

THE CHANGING MEANING OF 'THUNDERBOLTS'

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Abstract: The article concentrates on the widespread belief in the phenomenon of 'thunderbolts'. Stone artefacts like Stone Age axes, adzes, chisels, daggers, sickles, spear- and arrowheads as well as Iron Age strike-a-lights are mainly understood by the name 'thunderbolt', but no doubt various natural stones of peculiar or unusual shape were believed to have been created by strike of lightning as well. While corresponding examples of identifying and using 'thunderbolts' are given from different areas of the world, the emphasis is set on the respective Estonian material, introducing both the sources of archaeology as well as of folklore. The author discusses the background and the motifs of the well-known belief in 'thunderbolts' and reaches the conclusion that in Estonia it cannot be dated to a period prior to the Pre-Roman Iron Age when stone artefacts were no longer produced for practical reasons, and it is believed that the motifs of the belief were adopted significantly later, perhaps after the Christianization of the country in the 13th century.

Key words: archaeological material, folklore texts on 'thunderbolts', history of archaeological thinking, 'thunderbolt' belief

INTRODUCTION

The natives of Burmah, China, Japan [...] think that carved stone objects have fallen from the sky, because they think they have seen such objects fall from the sky. Such objects are called "thunderbolts" in these countries. They are called "thunderstones" in Moravia, Holland, Belgium, France, Cambodia, Sumatra, and Siberia. They're called "storm stones" in Lausitz; "sky arrows" in Slavonia; "thunder axes" in England and Scotland; "lightning stones" in Spain and Portugal; "sky axes" in Greece; "lightning flashes" in Brazil; "thunder teeth" in Amboina... (Fort 1919)

... and 'thunder arrows' and 'thunderbolts' in Estonia.¹ The belief in 'thunderbolts' is actually a very widespread tradition that, according to the quotation above, has been known to people in America, Asia, Europe, and Africa, and is missing only in Australia and the South Pacific. According to the legend, every time the lightning struck, a stone fell from the sky: while lightning was caused



Figure 1. A 15th-century engraving depicts the town of Ensisheim in present-day France being struck by a thunderbolt (after Carelli 1997: 400, Fig. 4).

by the falling stone, fire and thunder were seen as its consequences (Blinkenberg 1911: 1; Carelli 1997: 399) (Fig. 1). ‘Thunderbolts’ have a magico-protective function. The different qualities, the rules and ways of using ‘thunderbolts’ will be tackled more closely below, while at this point the major application fields should be mentioned. According to general beliefs, the stone protects the house, property (cattle, grain, etc.) and the family of its keeper against strokes of lightning, all kinds of misfortune and illnesses. Different ideas that are incorporated in the general concept involve protection against various evil spirits, assistance for keeping milk and butter fresh, etc. (see Blinkenberg 1911: 68–122). Generally, ‘thunderbolts’ have been recognized as peculiar stones with holes in them or sharp ends, polished, chipped, round and smooth or somehow strangely shaped. As much as there are describers or researchers of this belief, there are ideas of what should be regarded as a ‘thunderbolt’.

Over time, various stones have been respected and considered special. Amy Gazin-Schwartz (2001: 272ff) names different stones as having healing and protective powers, thus smooth pebbles have been found in burials dating to the Bronze Age through the Middle Ages, green stones, stones with holes, etc. have been used as amulets or for protection against evil spirits. Since archaeological material does not reveal the designations of magical stones, then perhaps all movable stones with protective or healing power could be named ‘thunderbolts’? In principle it is possible, but in reality we must follow the legend behind the stone. Thus ‘thunderbolts’ are stones that are believed to have fallen from the sky during thunderstorms. But as activities often tend to live longer than stories about them, it is possible that most of the stones with healing or protective qualities have been associated with the ‘thunderbolt’ belief.

In Sweden, echinites and flint nodules with natural holes have been called *marestenar* and *smördubbar* (only echinites for the latter), the first ones were used as a protection against nightmares and, for example, were hung up in stables and round the necks of the cattle; the latter helped to avoid accidents during the churning processes (Blinkenberg 1911: 91). Similar names were used in Denmark – *smörsten* or *smörlykke*, etc. (Blinkenberg 1911: 82). In case of the latter examples, Blinkenberg has classified these within the frames of the same 'thunderbolt' belief. The suggestion seems justified since similar functions are known for the stones that have been called 'thunderstones'. Similarly, there are examples of different types of thunderstones being treated and perceived differently: for example, "the stone axes were kept on shelves in the sitting-room; the fossils [echinites] were laid on shelves in the pantry because they 'kept the milk fresh and caused plenty of cream'" (Blinkenberg 1911: 79).

Due to the physical characteristics described above, it is only natural that a huge number of 'thunderbolts' are actually Stone Age artefacts, predominantly axes, daggers, chisels, sickles, spearheads, arrowheads, and other items that have been found but were not recognized as ancient man-made instruments by the finders. An excellent example can be given from Lund, the centre of archbishopric, where altogether 83 flint and stone artefacts dated to the period from the Late Mesolithic to the Bronze Age have been collected from medieval deposits (see Carelli 1997). Another group of 'thunderbolts' includes fossils like belemnites and echinites,² meteorites, sulphur crystals (Carelli 1997: 399, see also Masing 1995: 41; in more detail in Fort 1919). In Estonia and in its closest neighbouring countries there are also elliptical fire stones – a type of strike-a-lights, stones polished into oval forms, the exact function of which is disputed until this day, but which have also been regarded as 'thunderbolts' (see Salo 1990: 124ff) (Fig. 2). There is another interesting aspect about 'thunderbolts' –



Figure 2. PāMu 3/A 519. An elliptical fire stone, so-called strike-a-light, found in 1872 in the village of Tagasaare, the field of Uuetoa farmstead (Vändra parish, Southwest Estonia): "The farm owner's mother was milking a cow when lightning struck and at the same moment a stone rolled there" (Indreko 1925: 147). It was deeply venerated as a 'thunderbolt' and very reluctantly given to the antiquarian.

namely, they had to resemble weapons/tools, and this is connected with the concept of the weapon of the universal god of thunder (Zeus, Ukko, Thor). It is seen elsewhere in the world, where ancient stone artefacts have been identified as axes, adzes, etc.; however, not as man-made items, but as products of unknown spirits or remains of the gods (Carelli 1997: 398). The reason behind this phenomenon is the lack of historical thought, so that people found it difficult to ascribe the collected weapons and tools to creatures identical to themselves, and it was much more plausible that they belonged to gods. The contradiction between the folk tradition that could not see the past and the developing ideas of Renaissance naturalists formed a major fissure by the 16th century, and the gap started to narrow only in the 19th and the 20th century. One reason for that is of course the demands of theology that prevented the publishing and distributing of several theories about evolutionary human past.

In the following, the history of the research and the process of ‘thunderbolts’ becoming recognized as man-made will be discussed. The latter process has a big part to play in the development of archaeology as a whole, because strange stone tools and fossils instigated scholars to study the objects more closely, using different and sometimes very up-to-date methodologies and common sense³ which finally led to the identification of the three-age system.⁴

THE COURSE OF ACCEPTANCE

The first steps on the way of recognition

While ruins of the past and ancient artefacts have always attracted people’s attention, the beginning of the research history is dated to the Classical Greek culture where this attention has been more exposed in the works of Greek poets and historians. According to Trigger, there was very little interest in the physical remains of the past within classical civilizations with only Pausanias and other great historians of his time describing more famous landmarks, for example the Bronze Age ruins at Tiryns and Mycenae (Trigger 1989: 30 and references therein). At the same time, the interest in ruins and tombs, ancient artefacts found from the ground as well as mythical tales about the past was surely present, evidence of which can be seen for example in the appreciation of *keraunia* (‘thunderbolts’) and even in the practices of grave robbing (see further Holtorf 2000–2007 and references therein). The Greek, however, had virtually no scientific interest in ancient monuments, although the works of Homer and Hesiod, describing the life of the Greek people in the 9th century

BC, among other things, provided well thought-out data on the transition from bronze to iron technologies and speculations about the age of stone tools and weapons. A much-cited example has been written by Titus Lucretius Carus in years 95–53 BC:

The earliest weapons were the hands, nails and teeth, as well as stones, pieces of wood, flames and fire as soon as they were known. Later the properties of iron and bronze were discovered, but bronze came first, the use of iron not being known until later... gradually the iron blade replaced the bronze sickle (*De Rerum Natura*, verses 1283–1296; cited in Clarke 1968: 5ff).

At the same time all these philosophical and poetic contemplations totally lacked the practical aspect, thus none of the stone, bronze or iron items actually excavated were connected with the different eras (Clarke 1968: 5). One could even say that there was absolutely no awareness that the material remains of the past could be used to test the conflicting speculations about human origin (Trigger 1989: 30).

As to the excavated artefacts, the folk tradition was dominated by the belief in celestial 'thunderbolts' which had magical properties; all through the Middle Ages the same belief was supported by scholars. For example, in the 11th century bishop Marbodæus (Marbodo) wrote in his poem "Liber lapidum" how 'thunderbolt' protects its owner and his house from being struck by lightning, dying at sea, losing in battles, as well as guarantees good sleep at nights (see Merrifield 1988: 11). According to a record by Danish priest Harpestræng in the 13th century, 'thunderbolts' fallen from the sky are also good against witchcraft (Carelli 1997: 402). Medieval Church considered 'thunderbolts' the remnants of the war in heaven, for example the Emperor of the East sent a 'heaven's axe' to the Emperor in the West (White 1896).

In the intellectual sense the medieval period is, of course, marked by the Christian religion which meant that for a valid scholarly approach there was only one certain knowledge about the past – the one given in the Bible. The world was believed to be of recent origin and timely, and not on any kind of evolutionary highway. Since biblical times were viewed as identical to those of medieval Europe and the scholars were even less conscious of historical changes in material culture than the Greek and Roman scholars had been, the interest in the material remains of the past was almost lost (Trigger 1989: 31ff).

Breakthrough in interest and knowledge

The Italian Renaissance (in the 14th–17th century) brought along the establishing of the connection between celestial ‘thunderbolts’ and man-made stone tools (see Jensen 1999). The background of this particular and other acceptances/discoveries of the kind lies in the remarkable rise in the interest in and the study of natural history between the mid-fifteenth and the mid-seventeenth century as a result of new social circumstances (the appearance of naturalists in courts) and voyages of exploration and discovery (Findlen 1997: 57ff). In the Early Modern period the scholars emerged as a third leading power in European societies, next to the courts and the clergy. The so-called *virtuosi* or the *curiosi* of the Renaissance were interested in natural history and arts. Their collections included natural specimens and cultural artefacts and were known as cabinets of curiosities, or *Wunderkammern*⁵ (Hafstein 2003: 5ff) (Fig. 3). The acknowledgement of stone tools as man-made objects naturally partly co-existed and partly followed the period of collecting curiosities, something so universal to the scientific awakening processes of all nations. Naturally, at first no clear distinction was made between curiosities that were of natural and those of human origin, hence the belief in stone tools as ‘thunder stones’ or ‘elf bolts’, etc. (Trigger 1989: 47).

