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Skeuomorphism in Neolithic amber craft: imitations of the heads of axes and battle-axes[1]

https://doi.org/10.26881/porta.2024.23.02

Keywords: amber, Baltic, Neolithic, axe, battle-axe, stone, flint, copper

Słowa kluczowe: bursztyn, Bałtyk, Neolit, siekiera, topór, kamień, krzemień, miedź

Skeumorfizm w bursztyniarstwie neolitycznym: naśladownictwo siekier i toporów

Wśród wyrobów bursztynowych wywodzących się z neolitu (ok. 4000–1750 p.n.e.) w zachodniej i południowej części basenu Morza Bałtyckiego można znaleźć imitacje siekier i toporów w tamtym okresie wytwarzanych w krzemienia i kamienia, a czasem także miedzi. Stylistyka bursztyniarska oparta na naśladownictwie wytworów rąk ludzkich stanowi całkowity zwrot w stosunku do sztuki mezolitu (ok. IX–V tysiąclecie p.n.e.), kiedy to głównie przedstawiano w bursztynie przyrodę – zwierzęta. Skeumorfy siekier i toporów wykonane w bursztynie pojawiają się począwszy od ok. 3300 p.n.e. w kulturach pucharów lejkowatych, amfor kulistych, ceramiki sznurowej i toporów bojowych, każdorazowo wiernie odzwierciedlając kształt ich kamiennych i krzemiennych odpowiedników właściwych tym kulturom. Mają jednak mniejsze rozmiary i perforacje umożliwiające ich noszenie jako ozdób, np. paciorków w naszyjniku czy zawieszek. Ze względu na te cechy oraz właściwości surowca, z którego zostały wykonane – bursztynu, nie mogły one pełnić funkcji utylitarnych, tak jak siekiery i topory kamienne lub krzemienne.

Rola tych bursztynowych przedmiotów, poza zdobieniem ubioru, najpewniej sprowadzała się do symbolizowania pewnych treści kojarzonych ze wspomnianymi narzędziami, potencjalnie wykorzystywanymi również jako broń. O ile krzemienne siekiery stanowiły przedmioty codziennej pracy, które ze względu na swoją przydatność przedstawiały zapewne dużą wartość dla neolitycznych osadników-rolników w warunkach gęstego zalesienia północnej Europy, o tyle kamienne topory bojowe wykraczają poza sferę czysto utylitarną. Są one często

[1] The author would like to express his gratitude to the reviewers for their valuable comments on the manuscript of this article. This research was conducted within the scope of the project no. 2023/51/D/HS3/00778, "Amber and copper in the Early and Middle Bronze Age in Polish lands: acquisition, processing, circulation and use", financed by the National Science Centre, Poland.

zdobione, posiadają tępe ostrza nie noszące śladów użytkowania, a niewielkie otwory na rękojeści nie pozwoliłyby na ich efektywne wykorzystanie. Z tych powodów niektórzy badacze traktują je jako broń symboliczno-paradną. Niemniej jednak znane są przykłady toporów kamiennych o mniej wyszukanej formie, które noszą ślady uszkodzeń i napraw. Niewykluczone zatem, że przedmioty te mogły być w pewnych sytuacjach wykorzystywane do pracy lub w walce, choć trudno jest określić, jak uderzenia o tkanki miękkie i kości mogłyby wpłynąć na ich ostrza.

Dane archeologiczne wskazują na kryzys, jaki miał dotknąć społeczności neolityczne w związku ze zmianami klimatycznymi pod koniec IV tysiąclecia p.n.e., czyli w okresie powstawania pierwszych bursztynowych skeumorfów. W tych warunkach mogło dochodzić do migracji, rywalizacji o ziemię i niepokojów przybierających postać konfliktów zbrojnych. Bursztyn jako substancja rzadko występująca, dodatkowo uformowana na wzór siekier i toporów tradycyjnie wykorzystywanych w określonej społeczności, mógł służyć do wyrażania tożsamości oraz identyfikacji współplemieńców. Symbolika tych przedmiotów prawdopodobnie dotykała także wierzeń, na co wskazują badania lingwistyczne wywodzące takie terminy jak „grom" i „niebo" od „zaostrzonych narzędzi z kamienia/krzemienia". Wyobrażenia na temat kosmologii i sił rządzących światem przenikały do innych sfer życia społecznego, i poprzez swoją symbolikę siekiery i topory mogły znajdować zastosowanie wśród przedstawicieli grup dążących do władzy, np. jako insygnia czy talizmany. Jednakże trudno na obecnym etapie badań określić, czy bursztynowe paciorki oraz zawieszki w kształcie siekier i toporów spełniały tylko jedną funkcję, czy też ich symbolika oraz zakres zastosowań były szersze.

Abstract

Among amber artefacts originating in the Neolithic period (ca. 4000–1750 BCE) in the western and southern regions of the Baltic Sea basin are imitations of axeheads and hammerheads. These objects replicate tools that, during that era, were typically crafted from flint, stone, and occasionally copper. This trend in amber craftsmanship, based on imitating human-made objects, marks a significant departure from the Mesolithic artistic tradition (9th–5th millennium BCE), during which representations in amber predominantly depicted elements of the natural world, foremost animals.

Amber skeuomorphs of axe- and hammerheads began to appear around 3300 BCE within the Funnel Beaker, Globular Amphora, Corded Ware, and Battle Axe cultures. These items faithfully reproduce the shapes of their flint and stone counterparts characteristic of the archaeological cultures listed above. However, they are also generally smaller in size and feature perforations, suggesting their intended use as adornments – such as beads or pendants for necklaces – rather than functional tools. Given these attributes and the physical properties of amber, these objects could not have served practical purposes akin to their stone, flint, or metal prototypes.

In addition to their decorative role, these amber artefacts likely carried symbolic meanings, referencing the tools they imitate – tools that may also have functioned as weapons. While flint axes were utilitarian implements essential

for daily labour, and thus highly valued by Neolithic farming communities in the densely forested landscapes of Northern Europe, stone battle axes appear to have transcended mere practicality. Often elaborately decorated, with blunt edges and perforations too small for effective handles, they are interpreted by some scholars as ceremonial or symbolic weapons. Nevertheless, examples of more utilitarian stone axes bearing signs of damage and repair are also known, indicating that such items may sometimes indeed have been used in work or combat. However, determining the specific impacts of strikes to soft tissue or bone on such tools remains methodologically challenging.

Archaeological evidence points to a period of societal disruption among Neolithic communities linked to climatic changes at the end of the 4th millennium BCE – coinciding with the emergence of the first amber skeuomorphs. Under these conditions, processes such as migration, competition for land, and armed conflict likely intensified. Amber, as a rare and visually striking material, fashioned into forms evoking axe- or hammerheads traditionally used within specific communities, may have served as a medium for expressing group identity and social affiliation. The symbolic resonance of these items likely extended into the spiritual realm. Linguistic studies, for example, suggest that words such as "thunder" and "sky" may derive from terms originally associated with "sharpened stone/ flint tools". Cosmological beliefs and conceptions of the forces governing the world permeated social life, and through their symbolic associations, axes and hatchets could have functioned as insignia or talismans among individuals or groups seeking authority or prestige.

