, 803; Cagni 1977: 9, 13, 17; Lambert 1957–1958: 396–400). More recently, Frahm (2010: 6–8) argued that *Erra and Išum* (with Marduk and his favoured city Babylon waning in power) was written as a “counter-text” to the *Enūma Eliš* (which celebrates Marduk's mastery of the universe)—with deliberate inversion of motifs in response to changing political frameworks and emphasising an etiology of chaos over one of order. However, such categories are really intrinsic to myths of “creation” and

3 See James & van der Sluijs 2012: 241 for the possibility that, in an earlier version of the Phaethon story, the anti-hero aimed to assault the stronghold of Zeus, who in all versions felled him with a thunderbolt.

4 For references to and discussion of the translation of *elmēšu*. See Bodi 1991: 88–92; Heltzer 1995.

“destruction.” both of which are global in extent and are more likely rooted in profound natural events than in human politics.

It is well known that myths often convey meaning on multiple levels at once. For example, a metaphorical description of a witnessed remarkable natural event could simultaneously be applicable to shifts in political or religious power on a local scale, perhaps aided by an understanding that mortal rulers were incarnations or representations of celestial counterparts (compare Cagni 1977: 9). Thus, a geological and astronomical significance of the “epic” of Erra could well be compatible with a political one.

Against a purely political interpretation, Erra is clearly presented as a celestial body, and a destructive one at that: the Fox Star (^{mull}ka₅.a = *Šēlebu*—Gössmann 1950: 81), whose “mantle of radiance will be activated (?) and all people will perish” (Dalley 1997: 409). Recognising the astronomical interests of the Babylonian author of the text, and the well-attested associations of Erra with the planet Mars and Marduk with Jupiter, Cooley (2008: 179; 2013: 95–110, following Brown 2000: 256–257) flirted with the possibility that the story reflects an actual celestial event involving the disappearance of Jupiter from view at a time when Mars was particularly bright. However, this explanation seems too anodyne to have inspired the cataclysmic content of the myth. As summarised by Cooley himself (2008: 186–187; cf. 2013: 13, n. 48):

Erra is characterized as plotting not only to usurp *Šulpae* = Marduk, but to undermine the entire night sky and thus upset the natural, regular order of the cosmos.⁵

This is not to mention the dimming of the Sun and the devastation and possibly the plague Erra delivered to the land.

Further, considering the familiar Babylonian practice—for reasons as yet barely understood—to bestow the same names on planets, constellations, and fixed stars (Koch-Westenholz 1995: 130–131; Cooley 2013: 105), it should not be casually assumed that Erra in this context must represent the planet Mars. It is possible that the name Erra (“scorcher”), as in the case here, could refer to other fiery celestial bodies. For prominent comets such as those of Halley and Encke (see below) the use of a divine name would almost certainly have been required. As an analogy from Greek astrology, comets were classified using the names of planetary deities based on visual similarities including

5 As an epithet for Marduk, *Šulpae*, specifically referred to the planet Jupiter, in several instances at its heliacal rising (see, conveniently, and for references van der Sluijs & James 2013: 298).

colour (for references see, conveniently, van der Sluijs & James 2013: 292, esp. n. 104). While the epithet Fox Star suits Mars because of its conspicuously red colour, the same may have also applied to a comet, perhaps even more appositely given the red brush of a fox compared to the sometimes ruddy colour of cometary tails. Erra's retinue of the Sibitti easily resolves as associated cometary fragments, whether or not the concept of these seven gods had existed beforehand; their cult burgeoned in the second half of the 2nd millennium BC (Cagni 1977: 18).

In sum, it would appear that the myth of Phaethon is based on some unusual celestial event that was visible in the ancient Near East, but how do the various compared traditions relate to each other? At some time between 3000 and 1500 BC, the Indo-European ancestors of the Greeks moved into Greece from a homeland either in the Ukraine or the eastern Anatolian highlands. Is it conceivable that the myth of Phaethon was native to either Greece or the Greeks, resembling the tales of Silver, Fire and Erra merely because these neighbouring cultures all witnessed aspects of the same event?