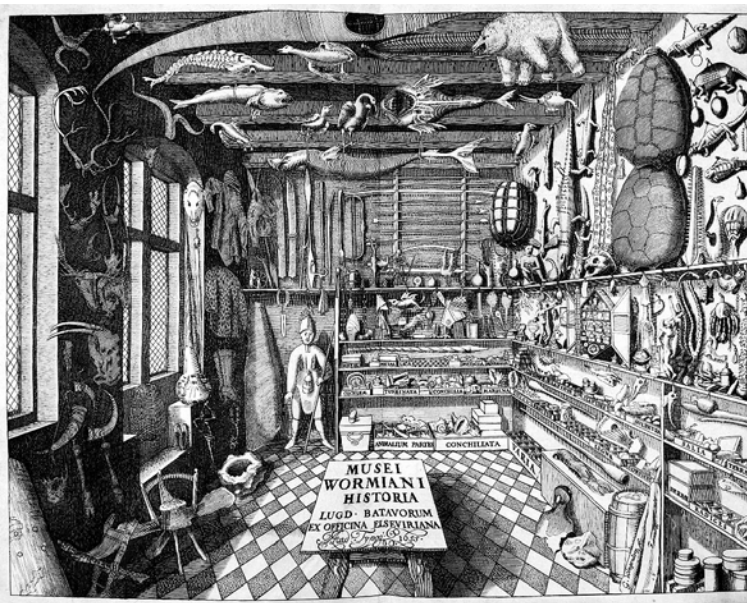


Figure 3. The frontispiece of the catalogue of Ole Worm’s collection, published as *Museum Wormianum* in 1655. (Source: <http://www.kunstskammer.at/wormraum.htm>)

The naturalists or collectors of the 16th century, who had already come across fossils and strange items while walking on fields, quickly adopted the idea of their human, and not natural or supernatural origin. Although direct intensified contacts with foreign cultures using stone artefacts in the 16th–17th century have been considered the major reason for the identification of 'thunderbolts' as man-made tools (e.g., Trigger 1989: 52), Ola Jensen believes that there was an over-individual epistemological change, a new attitude to man, to life and existence as well as a new way of ordering the world, classifying, sorting and identifying objects behind the process of 'thunderbolts' turning into "human tools" (Jensen 1999: 554, 560ff and references therein). One of the first to reject the idea of the celestial origin was Georgius Agricola (1490–1555), the father of mineralogy, in his work *De natura fossilium* in 1546:

Ceraunia [thunder stone] received its name in the same manner as the above minerals for the ignorant believe it falls during flashes of lightning. It is found not only in Carmania but also in our own fields. It lacks striae and lines and differs from *brontia*. It is usually smooth and either round or oblong. Different species are distinguished by color. Some are black, others red and others white and pellucid in part and in part black. (Agricola 1955: 98, Book V.)

The well-known Italian naturalist Ulisse Aldrovandi (Aldrovandus) (1522–1605), who has been considered the father of natural history studies but is perhaps the most famous for his 'dragon stories'⁶ (Aldrovandus 1640), stated in his *Musaeum Metallicum*, published in 1648, that stone tools had actually been used by the people of the past (see Clarke 1968: 6, Trigger 1989: 53). But probably the best known and most cited are the statements by Michele (Michael) Mercati (1541–1593), a long-time Superintendent of the Botanical Garden in Vatican and a true religious official who owned a wide collection of fossils and minerals as well as ethnographic and prehistoric stone tools from Asia and America. David Clarke has compared Mercati's contribution to the development of archaeology with Nicolaus Copernicus' to astronomy or Galileo Galilei's to physical sciences (Clarke 1968). Mercati's manuscript *Metallototeca*, which was published in 1717 but circulated among scholars all through the 17th century, is the first example of the use of comparative method. Mercati uses the notes from classical authors who arranged the stone–bronze–iron succession without formulating it themselves. In addition, he analyzes prehistoric artefacts that were brought to his collection. Mercati uses the Old Testament as a parallel to Homer's work which also describes the use of bronze artefacts and introduction of iron by the Philistines (Clarke 1968: 6, Mussi 2001: 6). As a result he came to the conclusion that the *cerauniae* had been produced by flint

percussion before iron was introduced, “for the most ancient men pieces of flint had the function of knives” (Mussi 2001: 6).

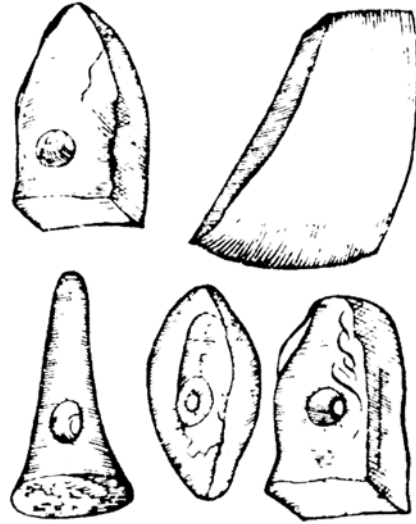
During the 17th century, together with the decline of Italian Renaissance, the ideas of Mercati started to be reflected in the works of French Jesuits and Danish scholars (Antoine de Jussieu, Bernard de Montfaucon, but especially Joseph-François Lafitau, and others); the process gained momentum especially after the publishing of *Metallotheca*. Joseph-François Lafitau, a French Jesuit missionary, compared ‘thunderbolts’ with prehistoric artefacts and was the first to formulate the definition for the Stone Age in his two volumes of *Mœurs des sauvages américains comparées aux mœurs des premiers temps* (“The Customs of the American Indians, Compared with the Customs of Early Times”), published in 1724 (see in detail Clarke 1968: 7–8). The comparing of ‘thunderbolts’ with prehistoric and ethnographic artefacts led to the understanding that primitive peoples offer a trustworthy picture of past societies and that the people who in the past had used stone for tools simply did not know about iron. This, in its turn, started the idea of the peoples’ gradual evolution from savagery to civilization – the nowadays’ state society. The concept of the cultural evolution of societies from simple to more complex in a similar manner all through the world dominated in the studies of archaeology until the second half of the 20th century (further on this issue see Johnson 2000). However, it is most interesting to note that before the 19th century the evolutionary view of human history was no more plausible than the degenerationist one, the latter position motivated by strong religious sanctions⁷ (see further in Trigger 1989: 54–55, 67).

A great collector, one of the best known antiquarians and probably the most important one in the Nordic countries was Ole Worm (1588–1654). Worm has been claimed as the local founding father for several modern disciplines – archaeology, museology, philology, ethnology, and folklore (Hafstein 2003: 5). Worm’s own museum presented one of the first collections in Northern Europe; this became the basis for the Royal Kunstkammer that was opened for the public in the 1680s (see Trigger 1989: 49, Hafstein 2003, further on the formation of the Royal Kunstkammer and the development of the National Museum of Denmark see Jakobsen 2007). Already in 1655, Worm acknowledged the origin of flint artefacts that he had excavated from barrows (Clarke 1968: 8). His attitude towards the folk tradition regarding ‘thunder stones’ is reflected in his catalogue where he describes them as follows:

Cerauniae, so called because they are thought to fall to earth in the lightning flash. They have various shapes, sometimes conical, sometimes hammer- or axe-shaped, and with the hole in the middle. Their origin is

Figure 4. Cerauniae ('thunderbolts') found in Sweden. The original image published in Ole Worm's Museum Wormianum. (Source: Salo 1990: 116, Fig. 15)

disputed; some deny that they are meteorites, supposing from their resemblance to iron tools that they are really such tools transformed into stones. On the other hand, reliable witnesses state that they have observed these stones on the precise spot – in a house or a tree, and so on – where lightning had struck. (Cited in Klindt-Jensen 1975: 23) (Fig. 4)



Many researchers have debated whether Worm actually believed the elements of superstition he described. Ejnar Hovesen suggests that there were many things that Worm did believe in and used himself, for example the healing qualities of stones and their use in medicine – hematite and jasper for nose bleeding, and diamond against stomach troubles, just to mention a few (Hovesen 1987: 260, 316ff). At the same time he, for example, seriously doubted in the stories about unicorns,⁸ lemmings which were believed to have fallen from the sky, and a woman who was thought to have given birth to an egg (see further in Hovesen 1987: 252ff). Although according to Trigger (see his sources in 1989: 54) Worm thought it likely that polished stone axes were of celestial origin rather than stone tools, one can hardly trust that the distinguished scientist, who had seen stone finds in barrows and accepted their human origin, could believe in 'thunderbolts' that fall from the sky (see also Clarke 1968: 9).

Nevertheless, quite surprisingly, by the 17th century both the human production of stone tools and their considerable antiquity in Europe were quite widely accepted among the learned circles (Trigger 1989: 54). However, only the representatives of the 18th-century Enlightenment movement truly recognized the growing technological development and believed in the progress and evolution (Trigger 1989: 56), thus introducing the idea of cultural evolution.

Paradoxically there are plenty of 17th-century examples of scholars whose conclusions are completely but spectacularly erroneous and yet nevertheless well-reasoned and thus viewed as plausible and cited by many truth-seekers. For example, Grant Allen has referred to a Chinese Encyclopaedia, according

to which the 'lightning stones' may have the shape of a hatchet, knife or a mallet, continuing,

And then, by a curious misapprehension, the sapient author of that work goes on to observe that these lightning stones are used by the wandering Mongols instead of copper and steel. [...] So deeply had the idea of the thunderbolt buried itself in the recesses of his soul, that though a neighbouring people were still actually manufacturing stone axes almost under his very eyes, he reversed mentally the entire process, and supposed they dug up the thunderbolts which he saw them using, and employed them as common hatchets. (Cited in Allen 2005[1896].)

Some of the authors discussed the problem of the origin of 'thunderbolts': for example, in 1649 Adrianus Tollius in his edition of *Boetius on Gems* very vividly describes the development of 'thunderbolts':

they are generated in the sky by a fulgurous exhalation (whatever that may look like) conglobed in a cloud by a circumfixed humour, and baked hard, as it were, by intense heat. The weapon, it seems, then becomes pointed by the damp mixed with it flying from the dry part, and leaving the other end denser; while the exhalations press it so hard that it breaks out through the cloud, and makes thunder and lightning. (Cited in Wallace 1894.)

For many naturalists the accepting of the long geological history meant establishing a contradiction with the Old Testament, not to mention the quarrels with serious theologians and the majority of simple folk behind the latter.⁹ At the beginning of the 18th century, Charles de Secondat, baron de Montesquieu, after suggesting in his *Persian Letters* that the world might be much older, was made to reject the idea in his later works. Georges-Louis Leclerc, Comte de Buffon, in his *Époques de la Nature* in 1778 only cautiously proposed that 'thunder stones' are of human origin, because a previous quarrel with theologians had cost him public retraction and humiliation. And as late as in the 1820s theologians had associated human artefacts with the remains of various extinct animals (often in caves that had been flooded in some time) with the Deluge of Noah (see further in White 1896).

So, one reason for the late acceptance of stone artefacts as ones made by humans was obviously that the religious circles did not exactly support the evolutionary ideas. The other was no doubt the inability to see the connection between 'thunderbolts' and ancient tools in a manner similar to Greek and medieval philosophers, the connection that was so obvious for the academicians of the 18th–19th century. The reverse logic of the people is well expressed in the quotation by Allen:

But the course of reasoning by which we discover the true nature of the stone axe is not one that would in any case appeal strongly to the fancy or the intelligence of the British farmer. It is no use telling him that whenever one opens a barrow of the Stone Age one is pretty sure to find a Neolithic axe and a few broken pieces of pottery beside the mouldering skeleton of the old nameless chief who lies there buried. The British farmer will doubtless stolidly retort that thunderbolts often strike the tops of hills, which are just the places where barrows and tumuli (tumps, he calls them) most do congregate; and that as to the skeleton, isn't it just as likely that the man was killed by the thunderbolt as that the thunderbolt was made by a man? Ay, and a sight likelier, too. (Cited in Allen 2005 [1896].)

The 'real science': scholars of the 19th century

As could be understood from the above quotation, the attitude of Grant Allen is laden with naked superiority towards both the "stupid peasants" as well as the past academic thinking. This approach, however, is actually very characteristic of the learned men of his time, the second half of the 19th and the beginning of the 20th century. An excellent example can be found in a text by Charles Hoy Fort where he marks that

stone implements, already on the ground – "on the ground in the first place" – are found near where lightning was seen to strike: that are supposed by astonished rustics, or by intelligence of a low order, to have fallen in or with lightning (Fort 1919).