Current research does not yet allow for a definitive interpretation of the roles and meanings of amber beads and pendants shaped as axe- and hammerheads. It remains unclear whether amber beads and pendants shaped like axe- and hammerheads had a single, fixed role and meaning, or whether their symbolism and use were broader.

Introduction

People have used amber as a medium to convey artistically their perceptions of the world since the dawn of time. Already in the Mesolithic (ca. 9th–5th millennium BCE) hunter-gatherers living in the Baltic Sea Basin collected locally occurring fossil resin (*succinite*) to turn it into ornaments and figures, often fashioned after the animals they encountered.[2] Around the turn of the 5th and

[2] Lars Larsson, *The Sun from the Sea – amber in the Mesolithic and Neolithic of Southern Scandinavia* [in:] *Baltic Amber. Proceedings of the International Interdisciplinary Conference "Baltic amber in the natural sciences, archaeology and applied arts", 13–18 September 2001, Vilnius, Palanga, Nida*, ed. Adomas Butrimas, Vilnius 2001, pp. 65–75; Tomasz Płonka, *The Portable Art of Mesolithic Europe*, Wrocław 2003; Gisela Woltermann, *Bernstein im archäologischen Fundmaterial. Ausgewählte Aspekte an Beispielen aus dem Mesolithikum und Frühneolithikum*, "Die Kunde N. F." 2009, Bd. 60, pp. 49–60; Karolina Bugajska, *Obrządek pogrzebowy łowców-zbieraczy epoki kamienia w południowej Skandynawii i na Niżu Środkowoeuropejskim*, "Przegląd Archeologiczny" 2014, t. 62, pp. 5–69.

4th millennia BCE, at the transition from the Mesolithic to the Neolithic, the tradition of zoomorphism in amber craft ceased and was replaced with a new style. At first glance, the amber artefacts being produced took more abstract forms, often morphologically simplified while being technologically more advanced, showcasing the increasing technical prowess of the maker. For instance, the elongated cylindrical beads, common in many Neolithic archaeological cultures in the Baltic Sea Basin, while unremarkable in terms of their geometric form, were a challenge to perforate lengthwise (as they sometimes exceeded 6 cm in length) using the available tools – flint drills.[3] Though the symbolism of the majority of these artefacts is no longer obvious to scholars, it is possible to rely upon formal resemblance to pinpoint natural phenomena or heavenly bodies, such as the sun and moon, which could have inspired Stone Age artisans. Yet, there is also a group of Neolithic amber finds bearing striking similarity to a group of man-made objects from the same time, namely the heads of axes and hammers of stone, flint or, rarely at this stage, copper. Since the physical properties of amber are completely different from those of the abovementioned materials, it is highly improbable that these axehead- or hammerhead-shaped amber items were used as tools or weapons, not least because they are much smaller than their lithic or metal counterparts. They usually feature perforations allowing them to be strung and worn. From this it can be inferred that the significance of axes and hammers for the Northern European Neolithic communities was great enough to make them widely recognised symbols (presumably on par with non-anthropogenic features, such as the abovementioned celestial bodies) with manifestations in a variety of materials, amber being one of them. Thus, we are confronted, possibly for the first time in the prehistory of the Baltic Basin, with a widespread trend of skeuomorphism in material culture which lasted until the turn of the 3rd and 2nd millennia BCE, when a new era – the Bronze Age – started, bringing about a different set of tropes and motifs. Below are presented selected examples from among this peculiar group of archaeological artefacts.

[3] Ryszard F. Mazurowski, *Bursztyn w epoce kamienia na ziemiach polskich*, "Materiały Starożytne i Wczesnośredniowieczne" 1983, t. V, pp. 7–130; Klaus Ebbesen, *Die nordischen Bernsteinhorte der Trichterbecherkultur*, "Praehistorische Zeitschrift" 1995, Bd. 70, H. 1, pp. 32–89; Eryk Popkiewicz, *Rekonstrukcje narzędzi, technik i technologii obróbki bursztynu z epoki kamienia*, "Prace Muzeum Ziemi" 2012, nr 50, pp. 91–99; Tony Axelsson, Anders Strinnholm, *The Use of Amber in the Scandinavian Stone Age* [in:] *From Funeral Monuments to Household Pottery: current advances in Funnel Beaker Culture (TRB/TBK) research. Proceedings of the Borger Meetings 2009*, eds. Jan A. Bakker, Simone B.C. Bloo, Monica K. Dütting, Oxford 2013, pp. 143–150; Gisela Woltermann, *Die prähistorischen Bernsteinartefakte aus Deutschland vom Paläolithikum bis zur Bronzezeit. Methodische Forschungen zu Lagerstättengenese, Distributions strukturen und sozioökonomischem Kontext*, Bonn 2016.

Forms

Amber ornaments imitating the heads of axes and hammers occurred for the first time around the mid-4th millennium BCE in the Funnel Beaker culture (henceforth FBC) – the archaeological term relating to the earliest evidence for an agricultural economy and a sedentary mode of settlement in the Baltic Basin, with its name derived from a particular kind of ceramic vessel. This phenomenon occurred in the wide zone from Jutland in the west to the Vistula river in the east, replacing or transforming the previous Mesolithic culture. Amber was already in use in the initial stages of the FBC (starting from the early 4th millennium BCE), but axehead- and hammerhead-shaped beads and pendants were introduced slightly later, around the transition from the Scandinavian Early to Middle Neolithic (ca. 3300 BCE).[4] They occur most commonly in graves and less frequently in hoards of amber.[5] Their distribution within the geographic scope of the FBC is uneven: they are characteristic almost exclusively to the Northern FBC group, with major occurrences in the regions of Schleswig-Holstein and Mecklenburg-Western Pomerania in Germany, Northern Jutland and Zealand in Denmark, and Scania and West Götaland in Sweden.[6]

While exact analogies for the hammerhead-shaped amber beads have yet to be documented among lithic or metal archaeological finds from the period, there are a number of artefacts which correspond morphologically to the axehead-shaped pieces. Typical for the Northern FBC group are double-axehead beads with two semi-circular "blades" on the opposite ends of an elongated piece of amber, narrowed in the middle, through which a hole for suspension was drilled (fig. 1a). On the basis of differences noted in the latter feature, some authors distinguish several variants of these beads.[7] They strongly resemble double-bladed stone axeheads (the so-called *Amazonenäxte*; fig. 1b) present during the Middle Neolithic (3300–2800 BCE) in the Western and Northern FBC groups, although there are often slight differences, namely the eccentrically

[4] Gisela Woltermann, *Früheste doppelaxtförmige Bernsteinperlen* [in:] *Durch die Zeiten... Festschr. für Albrecht Jockenhövel zum 65. Geburstag*, eds. Frank Verse, Benedikt Knoche, Rahden/Westf. 2008, pp. 97–111.

