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Research Article

New Early Neolithic and Late Bronze Age amber finds from Thy

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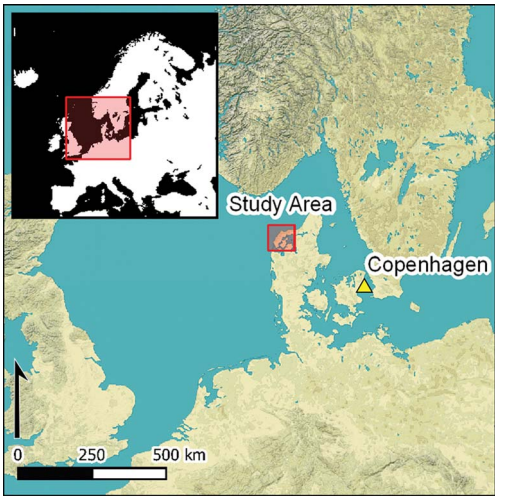

Amber was widely exchanged across prehistoric Europe and was transported long distances from primary sources on the Baltic and North Sea coasts. How did collection and working of amber develop and what were the effects of international exchange on local communities in Northern Europe? The authors present two recent, contrasting amber finds from Thy, northern Jutland: a cache of beads associated with the Early Neolithic Funnelbeaker Culture (4000–3300 BC); and evidence from a Late Bronze Age (1100–500 BC) non-elite settlement that suggests coastal amber collection was independent of elite control. Set within a review of amber's changing roles in prehistoric Thy, these finds evidence shifting local, regional and international connections.

Keywords: Europe, Jutland, Neolithic, Bronze Age, amber, exchange, household economies, caches

Introduction

Hard, yellow and translucent, amber is a fossilised resin that has been collected and valued for millennia. From the Mesolithic onwards, it has been shaped into pendants, small figurines and other objects for display, and marking personal status (Jensen 2000; Toft & Brinch Petersen 2013). An important source of amber is Thy on the north-western coast of Jutland, where it washes up following storms (Figure 1). Thy has a rich prehistoric archaeological record, extending from the Early Neolithic to the Iron Age, and is famous for its Bronze Age barrows and Early Bronze Age metal finds (Kristiansen 1978, 2018). This record is well documented due to early antiquarian interest, rescue excavations by the Museum Thy and by the *Thy Archaeological Project* (Bech *et al.* 2018). The collection and local use of Thy amber during prehistory is also well documented (Bech & Olsen 1985; Ebbesen 1995). Overviews of the prehistory of Danish amber suggest that it was a signature regional exchange material during the Neolithic, becoming an international export during the Bronze Age