The lack of close parallels to the myth of Phaethon in other Indo-European cultures indicates either that it arose after the breakup of the Indo-European language family, no later than 3000 BC, or that the Greeks borrowed it from a non-Indo-European culture. The possibility that the myth was first formulated by pre-Indo-European inhabitants of Greece and subsequently transmitted to speakers of the Greek language or that the ancestors of the Greeks carried it with them from their Indo-European homeland seems remote, because of Phaethon's absence from early Greek poetry and art (Diggle 1970: 5, 211) and the lack of a Phaethon cult in Greece (cf. Bömer 1969: 220; but see Polybius, *History* 2. 16. 6. 13–14 for a hint of a mourning cult for Phaethon in the Alpine setting of the Eridanus). This circumstantial information suggests that Phaethon was a relative newcomer to the corpus of Greek myth. If the myths of Phaethon, Erra, Silver and Fire commemorate the same natural event, the differences between their storylines suggest that they formed independently in different cultures. The stories of Phaethon and Silver resemble each other closely enough to be related through a direct chain of oral or literary transmission.

The most feasible interpretation is that the Greeks learned of the myth of Phaethon from the Levant at a later time, possibly the early 1st millennium BC, along with some elements of the *Kumarbi Cycle*. As the Greek tale contains similarities to that of the Canaanite Hēlēl as well as the Hurrian Silver, James & van der Sluijs (2012: 246–247) suggested that it was drawn from an area where Hurrian and Semitic cultures rubbed shoulders, i.e. Cilicia and northern Syria (as well as Cyprus, as they argued), a region long fingered as a conduit for oriental ideas into Greek tradition—recently again by López-Ruiz (2010: 2 and

passim), who stressed the important “role of the Syro-Phoenician peoples in the transmission of Near Eastern traditions to the Greek world.” Remarkably, Greek tradition associated this very region with various members of Phaethon’s family (James & van der Sluijs 2012: 247).

A Near Eastern Impact Crater?

Between them, the stories of Silver (Hurrian), Fire (Hittite) and Erra (Babylonian) contain virtually all the essential motifs of the eventual Greek version. If the story of Phaethon—like so much Greek myth—drew on Near Eastern prototypes, it could hardly have originated from a memory of the central European or Estonian impacts advocated by respectively Rappenglück et al. and Blomqvist. Given the clear Near Eastern precursors to the Phaethon story, a possible geological origin should be sought in a different area than Europe altogether—most likely in eastern Anatolia, Mesopotamia or Iran. A hint that the Greeks may have originally looked east for the “burning” caused by Phaethon is the statement that “flaming fires from the heavens once burnt up the Eastern parts, they say, in the time of Phaëthon” (pseudo-Aristotle, *On the World* 6 (400b)).

An attractive candidate is the momentous environmental crisis of the late 3rd millennium BC, well documented in the Near East and beyond since Ritter-Kaplan (1984) or earlier. Weiss et al. (1993) identified a thin layer of volcanic ash directly below a thick layer of dust, weathered volcanic glass and silt at Tell Leilan and nearby sites in northwestern Mesopotamia, dating to c. 2200 BC and synchronous with the sudden onset of a 300-year period of desiccation, the abandonment of the Ḫabur region and the collapse of the Akkad empire. This was matched by an anomalous peak of Aeolian deposits from a core in the Gulf of Oman (Cullen et al. 2000), of the same date. Despite the presence of the volcanic material, the researchers had strong reservations about volcanism as the cause of the prolonged drought (Weiss et al. 1993: 1002).