[5] Ebbesen, *Die nordischen Bernsteinhorte…*, fig. 10.

[6] Hilthart Pedersen, *Sozialarchäologische Analysen zur Kontinuität des neolithischen Bestattungsrituals Südskandinaviens. Versuch einer Analyse zur Sozialstruktur des Neolithikums auf der Grundlage von Bernstein und Nachnutzungen*, M.A. thesis, Christian-Albrechts-Universität zu Kiel, Kiel 2008, pp. 20–23; Axelsson, Strinnholm, *The Use of Amber…*, fig. 3:1; Gisela Woltermann, *Bernstein in der norddeutschen Trichterbecherkultur*, "Die Kunde N. F." 2013, Bd. 64, pp. 181–187; Morten Ramstad, Tony Axelsson, Anders Strinnholm, *Amber* [in:] *The Oxford Handbook of Neolithic Europe*, eds. Chris Fowler, Jan Harding, Daniela Hofmann, Oxford 2015, p. 664.

[7] Ebbesen, *Die nordischen Bernsteinhorte…*, fig. 1; Woltermann, *Bernstein in der norddeutschen…*, fig. 10; Ramstad, Axelsson, Strinnholm, *Amber…*, tab. 34.1.

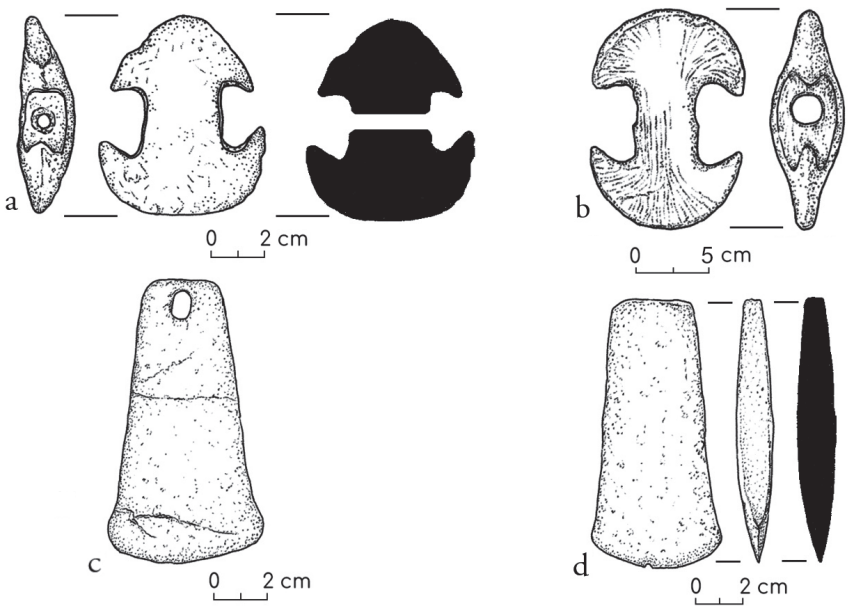

Fig. 1. Examples of axehead-shaped amber beads and pendants of the Funnel Beaker culture, and their counterparts in stone and copper: a – amber (after Ebbesen 1995, fig. 4:1), b – stone (after Bakker 2009, fig. 48:f), c – amber (after Woltermann 2016, fig. 65:o), d – copper (after Skorna 2022, fig. 65:1), all drawings by A. Dmitruczuk

located shaft-holes and unequally sized blades present in the latter.[8] Although double axeheads in stone and amber are rarely found together at the archaeological sites, they are still widespread in the same regions, thus rendering the connection more plausible.

By contrast, double-axehead beads in amber, as well as the corresponding tools in stone, are largely absent from the Eastern group of the FBC, despite the abundance of both raw materials there. FBC communities inhabiting areas of modern Poland demonstrated little interest in amber compared to their western and northern neighbours, as revealed by a huge discrepancy of amber finds in their respective territories.[9] A single amber artefact akin to a double-axehead bead, or rather pendant, was washed ashore from the Vistula river near Sandomierz in 1913, but is presently unlocated (fig. 2a). Given the circumstances of the discovery, its chronology and cultural affiliation can only be approximated through stylistic

[8] Klaus Ebbesen, *Die jüngere Trichterbecherkultur auf den dänischen Inseln*, Kopenhagen 1975, pp. 201–204; Magdalena S. Midgley, *TRB Culture: The First Farmers of the North European Plain*, Edinburgh 1992, p. 290; Ebbesen, *Die nordischen Bernsteinhorte*…, fig. 2:1–3, 4; Woltermann, *Die prähistorischen Bernsteinartefakte*…, pp. 112–113.

[9] Mateusz Cwaliński, *Evolution of amber's status and symbolism between the Neolithic and the Bronze Age: case studies from the Baltic and Adriatic Basins*, "Praehistorische Zeitschrift", in print.

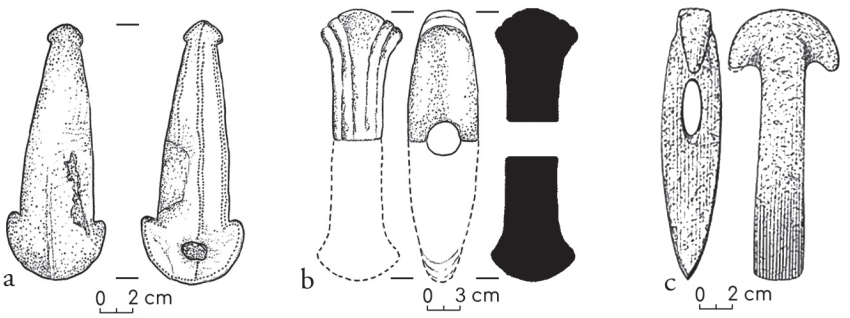

Fig. 2. Axehead-shaped amber object from Sandomierz (a), and its stone counterparts from the Funnel Beaker (b) and Globuar Amphora (c) cultures: a – amber (after Gula 1977, fig. 4), b – stone (after Bakker 2009, fig. 48:d), c – stone (after Beran 2014, fig. 4), all drawings by A. Dmitruczuk, except c by the author

analysis. Over the years it has been attributed to various Neolithic cultures.[10] Due to its semi-circular, blade-like terminations with a narrow and elongated middle part, the find from Sandomierz can be related to the group of stone axeheads representing the Hannover type, despite lacking a shaft-hole (fig. 2b).[11] This classification confirms W. Antoniewicz's original attribution of the find to the FBC.[12] Hannover-type stone axeheads are distributed exclusively in the Western and Northern FBC groups, along the south-east coast of the North Sea, far from the findspot at Sandomierz. However, they are morphologically related to the group of Saxon and Harz axeheads from Central-Eastern Germany and Bohemia, which may provide a geographically closer source of inspiration for the amber artefact in question.[13] Equally, the comparison with the Hannover type is not straightforward: the Sandomierz find has one blade smaller than the other, and lacks a collared shaft-hole, whereas in the Hannover type axeheads the blades are usually equal-sized, and the collar around the shaft-hole is always present. Nevertheless, it is worth noting the decoration on the sides: in the case of the amber artefact from Sandomierz single, double and triple rows of punctulated dots along the edges and across the middle section, and in the case of the stone axeheads, double grooves.