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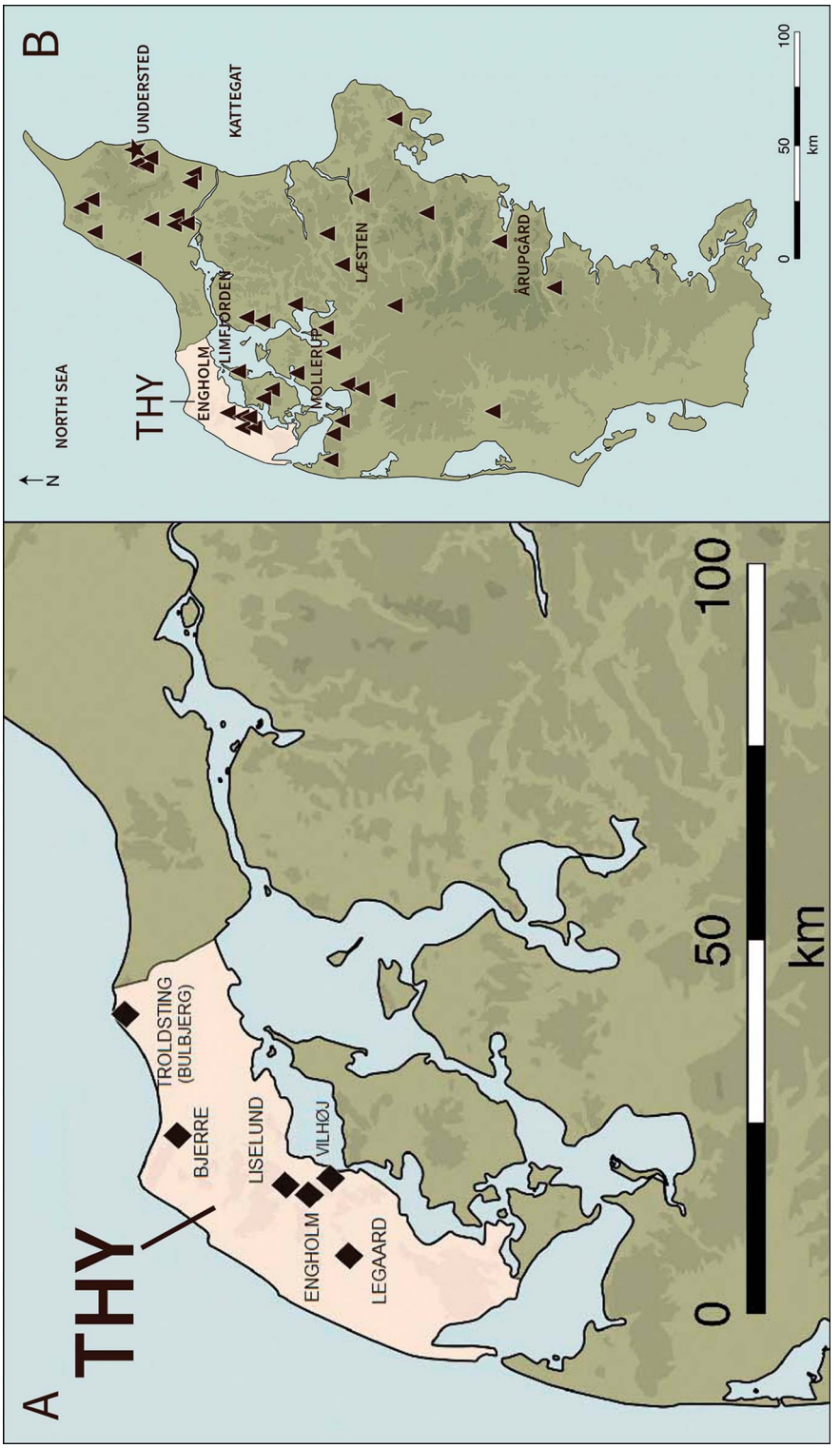

Figure 1. A) Map of Thy (including Vester Hanherred), Denmark, showing sites discussed; B) map of Jutland, showing Funnelbeaker Culture votive caches (after Ebbesen 1995, with corrections) (maps by T. Grøfsk).

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(Vandkilde 2020; Nørgaard *et al.* 2021). In this article, we examine Thy amber's changing roles within expanding Neolithic regional networks and alongside the long-distance exchange of metals during the Bronze Age.

Using a recently discovered Early Neolithic amber cache and the extensive presence of raw amber at a Late Bronze Age farmstead, we question assumptions about the ways in which the local collection and use of amber articulated with broader regional and international contexts. We discuss how, in the Early Neolithic, expanding regional distribution and use of amber may have been associated with monumental gathering places and their role in exchange. During the Late Bronze Age, however, small-scale amber collection and exchange came to provide an opportunity for coastal households to gain access to metals.

The changing role of Thy amber

To understand amber in Danish prehistory, micro-regional variability is critical but not well studied. Here, we focus on the extraction and use of amber in the single area of Thy. During the Early Neolithic (4000–3300 BC) and Middle Neolithic A (3300–2800 BC), amber played a distinctive role in Thy's Funnelbeaker Culture as votive offerings and grave goods. Recent finds from seven (unpublished) burial sites excavated under rescue conditions, including five megaliths, typically included between 25 and 140 beads. Four wetland votive offerings, attributed to the Funnelbeaker Culture, were also recorded during peat extraction prior to the Second World War, including an unusual find of 0.8kg of unworked amber alongside three thin-butted flint axes (Becker 1953; Ebbesen 1995). Generally, amber finds are almost exclusively beads, manufactured by drilling, cutting and polishing. Amber was usually drilled for stringing as necklaces. Twelve 'necklace' spacers have been recovered from burial site THY 3933, and they were probably also sewn onto clothing (unpublished data).