At about the same time, the Old Kingdom in Egypt collapsed under drought conditions involving extreme dust storms and a severe drop in the Nile level, causing a failure of the annual floods, famine and a breakdown of society (Stanley et al. 2003; Hassan 2007). Increased desertification occurred in Palestine (Neev & Emery 1995) and the Sahara region, in a phase of quasi-global environmental disturbances (Dalfes, Kukla & Weiss 1997). A vast literature on the subject is now available and the c. 2200 BC horizon, characterised by a mid/low-latitude aridification event, has recently been suggested as a new

chronostratigraphic marker within the Holocene, separating the Middle from the Late Holocene: “The 4.2 event appears to have been one of the most pronounced climatic events of the Holocene in terms of its effects on human communities, being associated with cultural upheaval in north Africa, the Middle East and Asia . . .” (Walker et al. 2012: 655; for further discussion, particularly of the radiocarbon questions, Höflmayer 2014).

Walker et al. (2012: 654; cf. Weiss 2012: 11) correlate the onset of the aridification with a cooling of the Atlantic Ocean, but this could leave the volcanic activity detected in northern Mesopotamia as merely coincidental. That there was a major seismic upheaval around this date was suggested long ago by Claude Schaeffer (1948), who argued that swathes of major sites in the Aegean, Anatolia, the Caucasus and Iran were then levelled by earthquake, bringing about the end of the Early Bronze Age. Schaeffer’s conclusions were ignored for many years for doctrinaire reasons (see, e.g., French 1996: 51): it was simply disbelieved that so many earthquakes could have taken place concurrently. Recently, geophysicist Amos Nur (Nur & Cline 2000) has vindicated Schaeffer’s work, developing a model of earthquake storms in which a series of related shocks can continue over decades or longer. Arguably, the catastrophic drop in the level of the Nile may have partly had a seismic origin.

As to the cause of these synchronous, superficially unrelated phenomena, centred on 2200 BC, Courty et al. (2008; cf. Courty 1998) analysed soil from burnt horizons of that date from the Ḥabur valley (northwestern Mesopotamia), the Vera Basin (Spain), the Moche Valley (Peru) and Ebeon (west France) and discovered a common layer of burnt soil with a peak in dust deposits, including anomalous particles such as spherules, suggestive of a fallback of impact ejecta. They concluded that the widespread environmental changes c. 2200 BC were due to an impact event. In the same vein, Hamacher (2005: 132) wrote:

To account for the clearly detectable changes in lacustrine, fluvial, and Aeolian deposits, terrestrial events do not fully support an explanation. This, along with severe ecological changes, and the global extent of these events, points towards a bolide impact as an explanation.

A potential candidate for the smoking gun has been identified. Following the partial draining of the Al-‘Amarāh marshes of southern Iraq by Saddam Hussein after the First Gulf War (1991), evidence emerged from satellite imagery that the former lake Umm al-Binni (31°8'58.2" N, 47°4'44.4" E) is a substantial crater. Based on its nearly circular rim shape, different from that of other lakes in the area, Master (2001; 2002) offered a persuasive case that—between c. 3000 and

2000 BC—the lake was created by impact of a bolide c. 100 metres across, with an estimated release of energy of between 9400 and 50,000 Hiroshima atomic bombs (Master & Woldai 2007: 95; Hamacher 2005: 119).

Master & Woldai (2007: 95; cf. Hamacher 2005: 130) related the evidence from Tell Leilan and Gulf of Oman to the suspected Umm al-Binni impact. While new satellite photographs support the original conclusion, continuing political instability in the region has unfortunately meant that no one has yet been able to carry out on-the-ground inspection of the structure.