[10] Małgorzata Gula, *Bursztynowa plastyka figuralna epoki kamienia w Polsce*, "Archeologia Polski" 1977, t. XXII, nr 2, p. 384.

[11] Nils Åberg, *Streitäxte mit Doppeltülle*, "Praehistorische Zeitschrift" 1916, Bd. 8, pp. 85–93; cf. Karl Heinz Brandt, *Studien über steinerne Äxte und Beile der jüngeren Steinzeit und der Stein--Kupferzeit Nordwestdeutschlands*, Hildesheim 1967.

[12] Włodzimierz Antoniewicz, *Z dziedziny archeologii ziem Polski*, "Światowit"1936–1937, nr 17, p. 27.

[13] Jan A. Bakker, *The TRB West Group. Studies in the Chronology and Geography of the Makers of Hunebeds and Tiefstich Pottery*, Leiden 2009, pp. 93–94; cf. Milan Zápotocký, *Streitäxte des mitteleuropäischen Äneolithikums*, Weinheim 1992.

Despite being executed using different techniques, the outlines of this decoration are quite similar in both cases, reinforcing a possible connection.

Double-axehead shaped beads are not the only category of amber ornament in the FBC bearing a resemblance to axeheads. Another group comprises the axehead-shaped pendants, differing from the beads in the placement of the perforation which, in pendants, is perpendicular (fig. 1c). While they can be related to their lithic counterparts, as single-bladed axeheads are very common in the Scandinavian Neolithic, a closer parallel is offered by the analogous tools made of copper (fig. 1d).[14] Particularly telling are the widened blades, and lenticular cross-sections encountered in the copper examples. These pendants are rarer than the double-axehead beads, but this should come as no surprise since copper had only just made its first appearance in Scandinavia during the Neolithic, and it took over a thousand more years until it became widespread there.[15]

Roughly at the time of the Early to Middle Neolithic transition in Southern Scandinavia (ca. 3300 BCE) a different culture emerged in the southern parts of the Baltic Basin, in the areas of Germany and Poland. In comparison to the FBC, this new community gave rise to a different set of artefacts, particularly evident in pottery, among which amphorae stand out, hence the designation Globular Amphora culture (henceforth GAC). Changes were more than superficial. Developments can be seen in the economy, with more emphasis placed on animal husbandry and peripatetic settlement, thus contributing to the picture of the GAC people as "pastoralists".[16] From ca. 3200 to 2700 BCE, amber was used extensively by GAC communities. In Poland especially, amber was exploited and distributed by GAC people on an unprecedented scale.[17] The morphological variability of amber jewellery utilised by GAC is considerable, not unlike the Northern FBC group. Scholars tend to highlight the large discs with punctulated circle and cross designs, interpreted as symbols of the sun.[18] While

[14] Larsson, *The Sun from the Sea…*, pp. 68–71; Jackie Taffinder, *Stone Age gold* [in:] *Baltic Amber...*, fig. 8–9; Woltermann, *Die prähistorischen Bernsteinartefakte…*, fig. 65.

[15] Lutz Klassen, *Frühes Kupfer im Norden: Untersuchungen zu Chronologie, Herkunft und Bedeutung der Kupferfunde der Nordgruppe der Trichterbecherkultur*, Aarhus 2000; Jan P. Brozio, Zofia Stos-Gale, Johannes Müller, Nils Müller-Scheeßel, Sebastian Schultrich, Barbara Fritsch, Fritz Jürgens, Henry Skorna, *The origin of Neolithic copper on the central Northern European plain and in Southern Scandinavia: Connectivities on a European scale*, "PLOS ONE" 2023, vol. 18, no. 5.

[16] Marzena Szmyt, *Collective graves, flint axes, and cows. The people of Globular Amphora culture on the Vistula and Odra* [in:] *The Past Societies 2. Polish lands from the first evidence of human presence to the Early Middle Ages: 5500–2000 BC*, ed. Piotr Włodarczak, Warszawa 2017, pp. 211–274; Johannes Müller, *Separation, hybridisation, and networks. Globular Amphora sedentary pastoralists ca. 3200–2700 BCE*, Leiden 2023.

[17] Mazurowski, *Bursztyn w epoce kamienia…*, pp. 55–65.

[18] Janusz Czebreszuk, *Amber on the Threshold of a World Career* [in:] *Amber in Archaeology. Proceedings of the Fourth International Conference on Amber in Archaeology, Talsi 2001*, eds. Curt W. Beck, Ilze B. Loze, Joan M. Todd, Riga 2003, pp. 164–179; Adomas Butrimas, *Amber discs with cross decoration in the South Eastern Baltic*, Vilnius 2018.

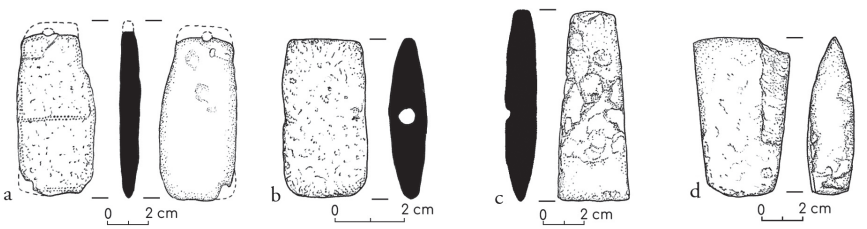

Fig. 3. Examples of axehead-shaped amber beads and pendants of the Globular Amphora culture, and their counterparts in flint: a – amber (after Mazurowski 1983, fig. IX:50), b – amber (after Mazurowski 1983, fig. XI:9), c – flint (after Boroń/Winiarska-Kabacińska 2021, fig. 6), d – flint (after Bronicki 2000, fig. 4:7), all drawings by A. Dmitruczuk

certainly most striking in appearance, they are less numerous than the tubular/elongated cylindrical beads, buttons with V-shaped perforations, or axehead-shaped beads and pendants.[19] The last-mentioned are of particular interest since they follow the trend already established by the FBC, but seem to have been adapted to match the appearance of flint axeheads produced by the GAC (fig. 3a–b). This hypothesis seems plausible especially when comparing those axehead-shaped amber artefacts with axeheads made of banded flint obtained from the Krzemionki Opatowskie mines (Ostrowiec Świętokrzyski, Poland) and used throughout the GAC sphere (fig. 3c–d).[20] Their amber counterparts have lenticular cross-sections and an elongated rectangular or trapezoid form corresponding to the shape and polished surfaces of the flint axeheads. The difference is that the flint axeheads lack the shaft-holes since they were butt-hafted, whereas axehead-shaped amber ornaments were perforated longitudinally (across the length and along the width of the objects), in the case of beads (fig. 3b), or perpendicularly (along the thickness) at the distal end of the object, in the case of pendants (fig. 3a). Pendants are occasionally decorated along the edges with punctulated dots arranged in double rows – the same technique as seen in the aforementioned discs; apparently this was a specific trait of GAC amber-working (fig. 3a).