Funnelbeaker bead forms are numerous and diverse. These include unshaped pieces with a drilled suspension hole, but the most common are drilled disc- or barrel-shaped pieces (often <10mm). Other diagnostic types include tubular forms (<100mm), necklace spacers and, from the Middle Neolithic A, double-axe beads (Figure 2, nos 1–9). Although some of this typological variability is chronological, multiple forms are recorded in single contexts, including the newly discovered Engholm cache described below.

The skilful drilling of long tubular beads and shaping of double-axe forms suggests the work of skilled specialists. Although no definitive Funnelbeaker amber workshops have been found in Thy, as amber was immediately available, objects were probably locally worked, and exchanged away from coastal sources, where they are found in burials and votive caches (Figure 1B).

Later, during the Middle Neolithic B (Corded Ware Culture; 2800–2400 BC), amber disappears from votive offerings, both in Thy and throughout Jutland. Its use in mortuary contexts, however, continues, albeit now with gendered differences (Glob 1945; Hübner 2005). As described by Bech & Olsen (1985), at site THY 1408, for example, a male burial contained two amber rings, possibly from a belt, while a female from the same mound was accompanied by at least 135 amber beads, and a handful of unworked amber pieces were strewn in the fill above the grave. And, at site THY 1678, two female burials were associated

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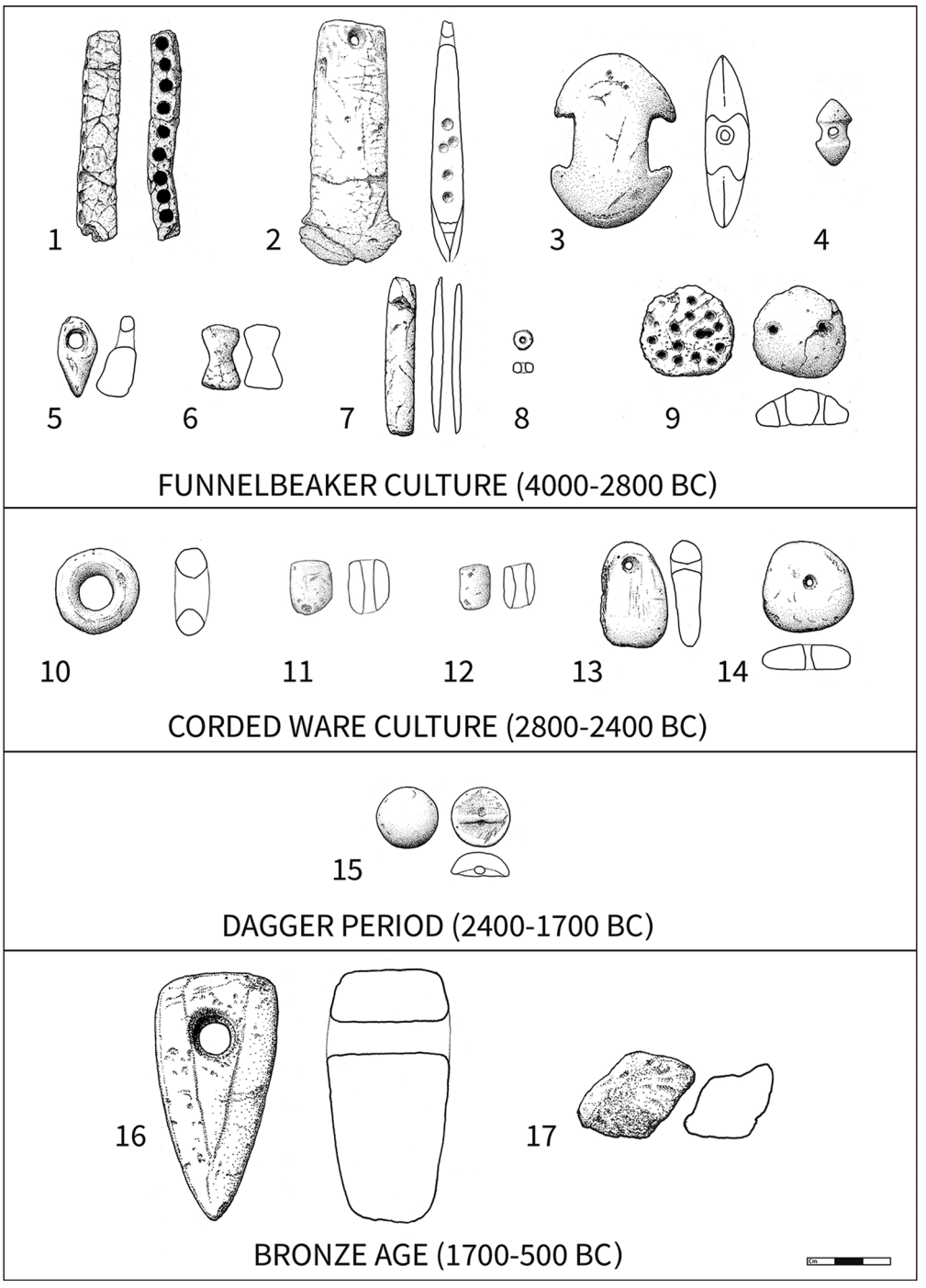