Master (2001; Master & Woldai 2007: 95) linked Umm al-Binni to Mesopotamian Flood myths. However, on the surface a “heat disaster” of the type mythologised in the stories of Phaethon, Silver, Fire and Erra is a much more plausible contender. Indeed, the myth of Erra explicitly contrasts the latter’s devastation of the land with the Flood, a catastrophe specified as having occurred much earlier. In the Babylonian view of prehistory, the Great Flood was a distant event which long preceded the Dynasty of Akkad (c. 2300–2200 BC)—as exemplified by the Sumerian King List (Glassner 2004: 117–126). Rather more likely is that the vast dustcloud raised by an impact such as that proposed for Umm al-Binni—or elsewhere in the Near East—with associated fires, a massive blast, seismic shock and loss of life informed the stories of Erra, Silver, and Fire. The mythical motif of the temporary disappearance of Sun and Moon could be due to their obscuration by dust (cf. Hamacher 2005: 132).

Excursus: Dating the Erra myth⁶

Where does this leave the apparent chronological gap between this time frame and the earliest attested evidence of the myths in question? The date of the

6 [An important word on this question is that of W. von Soden (“Etemenanki vor Asar’addon—Nach der Erzählung vom Turmbau zu Babel und dem Erra-Mythos,” *UF* 3 [1971]: 253–264, esp. 255–56), who, on the basis of the apparent allusion in the myth (IV 52–62) to the abduction of the Ištar-of-Uruk statue from her Eanna home, situated the text within the precise window of 765–763 BC; this owed in the main to the claim made in a stela of Nabonidus that this event occurred in the reign of Erība-Marduk (769–760 BC). This claim and the episode behind it has been the subject of ongoing dispute. For a more recent word on it, including a date for the Erra myth (ca. 700 BC), see P.-A. Beaulieu, “The abduction of Ištar from the Eanna Temple: The Changing Memories of an Event,” in T. Abusch et al. (eds.), *Proceedings of the XLV^e Rencontre Assyriologique Internationale*, Part 1: Harvard University: *Historiography in the Cuneiform World* (Bethesda, MD: CDL), 29–40; id., *The Pantheon of Uruk during the Neo-Babylonian Period* (CM 23; Leiden: Brill), 129–38.—A.W.]

Hurrian/Hittite materials provides a rough *terminus ante quem* of c. 1500 BC for the first formulation of the Silver story. As for Erra, as a theophoric element the name is extremely rare in royal names and it seems significant that it occurs in those of two rulers of the Dynasty of Isin. The first of these, Išbi-Erra, is thought to have lived c. 1950 BC. Apparently, it had become desirable at that time to venerate (and thereby placate?) Erra.⁷ Intriguingly, a list (W 20030, l. 13) from the Seleucid period of Babylonian kings and scholars associates Kabti-ilāni-Marduk, the self-proclaimed author of *Erra and Išum*, with Ibbi-Sîn (late 21st or early 20th century BC), the last king of the 3rd Dynasty of Ur (van Dijk 1962). Whereas Frahm (2010: 7 and n. 15) dismissed this as “undoubtedly a late fabrication, inspired by the tradition that Ibbi-Sîn’s reign ended in chaos,” in the light of the above information there is no compelling reason why the *nucleus* of the story of Erra could not date back this early as indeed argued by van Dijk (1962: 51). After all, the understanding of Frahm (2010: 8) and others that the *Enūma Eliš* was repeatedly “updated” to changing political circumstances, for example by substituting Aššur for Marduk in an Assyrian version, can *mutatis mutandis* be applied to the text at hand as well. Thus, where the original tradition may have related the devastation of Akkad by Erra, a later story-teller may have reworked its core motifs under the influence of a late-2nd or early-1st-millennium BC political context when Babylon was in decline—in the same way that the creation and Flood motifs were transferred to Marduk during Babylon’s ascendancy. In a colophon to our main exemplar (V: 1–5), king Aššurbānīpal claims to have personally coordinated its collation from other—presumably variant—copies in circulation from Assyria, Sumer and Akkad. Given his conflict with, and eventual suppression of, his brother Šamaš-šum-ukin, king of Babylon, Aššurbānīpal would naturally have favoured a version depicting a decline in the might of Marduk and his city.