Derogatory attitude towards Estonian peasants is apparent in the writings of several Baltic-German scientists, for example the much-cited remarks by the embryologist Karl Ernst von Baer (1792–1876) about the mental and especially physical development of Estonian indigenous people (see Baer 1976[1814]). To some extent a similar attitude can be followed among some of the learned men of Estonian origin in the 19th century who were clergymen or were connected with church and had pejorative feelings about the local superstition from the perspective of religious rather than scientific beliefs. For example, Jaan Jung (1835–1900), a schoolteacher of Abja, South Estonia, stated that superstition is "nothing else than the remains and leftovers of the development of mind and education of the earliest times of the humankind" (Jung 1879: 6). Unfortunately the set of problems surrounding 'thunderbolts' in these (archaeological) writings has not been discussed very often; we are rather dealing with descrip-

tions seeking objective awareness (e.g., Jung 1883, Kreutzwald 1879, and others). Many of the learned men of the time were actually of the opinion that “it is scarcely necessary to suggest to the intelligent reader that thunder stones are a myth and that it is remarkable that any man of ordinary reasoning powers should write a paper to prove that thunderbolts do not exist” (quoted in Fort 1919). Fortunately, there were men who did just that – they described their efforts to prove the nonexistence of ‘thunderbolts’. A 19th-century English meteorologist George James Symons tried to show that the finding of an axe, a wedge-shaped stone or an otherwise peculiar object from the ground after a storm was a pure coincidence and the object had been in the spot where it was found already for a longer time (Fort 1919).¹⁰

The quotes of Allen very vividly express only one side of the attitude of the learned circles – namely the pre-eminence of real ‘scientific’ approach over supernatural and even ‘false’ one. But there is another aspect to the process proposed by folklorists. According to Burström (1999: 36ff), the fascinating part of the process of the acknowledgement of archaeological sites is the recording of all kinds of cultural interpretations by the early antiquarians who with the same eagerness collected material on the location of archaeological sites as well as stories told about them by the local people. Thus a grave was as important a site as, for example, the ‘bowl of a giant’. And unlike the 19th-century scientists we must not be condescending. When people interpret the world around them and ascribe it meaning, all elements are made cultural. The distinction an archaeologist makes between ancient monuments and natural phenomena is not relevant in another conceptual framework (Burström 1999). Thus, in retrospect it may be stated that the distance between archaeologists and the ordinary people (the public) was made huge by the 19th-century scientists, the distance that only now is being overcome (Burström 1999: 43, 45). However, to be fair, there are treatments that are surprisingly objective and impartial among the 19th- and early 20th-century writings as well. One of these, *The Warfare of Science with Theology* by Andrew Dickson White, opens another aspect of the process of recognizing the long prehistory of mankind. Another similar treatment is *The Thunderweapon in Religion and Folklore* by Christian Blinkenberg (1911), which quite impartially describes the essence of ‘thunderbolts’ and belief in them primarily in Scandinavian countries as well as in Greece and India and analyzes the beginning of the ‘thunderbolt’ belief. Characteristic of these publications is their seemingly impartial manner of discussion that does not so much downgrade as conspicuously wonders how it is possible to believe in something so foolish as ‘thunderbolts’ as late as at the end of the 19th century. As to the literature of the second half of the 20th century, separate treatments on the topic have not been published and the

book by Blinkenberg from 1911 has by far remained the most informative. To a lesser extent 'thunderbolts' have been approached in longer articles (e.g., Mildenerger 1969; Salo 1990; Carelli 1997), but mostly the topic has been only briefly mentioned in the discussions of other problems. For Estonian researchers, 'thunderbolts' have never been a problem demanding a solution; nevertheless, they represent an intriguing research topic and in addition to a broader overview, an outline of local beliefs as part of the 'thunderbolt' discussion deserves to be drawn. The study of 'thunderbolts' must encompass the sources of folklore studies as well as of archaeology and employ the methods of both disciplines. At the same time, it is important to present the whole source material that relates to the topic. Both disciplines would benefit from the research of the contact object. For example the secondary use of Stone Age artefacts has been left aside in archaeological studies until now, at least in Estonia, but the same material could be explained in a totally different way as a concept of magical practices and the use as 'thunderbolts'.

ESTONIAN 'THUNDERBOLTS'

Description

Descriptions of 'thunderbolts' can be found in Estonian folklore collections, from which the following examples have been taken:

Thunder arrow. – Thunder arrow is the stone the one end of which is sharp and the other one blunt, it is round and hard, black, grey or blue. It is used in the same way as the stone heart [belemnite]. Thunder arrow comes down from the sky during the thunder with the strike of lightning [...] (E 217/8 (22a), Mihkel Leppik, Koeru parish, Central Estonia);

One end was sharp, the other one broad, black like whetstone. (ERA II 24, 90 (41), Richard Viidebaum, Türi parish, Central Estonia)

Thunder-arrow has two sharp ends, a hole in the middle, itself blackish grey. (E 8^o9, 9 (24), Matthias Johann Eisen, Vigala parish, West Estonia)

Thunder stones are small round stones with three sides, and a hole in them. (E 15038, Matthias Johann Eisen, Saaremaa Island)

Thunder stone is of the size of an egg yolk, lined, of different colours. It was said – this is the thunder ball. It was sometimes found on the ground

when there had been heavy thunder. (ERA II 284, 129 (128), Liis Pedajas, Sangaste parish, South Estonia)

[...] grey in colour, small, soft stones which are called ‘thunder arrows’ [*piksenool*, *äianool*] and ‘stroke stone’ [*rabandusekivi*], (the latter name is borrowed from the wandering Gypsies) [...] and has been given to it because it was offered to the sick as a remedy against the stroke. (E 50183, Salomon Lilhein, Kuusalu parish, North Estonia)

Arrow-thunder [*nool-pikne*] is said to be a bare stone arrow, one end thick, the other sharp. It only destroys, but never burns anything. This is what people think. (E 39333, Alfred Konstantin Kivi, Kadrina parish, North Estonia)

The descriptions of ‘thunderbolts’ in Estonian folklore archives are extremely diverse – of the colours, black, but also grey, bluish, red, and white are mentioned; the weight and hardness of ‘thunderbolts’ varies as well. In general, ‘thunderbolts’ are small, although the size is very rarely mentioned, it is compared to the egg and the palm of hand, the length can be 2–3 inches or 5–7 cm, it is important that a ‘thunderbolt’ fits in a pocket as well as a sowing-sack.¹¹ Vello Lõugas (1996: 116) has written down an account from Saaremaa according to which ‘thunderstones’ had to be round and smooth, usually small, black, brownish, but sometimes even white. The presented descriptions seem to confirm that the archaeological material belongs among ‘thunderbolts’: the stone axes and adzes have one sharp end, and the other end is dull; axes have holes in them; strike-a-lights are round and usually of white colour, but the descriptions surely apply to natural stones as well. Although flint axes and flint wedges, echinites and belemnites are known as ‘thunderbolts’ in records written down in Scandinavia, there are descriptions that refer to usual pebbles being considered thunderstones: “[...] a piece of flint stone about as large as the yolk of an egg [...]” (Blinkenberg 1911: 75–76). In Norway, several stories refer to ‘thunderbolts’ as shots that thunder uses to strike down trolls, and according to the descriptions the largest of the shots “resemble hen’s eggs in shape and size” (Blinkenberg 1911: 91). In Italy, globular stones and especially all black stones are also looked upon as ‘thunderstones’ (Blinkenberg 1911: 107).

Relatively similar stories have been told about obtaining ‘thunderbolts’ in which the main character is the god or thunder itself, who chases after the devil or devils with stones or arrows.¹² When thunder has struck into ground, it is believed that after some time it will rise up again whereas the time estimations vary: according to more widespread stories it goes seven or nine feet into the ground and rises up again after seven, nine or even eighteen years.

There are similar stories about obtaining 'thunderbolts' in other European regions (see, e.g., Blinkenberg 1911). Some examples can be found in Estonian folklore

Thunder arrow comes down during thunder with the stroke of lightning. God chases after the evil spirit. In this place where the evil spirit stands, God sends lightning with the rumbling: the arrow, be it in the tree or a stone or in front of a house, God does not care, the main thing is that the evil spirit gets what it deserves. (H II 38, 776/7 (2), Mihkel Leppik, Koeru parish, Central Estonia)

During the rumbling thunder is said to throw stones and knives in the sky. (H III 19, 361 (45), Jaan Sõggel, Halliste parish, South Estonia)

or

[...] glass and stone balls, some of which fall on the ground. (H II 26, 133 (3), Johan Reimann, Viljandi parish, South Estonia)

When lightning strikes into a tree and splits the tree, it must be a stone which can split a tree. This stone goes into the ground and comes up again after some time. (E 22500/1 (9 III), Danel Pruhi, Haljala parish, North Estonia)

The same way lightning strikes into a tree, when the thunder arrow runs down the tree, then immediately after the strike you must dig carefully at the roots of the tree and look until you find the arrow. (RKM II 204, 218/9 (11), Johannes Valdur, Kadrina parish, North Estonia)

Thunder stone. [...] In order to get the thunder stone, people used to dig in the ground and look for its location. This way they sometimes succeeded in finding a thunder stone which was of round shape, the size of a palm and had a hole in the middle. (ERA II 131, 155/6 (223), Leida Bökler, Ambla parish < Kadrina parish, North Estonia)

Healing with 'thunderbolts'

Thunder arrows have often been used for healing

Thunder arrow (thunder stone) has to be by the work of art, the work of healing. (ERA II 34, 153 (10), Oskar Loorits, Kihelkonna parish, Saaremaa Island)

The sore spots, mostly swellings, various skin diseases, carbuncles and furuncles, were pressed or massaged with the stone which was believed to have healing properties. The scraping and grinding of the stone has been widely practised as well, and the powder obtained was used in folk medicine, for example against tooth problems. Sometimes the powder was added to the food or drink of the animals.

Teeth were cured with thunder arrow, but also with this piece of wood where lightning had struck. (E 57314, Matthias Johann Eisen, Tartu, Southeast Estonia)

[...] powder is scraped and the powder is used to cure teeth, as well as stroke. (E 8°12, 5 (4), Matthias Johann Eisen, Nõo parish, Southeast Estonia)

The steam of it [thunderbolt] is made against sore tooth, it should help. (ERA II 55, 253/4 (63), Rudolf Pöldmäe, Ridala parish, West Estonia)

The thunderbolt was used for pressing furuncles, boils, rubbing the teeth of animals – these were strong in the mouth. (ERA II 34, 193 (3), Oskar Loorits, Mustjala parish, Saaremaa Island)

It is told [by Kaarel Pärn] that it has been used to cure illnesses: rheumatism, swelling, tooth ache and sore shoulders. The stone was used for pressing (massaging) until the sick place was cured while healing words suitable for this illness were being recited. The stone had been found by the owner of the farmstead from the field, about two feet deep under a big stone. (ERM 64, 59164, Arnold Mäetam, Tartu-Maarja parish, South-east Estonia)

If somebody has furuncles, pimples, boils or some kind of swelling, they need to press the sick place with the thunder arrow, then the sick place will soon be cured. (E IV 12 (36), Matthias Johann Eisen, Tartu, South-east Estonia)

On Saaremaa it was known that a ‘thunderbolt’ was used to cure scabies [*kärnad*], all kinds of rashes [*söötreis*], it was pressed against boils, was used to cure teeth and was placed inside the ear to heal aching ear. (Lõugas 1996: 116)

The founder of a thunder bolt had this good quality that with the touch of his bare hand he could heal people who had suffered from severe illnesses for many years. (RKM II 204, 218/9 (11), Johannes Valdur, Kadrina parish, Northeast Estonia)

Stories concerning specific archaeological artefacts confirm the information mentioned in traditional records. Thus it is known about a strike-a-light, found in the village of Bereza in Setumaa region, Southeast Estonia, that it was named a 'thunder arrow' and was used by grandmother to cure tooth ache and stomach ache (Zuroff 1937: 19); an adze from Hindaste, Risti parish, West Estonia has been often held in hot ashes and used for healing (Nigul 1923: 3); a fragment of a stone adze found in the village of Vihtra, Vändra parish, South-west Estonia was said to have been found at the roots of a birch split by lightning and used for healing (Indreko 1925: 17). According to archaeologist Andrejs Vasks, in Latvia 'thunderbolts' were used not by the common people but only by folk doctors, for example a mid-19th-century sorceress, called *Mīlā, māte* ('Dear Mother') is known there.