Figure 2. Changing amber forms in Thy; scale in cm (illustrations by J.B. Jepsen).

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with 27 and 193 amber objects, respectively (Bech & Olsen 1985). More generally, most Corded Ware Culture beads from Thy are simpler in form than those of the preceding Funnelbeaker Culture, comprising short tubular forms, elongated pendants, and a few small amber discs and rings (Figure 2, nos 10–14). Beads continued to be strung as necklaces but could also have been sewn onto clothing. Local production during the Corded Ware period is attested by an amber workshop on Thy's North Sea coast, at Mortens Sande 2 (Liversage 1988). The assemblage from this site includes unmodified and partially worked amber, unfinished beads (some evidently broken in manufacture), micro-debitage, and flint borers used to drill biconical holes.

From the Late Neolithic (Dagger Period; 2400–1700 BC), amber is almost non-existent archaeologically in Thy. A few Bell-Beaker-like (early Late Neolithic) amber buttons with V-shaped suspension holes (Figure 2, no. 15; cf. Lomborg 1973) were found during peat extraction prior to the Second World War. In mortuary contexts, however, amber all but ceases to be present. Personal status became marked by flint daggers and arrows and, subsequently, metal weapons. Amber instead became an international export commodity, being commonly exported to Europe and southern England (Nørgaard *et al.* 2021).

During the Early Bronze Age (1700–1100 BC), amber finds were common from household contexts but rare in the many contemporaneous barrows. Excavations of Bronze Age houses near the coast at the Bjerre settlement sites, located close to the ancient shoreline (Figure 1A), frequently recovered raw amber (Figure 2, no. 17). Amber finds from Early Bronze Age household contexts are all unmodified, with the exception of a single irregular bead with a parallel-sided hole (suggesting manufacture with a metal drill), found in backfill at Bjerre 6. This latter site comprises a well-preserved Early Bronze Age II–III three-aisled house measuring approximately 25.5m in length. In addition to its size, three metal finds, including a sword-belt button, suggest that it may have been a warrior's house (Olsen & Earle 2018a). Hand excavation and screening of the well-preserved cultural layers at Bjerre 6—and at Bjerre 7, dating to the Late Bronze Age—yielded abundant raw amber, scattered across living surfaces and in subsurface features and storage caches.

Bjerre 6 provides the richest available data for the presence of amber in an Early Bronze Age household. Within this structure, the amber was concentrated towards its western, domestic end (Figure 3). Three 2 × 2m units, excavated in the cultural layer around a cluster of cooking pits, produced scatters of 6–20 natural amber pieces (e.g. Figure 2, no. 17). Lower densities of amber were found in most other excavated units throughout the house, as well as outside. Below the floor, near the middle of the north-eastern external wall, was a compact mass of 69 unworked amber pieces, which were probably held within a small, organic container. Nothing indicates that this feature was a ritual deposit. The general distribution of amber appears to document sorting and storage within the house. Other contemporaneous houses in Bjerre also contained amber, albeit in lesser quantities (six pieces each from Bjerre 2 and 3). This Early Bronze Age amber assemblage is unique amongst other southern Scandinavian Bronze Age household contexts; its closest parallel is the Understed hoard on Jutland's Kattegat coast (Figure 1B), where 3.3kg of unworked amber was found within a vessel, alongside two Early Bronze Age bronze collars (Jensen 2000).