The tradition of working amber, along with certain ornament types, may have been borrowed from the slightly older FBC by the GAC, especially from its Northern group where this craft was more advanced than in the eastern parts of the FBC domain. This is confirmed, for example, by the occasional presence of the double-axehead beads akin to FBC models in the Western GAC group in Germany, and by sporadic discoveries of hammerhead-shaped beads in the Central GAC group

[19] Mazurowski, *Bursztyn w epoce kamienia…*, tab. 5.

[20] Wojciech Borkowski, Janusz Budziszewski, *The use of striped flint in prehistory*, "Archaeologia Polona" 1995, t. 33, pp. 71–87.

in Poland.[21] Nevertheless, there are internal differences between amber assemblages from the Western and Central GAC groups, reflected, for example, by the absence of single-blade axe-shaped beads and pendants west of the Oder river. Interestingly, these spatial differences overlap with the distribution zones of the two variants of lithic axeheads: banded-flint axeheads favoured by the GAC communities in Poland, and stone fan-butted axeheads (*Nackenkammäxte* in German) that were popular among the Western GAC communities but in Poland are only encountered in Pomerania.[22] It has been argued that the fan-butted axes evolved from TRB double-axeheads.[23] This could also explain why double-axehead amber beads stayed in use among those western communities during the GAC phase. Here, it is worth returning to the problematic Sandomierz amber axehead pendant discussed above. Given its unknown provenance it is possible that it, in fact, originates from the GAC – an hypothesis already posited by E. Šturms in 1955.[24] There are two elements that allow for such interpretation. The first is that it exhibits the punctulated decoration which, as argued before, is typical of GAC amber crafting, and, secondly, its shape more closely resembles some fan-butted axeheads than Hanover-type FBC axeheads (fig. 2c). Unfortunately, the question of origin of the amber axehead-pendant from Sandomierz will probably never be solved; however, both the FBC and the GAC options seem equally viable.

During the final stages of the Neolithic (ca. 2800–2150 BCE in Central Europe, 2800–1700 BCE in Northern Europe), these cultural transformations impacted upon the ways in which amber was shaped. This phase can be best described in terms of several widespread patterns occurring among communities inhabiting different regions of Europe. These patterns are particularly evident in funerary practices from the period: singular inhumations slowly replace collective burials, with specific arrangements for males and females, seen in the positioning of the bodies in a N–S direction but on opposite sides (usually: right – males, left – females), accompanied by different grave goods (weapons – males, jewellery – females). This has led to the "single burial complex" descriptor to which are attributed, for example, the Corded Ware culture (CWC), Single Grave culture (SGC) and Battle-Axe culture (BAC).[25] Yet, deviations from these patterns suggest that these norms were not always strictly followed.

[21] Mazurowski, *Bursztyn w epoce kamienia…*, tab. VIII:1; Woltermann, *Die prähistorischen Bernsteinartefakte…*, p. 118.

[22] Müller, *Separation, hybridisation, and networks…*, fig. 276.

[23] Jonas Beran, *Nackenkammäxte und A-Äxte: eine Werkstatt – zwei Auftraggeber?* [in:] *Varia neolithica VIII – Dechsel, Axt, Beil und Co – Werkzeug, Waffe, Kultgegenstand ? – Aktuelles aus der Neolithforschung*, eds. Hans-Jürgen Beier, Ralph Einicke, Eric Biermann, Langenweissbach 2014, pp. 21–30.

[24] Eduard Šturms, *Die neolithische Plastik im nordischen Kulturkreis*, "Jahrbuch Des Römisch--Germanischen Zentralmuseums Mainz" 1955, Bd. 2, p. 24.

[25] Martin Furholt, *Mobility and Social Change: Understanding the European Neolithic Period after the Archaeogenetic Revolution*, "Journal of Archaeological Research" 2021, vol. 29, no. 4, pp. 481–535.

Certain older traditions lingered as is indicated by the occurrence of communal graves as well as the use of amber ornaments by representatives of both sexes. Generally speaking, amber jewellery changed very little, although there was an increase in less sophisticated forms, such as simple globular and ellipsoid beads.[26] Meanwhile, objects such as amber discs, V-perforated buttons, or axehead-shaped beads and pendants were still being manufactured. The latter are not encountered as frequently as previously but a small number of cases stand out for their particular appearance. It is currently possible to name three examples of amber beads closely resembling stone "boat-shaped" battle-axeheads – one of the most iconic elements of material culture related to the "single burial complex" (fig. 4a–b). All were discovered out of context: one in the northern part of Öland, Sweden, the other two in the Vistula Fens, Poland.[27] However, their uncanny similarity to the stone battle-axeheads used in the respective local manifestation of the "single burial complex" – BAC in Sweden and CWC in Poland – leaves little

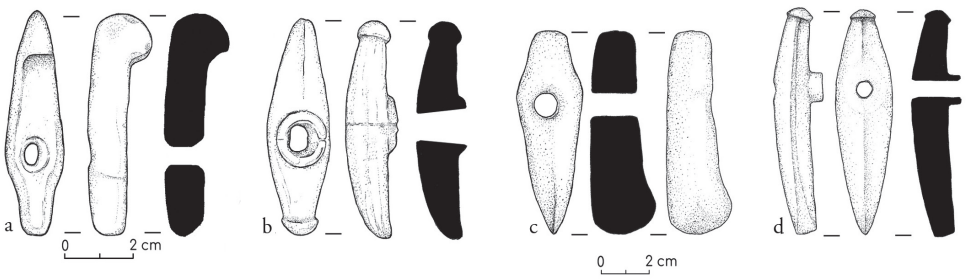

Fig. 4. Examples of axehead-shaped amber beads of the Corded Ware (a) and Battle Axe (b) cultures, and their counterparts in stone: a – amber (after Cwaliński, in print), b – amber (after Larsson 2017, fig. 2–3), c – stone (after Libera/Sobieraj 2016, fig. 3:8), d – stone (after Westrin 1917, fig. XXVI:12), all drawings by A. Dmitruczuk

doubt as to their chronology and cultural affiliation (fig. 4c–d). The most characteristic features of these three amber beads and their stone counterparts are the drooping blades and button-shaped butts. Notably, the perforations in the amber beads correctly reflect the location of the shaft-holes in stone axeheads. Though scarce, these beads prove that the tradition of skeuomorphism based on imitating lithic tools and weapons continued in the crafting of amber, adapting itself again to new variants.