She had two quite large bags full of such holy relics. These contained all sorts of thunderballs, that is, stone and bronze axes and chisels, and jewellery found in old graves... (Vasks 2003: 30).

Blinkenberg has written down numerous similar descriptions on the basis of Danish material. For example, a lady in Hammershöy (Viborg) offered her husband "a piece of this stone [a flint axe] finely pounded and taken in cold water" against persistent colic and, according to the source, the heaven-fallen thunderstone actually helped (see Blinkenberg 1911: 75–76). In Sweden, pierced stone axes were used as a cure for toothache (healing by touch), butter which has been melted with a heated 'thunder arrow' is eaten or smeared on a sore spot, pounded pieces of 'thunder arrows' are swallowed, etc. (Blinkenberg 1911: 90). Similar examples can be found in other parts in Europe (see further in Blinkenberg 1911). Archaeological material also confirms the grinding of 'thunderbolts' and their probable use as a means of healing. For example, axes found in medieval Lund show unexplained damages: often there are depressions hollowed in the surface of the items, sometimes their edges have been broken off, etc. (Carelli 1997: 406). Traces of secondary use have been detected on axes found in Estonia as well: for example, sometimes the blade has been worn on one side only so that the axe has become asymmetrical and thus unsuitable as a cutting device; such as, for example, an axe found in the village of Kõnnu, North Estonia (AI 6013). In case of these axes, the possible secondary use as whetstone emerges but their 'grinding' cannot be ruled out either. The fact that in Estonia stones connected with thunder have also been used in prophylactic medicine is revealed by a quote in Forselius (2004 [1684]):

If they [Estonians] hear the rumbling of thunder for the first time, they take the stone and hit their head with it, this way they should not get head-ache this year (Forselius 2004[1684]).

There are hardly any published records about using ‘thunderbolts’ in Estonian folk medicine and for magical purposes. Baer (1976[1814]) has written quite thoroughly about illnesses and the attitudes towards medicine among Estonians, emphasizing the prevailing superstition and preferring of local wise men and quacks over learned doctors (see also Gustavson 1969: 125). Similarly to Baer, Friedrich Reinhold Kreutzwald (1803–1882), an Estonian doctor and writer, who has authored several publications of the middle and the second half of the 19th century describing illnesses and their domestic treatments (Kreutzwald 1879), only mentions the use of popular healing methods but names none.

Magical purposes

‘Thunderbolt’ was very important as a protective magical instrument. Estonian folk tradition includes the following examples:

In spring when animals are let out, one walks around them with the thunderbolt, then witchcraft will not threaten them nor wolf will take them – and nothing bad will happen. (E 15038, Matthias Johann Eisen, Saaremaa Island)

Thunder arrow is held in the sowing-sack while sowing, then worm will not eat the crops. (H II 38, 776/7 (2), Mihkel Leppik, Koeru parish, Central Estonia)

There lived a man in Hellenurme who always carried a thunder arrow in his pocket during the summer. When he was asked why he has it, he used to answer that then he fears no lightning, meaning that lightning would not hit him. (E 8°11, 94 (227), Matthias Johann Eisen, Rõngu parish, Southeast Estonia)

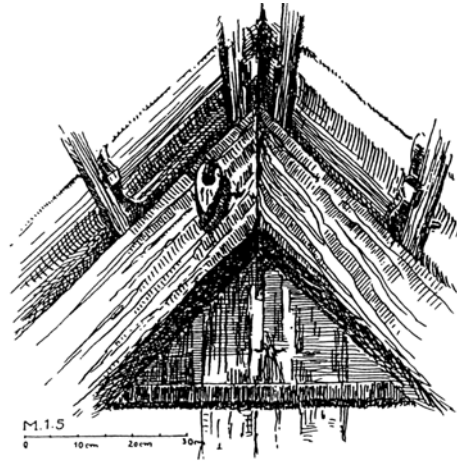
Also Carl Russwurm has described the ‘thunderbolt’ superstition held by Swedes on the coast of Estonia:

During thunder, thunderbolt turns red and it is put into a vessel where the cattle drink, so that the strike of lightning would not damage it; also milk goes weak and does not give any cream. Thunderbolt ensures against the strike of lightning. When corn is being sowed, it is placed into the sowing-sack, so thunder would not damage the crops this year. It also helps to relieve tooth ache. Who finds a thunderbolt, must not give it away, otherwise he loses his luck (Russwurm 1969[1855]: 249).

Probably the most important protective magical function is keeping lightning from striking into houses and preventing fires. Among other things, ‘thunder-

Figure 5. A 'thunderbolt' hung in the eaves (after Carelli 1997: 405, Fig. 5).

bolt' prevented a bin from running out of grain, kept rats away from grain, prevented milk from going sour, made the beer ferment, guaranteed good breeding luck, good hunting and fishing luck, and kept fire under control while practising slash-and-burn. According to beliefs spread in Scandinavia, it ensured protection against trolls and other evil forces. In addition it could be used in love magic (Carelli 1997: 405ff). From Scandinavia it is known that stone axes were kept on the shelf, chest of drawers, or in a bag; usually it was hidden in a special place, further away from everyday activities, and thus have been immured into walls, placed under the floor or threshold, attached above the bed or in the ceiling (Carelli 1997: 404). Similar stories are known about Estonian archaeological finds: these have been kept in a sowing-sack, carried along in pockets or kept under the stairs or eaves (Fig. 5); for example, an adze was found placed under the staircase in Abula village (Mustjala parish, Saaremaa Island) (Vaas 1922: 7). However, despite the many ways a 'thunderbolt' could protect people, it was probably not a vitally important item. As Blinkenberg has written:



The stones were therefore [protection against lightning] collected and carried home. They were put everywhere as safeguards, both in the house and in outhouses, in a window or on a shelf, on a beam or in a corner, but they were not made much of and in most cases were covered by dust and cobwebs. Notably large or fine specimens were laid on the chest as a decoration. (Blinkenberg 1911: 81)

Archaeological material

In addition to numerous natural peculiar stones, of various archaeological items found in Estonia, also oval strike-a-lights, stone adzes, and stone axes with shaft holes were considered 'thunderbolts'. On the example of Scandinavian material, flint daggers can be added to this list, although these have rarely been found in Estonia (see Kriiska & Tvauri 2002: 86). The common character-

istic of these artefacts which have been considered ‘thunderbolts’ is their find context, which often (especially in case of shaft-hole axes, daggers, and strike-a-lights) is relatively ambiguous. For example, while a Bronze Age item at a Bronze Age burial site refers to one cycle, or rotation (production, use, deposition), then a stray find need not, but probably does, refer to several cycles (production, use, deposition, finding, re-use, re-deposition, etc.). For example the form, appearance, extent of wearing might indicate several rotations (see in detail Johanson 2006b: 84ff). Another common trait of the ‘thunderbolt’ items is the debate over their function, which proceeds from the same confusing find context.

Strike-a-lights have been found in all countries in the Baltic area, and also from Ireland and Scotland (see the distribution in Pellinen 1999: 25, Map 1). While in Estonia these objects have been not sufficiently studied, in Finland more publications on the topic have been issued (e.g., Pellinen 1999, see also Salo 1990: 124ff). These items, the size of a palm, have been dated to the period from the Roman Iron Age to the Viking Age; they are of oval or sharp-oval shape, usually made of quartz or quartzite and have a groove scraped in the centre. As the name reveals, they have apparently been used to strike fire with a firesteel, but they have often been connected with fertility magic (Pellinen 1999: 33, Salo 1990). Strike-a-lights have been found in lesser numbers in burials, but what makes them so mystical is that they have mainly been stray finds, often in boggy and woody areas outside established agricultural regions (see Jaanits *et al.* 1982: 192, Kriiska & Tvauri 2002: 149, Pellinen 1999: 31). According to Salo (1990: 128) they are often votive or sacrificial finds and he suggests that “by sacrificing an elliptical fire stone man begged for thundery weather, or most often, probably, only rain” (Salo 1990: 130). In offering rituals, the offerings for conciliation or securing favour have been proposed (see Pellinen 1999: 35).

At the first glance, the function of stone axes and adzes does not give much reason for discussion. However, their practical purpose has probably not been the only function of these beautiful items, the making of which must have consumed time and energy. I have suggested that at least shaft-hole stone axes were the so-called universal tools which were used to carry out different tasks when necessary, whereas the tasks could have been non-practical, with cultic or ritual background (see Johanson 2006a, b).¹³ Thus, as a rule, the functions of shaft-hole stone axes are not context-based: in other words, the majority of these were used for all kinds of tasks, both everyday tasks as well as in ritual practices. Certainly we cannot exclude the existence of tools made specifically for religious activities (for example, axes with a shaft-hole too small, with asymmetrical shape, though these may have become asymmetrical after regular

grinding and sharpening, with ostentatious accessories, or unnecessary for practical work, etc.), but as a rule, shaft-hole stone axes could be considered universal tools. At this point we could draw a parallel with unique thunder altars, which have been described in India at the end of the 19th century. On these altars, strange stones, stone axes, and adzes were honoured as village deities; these were placed on an altar erected at the village entrance. In addition, there was a small *trisula* [trident] and two ceramic bowls with oil and camphor for anointing on the altar. It is especially important in this respect that both the bowls and the trident often went missing; children played with these, broke these into pieces, etc., but when the time came to anoint and honour the axes, the accessories had to be found, and if not, new ones were bought (Blinkenberg 1911: 10). The mentioned description shows how ritual items can turn into ordinary things during the time between rituals and become important again only in the course of specific rituals. Beyond doubt, stone axes with shaft-holes were prestigious items but their prestige predominantly proceeded from their use value and potential (Johanson 2006b: 44ff), which in its turn conditioned their significance in rituals.

The association of Stone Age items with 'thunderbolts' will be discussed below. However, it should be stressed that the concept of 'thunderbolt' provides the most important explanation for early finds in later contexts. The discussion of Estonian 'thunderbolts' will be based on the texts with parallels from Estonia's neighbouring countries, the Estonian Folklore Archives, the find contexts, and sometimes the appearance (wearing, grinding) of certain archaeological objects, which refer to their use as 'thunderbolts'. The task is made more complicated by the fact that when using a 'thunderbolt', it was not necessary to change or damage it in any way; for instance, carrying the stone in one's pocket, stroking, or pressing sore spots on the body, or other activities, unfortunately for the present research, usually did not leave any traces on the item. The find context cannot be trusted either, since many of the axes and adzes that are held in museums today have been collected in the 1920s and 1930s from farmers who had often saved them for generations as heirloom. It is possible to speculate, though without any certainty, that these stones had once been used as 'thunderbolts' by their owners' (great-)grandfathers. However, hypotheses can be suggested.

