

AUTHORS' RESPONSE: *ECHOES OF ANCIENT CATAclysms IN THE BALTIC SEA*

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Since first submitting our paper in August 2002, additional findings have come to our attention. Several pertain to the age of the Kaali meteorite impact. We found Vello Lõugas' *Kaali kraatriväljal Phaethonit otsimas* while our manuscript was under review. It presents a detailed review of archeological investigations at the Kaali site and offers intriguing speculations (somewhat different from our own, but certainly compatible with our general approach) about the impact on various peoples living around the Baltic Sea. We would like to thank Benny Peiser in the United Kingdom for emphasizing the continuing controversy over the age of the Kaali meteorite impact, and for explicitly pointing out recent research on the subject, as well as for introducing us to a broader scientific literature on cosmic catastrophes of greater (hemispheric or global) magnitude that evidently coincided with collapses in ancient civilizations and other major social upheavals in many parts of the world. (See *Natural Catastrophes During Bronze Age Civilisations*, ed. by Benny J. Peiser, Trevor Palmer, and Mark E. Bailey, Oxford: BAR [British Archeological Reports] International Series 728, 1998.)

We also thank Marika Mägi for her incisive comments as a reviewer of our manuscript. Our reactions to various specific comments in her critique follow below.

In her statement that we claim that "...the Kaali meteorite must have hit the island of Saaremaa around 3000 BC at the latest,...", surely she meant to say *at the earliest* instead. According to Raukas 1995, the Kaali site may have indeed been above water as early as 6000 BC. Nevertheless, we find the statement that "The Kaali crater is located 20 m above the contour line of the water level about 6000 BC" improbable. Such elevation is the case today (Tiirmaa 1994: 26). But these are minor matters.

We have not reviewed in detail *all* the various research results on the age of the Kaali craters. Determining their exact age was not our primary objective, nor do we feel qualified to determine which of the three contradictory datings offered by scientists so far is actually correct. While we find the most recent dating of ca. 600 BC quite plausible, we do not feel comfortable just ignoring the earlier findings, and await further clarification from scientific experts about how such disparate datings could have

arisen. More important in this context are the links between natural phenomena and ensuing folklore. Of course, the more recent the actual date of the meteorite crash turns out to be, the more likely it is that its folkloric echoes continued to reverberate until our own day.

Turning now to Estonian folklore describing the transformation of water into earth, we are grateful for Marika Mägi's comments regarding fluctuations in sea level in relatively recent times, such as rising during the Viking Age and falling during the medieval "Little Ice Age". This means that the isostatic-rebound average of roughly 2 mm per year is not by itself a sufficiently adequate alternative explanation over all time reaching as far back as the draining of periglacial lakes.

Nevertheless, even if at the height of the fluctuation, the fall of the sea level were 10 times the average of the isostatic rebound, it would still be but 2 cm per year. By contrast, the fall of the level of Lake Ancylus about 6500 BC was according to Kessel & Punning 1995, almost 20 meters in about 20 years, or close to 1 meter per year; much faster. Also, the Estonian creation-song given in Honko et al 1994 specifically mentions the bird flying "over the world's great lake" (*üle ilma suure järve*), not over the world's great sea. This is an allusion to a large body of fresh water, not salt.

The question of persistence of memory reaching back into glacier-melting times is indeed serious, as proofs beyond time lapses of around 4000 years are lacking, as pointed out in our paper. Indeed, if the information from Estonia were to be taken in isolation, it would be tempting to conclude that the creation-song/legend did not reach into the glacier-melting age.

The main problem with such a dismissal is that similar legends have a world-wide distribution, and are especially concentrated in the circumpolar region in the form of the "earth diver" myth, even as far east as among Native Americans in North America (as mentioned in our paper). Throughout the circumpolar region, at/near the end of the ice age, periglacial melt-water lakes formed, and were often drained very suddenly, as pathways opened, sometimes through ice. It becomes difficult to relegate these two sets of facts to mere coincidence. It appears that the Estonian creation-song/legend (37 lines) is only a particularly vivid example of a more general phenomenon.

We would like to add that old legends transmitted orally typically include later embellishments. Two such examples occur in the Estonian creation song: one is the allusion to agriculture and another allusion is to the world's globe (round earth). As both are parallelisms to other lines in the song, they do not necessarily constitute core material and can not be used to fix the original to a later date.