Excavation of many Early Bronze Age houses in Thy documents a settlement hierarchy of elite farms with chiefly halls, various mid-sized households, such as Bjerre 6, and smaller

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Figure 3. Distribution of amber across Early Bronze Age house Bjerre 6. Subfloor amber cache N12 is indicated by the star (illustration by L.F. Thomsen).

houses (Bolt-Jørgensen 2016; Bech *et al.* 2018). Depending on their location, farmsteads display differences in their amber finds. Away from the North Sea coast, typically only single pieces are found at these sites. At the inland farmstead of Legaard (Figure 1A), with its two sequentially occupied Early Bronze Age chiefly halls (Mikkelsen & Kristiansen 2018), only a single small piece of raw amber was recovered. Consequently, we conclude that, during the Early Bronze Age in Thy, only non-chiefly households located near the North Sea coast collected amber for export, perhaps to exchange for metal objects, as documented by the Bjerre 6 'warrior' house.

Early Bronze Age amber finds outside of household contexts, for example in barrows, are very rare. At Egshvile, located 10km from Bjerre, two burials yielded a few finished amber pieces, including two rough beads (one broken) with parallel drilled holes, a well-made bead embedded in pitch and 20 small pieces of unworked amber (Olsen 1992). The exceptional Hørdum deposit of five large amber shafthole axes stands out, however; with drilled

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openings representing hafting holes, these could have been ostentatious display objects (Figure 2, no. 16). The assemblage was found next to a large glacial erratic with no associated cultural context, suggesting that it was a votive deposit (Brøndsted 1934; Jensen 2000: 68). Vandkilde (2014: 71) notes that the amber axes were "translations" of Fårdrup bronze axes from the beginning of the Bronze Age, suggesting a close relationship between importing metal into southern Scandinavia and amber's export as a commodity for international trade during this period (Shennan 1982; Varberg *et al.* 2015; Nørgaard *et al.* 2021).

During the Late Bronze Age (1100–500 BC), the abundance of amber near the North Sea coast increased dramatically. Amber finds from rescue excavations at Bjerre suggest that its collection was a general activity of contemporaneous coastal households (Earle 2018). Here, a cache of 84 amber pieces was recovered from a subsurface pit at a Late Bronze Age settlement site; below, we discuss the finds from Bjerre 7 as a case study. At the Late Bronze Age Troldsting settlement at Bulbjerg, along Thy's northern coast, hand excavation in the early twentieth century yielded 66 pieces of raw amber scattered across the site (Müller 1919). Away from the North Sea coast, however, amber finds are very rare. At Fårtoft, near the Limfjord coast, excavation of many Late Bronze Age farmsteads found only one amber cache (Bech 2018), while almost no amber was recovered during extensive excavations of the Late Bronze Age sites at Vilhøj (Mikkelsen 2018).

By the Early Iron Age (500 BC–AD 400), despite intensive investigation of several Thy village mounds, the use of amber appears to come to an end, following more than 1000 years of amber exploitation and exchange.

In sum, the prehistory of Thy is characterised by cycles of amber collection and use. During the Neolithic, collection and probable local manufacture created a rich assortment of beads, primarily for personal dress, status display and regional exchange. After *c.* 2000 BC, amber became almost exclusively an export commodity used in the trans-regional trade of metal and other objects (Vandkilde 2020; Nørgaard *et al.* 2021). The distribution and date of amber in non-elite household contexts along the North Sea coast suggest that its extraction and storage were not controlled by Bronze Age chiefs.