The use of 'thunderbolts' for magical purposes might be supported by the fact that stone axes and adzes and other stone artefacts have been found in the medieval urban context. The most astonishing example is, of course, the 83 Stone Age artefacts found in the habited layers of medieval Lund, the centre of archbishopric (Carelli 1997). Maybe the practices which at the first glance seemed to be pagan during Christianity are not so surprising because it is known that

during the Middle Ages stones fallen from the sky or ‘thunderbolts’, meaning Stone Age artefacts, were often considered weapons in heavenly war (White 1896). The same way, ‘thunderbolts’ have been immured into church walls with the purpose of seeking protection against lightning (see below). Plenty examples of shaft-hole stone axes with secondary use as ‘thunderbolt’ have been given by Mildenerger (1969: 3ff), the most remarkable of these being a collection of about 40 ‘thunderbolts’ found in a corner between roof rafters and joists in a house in Middle Rhineland (Mildenerger 1969: 11). In Estonia the Stone Age artefacts found in medieval town layers have been so far observed as accidental finds which have probably reached the town cultural layer from a nearby Stone Age settlement site in the course of soil redepositing. This explanation cannot be excluded, of course, but considering the spectacular appearance of stone axes, this randomness cannot be considered the most justified reason. Unfortunately, very few stone axes have been found in early towns in Estonia, thus making speculations on account of these would be hasty. Two stone axes were discovered from the medieval town layer of Lihula, West Estonia, one of these by the road leading through Lihula near the manor house, the other in a room(?) of a medieval building, from the same layer with an iron nail, bronze spirals and a penannular brooch (Mandel 1991a, b). The third axe was obtained from the medieval layer of Tartu, Southeast Estonia, probably under a wooden barrel. Axes have been found from the territory of present-day towns as well, but their find context does not refer to the possibility of secondary use; for example, there are records of finding stone axes on garden plots or in foundation pits of residential houses,¹⁴ which might, but need not, indicate some sort of secondary magical purpose in the period following the Middle Ages. Some records describe the finding of axes inside or on top of the ruins of buildings, under so-called oven ruins [*ahjuvared*]¹⁵ or among foundation stones, etc.¹⁶ and refer to their secondary use as ‘thunderbolts’. Fragments of two stone axes from the Late Iron Age settlement site of Pada, North Estonia, and a fragment of a stone axe from the Late Iron Age and medieval¹⁷ settlement site of Lagedi, North Estonia (Sarv 1998), can probably be added to this list as well. Surprisingly, no adzes or fossils have been found or collected in urban context in Estonia.

While the axes, adzes, and fossils found in medieval urban context probably refer to their magical use as ‘thunderbolts’, the numerous find material from Iron Age graves might, but need not, indicate the same thing. It is certain, however, that the adding of Stone Age (or other earlier) artefacts into later stone graves points to some magical or ritual practice. One reason for that is that the adding of earlier material into later graves had the same effect that the building of a grave on top of an earlier settlement site had – namely, this

represented the remembrance of mythical ancestors, the ensuring of their life force and, for the following generations, protection (see further in Johanson 2006b). Thus the existing myth or idea of predecessors might have meant that the people who buried into the stone graves carried along finds from a distant settlement site and, when necessary, placed these into the stone graves of their dead relatives of the contemporary time. Quartz and flint flakes as well as artefacts of secondary processing have been found in Iron Age stone graves in relatively large numbers in Estonia and the neighbouring countries (Johanson 2006b; see also Carlie 1999). While in this case it is possible to suggest that this has been an emotionless redeposition of the soil of a nearby settlement site into the grave, as it has often been proposed (e.g., Lang 2000a: 160), then in the case of remarkable items like stone axes and adzes it hardly could have happened accidentally. At the same time, it is unlikely that quartz was added to the graves only for the sake of predecessors, as it was an important material. According to a description by Pliny the Elder (37:48), *astrion* (a sort of rock crystal) was a valued and sought for *ceraunia*, and artefacts of rock crystal were very expensive (Pliny 37:10; for the discussion of Pliny's terms see King 1867). Bjørn Myhre goes even further and suggests that perhaps the people who built the stone graves and added quartz items there made looting raids to the Stone Age settlement and burial sites to get these (Myhre 1988: 321). Here it is worth noting that Estonian strike-a-lights are also usually made of quartz and quartzite. The magical function of quartz could be confirmed by folklore accounts: sometimes the healing 'thunderbolts' are white and round stones which might be strike-a-lights or quartz nodules. In Finland, *ukonkivi* ('thunder stone') is the most widespread name for quartz (Salo 1990: 108).

Only three stone axes with shaft-holes have been found in stone graves so far: a rough-out of a stone axe with undrilled shaft-hole from a Late Bronze Age ship-setting of Lülle, Saaremaa (AI 4409: 31) (Lõugas 1970: 112, 117, Fig. 6:1), while the axe might be contemporary with the grave. Fragments of two more stone axes with shaft-holes have been found in stone graves on the Saaremaa Island: a fragment from the Tõnija stone grave dated to the Roman period and a blade fragment from the filling of a Viking Age stone grave of Piila (SM 1468: 37) (Mägi 1997b). All three have been considered the filling stones in the grave by the researchers (Lang 2007: 29; Marika Mägi, from personal communication, June 8, 2006; Lõugas 1970: 112). Among the few stone adzes found in graves there are fragments from Saha grave D (Lang 1996: 246) and the Jäbara grave B (Vassar 1943: 342), both dated to the Roman Iron Age. An intact stone adze has been found on the Iron Age Chapel Hill (Kabelimägi) of Nurme village on Saaremaa Island (Tallgren *et al.* 1924: 37). These also represent a part of

the same custom. According to Artur Vassar, this phenomenon follows a recurrent pattern.

Stone axes and adzes have been repeatedly found in stone graves where they might have arrived by accident while collecting stones, but more probably in connection with magic (Vassar 1943: 342).

Stone axes with shaft-holes have been found in Finnish (Asplund 2005) and Scandinavian Iron Age graves, in Sweden also in the piles of burnt stones (e.g., Petersson 1998). Examples of the same tradition elsewhere in Europe have been discussed, for example, by Mildemberger (1969) and Holtorf (2000–2007).

Finds of stone axes and adzes in stone graves in Estonia have been often recorded in written documents. Still, uncontrolled and unverified records of these discoveries are much more numerous.¹⁸ There are stone axes in museum collections that according to find reports have been collected in stone ruins, oven ruins (see above) which might, though need not, refer to a grave. The majority of these ruins are uninspected and by now have probably been destroyed by land improvement or are impossible to find because of the ambiguousness of reports. Naturally we cannot exclude the possibility that axes in later graves may refer to unconscious deposition, since grinding stones, burnt sauna rocks and numerous fragments of polishing stones have been gathered among the grave stones (see Vassar 1943: 231, Lang 2000: 123) which, similarly to stone axes, have usually been considered the filling stones of the grave. At the same time it has been suggested that the adding of grinding stones to graves refers to the cult of dead (Kaliff 1997: 77).

In addition to Iron Age stone graves, Stone Age artefacts have been discovered in medieval burial sites and here they should point at the ‘thunderbolt’ belief. We could mention the potential find of a stone axe in a medieval village cemetery in the parish of Hargla on the lands of Orsti farmstead in Southeast Estonia, where in addition to a sitting skeleton, a brooch, a coin from the year 1400, and a stone axe were found (Liiv 1924: 5ff). A stone axe has been found in a barrow in the village of Tiivikova, Southeast Estonia, together with bones and a spiral ring (Parmas 1922: 6ff), exactly the same selection of artefacts was found from a grave in the village of Vinski, Southeast Estonia, dated to the second half of the 1st millennium AD (Parmas 1922: 10ff).

Of the nearly a hundred strike-a-lights found in Estonia, a part has been collected in stone graves and barrows but since the dating of strike-a-lights falls into the same time span as the using of these grave types, this might point to a primary context. However, since the function of strike-a-lights is not clear, it is possible that in addition to striking fire they were used for ritual purposes, perhaps even as ‘thunderbolts’ in some protective magical rituals.

Strike-a-lights in stone graves and barrows could have served as magico-protective items.

Since fossils have also been related with 'thunderbolts', the stone graves which are mostly made of limestone and are situated in northern and western Estonia and on Estonian islands, that is in places where limestone is easily available, could be mentioned. Limestone is rich in fossils (see descriptions of different species of limestone in Perens 2006: 6ff). Only lately have researchers started to pay attention to the building process of stone graves. The excavations of recent years have rather indicated that although stones were probably not specifically chosen for the grave structure, the "more meaningful" among them have been picked out, for example in case of limestone graves it has been suggested that the side with fossil exposed in it has been placed upwards (Tõnno Jonuks, from personal communication).¹⁹ Natural stones with holes in them have been found in stone graves, and these might have been used as ornaments, weights or spindle-whorls. Many fossils of this kind have been recorded in Northwest Estonia (Lang 1993: 37, Fig. 14). In addition to natural stones with holes, other, more outstanding fossils have been discovered every now and then. For example, an intact trilobite (VM 8873) was found from the medieval village cemetery of Pirmastu, South Estonia, in 1956. However, in latter years more attention has been paid to fossils while excavating the graves in the region where limestone is easily available, for example on Kunda Hiimägi ('Sacred Hill'), North Estonia. To sum up, the discovery of many Stone Age artefacts, quartz and flint flakes, scrapers, arrowheads in Iron Age sites is not a definite proof of their use for the remembrance of ancestors or as 'thunderbolts'.

Since stone axes, adzes, Stone Age arrow- and spearheads and fossils have been considered 'thunderbolts', their finds in graves, whether stone graves, barrows or on medieval and modern village cemeteries, might refer to the connection of 'thunderbolts' with ancestral cult. The use of 'thunderbolts' as magico-protective amulets in graves has been a relatively old tradition in different cultures. A stone axe, pierced to be worn as an amulet, has been found in grave inventory from the Mycenaean period in Phaistos, Crete (Blinkenberg 1911: 22ff). A stone axe in a necklace is a grave find in Narce in Roman Italy (Blinkenberg 1911: 29). A somewhat later example comes from the Early Middle Ages: a stone axe was found on the breast of the skeleton of a Christian woman in a catacomb in Syracuse, dated to about 350 AD (Blinkenberg 1911: 109). The list could be lengthened to include a grave find in Estonia, Metsiku manor in Haljala parish, where a stone shaft-hole axe with iron chain attached to it was found next to a skeleton (Lepik 1922). It has been regarded as a Stone Age Corded Ware Culture burial, and its find circumstances were poorly re-

corded. But in the light of the so-called 'lightning graves' phenomenon which is known in other countries the grave find from Metsiku could be a later (medieval?) burial accompanied by a 'thunderbolt'. A separate subject, although connected with the current topic and thus worth mentioning in this relation, is the axe-shaped pendants used as magical amulets of which the most famous are the so-called hammer-shaped pendants.

ANALYSIS

The dating of the emergence of the belief in 'thunderbolts' is definitely complicated. When talking about 'thunderbolts' as these are known and perceived on the basis of folklore texts today, these are mainly prehistoric everyday items or natural stones. When talking about materialized lightning bolts, thunder and lightning as very spectacular natural phenomena certainly formed various beliefs already during the Stone Age. It is likely that already back then people used to look for specific traces left by the strike of lightning in the ground, collected stones of strange appearance, etc. Attention has been drawn above to the possibility that certain unnatural and hard objects, possibly fossils, especially smooth and round stones, stones with holes in them, various stones of strange shape, colour or texture have probably been considered the product of lightning for a long time already, since these have been found at Stone Age settlement sites. The Estonian archaeologist Vello Lõugas has written that while excavating prehistoric burials and hillforts, little round or oval stones have often been found, which beyond doubt have ended up in the cultural layer deliberately by human hand (Lõugas 1996: 117). Unfortunately these have been considered natural "products" and are therefore almost never²⁰ collected during archaeological excavations. So we have no knowledge of how many of these can actually be found at prehistoric sites. Finding fossils in Estonian Bronze and Iron Age stone graves, situated on the fossil-rich limestone region is not unusual (see the discussion above) and therefore it is difficult to decide whether it is a natural or an archaeological phenomenon. In Denmark, however, echinites have been found, on several occasions, in positions which can hardly be accidental: for example an echinite which had been placed on top of a heap of stones covering a Bronze Age grave was found in a mound in Sönder Omne (Blinkenberg 1911: 84). Echinites have sometimes been furnished with a metal loop for use as amulets or even wrapped in bronze bands (Blinkenberg 1911: 84f). Thus fossils, especially belemnites and echinites, can be interpreted as 'thunderbolts' ever since the time people have tried to explain thunder. While people see lightning bolt as serrated, it has been speculated that the first de-

pictions of 'thunderbolts' had to look something like that – for example, Stone Age arrowheads or precious stones that shimmer to different directions (e.g., Allen 2005 [1896]). The same glittering quality is the reason why quartz, rock crystal, and quartzite have been important for prehistoric people. The author feels, however, that the outside similarity of 'thunderstone' with lightning bolt was evidently not singularly responsible why one or another item/material became to be considered important. When lightning struck, people used to look for traces of this strike and everything unusual found on the spot of the strike was associated with the lightning bolt and later similar finds were already named after the first ones.