[26] Mazurowski, *Bursztyn w epoce kamienia…*, p. 78; Palle Siemen, *Single Grave Culture Amber from Jutland*, "Fontes Archaeologici Posnanienses" 2016, vol. 52, pp. 13–40; Woltermann, *Die prähistorischen Bernsteinartefakte…*, pp. 127–132.

[27] Lars Larsson, *A miniature in amber of a battleaxe from the Battle-Axe Culture*, "Adoranten" 2017, vol. 1, pp. 48–54; Mateusz Cwaliński, *Evolution of amber's status…*

At the turn of the 3rd and 2nd millennia BCE, the cultural appearance of the circum-Baltic region changed yet again, with the spread of Bell Beaker culture (BBC) – another variant in the "single burial complex". While Northern Europe still remained in a largely Neolithic state, the slow but steady influx of metal items from the south heralded the Bronze Age which finally broke around the 17th century BCE. These items were the bronze axeheads and daggers from which amber craftspeople drew inspiration. Once again, the most spectacular examples thereof are unprovenanced amber artefacts from the region of Masuria in Poland: an axehead-shaped pendant from Kruklanki, a dagger-shaped pendant from Nidzica, and a "halberd" from Niedźwiedziówka in the Vistula Fens.[28] It must be stressed that these are not the only examples of skeuomorphism in the crafts of Baltic Basin communities. Flint daggers mirroring the shape of the early types of bronze daggers are common, even lending this name to the late phase of the Neolithic in southern Scandinavia – "the Dagger period".[29]

Meanings

The obvious place to begin a consideration of the meaning of amber axehead skeuomorphs is their stone, flint and copper counterparts. As previously clarified, the physical properties and smaller size of amber prevented its employment for similar purposes. A purely functional justification for the use of amber to produce axehead-shaped objects is therefore implausible. Yet it might be posited that the symbolism of the axe form and practical benefits thereof were reified by the use of amber as a medium. What was it about the axe that encouraged it to become such an important and enduring piece of the Neolithic material culture around the Baltic Sea?

The functions of the Neolithic axes were multiple. In the densely wooded landscape of Northern Europe during the Early to Middle Holocene, gaining land for farming and grazing necessitated deforestation. The so-called "slash-and-burn" technique involved both cutting down trees, especially the larger ones offering good-quality timber, and burning the remaining vegetation

[28] Dariusz Manasterski, Katarzyna Kwiatkowska, *Wyroby bursztynowe jako jeden z wyznaczników prestiżu „elit" na przełomie neolitu i epoki brązu na rubieży nizin środkowo- i wschodnioeuropejskiej*, "Studia i materiały do badań nad neolitem i wczesną epoką brązu na Mazowszu i Podlasiu" 2015, t. V, pp. 87–111.

[29] Janusz Czebreszuk, Dorota Kozłowska-Skoczka, *Sztylety krzemienne na Pomorzu Zachodnim*, Szczecin 2008; cf. Rune Iversen, *Big-Men and Small Chiefs: The Creation of Bronze Age Societies*, "Open Archaeology" 2017, vol. 3, no. 1, pp. 361–375; Jens Winther Johannsen, *Late Neolithic Expansion: Ancient and new traditions 2350–1700 BC*, "Danish Journal of Archaeology" 2023, vol. 12, no. 1, pp. 1–22.

(trunks and branches left after felling, as well as undergrowth).[30] Furthermore, axes served as every-day tools for the processing of wood to a variety of ends, from small utensils (e.g. cutlery, hafts, shafts, etc.) to freestanding structures (e.g. houses, fences, palisades, etc.). Axes may thus be understood as symbolising the conquest of land and subjugation of nature.[31] Although roughly flaked lithic axeheads were already being used in the Mesolithic, polished axeheads were first introduced in the Neolithic. New studies from Denmark show this may have been by genetically foreign farmers and herders of ultimately Anatolian ancestry arriving in Northern Europe.[32] Settling in around the turn of the 5th and 4th millennia BCE, these newcomers then began to exploit locally occurring raw materials, e.g. flint and amber, but producing forms different from the material culture of the Mesolithic hunter-gatherers, evident, for example, in the emergence of the FBC style of worked amber.[33]

Yet, axehead-shaped amber beads and pendants appear somewhat later, around the time of the transition from the Early to Middle Neolithic (ca. 3300 BCE), that is to say after about 700 years of the development of FBC in Southern Scandinavia, during which the agricultural way of life progressed from a state of introduction to that of homogenisation.[34] In the area of modern Poland, the occurrence of these ornaments follows this dating, but rather than the FBC this innovation is credited to the GAC which relied more heavily on herding than farming. Were axes to have been such an important tool for Neolithic farmers, one might expect the symbolism of the axe to make itself felt long before this stage.

The period during which axehead-shaped amber beads and pendants were being introduced exhibits a range of interesting dynamics with respect to climate change and the human response to it. The beginning of the second half of the 4th millennium BCE is regarded as time of economic boom among FBC communities. The concurrent drop in tree pollen and increase in grass pollen and that from ruderal plant species, as well as rise in charcoals, evident in profiles from Germany and Poland, suggests the opening of the landscape

[30] Manfred Rösch, Harald Biester, Aarno Bogenrieder, Eileen Eckmeier, Otto Ehrmann, Renate Gerlach, Mathias Hall, Christoph Hartkopf-Fröder, Ludger Herrmann, Birgit Kury, Jutta Lechterbeck, Wolfram Schier, Erhard Schulz, *Late Neolithic Agriculture in Temperate Europe—A Long-Term Experimental Approach*, "Land" 2017, vol. 6, no. 1, pp. 1–17.

[31] Jan Turek, *Stone axes as tools, valuables and symbols (3300–1900 BC)* [in:] *Material, Virtual and Temporal Compositions: on the Relationship between Objects*, ed. Dragos Gheorghiu, Oxford 2001, pp. 53–62.

[32] Morten E. Allentoft et al., *100 ancient genomes show repeated population turnovers in Neolithic Denmark*, "Nature" 2024, vol. 625, no. 7994, pp. 329–337.

[33] Cf. Solange Rigaud, Francesco d'Errico, Marian Vanhaeren, *Ornaments Reveal Resistance of North European Cultures to the Spread of Farming*, "PLOS ONE" 2015, vol. 10, no. 4.