Further, Babylonian tradition linked some of Erra’s exploits to the time of the Akkadian Empire. This is clear, for example, from the heroic epic *Erra and Narām-Sîn* (Westenholz 1997; Lambert 1973), which from the morphology of the text and the “highly evolved Old Babylonian hymno-epic poetic style” (Westenholz 1997: 191) is clearly of great antiquity (cf. Lambert 1973: 357–358). The text is complete enough for the narrative to be understood. Far beyond mere veneration or placation—as suggested by the onomastic evidence from the Isin Dynasty—the hero Erra is represented in plain terms as the ally of Narām-Sîn, the fourth and last significant ruler of the Akkad Dynasty. Ištar engineers their struggle against the unnamed forces of the Storm-god Enlil.

7 In addition, Colonna d’Istria & Beyer (2015) have recently proposed to read the name Erra-kibrī on a cylinder seal from Kültepe-Karum II (late 21st to early 19th century BC).

Narām-Sîn undertakes to build a temple for Erra in return for which he receives weapons and, with his help, succeeds.

While Narām-Sîn's reign may have ended in disaster, the Akkadian Dynasty continued for some decades. The exact relationship between the environmental catastrophes discussed above (dated largely by radiocarbon evidence) and the vicissitudes of the Akkadian Empire at a given point or points in time presently remains unclear and may be intractable. Nevertheless, the traditions and the contemporary building inscription show that the powerful and belligerent deity Erra was thought to be in the ascendant during the mid-Akkadian period, and in particular was associated with Narām-Sîn. Curiously, throughout *Erra and Narām-Sîn* this king is referred to as on a par with the gods (Erra, Ištar, and Enlil). A contemporary statue inscription (IM 77823) specifically records his deification (Frayne 1993: 113–114), while he is seen wearing a horned crown, an attribute of divinity (see, e.g., Westenholz 2000: 101–102), on his famous Victory Stela (below).

One or Multiple Impacts?

Master (2002) speculated that the Umm al-Binni event was part of a wider pattern as it “may possibly be linked with other young postulated impact structures in western Iraq (Al Umchaimin), Estonia and Argentina...” The Argentinian case concerns the well-known meteorite crater field of Campo del Cielo, from an impact dating to 2700–2200 BC which seems to be echoed in local myth (see above and Giménez Benítez et al. 2000; Masse 2007: 28, Tab. 2.1, 31). The proposed date ranges for the impact at Kaali (Estonia) vary by 7000 years, though a late Holocene date—within the 3rd–2nd millennium BC—is deemed most likely (Veski et al. 2004: 197, 199, 202; 2007: 269–270; cf. Moora, Raukas & Stankowski 2012), especially given the *ante quem* provided by the spruce pollen at the base of the crater.

Opinions differ widely on the trajectory of the body that created the Kaali crater field (Veski et al. 2007: 266–267; Moora, Raukas & Stankowski 2012: 265–266). Perhaps significantly, Blomqvist & Wickman (1994: 36; cf. Krinov 1961: 437), unaware of Umm al-Binni as well as the Chiemgau craters, calculated that parts of the body that impacted at Kaali had broken off over the Near East and central Europe, as it passed over western Asia Minor, eastern Romania, western Ukraine, Lithuania, and Latvia—a SE to NW trajectory confirmed by Moora, Raukas & Stankowski (2012). With a diameter of c. 3.4 km (Master 2001), the Umm al-Binni crater might reflect the fall of one of the larger fragments

from such a disintegrating body; by comparison, the Tüttensee measures only 600 m in diameter (Rappenglück et al. 2009: 429) and Kaalijärv a mere 105–110 m (Blomqvist 1994: 14; Veski et al. 2007: 268).

We might be seeing here a partial vindication of the polymathic Kugler (1927: 48) who, long ago, suggested that “it is possible that one and the same meteor stream passed over Africa (especially Ethiopia) and the Aegean Sea, producing big fires there, enormous flood waves here.”