The subject of 'thunderbolts' and 'thunderstones' is partly associated with the concept of thunder god. At this point it is worth looking into how and with which weapon has the thunder god been depicted in iconography and when it is possible to speak of stone axes as attributes of thunder god. The most familiar lightning motif is that of the storm god wielding his thunder weapon in the form of a club, a hammer or a double axe: for example, Thor with Mjöllnir, Zeus with Keraunos, as well as Indra with Vajra to mention a few. Marinus van der Sluijs writes that among the mentioned weapons, "the double axe deserves special mention, both because of its antiquity as a symbol and its total incompatibility with the lightnings that ordinary people are used to see in the skies" (van der Sluijs 2001). The oldest divinity associated with the double axe is perhaps the Sumerian Ishkur, who is followed by the pan-Semitic figure Adad or Hadad. The Hurrian Teshub/Teshup is also depicted holding a 'thunderbolt' and a weapon, usually an axe (often doubleheaded), or a mace. It is probably from there that the Greeks borrowed the idea of the labrys, the double axe, and sometimes connected it with Zeus' paraphernalia (van der Sluijs 2001),²¹ worshipping the double axe as a holy being²² (see further on the images and development of the double axe as the attribute of thunder god in van der Sluijs 2001). One of the best known double axes in Nordic countries is certainly the hammer of Thor, Mjöllnir, but in addition to its being a hammer some researchers have interpreted this as a stick or a sceptre (see Motz 1997: 243ff). The first form of Thor's weapon was even thought to be a millstone (Puhvel 1996: 237).

According to van der Sluijs (2001), the double axe and the thunder stone are inseparable concepts, the designation of one being often replaced by the other. There is, for example, a flint nodule (*lapis sillex*), interpreted as "an image of the thunderbolt", which is kept in the temple of Jupiter in Italy, which was consecrated in 428 BC. This has given reason to suggest that the image of stone 'thunderbolts' was widely spread in the antique world, at least since the beginning of the last pre-Christian millennium (Salo 1990: 112ff).

While the foremost purpose of making stone axes, adzes, arrow- and spear-heads was their use as cutting tools and weapons, it is possible that they became to be interpreted as ‘thunderbolts’ only after their pragmatic explanation was no longer recognized and a new religious or ritual explanation was needed. Unto Salo has suggested that while the Stone Age shaft-hole axes were used as weapons, then the stone axes produced during the Bronze Age were already made for a cultic purpose – as attributes of an Indo-European thunder god, which developed in the Late Neolithic among the first farmers (Salo 1990: 149–150, 181). In order to confirm his statement he asks why anybody would make artefacts of stone at the time when metal was already known. He forgets, however, that bronze cannot be regarded as the so-called everyday raw material during any prehistoric period and it is possible that the majority of artefacts were produced of stone even in the Pre-Roman Iron Age.²³ In addition, the existence of Bronze Age axes that were specifically made for the cult of thunder god should be proved by a stone axe decorated with a zigzag pattern found in the burial in Horozheno, South Ukraine (Salo 1990: 150). At the same time Salo has admitted that the same lightning-pattern has been used on the Mesolithic clubs and shaft-hole items of Suomusjärvi Culture (8500–5100 BC) (Salo 1990: 175); thus it seems that even if zigzag ornament can be considered a reference to the strike of lightning, associating it with the veneration of thunder god on the basis of a single find would be dangerously misleading. The author of the present article is convinced that specific weapons of thunder god were, as a rule, not produced at least during the Stone Age and the first half of the Bronze Age (at least in Estonia and the nearest neighbouring countries) and Stone Age tools and weapons were apparently not yet associated with thunder and lightning.²⁴ The relation of the antique world and double axe is a wholly different topic and should be left for a separate research paper at this point. Stone Age artefacts were started to be associated with ‘thunderbolts’ only after they were no longer recognized as man-made and this could not have happened before the Iron Age.²⁵

The emergence of the belief in thunder god on the territory of Estonia should be briefly discussed. The idea or image of a universal fertility god who was especially important for the first farmers was probably adopted before the Stone Age artefacts became to be connected with thunder god (Salo 1990: 182). The idea of stone axes as weapons of thunder god did not become established before stone as raw material for weapons and tools finally began to disappear in the second half of the Pre-Roman Iron Age (Kriiska & Tvauri 2002: 129) and the local people gradually started to believe that stone axes found in the ground were ‘thunderbolts’. While Salo, on the basis of Finnish material, links to-

Figure 6. *PäMu 3/A 515. A fragment of a stone adze found in 1863 by Karl Kuuse in Vihtra-Ülejõe farmstead (Vändra parish, Southwest Estonia) from the left bank of the Pärnu River, under the roots of a spruce struck by lightning. The adze used to be intact, "but was broken in order to share the pieces of the 'thunderbolt' with wondrous powers with other men".*



gether Ukko and 'thunderbolts' and these, in turn, to Thor and the supreme sky deity (see Salo 1990: 116ff), then in Estonia two different strata of folk religion emerge, one of which is connected with Uku and the supreme god who was asked to end drought and start the rain and to whom sacrifice of different goods in special chests was made. The other stratum is thunder and thunder god who may not be connected with the mentioned supreme god. In addition, it seems that the case of thunder god and 'thunderbolt' represents phenomena of different degrees – 'thunder stone/arrow/bolt' was the materialized abstract thunder or strike of lightning itself, while thunder god had several other functions. Thus it seems that in Estonian folk religion there is no straightforward connection with Uku, with appealing to him with requests, making him sacrifices and 'thunderbolts' as it can be followed in the Finnish material. In addition, none of the stories of finding 'thunderbolts' have been associated with a specific place with the respective toponym. Although stone axes, adzes and strike-a-lights have sometimes been found under stones and the roots of trees (Fig. 6) which have been destroyed by lightning, no connection between sacrificial stones or trees and 'thunderbolt' can be drawn. Moreover, apparently the stories of finding 'thunderbolts' under these trees and stones are legends that have been associated with the artefacts. It seems that finding 'thunderbolts' has not inspired new toponyms, has not given names to stones, trees or other places struck by lightning; rather it could be noted that the site where a 'thunderbolt' has been found was often merged with the site of a stone or a tree that was known to have been destroyed by lightning, and in this way an acceptable explanation was attached to the artefact called 'thunderbolt' (Fig. 2 see p. 131).

In the following, the syncretic nature of the 'thunderbolt' belief on the border of the Iron and Middle Ages will be discussed; also, an attempt to analyze when and in what way the belief in the magical and healing qualities of 'thunderbolts' could have reached the Baltic region, and whether it is possible to date the disappearance of the belief.

The syncretic nature of ‘thunderbolts’

By agreeing that the belief in the magic of ‘thunderbolts’ originates in the pre-Christian centuries, it is exciting to follow the spread of the belief in time – through the initial period of Christianization and the High and Late Middle Ages until the modern period into our time. As could be seen from the section on historiography, already the antique authors wrote about ‘thunderbolts’. The adopting of the ideas in Christian texts, which were written down by non-Christians, and spreading these deserves attention. The controversy and contradiction between the pagan culture and Christianity is evident in the Early Christian and Christian medieval literature but these conflicting ideologies were still relatively extensively used. For example, St Augustine stated that Christians have to use the antique culture because “if the philosophers [pagan philosophers, understood] chanced to utter truths useful to our faith [...] not only should we not fear these truths but also we must remove them from these unlawful usurpers for our own uses” (Le Goff 1991: 114).

What concerns the written word can be seen in material culture. For example, with Christianization earlier cult places and artefacts were generally given new meaning and were not destroyed.²⁶ The mentioned phenomenon is widespread in whole Europe where non-Christian cultic places are situated under medieval churches or in their close vicinity: the Pantheon in Rome was turned into a church at the beginning of the 7th century (Le Goff 1991: 114); in Scandinavia the most famous example is the church of Fröse in Sweden, where animal bones dated to the Viking Age and wooden poles refer to the continuing cultic activity and the rise of a Christian church on the same spot (Fabech 1989). An example can be found in Borg in Östergötland in Sweden, where the walls of a Late Iron Age cult house were pulled down in the 11th century in order to cleanse the place, whereas only after the purification the place could be used to erect a new church (Nielsen 1997: 387–388). A similar example can be given about Russia, where one of three pillars of Perun, the Slavic thunder god, was discovered under a church foundation from the 12th century (Svirin 2006: 245). The same phenomenon has been followed in Estonia: for example, according to the Estonian archaeologist Marika Mägi, the church of Valjala “was obviously built at a pagan cult place, a low hill beside a little sacred lake” (Mägi 2002: 155). There are other folklore texts that refer to the same tradition, for instance about the church of Juuru:

At the church of Juuru there was an old grove site of Estonians. There are still two oak trees there, from this oak grove. [...] Offerings were

made there later as well [...] Ribbons were tied there in the past. [...] (RKM II 401, 320/1 (5), Mall Hiimäe, Juuru parish, Central Estonia)

There are several traditions and artefacts in case of which neither their Christian nor pagan origin is clear. The majority of examples probably represent a pagan phenomenon which was merged into the Christian context. For example, it has been discussed whether the so-called 'walking rites', processions through the fields that were held in parts of Sweden and Norway as late as in the 19th century, were actually a pre-Christian ritual replaced by similar church ceremonies (Nielsen 1997: 382). Similarly, "evidence for the existence of 'pagan hermits' before the Christian eremitic movement" can be found (see Dodds 1965: 31). The phenomenon of werewolf should be mentioned as well: Jacques Le Goff has suggested that it was easy for the medieval imagination to turn several old folklore characters into monsters (Le Goff 1991: 133). The living dead are the product of the same "imagination". Although Christianity insisted that ghosts are souls rather than walking corpses, the two views sometimes co-existed. Corpses reanimated by the devil are mentioned as horrifying but undoubted facts by several 12th-century clerical writers from various parts of Britain (Simpson 2001: 306). There are plenty of examples from folk medicine, which reveal that old habits are complemented by Christian practices: for example, fire for treating erysipelas has two strata – the earlier stratum (fire as something purifying in folk religion) and the later one (fire as St Anthony's fire) (Veidemann 1985: 146). Among other things Christianity brought along tendencies of superstition. For example, after Estonia was Christianized, the sauna, an important place for healing and witchcraft among the Slavs and Finno-Ugrians became a place where water turned into blood after Saturday midnight, and werewolves and devils came to vex late sauna-goers (Gustavson 1969: 95).