In attempting to determine events which may have inspired myths and folklore, in almost all cases it is not possible to offer rigorous proof. All that can be done is to offer the most parsimonious explanation, one that fits known facts and natural phenomena.

Marika Mägi seems inclined to relegate speculations about what might have happened to “science fiction”, but such pondering is an important part of the scientific enterprise. Without letting their imaginations occasionally run wild, researchers would miss opportunities to develop promising leads for further investigation. Significant advances in our knowledge of the natural and social world have occurred not just because scholars plod along checking small facts that fit within the realm of conventional wisdom, but also because they dare to think “outside the box” and explore unorthodox paths. With that in mind, it seems unduly harsh for her to dismiss such sources as Lennart Meri, Matti Klinge, and Vello Lõugas. Even if many of their hunches turn out to be wrong, these researchers demonstrate original thinking and encyclopedic knowledge of possibly relevant facts, as they attempt to make the seemingly irrational or unfathomable behavior of our ancestors more understandable in the light of empirical evidence. The basic insights they offer about what underlying realities might tie seemingly unconnected facts together deserve serious consideration and further investigation.

Skeptics like Marika Mägi play an important role in framing the issues that come up for discussion in the process, but their own assertions must not go unchallenged, either. Her comment that the Balto-Finnic gods are “largely associated with the wave of National Romanticism” certainly has an element of truth. One need only to look at the first (early and mid-1800’s) illustrations of the legendary Estonian sage and musician Vanemuine, holding a harp instead of a Baltic psaltery (*kannel*), to realize that foreign elements or inappropriate embellishments may have found their way into the works of Lönnrot, Faehlmann, Kreutzwald, and others who wrote of the ancient gods. But that does not mean that these authors had no local basis for their mythological references. In the absence of detailed writings about such matters before the 19th century, we cannot know exactly what the ancient Estonians and their neighbors believed. But there are hints in the pre-Romantic literature (e.g., in Henry of Livonia’s 13th century notations about the Saaremaa inhabitants’ belief in Tharapita), as well as in etymological patterns. The literal meaning of the Finnish word *ukko* is “old man, grandfather”, while *ukkonen* (note possessive case ending) denotes thunder. The Estonian word *äi* means “father-in-law” while *äike*, *äikene* (note diminutive endings) denote thunder or thunderstorm. These sound more like local personifications of powerful natural forces than Romantic-era borrowings from the Classical world.

Mägi's report of iron smelting at the Kaali site is an important new fact that makes more plausible the connection of the meteorite crash with the folkloric concept of an "iron star" (as well as with the metallic scales of the Northern Frog). The impact-explosion at the main crater was sufficiently intense for vaporizing/pulverizing the main meteorite fragment and indeed, (small) meteoritic nuggets have only been found at the secondary, smaller craters (Tiirmaa 1994). Especially if the later datings of the impact were to prove correct, this raises the possibility that iron-smelting in the Kaali area may have derived its initial start from gathering nuggets of meteoritic iron from at and near the smaller craters (and perhaps continued using bog-iron ore when sufficiently large nuggets ran out).

We certainly agree with her assertion that "snakes are not regarded as entirely positive creatures in the Estonian folklore", and said so in our paper. But it is not clear to us why she believes that the need to exterminate rodents was "hardly related" to the worship of snakes. Her report that cats appeared in Estonia at about the same time as in Scandinavia does lead us to reconsider the possible reason(s) for the difference in attitudes toward snakes. Since Scandinavia was more easily integrated into the Christian Europe than Estonia, more hostile attitudes toward snakes might have diffused earlier to Scandinavia through the process of religious conversion.

We also agree that the Kaali site may not have had a sacred aura when Baltic German authors began to write about it, and we did not say otherwise in the paper. Our position is that the site most likely was considered sacred in ancient times (as Mägi herself suggests with her reference to archeological studies of constructions at the edge of the main crater), and that lore about it could have survived in some form, even if the exact location of the event that inspired it was lost in transmission.

In short, we welcome Marika Mägi's stimulating critique, and hope that our work and the resulting exchange will inspire others to ponder the existing evidence and pursue further investigations of these matters.

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