A Cometary Aspect?

Differing opinions on the astronomical nature of Phaethon were already circulating in antiquity. For example, Ovid (*Metamorphoses* 2. 320, possibly drawing on Euripides, Fr. 971, ed. Kannicht 2004: 968, trans. Reckford 1972: 427 n. 23) likened Phaethon’s fall to a meteor; Plutarch (apud Malalas, *Chronography* 1. 3 (7)) envisioned a “ball of fire” dropped onto the land of the Celts; and Valerius Flaccus’ description (*Argonautica* 5. 471–478) of the charred remains of the driver and chariot as a “black ball” (*ater globus*) can only remind us of a meteorite. The Pythagoreans were said to have believed that Phaethon was a comet (Olympiodorus, *Commentary on Aristotle’s Meteorology* 1. 8, on 345a11; cf. Proclus, *Commentary on Plato’s Timaeus* 1. 109. 23).

The two possibilities that the original Phaethon was an impacting body and a passing comet are not mutually exclusive. Arguably, both are needed to explain the full gamut of motifs in the story of Phaethon and its parallels around the globe. So far, all those writing on the subject have focussed on an impacting meteorite. This could indeed explain the phenomena surrounding the *fall* and fragmentation of the mock sun, such as fire, smoke, ash, floods and glass-like ejecta, but it would not suffice to account for other, equally integral parts of the universal story. A glowing meteorite in fall might well be perceived as the “son of the Sun.” but that leaves the complex mythology concerning the protagonist’s wider career unexplained: his conception, his lingering with his mother, his goading by his companions, his peregrinations—towards the east to find his solar father and to the height of heavens which he sought to control—and his eventual placement in the sky as a constellation. In effect, a geomythological explanation (bolide impact) must be supplemented with what one might call a cosmomythological one (van der Sluijs 2009b: 62) in order to explain the celestial spectacles preceding and following the impact.

Supposing that the impacting body was spawned by a fragmenting short-period comet in a Sun-grazing orbit, a number of themes could be explained.

Such a swarm or stream, encountered by the earth, could have led to multiple impacts, be they clustered around the same date or spread out over time (Hamacher 2005: 132). While the parent comet would have been seen globally, separate impacts could account for observations in unconnected cultures, solving the conundrum of diffusion-versus-independent observation. As the comet began its disintegration, the detachment of “ur-Phaethon” from other, attendant, fragments could have led human witnesses to believe that the protagonist was beleaguered or coaxed by his companions—e.g., the peer(s) of Silver. Phaethon and Mink or the seven Sibitti of the Erra myth. We may even have contemporary pictorial evidence of the cometary fragments. A question which has long baffled historians of Mesopotamian art is the appearance of (at least) three suns at the top of the Victory Stela (Louvre Sb. 4) of Narām-Sîn who, as noted above, lived shortly before the environmental catastrophes and was intimately associated with the god Erra. The suns appear above a mountain and are stylistically dissimilar to the conventional Babylonian depictions of the Moon and Venus, but closely resemble one version of the symbol used for the Sun-God Šamaš (Winter 2004: 618, Fig. 7). A number of interpretations are possible (see Winter 2004), further complicated by the possibility that the damaged apex of the Stela originally accommodated seven suns (Börker-Klähn 1982: 135). Westenholz (2000: 105) tentatively associated the latter with the heroic Heptad of the Sibitti. Irrespective of the precise number of suns originally on the Stela, they could well have represented an aggregation of prominent cometary fragments.

Furthermore, the comet’s incoming journey towards the Sun could have been mythologised as the entity’s search for his missing parent, while its tail may have inspired associations with a fox (Erra), a snake (Fire) or a mink (British Columbia). And if it subsequently followed a temporary course around the Sun, within the orbit of the earth, human observers could have perceived it as a morning star and evening star sojourning with the Sun before embarking on its fateful trip.