Numerous analogical examples can be given on the basis of artefactual material. For example, a bronze bell found in Borg, Sweden, has been interpreted by several scholars as having both pre-Christian cultic and early Christian contexts (see more in Nielsen 1997: 387 and references therein). 'Thunderbolts' can be considered the kind of phenomenon that has crossed, so to speak, the border of pre-Christian ideology and acquired new qualities in the Christian context: for example, their use in heavenly war. An example of how Christian church has used 'thunderbolts' is a large jadeite axe head that was found in the roof of the granary of a ruined Cistercian nunnery at Bonn, presumably placed there as a protection against lightning not earlier than the 12th century, and possibly later (Merrifield 1987: 13). Judging by a discovery of a flint dagger in Skåne, it was probably immured in the wall of a church



Figure 7. Neolithic spearhead in a bronze case. Note the cross motif engraved on the case. (Museum of Novgorod, Russia.)

(Blinkenberg 1911: 90). A remarkable find from the 14th century was made in Novgorod, Russia, where a Neolithic flint spearhead was unearthed during archaeological excavations. The spearhead had been enclosed in a bronze case, decorated with a cross (Fig. 7). These finds lead to the conclusion that the church too was a building that needed a superstitious protection against the strike of lightning. Thus

it seems that ‘thunderbolts’ functioned as amulets referring to the syncretism of paganism and Christianity which were not considered a pagan remnant necessary to eliminate during the Christian era. In addition to their use by the general population, it always remained an important accessory for people closely connected to the church. When the rituals that involved the use of a ‘thunderbolt’ meant using Christian beliefs about miracles, saints, holy water, etc., then the church tolerated and even fostered the activities (Gazin-Schwartz 2001: 266). A similar, but a much later (18th- to 19th-century) example where the use of ‘thunderbolt’ has been marked by a Christian theme can be found in the belief that god used ‘thunderbolts’ to eliminate Satan. According to Carl Russwurm, the Christian belief in demons and Satan has actually replaced the old image of the fight between evil ghosts and thunder god (Russwurm 1855: 249). At this point an example from the *Superstition, Tradition, Ways and Habits of Estonians*, collected and published by Johann Gottfried Forselius (2004[1684]) is appropriate:

When it rumbles, they used to say that thunder god is chasing after the devil and where he catches him, he strikes into the ground and knocks the devil on the ground. That is why they carefully close the doors and windows when it rumbles so that the devil would not crawl into the house and lightning would not strike there. A trustworthy man told me that some farmer had indeed proved him that once with a tremendous thundering he saw a devil in the corner of his room; when he had chased the devil out with a big carrying pole, lightning killed the devil immediately in front of the door, and with several neighbours he had seen the

devil with three ugly heads lying dead on the same spot. (Forselius 2004 [1684]; see also Russwurm 1969 [1855]: 249)

Similar examples can be found in Latvia (see further in Vasks 2003: 30).

On the basis of several examples it can be said quite confidently that religious (superstitious) phenomena that started off during the pagan time were not only kept alive under the influence of Christianity but were often even amplified. Numerous new magical functions for the 'thunderbolts' certainly appeared during the period of Christianity. From the perspective of the present article it is probably more important to observe when and in what way the magical and healing aspects of 'thunderbolts' have reached the Estonian folk. As it is known, Christianity was officially adopted in Estonia in the 13th century, although some aspects of Christianity definitely spread to our territory already before. However, there are numerous instances that rather support the belief that many magical formulae written down in the 19th century have reached our region with the adoption of Christianity. For example, the custom of carrying 'thunderbolt' around in a sowing-sack during sowing has been recorded in Estonia; the same tradition is known in Germany but not in Scandinavia (see Blinkenberg 1911: 97). At the same time the idea that 'thunderbolt' keeps the milk from going sour and ensures good butter is widely known in Scandinavia but relatively unknown in Estonia. Since contacts with Germans were started in the Middle Ages, the relations were stronger with the Scandinavian countries in the Iron and Viking Age, and getting acquainted with the mentioned magical and other rituals in Estonia can be dated to the period following the Christianization.

When trying to date the beginning of the belief on the basis of archaeological material, stone axes and adzes that have usually been considered 'thunderbolts' can be of help. The process in the course of which the stone axe as a man-made tool disappeared from people's minds and was replaced by a magical attribute took place over many generations, but it is quite possible that in Estonia the belief in 'thunderbolts' was not immediately ascribed to stone axes when they were no longer recognized as man-made. It is likely that for a long time they were perceived as a legacy of ancestors and their role was understood similarly to other earlier material in Iron Age graves. During the period when stone cist graves and *tarand*-graves were in use, a strong bond between ancestors, commemorating them and preserving the traditions was established. The adding of Stone Age material to graves is merged with this ideology. It has been suggested that during the use of stone cairns, graves started to lose significance as a ritual place connected with ancestral cult and for conducting rituals (Jonuks 2005); at the same time, the change does not need to be final.

For example, the Stone Age artefacts discovered at the Viking and Late Iron Age settlement and burial sites in Madi, South Estonia, as well as Piila and Tõnija on the island of Saaremaa, West Estonia, can be connected with thunder, but it is even more likely that these represented a longer preserved ancestor cult or a certain intermediary degree between different magical roles.²⁷ A certain influence of Christian mentality which left genealogy on the background but considered the role of magic important cannot be left unnoticed. It would be strange to believe, though, that crusaders who came to convert the people of Estonia to Christianity also brought along the superstitious sacralization of ‘thunderbolts’. Rather it seems that the knowledge of axe as a ‘thunderbolt’ existed on the background of the distribution of different ideas all through the 1st millennium in the Baltic region but became visible only as a result of Christian impact. The belief in ‘thunderbolts’ in its specific “elaborated” form can be dated to the Middle Ages and the modern period in this region.

The end of the belief in ‘thunderbolts’

How long did the belief in ‘thunderbolts’ persist? According to Gazin-Schwartz (2001: 266 and references therein) in the collective mind there are close links between the pre-Reformation Christianity and ‘magical’ rituals designed to achieve practical ends throughout the Middle Ages. Belief in the efficacy of these rituals weakened only in the late 17th and 18th century, following the Reformation. In addition to the religious change, also historical processes such as agricultural advances, scientific approaches to diseases, introduction of fire insurance promised people protection against illnesses and misfortune, thus removing the need to use magical rituals. Despite the fact that by the 18th century at the latest, the learned circles had acknowledged the man-made origin of ‘thunderbolts’, it took much more time for these to be accepted by the common folk. In fact, it would not be surprising to find the traces of the old belief even nowadays. For example, Cornelius Holtorf (1998) mentions two stone axes that could be seen at one gable near the apex of the roof of a farm building in Rothemühl, Kreis Ueckermünde as late as in 1988. Examples of ‘thunderbolt’ fetishism from the 19th and the beginning of the 20th century are numerous in Estonia as well as elsewhere; for instance, Christian Blinkenberg (1911) in his thorough treatment offers quite a few from Denmark:

During a summer’s residence at Refsnæs (district of Holbæk) in 1877 or 1878 I visited the peasants in search of stone antiquities. At a farm where I went for that purpose the farmer’s wife showed me a stone axe fixed

under the thatched roof; but she would not sell it, as, according to her, it protected the house against lightning. [Communicated in 1909 by Mr Peter K bke, secretary to the city board of Copenhagen.] (Blinkenberg 1911: 69)

Next to the archive texts that describe the use of 'thunderbolts' at the end of the 19th and the beginning of the 20th century, there are examples that show that during this time the belief was in most part dependent on a specific person and definitive conclusions cannot be made about the attitudes of the whole village or even a nation. For example: "Who did it [thunderbolt], did it come from sky or somewhere else, or was it the product of factory." (ERA II 284, 129 (128), Liis Pedajas, Sangaste parish, South Estonia). Jung has written in the last quarter of the 19th century: "The superstition of folk has mostly become the object of fun and mocking; it is often considered in some places as a toy, and there it seems as an innocent poem (Jung 1879: 5)". Still there are people who, in spite of knowing what the 'thunderbolt' really is, continue to believe in them:

I myself carried a couple of stones in my pocket and felt fairly safe in a thunderstorm; I did this even after I had learned at school what the stones really were. Vonsild near Kolding. [Communicated in 1908 by Mr Andr. G. Jensen, headmaster of Flemming school.] (Blinkenberg 1911: 81)

It may be concluded that the end of the belief in 'thunderbolts' cannot be dated with any degree of certainty; in fact, it may still be a living tradition even in Estonia.

CONCLUSION

The belief in 'thunderbolts' is a very widespread tradition that has been known to people in America, Asia, Europe, and Africa. According to the legend, every time the lightning struck, a stone fell from the sky. The thunderstone protected the house, property (cattle, grain, etc.) and the family of its keeper against strokes of lightning and all kinds of misfortune and illnesses.

A huge number of 'thunderbolts' are actually prehistoric artefacts, predominantly stone axes, daggers, chisels, sickles, spearheads, arrowheads, elliptical fire stones (strike-a-lights) and other items that were not identified as man-made by the finders. A big part of the current study has been devoted to the long way that lead to the identification of those artefacts as man-made and not

as fallen from the sky during thunderstorms. Although the first steps on the way of acceptance were made already by the ancient Greek and Roman, the breakthrough came with the Italian Renaissance of the Early Modern period and was connected with the remarkable rise in the interest of natural history, the voyages of discovery, the emergence of scholars as the third leading power in European societies and the establishment of cabinets of curiosities (*Wunderkammern*). Although by the 17th century both the human production of stone tools and their considerable antiquity in Europe were relatively widely accepted among the learned circles, common people found it difficult to connect ‘thunderbolts’ with artefacts that have been made by humans at least until the 19th century. However, it is impossible to date the end of the ‘thunderbolt’ belief, since in places it may still be a living tradition. The authors whose works have been consulted or cited in the study represent only a section of the whole myriad of what has been written about the topic. Certainly, some studies have been disregarded and others overexploited but hopefully the objective – to give an overview of the course of acceptance of the remains of the past and perhaps offer the reader a few less-known but exciting nuances on the way – was reached.

The belief in the materialized forms of thunder has probably existed for a long time. In the Stone Age, ‘thunderbolts’ (stones fallen from the sky) could have been strangely shaped stones, also fossils. On the Estonian territory, man-made artefacts – adzes, axes, flint and quartz items – were first connected with ancestors in the Iron Age and were taken into use as magico-protective objects. Evidently, the one function was soon supplemented by another which associated axes with the weapon of the thunder god. But generally the protective magic of stone artefacts did not change and being a divine weapon was not so important. The phenomenon of ‘thunderbolts’, about which folklore texts have been preserved to this day, could have emerged already in the 1st millennium AD with the texts of antique authors or early medieval writings. However, it is much more likely that the motifs of the belief reached the Baltic region later, in places already in the Late Iron Age (for example, axes from Pada and Lagedi, North Estonia), and, as expected, only after the Christianization of Estonia at the beginning of the 13th century.

As magico-protective and healing stones/items, ‘thunderbolts’ are known in Estonia predominantly from folklore texts, according to which strike-a-lights, shaft-hole axes and adzes as well as fossils have been considered ‘thunderbolts’. On the basis of folklore texts and archaeological items, ‘thunderbolts’ and the ‘thunderbolt’ belief in Estonia can be regarded as a widespread phenomenon: these have been perceived as magical items; different beliefs have been attached to these and they have been used for healing purposes. ‘Thun-

derbolts' are definitely a very complex phenomenon which due to its long dating has been changed, and has acquired new, and lost its abandoned functions. The folklore material collected in the 19th century and the scarce archaeological material, which more or less confirm the perceptions of 'thunderbolts', only offer recorded moments from the history of knowing-perceiving-using the given phenomenon. Only a proper analysis of all the artefacts that have been regarded as 'thunderbolts', as well as comparative material of the neighbouring countries will yield additional material for future research.