[34] Kurt J. Gron, Lasse Sørensen, *Cultural and economic negotiation: a new perspective on the Neolithic Transition of Southern Scandinavia*, "Antiquity" 2018, vol. 92, no. 364, pp. 958–974.

by means of the slash-and-burn technique.[35] In the course of the 33rd century BCE, corresponding to the transition from the Early to Middle Neolithic, climate began to deteriorate. Many parts of the Baltic Basin experienced conditions unconducive to farming, shown by a decrease in pollen from cereal and ruderal plant species that was matched by reforestation, leading to population decline.[36] One of the regions least affected by this crisis was Zealand which apparently saw demographic growth in the Middle Neolithic and has supplied the largest collection of amber axehead-shaped ornaments in Denmark.[37] Another interesting contemporary cultural trend is the spatial shift in the deposition of amber, with the volume of amber deposited increasing towards eastern Jutland and the Danish Islands as the distance from Jutland's western coast – where amber is easily found – becomes greater.[38] These areas with more fertile arable soils were sparsely inhabited by Mesolithic hunter-gatherers but preferred by FBC farmers.[39]

Taken together, the evidence presented above indicates that axehead skeuomorphs in amber started to be manufactured during the period of crisis that followed the commencement and intensification of land cultivation during which flint-bladed axes were surely used to a great effect. This suggests that other forces lay behind their creation. One possible reason may be the upturn in violence among communities of farmers competing for land, resources and power, attested

[35] Agnieszka Wacnik, Magdalena Ralska-Jasiewiczowa, Ewa Madeyska, *Late Glacial and Holocene history of vegetation in Gostynin area, central Poland*, "Acta Palaeobotanica" 2011, t. 51, nr 2, fig. 5–7; Ingo Feeser, Walter Dörfler, Jutta Kneisel, Martin Hinz, Stefan Dreibrodt, *Human impact and population dynamics in the Neolithic and Bronze Age: Multi-proxy evidence from north-western Central Europe*, "The Holocene" 2019, vol. 29, no. 10, fig. 3; Johannes Müller, *Funnel Beaker Societies and Long-Distance Trade* [in:] *Trade before Civilization*, eds. Johan Ling, Richard Chacon, Kristian Kristiansen, Cambridge 2022, p. 25; Walter Dörfler, Ingo Feeser, Iwona Hildebrandt-Radke, Monika Rzodkiewicz, *Environment and settlement – A multiproxy record of holocene palaeoenvironmental development from Lake Woniešć, Greater Poland*, "Vegetation History and Archaeobotany" 2023, vol. 32, no. 2, fig. 6; Walter Dörfler, Stefan Dreibrodt, Berit V. Eriksen, Ingo Feeser, Daniel Groß, Robert Hofmann, Artur Ribeiro, Frank Schlütz, Magdalena Wieckowska-Lüth, Markus Wild, *Creation of Cultural Landscapes – Decision-Making and Perception Within Specific Ecological Settings* [in:] *Perspectives on Socio-environmental Transformations in Ancient Europe*, eds. Johannes Müller, Wiebke Kirleis, Nicole Taylor, Cham 2024, fig. 7.6.

[36] Wiebke Kirleis, Elske Fischer, *Neolithic cultivation of tetraploid free threshing wheat in Denmark and Northern Germany: implications for crop diversity and societal dynamics of the Funnel Beaker Culture*, "Vegetation History and Archaeobotany" 2014, vol. 23, no. S1, fig. 7; Feeser et al., *Human impact…*, fig. 4–6; Magdalena Maria E. Bunbury, Knut I. Austvoll, Erlend K. Jørgensen, Svein V. Nielsen, Jutta Kneisel, Mara Weinelt, *Understanding climate resilience in Scandinavia during the Neolithic and Early Bronze Age*, "Quaternary Science Reviews" 2023, vol. 322, fig. 4.

[37] Pedersen, *Sozialarchäologische Analysen…*, p. 20, fig. 5; Bunbury et al., *Understanding climate resilience…*, p. 12.

[38] Stephen Shennan, *Exchange and ranking: the role of amber in the earlier Bronze Age* [in:] *Ranking, resources, and exchange*, eds. Colin Renfrew, John Cherry, Cambridge 1982, fig. 4.3.–4.4.

[39] Gron, Sørensen, *Cultural and economic negotiation…*, fig. 2.

by archaeological data.[40] The decline visible at the end of the 4th millennium BCE may have been caused in part by famine and/or sickness but also by warfare and the transformation of the axe from a tool into a weapon. These troubled times could be at the root of the migrations away from areas beset by crisis towards more fertile and peaceful regions in western Jutland and the Danish Islands, as demonstrated by shifts in the distribution of amber.

At this juncture it is important to highlight that the most common type of axehead-shaped amber ornaments in the FBC is that imitating so-called Amazon battle-axeheads, stone axeheads with twin blades, rather than the more common pointed-butt axeheads.[41] What is more, the Final/Younger Neolithic amber axehead skeuomorphs follow the shape of the stone battle-axeheads characteristic of cultures belonging to the Single Grave Complex.[42] It certainly cannot be excluded that some amber axehead skeuomorphs were fashioned after "workaday axeheads" in that some GAC beads and pendants resemble flint axeheads, many of which show use-wear marks on their blades.[43] But it must also be noted that the ornamental features of FBC stone battle-axeheads are unnecessary if axes are to be employed in cutting and working wood. Moreover, these battle-axeheads sometimes have blunt blades and narrow shaft-holes which hamper their practical use, meaning they are more often regarded as symbolic insignia. Microwear analyses have offered a range of conclusions in this regard, partly stemming from the application of different methodologies. Studies of Younger Neolithic shaft--hole axeheads show that more elaborate battle-axeheads rarely exhibit use-wear marks, whereas in some regions, simpler shaft-hole axeheads were repaired and/or reworked, implying extensive use.[44] When these marks are visible, the studies mostly confirm the use of the axes with relatively hard materials (e.g. wood) in a percussive or cutting manner. Blows against soft tissue would, arguably, leave little trace, meaning that it is difficult to confirm or disprove the use of stone--headed battle-axes in combat. Trials with human bones and soft tissues cannot

[40] Christian Horn, *Trouble in Paradise? – Violent Conflict in Funnel-Beaker Societies*, "Oxford Journal of Archaeology" 2021, vol. 40, no. 1, pp. 43–64; Müller, *Funnel Beaker Societies…*, pp. 27–30.

[41] Lasse Sørensen, *From hunter to farmer in Northern Europe. Migration and adaptation during the Neolithic and Bronze Age,* Acta Archaeologica, vol. 1–2, Oxford 2014, pp. 162–169.

[42] Cf. Zápotocký, *Streitäxte des mitteleuropäischen…*

[43] Tomasz Boroń, Małgorzata Winiarska-Kabacińska, *Flint manufacturing of the Globular Amphorae culture at the site Wilczyce 10 (Lesser Poland) in the context of inventories from the neighbouring areas*, "Archeologické rozhledy" 2021, vol. 73, no. 2, fig. 10; Piotr Mączyński, *Flint products from a Globular Amphora culture grave in Stefankowice-Kolonia, Hrubieszów District, site 33 in the light of the latest considerations*, "Sprawozdania Archeologiczne" 2022, t. 74, nr 1, fig. 6–7.