The existence of such a comet fragmenting during the Holocene has already been deduced by Clube & Napier (1990; Asher & Clube 1998) from retrocalculation of the orbits of comet 2P/Encke, the Taurid meteoroid stream and some Apollo asteroids, including Hephaistos and Oljato. The team deduced that these were once part of a single body dubbed “proto-Encke”: this Sun-hugging supercomet, also on an Earth-crossing orbit, appears to have undergone several major periods of fragmentation including at least one during the Bronze Age. Steel & Asher (1996) calculated that the earth would have passed through

the trail of the comet, creating a pair of intense meteor storms at two unspecified dates between 3600 and 1800 BC. From a terrestrial point of view, there would have been a massive increase in fireball activity and a high probability of Tunguska-like impacts.

Phaethon on the Move

If the Greek tradition of Phaethon's fall was derived from the Orient, the question remains as to how it came to be associated with the Celtic lands, and specifically with the rivers Po and Rhône.

As well as the general tendency for the Greeks to relocalise myths towards the unknown west, curious geological features often provided a rationale. For example, in a Greek tale with a clear Hurrian precursor, Kronos castrates his father, the sky-god, with a sickle which he then throws into the sea. The place where this happened was identified with various coastal sites—on Cyprus, near the Sea of Marmara, in Achaia (mainland Greece) and on Sicily—called Drepanon (after *drépanon* or *drepánē*, “sickle”) because of their hook-shaped coastlines (Lane Fox 2008: 284–293). The burial place of the smouldering corpse of the fire-breathing monster Typhon, again with clear Anatolian antecedents, was sought not only in the Near East but in various locations in the west which share a volcanic aspect, such as Mount Etna (Worms 1953: 35–36, 39). Fossil finds, too, frequently served as local fixes for mythological heroes and/or giants (e.g., Mayor 2000).

In the case of Phaethon, it would seem that sources of amber or amber-like materials helped to prompt relocations of the story within Europe—as anticipated by Pliny (*Natural History* 37. 11. 44; cf. Blomqvist 1994: 10). Since Late Bronze Age times, amber was imported from the Baltic into southern Europe and the Aegean, with the estuaries of the Po and Rhône the access points for the Greeks to the trade routes. But whence the association of Phaethon with amber, said to be the tears of his sisters who had been transformed into poplar trees? As we have seen, the story of Erra associated *elmēšu*, almost certainly amber, with the mythical *mēsu* tree. It would appear that this element of the Erra story (or a related Mesopotamian myth) may have been the ultimate origin of the association of Phaethon with amber—via a Syro-Phoenician source. It would have provided a handy rationale for the Greeks to localise the story at the western Mediterranean estuaries which provided them with the amber trade.

Concluding Remarks

While the scenario we envisage is necessarily speculative in many aspects, it is certainly no more so than that of Blomqvist and Rappenglück et al. We have established that the origin of the classical Phaethon story cannot be explained by an impact in Bavaria or Estonia. There were Phaethon-like stories, almost certainly memories of cosmic impacts, throughout prehistoric Europe—but also much further afield. The classical myth as it stands has demonstrable origins in Near Eastern precursors. The much wider problem, raised almost a century ago by Frazer, concerns the extraordinary matches found outside the Old World. Here only a wider approach towards the astronomical possibilities—beyond a simple meteorite fall—can provide a plausible explanation for both the similarities and the differences between the global traditions.

The impact of a bolide in the Near East c. 2200 BC would seem to explain most of the defining elements in the classical Phaethon story and its oriental equivalents. The additional hypothesis of a progenitor comet and possible impacts of other fragments in Estonia, Bavaria and elsewhere could elucidate their relationship to analogues from far more remote cultures, notably in Europe and the Americas. Such an explanation of the global parallels is preferable to the idea of (unexplained) diffusion.

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