NOTES

- ¹ In Estonia many different names have been used for thunderstones [*piksekivid*, *kõuekivid*, *isukivid*] that fall from the sky: thunder arrows/lightning arrows [*piksenooled*, *kõuenooled*, *isunooled*, *välgunooled*], thunder shots, (-bullets) [*piksekuulid*, *-loodid*, *kõuekuulid*], thunder eggs [*piksemunad*], thunder balls [*piksekerad*], grandfather's shots/bullets [*vana-isa kuulid*] (Loorits 1951: 12). While *pikse-*, the first word of the compounds, was known everywhere in Estonia, the word *kõue-* was used mainly on the island of Saaremaa, in West and North Estonia, in some parishes in East Estonia but never in South and Central Estonia (Pall 1982a: 345; 1982b: 206). The word *isu-* was used only on Hiiumaa Island. (Pall 1982a: 104)
- ² The names and perceptions vary, of course. A different approach can be presented: "His father brought 'stars' [fossilized sea-urchins or echinites] and 'thunder-arrows' [belemnites] home from the fields. Lars was quite sure that the 'stars' came down with the shooting stars and the 'thunder-arrows' with lightning." (Blinkenberg 1911: 77)
- ³ For example, David Clarke writes of Michael Mercati, one of the best-known naturalists of Italian Renaissance, "These three stands, comprising field observations, ancient tradition, and contemporary ethnology were the foundations of Mercati's interpretation and remain, in altered form, the foundations of modern archaeology" (Clarke 1968: 6). Mercati's contribution will be discussed in the main article text.
- ⁴ Although the bases of the three age system were in a way formed already by Lucretius (see the citing in the following section in the main article text), the theory did remain dubious for many scholars as late as in the 18th century and even later. Still, the acceptance was growing that for some time in the remote past at least some Europeans had made and used stone tools (Trigger 1989: 61).
- ⁵ The first *Wunderkammer* was established in Vienna in 1550. The collections included rarities of all sorts, natural and artificial, for example in the collection of Ralph Thoresby there were among other things European coins and medals of all ages, human rarities such as an Egyptian mummy, wonderful monsters such as a "young Cat with Six Feet and Two Tails having two distinct Bodies from the mid-Back", specimens from exotic animals like the foot of a white bear, shells and butterflies, rare exotic plants, fossil shells, formed stones, corals, mathematical instruments like a telescope and two globes, paintings, maps, ancient manuscripts, Roman an-

tiquities, etc. (see more in Whitaker 1997: 85ff). Many of the collections in the cabinets became the source collections of later museums, for example the cabinet of John Tradescant from the 17th century was the heart of the Ashmolean Museum (more in Trigger 1989: 47). In Denmark, Ole Worm, professor of medicine at the University of Copenhagen, founded a famous museum which formed the basis for Denmark's National Museum (Hafstein 2003: 5; Jakobsen 2007). The cabinets started to vanish around the turn of the 18th century when the collections were not so popular anymore (Hafstein 2003: 6).

- ⁶ Apparently Ulisse Aldrovandi described a small 'dragon' with a long neck, a very long tail and a fat body, seen along a farm road in northern Italy in 1572. After it was killed by a farmer, Aldrovandi obtained the dead body, made measurements and a drawing and had the animal mounted for a museum (Aldrovandus 1640: 402).
- ⁷ Stone tools were seen in use alongside metal ones in the contemporary world and according to the Bible iron working was practised from early times. As late as in 1857, some scholars argued that stone tools must be imitations of metal originals for the people too poor to own iron metal (Trigger 1989: 55).
- ⁸ In reality, Worm proved that what was believed to be the horn of the unicorn, a very expensive and valued medication, was actually the tooth of narwhal. Nevertheless, even after the myth was discarded, the unicorn's horn was still used in medicine as a remedy (Hovesen 1987: 254–257, 316).
- ⁹ Because of scholasticism – a fusion of Christian theology and classical philosophy, which was the dominating epistemology up to the 17th century – the named contradiction was hardly consciously formulated before the 17th century and the rise of scientific interest. Since scholasticism meant very strong belief in earlier texts and the notion that everything has already been said, very little doubt was raised regarding the words in the Bible or the texts of the classical authors (see more in Jensen 1999: 562).
- ¹⁰ Some examples: *June 20, 1880, it was reported that a 'thunderbolt' had struck the house at 180 Oakley Street, Chelsea, falling down the chimney, into the kitchen grate. Mr. Symons investigated. He describes the 'thunderbolt' as an "agglomeration of brick, soot, unburnt coal and cinder". He says that, in his opinion, lightning had flashed down the chimney, and had fused some of the brick of it. He does not think it remarkable that the lightning did not then scatter the contents of the grate, which were disturbed only as if a heavy body had fallen. If we admit that climbing up the chimney to find out is too rigorous a requirement for a man who may have been large, dignified and subject to expansions, the only unreasonableness we find in what he says – as judged by our more modern outlook, is: "I suppose that no one would suggest that bricks are manufactured in the atmosphere". Then comes the instance of a man, his wife, and his three daughters, at Casterton, Westmoreland, who were looking out at their lawn, during a thunderstorm, when they "considered", as Mr. Symons expresses it, that they saw a stone fall from the sky, kill a sheep, and bury itself in the ground. They dug. They found a stone ball. Symons: Coincidence. It had been there in the first place. (The cases are described in Fort 1919 and taken from the Symons' "Alleged thunderbolts" in *Quarterly Journal of the Royal Meteorological Society of London*, Vol. 14 (1888)).*
- ¹¹ One sowing-sack [Est. *külimit*] equals 11–24 litres.

- ¹² Latvian mythological legends include a series of stories about Thunder (*Pērkonis*) trying to strike down the Devil. For example, God argued with the Devil about who should rule the earth. God told the Devil that he would make Thunder strike him down wherever he might hide – in people, animals, in wood or water. The Devil and God are still fighting today. Wherever the Devil is hiding, Thunder strikes (Vasks 2003: 30).
- ¹³ The author has carried out thorough research into shaft-hole stone axes (Johanson 2006a, b) where next to the potential Stone Age deposition contexts later use of Stone Age artefacts and the possibility of secondary deposition context was emphasized.
- ¹⁴ At least four and five shaft-hole stone axes, respectively, have been discovered from the yards and garden plots of private houses on the territory of present-day cities of Tallinn and Tartu, but the number is probably even bigger.
- ¹⁵ According to Indreko (1925: 36–41) oven ruins [*ahjuvared*] are ruins with “much brick, lime and coal debris, sauna rocks, etc.” Thus these could rather indicate a place of crumbled buildings, but sometimes probably stone graves as well.
- ¹⁶ For example, shaft-hole stone axes have been collected near the ruins of a farmstead in Patküla village, South Estonia (VaM 1590 A 27) (Valk 1987: 78); by a building ruins in Läsna village, North Estonia (RM A 18); under an oven ruins in Pärassaare village, Southeast Estonia (Markus & Allik 1923: 9); under the foundation of railway barracks in Aruküla village, North Estonia (Mägiste 1924: 1), and under the foundation of a factory in Sindi, Southeast Estonia (Laid 1924: 66).
- ¹⁷ Pottery shards collected during preliminary excavations at the settlement site of Lagedi in 1998 belong to the time span from the 7th to the 12th century and the 14th to the 16th century, the whole find material is dated to the period from the end of the 1st millennium to the 18th century (Sarv 1998: 13).
- ¹⁸ For example, according to the record only a single human tooth and a stone axe (AI K 91: 12) were gathered in a destroyed *tarand*-grave in the village of Rootsiküla on Muhu Island (Tallgren *et al.* 1924: 139); a fragment of a shaft-hole stone axe was found in a stone grave in the village of Raiste (Urgart 1922: 1). We can probably add to this list the core drilled out of the shaft of a stone axe found in the grave of Kurevere on Saaremaa Island (Vaab 2003: 30).
- ¹⁹ However, in these cases it is also possible that the surface of limestone slabs have been eroded with time so that fossils have been exposed.
- ²⁰ Lõugas (1996: 117) has expressed hope that round and oval stones (the so-called ‘thunderstones’) would be gathered more carefully than before, and not only on archaeological excavations.
- ²¹ Nevertheless, on different images and statues of Zeus the thunderbolt he uses is a “winged bundle of lightning” and not an axe (see, for example, Figs. 11–14 in Salo 1990, from the last centuries of the 1st millennium BC).
- ²² Blinkenberg gives an example from the Mycenaean period in Knossos, Crete, where an altar stood with various cultic objects, including double axes in the central place (Blinkenberg 1911: 17ff).

- ²³ In Estonia iron started to be locally produced during the Late Pre-Roman Iron Age, approximately 200 years BC, the oldest traces of iron melting originate in the second half of the Pre-Roman Iron Age from Tindimurru in Virumaa, Northeast Estonia (Kriiska & Tvauri 2002: 129), iron melting sites of the same period have been suggested in Jüri and Rae, and probably in Siksali (Peets 2003: 323ff). It was only then that iron tools came in use and replaced stone in the production of consumer goods.
- ²⁴ Weapons with ceremonial or ritual and/or magical meaning (e.g., some stone battle axes) could have been made as non-practical items but even so their production cannot be connected with thunder god. In addition, the meaning and types of artefacts change during their spread and so the axes that were imported to our region or which shape was imitated here no longer needed the initial ritual meaning attached to these. A question emerges why axe is usually depicted as the weapon of thunder god? Several shaft-hole axes, such as those from the Funnelbeaker culture, have been considered ceremonial already from the start of their production; also the first copper axes are an example of these (see Vandkilde 1996). Small axe-shaped amulets are known from many cultures and periods (see Skeates 1995); in modern period the Wend children in Lausitz wore amulets fashioned like stone axes as protection against evil (Blinkenberg 1911: 100); also the Mycenaean grave finds belong here (Blinkenberg 1911: 108). It could be suggested that already familiar ritual artefacts attract new beliefs more easily.
- ²⁵ Of course, it is difficult to say about the remote past and without written sources whether Stone Age artefacts found in Iron Age graves and settlements were already perceived as 'thunderbolts' or they were regarded as general magico-protective items. Vasks, however, having stated the same, gives two examples from Latvia where the stray find of two shaft-hole axes with grounded grooves similar to strike-a-lights was discovered. Vasks suggests that the axes could have been used as strike-a-lights and this suggestion supports his other speculation that stone axes may have been considered magical heavenly objects ('thunderbolts') already then, in the Iron Age (Vasks 2003: 31).
- ²⁶ The letter of Pope Gregory the Great to king Æthelberht of Kent in England from the year 601 can be viewed as an example of this. As it stands there, pagan temples should not be destroyed but only idols in them: "if the sanctuaries are well built, it is essential that they should be transformed from the cult of demons to the cult of the true God, so that people, when they see that their sanctuaries are not destroyed, abandon the false belief in their hearts" (cited in Nielsen 1997: 373).
- ²⁷ In the West-Estonian word *kõu* a connection between thunder and ancestors is formed and the word has derivatives in Finnish where *kouko* means 'ghost', 'bear', 'predator', 'louse', 'stout person', corresponding to the word *kõuk* or 'ancestor' in Estonian dialects (Rätsep 2002: 115). According to Estonian folklorist Uku Masing, the Lithuanian word *kaukas* means 'underground man', 'unbaptized dead child', 'a ghost of the breed of dwarfs'. Considering both the Lithuanian as well as the Finnish etymology, it may be concluded that *kõu* means 'old', 'dying' or 'already dead (ancestor)' (Masing 1995: 39 and references therein).

ARCHIVE SOURCES

ERA – Estonian Folklore Archives

E – Matthias Johann Eisen collection in Estonian Folklore Archives

H – Jakob Hurt collection in Estonian Folklore Archives

RKM – State Estonian Literary Museum

ERM – Folklore archives of Estonian National Museum, held in Estonian Folklore Archives

AI – Institute of History, Tallinn

VaM – Valga Museum

VM – Viljandi Museum

RM – Rakvere Museum

PäMu – Pärnu Museum

SM – Saaremaa Museum

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