[44] Sebastian Schultrich, *Neolithic Battle Axes with Cup Marks*, "Proceedings of the Prehistoric Society" 2024, vol. 90, p. 8.

be performed for ethical reasons, but recent experiments with animal bones have yielded interesting results.[45]

It can be inferred from this complex picture that Neolithic stone or flint axes were not universally used for a single purpose across Europe. Their potential as political and/or religious paraphernalia must also be acknowledged. Other forms of evidence, above all linguistic and historical in nature, can supplement our knowledge of axe symbolism significantly. In the Northern European tradition, the axe is regarded as symbolic of supernatural powers and those deities embodied by thunder (sometimes associated with the sun-god), later synonymous with the Nordic Thor whose attribute was the hammer "Mjölnir".[46] According to J. P. Maher, the etymology of the word "axe" goes back to the Pre-Indo-European term **H'aeḱmon* which is translated as the "sharp thing", and which, as a figure of speech, refers to the material "stone" processed into a tool.[47] The crashing noise associated with processing and using a sharpened stone-bladed tool, i.e. axe, became a metaphor for "thunder-sky", which then was substituted, in abbreviated form ("sky"). It is possible to imagine stone or flint processing as, in the minds of the Neolithic people, communing with the supernatural realm, with the effects of this work, i.e. axes and hammers, being objects endowed with supernatural powers.[48] These objects then acted as amulets or talismans – tokens of divine favour bringing protection and strength to axe-bearers, e.g. warriors in battles.

In Mediterranean Europe, the axe became known as the symbol of political power in antiquity, first in Minoan Crete, and later in Etruscan and Roman Italy.[49] In Latin, the term for "sky" and "chisel" – *caelum* – may derive from the Proto-Italic **kaizlom* which, according to Maher, replaced **H'aeḱmon* (version with no phonetic reflex) but retained its meaning.[50] **kaizlom* is created

[45] Amber S. Roy, *Direct analysis of ground stone artefacts; a study of the use of Early Bronze Age Stone Battle-Axes and Axe-Hammers*, "Journal of Archaeological Science: Reports" 2022, vol. 46, p. 19.

[46] Oscar Montelius, *The Sun-God's Axe and Thor's Hammer*, "Folklore" 1910, vol. 21, no. 1, pp. 60–78; Georges Dumézil, *Gods of the Ancient Northmen*, Berkeley–Los Angeles–London 1973.

[47] J. Peter Maher, **H'aeḱ-mon: "(stone) axe" and "sky" in I-E/Battle-Axe culture* [in:] *Papers on language theory and history I: creation and tradition in language*, Amsterdam Studies in the Theory and History of Linguistic Science, s. IV, vol. 3, ed. Ernst Frideryk K. Koerner, Amsterdam 1977, pp. 85–106.

[48] Cf. Peter Pétrequin, Serge Cassen, Michel Errera, Lutz Klassen, Alison Sheridan, *Des choses sacrées… fonctions idéelles des jades alpins en Europe occidentale* [in:] *Jade. Grandes Haches Alpinesdu Néolithique Européen. Ve et IVe Millénaires av. J.-C.*, Presses Universitaires de Franche-Comté et Centre de Recherche Archéologique de la Vallée de l'Ain, vol. 2, eds. Peter Pétrequin, Serge Cassen, Michel Errera, Lutz Klassen, Alison Sheridan, Anne-Marie Pétrequin, Besançon 2012, pp. 1354–1423.

[49] Matthew Haysom, *The double-axe: a contextual approach to the understanding of a Cretan symbol in the Neopalatial period*, "Oxford Journal of Archaeology" 2010, vol. 29, no. 1, pp. 35–55; T. Corey Brennan, *The Fasces: A History of Ancient Rome's Most Dangerous Political Symbol*, Oxford 2022, pp. 1–7.

[50] Maher, **H'aeḱ-mon…*, p. 94.

from the morpheme **kaid* meaning "striking", "cutting", "chopping", and could stand for "cutting tool", giving it a polysemy similar to **H'aeḱmon*.[51] If *caelum* is understood not only as "sky" but also as "whole" (originating from Proto-Italic **kailo-*, in turn derived from the Pre-Indo-European **keh$_2$i-lo-*), then its opposite, in Latin, is *templum* meaning "part".[52] The later term may also originate from "cutting"/"forest-clearing". Maher explores and explains the paradox on the basis of the archaic Latin *caeli templa*, for which he replaces the common translation "temples of the sky" with "cutting the sky", something which can also be understood "contemplating the sky".[53] Alternatively, *caelum* is taken to mean "whole", then the phrase could be translated as "dividing the whole into parts". Thus, it might be said that a cutting tool – axe or chisel – produces a fragment from the whole or sets lines of division in physical as well as symbolic senses.

Metaphysically speaking, lithic axeheads could be regarded as "gifts of the gods" – empowering and blessing – which might be used further to increase social standing and political position. Turning now to amber, its processing may have been perceived as the shaping of a divine substance, the tangible result of which was an axehead-shaped object capable of relaying the powerful symbolism of divine authority ("thunder-sky", "dividing the whole") already connected to lithic axeheads. Both the real-size lithic and miniature amber axeheads may be regarded as manifestations of a similar symbolism pertaining to institutions of religious and political power, and with an archaeologically attested role in rituals such as offerings and funerals. In the social sphere, they may have been used to legitimise social divisions (inequalities?) and guarantee social order.

Conclusions

Despite the rich evidence marshalled above, it remains impossible to state precisely why the amber axehead skeuomorphs were manufactured in the Neolithic and what they meant for the populations then inhabiting the Baltic Basin. It is most likely to have related to the deep and timeworn symbolism of the axe. However, the exact role of axehead imitations in amber, other than the decorative function, eludes archaeologists. The circumstantial evidence, offered both by archaeological and linguistic sources, seem to support their significance as markers of a particular but as yet unconfirmed identity, the notion of which emerged at the turn of the 4th and 3rd millennia BCE in the western and southern Baltic Basin. By using amber, a uniquely locally resource, the communities of the late FBC, then the GAC and finally, albeit to a lesser degree, CWC and BAC, created a hallmark which blended with their culture in being shaped like other

[51] *Ibidem*.

[52] Michiel De Vaan, *Etymological Dictionary of Latin and the other Italic Languages*, Leiden–Boston 2008, pp. 80–81.

[53] Maher, **H'aeḱ-mon…*, pp. 96–97.

more commonly known yet nonetheless important elements, be they natural, e.g. celestial bodies, or anthropogenic, e.g. lithic axeheads. The latter must already have been endowed with well established and widely recognised symbolism that was subsequently transferred to skeuomorhic amber axeheads. The presence of these artefacts in graves, and less frequently in hoards, appears to correspond with the sacred connotations of axes exposed etymologically in the term "thunder-sky" which originated in the Pre-Indo-European **H'aeḱmon–* "sharp thing"/"axe". In traditional communities, which the FBC, GAC and other Neolithic groups represented in their times, magic and belief were infused in every aspect of life. Thus, it is plausible that lithic axeheads and their amber counterparts played a social role, possibly becoming emblematic of personal struggles for political power. Whether the amber axehead skeuomorphs had a single, universally understood meaning, or were multivalent, cannot yet be said. It is to be anticipated that future research will reveal more information allowing these issues to be addressed. Axeheads, whether of stone, flint, metal or amber, will surely continue to draw the attention of scholars.

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