New amber finds from Engholm and Bjerre 7

Excavations at Engholm and Bjerre 7 have documented some of the largest amber caches ever recovered in Denmark and help us to understand amber's changing roles, from a local valuable in the Funnelbeaker period to an international export in the Late Bronze Age.

The Engholm cache

The Engholm amber cache, discovered near Sjørring in central Thy (Figure 1), is among the richest prehistoric amber assemblages from Scandinavia. It contains an estimated minimum of 10 000 beads, the forms of which suggest an Early Neolithic date. The site is situated on a promontory in a rolling morainic landscape that, in Early Neolithic times, comprised hills dissected by streams, extensive wetlands and bogs, and two lakes. Substantial Early Neolithic activity documented in Thy includes settlements, burial monuments, gathering places, flint mines and votive deposits (Klassen 2014; Sørensen 2015). The Liselund causewayed

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enclosure (3700–3300 BC) lies 2km to the north of Engholm. At approximately 14.5ha and surrounded by a 1.6km-long ditch (Westphal 2000; Olesen & Mauritsen 2015; Torfing 2016), Liselund is one of the largest Early Neolithic gathering sites within Scandinavia. Test excavations have documented disposal pits, one containing two large preforms for thin-butted axes and two others associated with charred emmer grains (Westphal 2005). Similar pits containing grain caches are also known from the Sarup I enclosure on the island of Funen, Denmark (Andersen 1997). Virtually all Danish Funnelbeaker period amber caches found to date have been recovered from wetlands (Ebbesen 1995), where anaerobic conditions provide good preservation.

In contrast, the Engholm cache was discovered during gravel extraction on higher dry land. By chance, the backhoe operator tasked with clearing topsoil in advance of gravel extraction was Peter Jensen, an experienced excavator with Museum Thy. Recognising the presence of amber, he stopped work and alerted the Museum's archaeologists. The cache had lain for over 5500 years just below a well-drained plough layer. Oxygenated soils and plant roots had heavily degraded but not disturbed the cache, which was encased in plaster of Paris and lifted intact with the surrounding soil.

Due to its poor preservation, the Engholm cache has been kept intact and examined remotely. A preliminary X-ray study by the Danish National Museum was unsuccessful, and CT scans were therefore conducted at the Department of Forensic Medicine, University of Copenhagen, using a Siemens Volume Zoom at the following settings: 120kV, 151mAs, FoV 472mm, pixel size 0.9mm, slice thickness 1mm, slice reconstruction 0.5mm and reconstruction algorithm B20f (soft kernel), with a resulting pixel size of 0.9mm.

The excavated mass measured 320 × 280 × 150mm; removing the volume of interstitial space between the beads, the volume of amber is approximately 7250cm^3 and would have weighed approximately 8kg (Figure 4A–B). Varied bead forms are present, including small disc-shaped beads, larger perforated, unworked amber beads, at least 10 rectangular pieces that display five or more parallel drilled holes (considered to be spacers for necklaces), and several 90–100mm-long tubular beads. The compactness of the mass and lack of ordering within it suggest that the beads were unstrung, and no traces of string residues have been identified. Based on the CT scans, we estimate the presence of some 10 000 beads, totalling approximately seven litres of worked amber. The number of beads is a minimum, as damage from original clearance removed the top of the cache. Transverse CT-images show that the bead mass has a distinct oval shape, suggesting they were originally held in an organic container—perhaps a bag, wooden bowl or basket (Figure 4C).

The beads from Engholm date to the early Funnelbeaker period (4000–3300 BC). A votive cache from nearby Engkær Mose features a distinctive, 98mm-long tubular bead (Ebbesen 1995), which offers the closest parallel to the long, tubular beads from Engholm. The Engkær Mose cache is associated with Volling ceramics that have been AMS radiocarbon dated to 3800–3600 cal BC (Sørensen 2015). This would be contemporaneous with the construction of the Liselund causewayed enclosure, which dates to 3730–3645 cal BC (at 95.4% probability) (Torfing 2016). Further support for an Early Neolithic date for the Engholm cache comes from the absence of typical Middle Neolithic A axe-shaped beads. The cache can, therefore, confidently be assigned to the Early Neolithic period, suggesting it is contemporaneous with the nearby causewayed enclosure.

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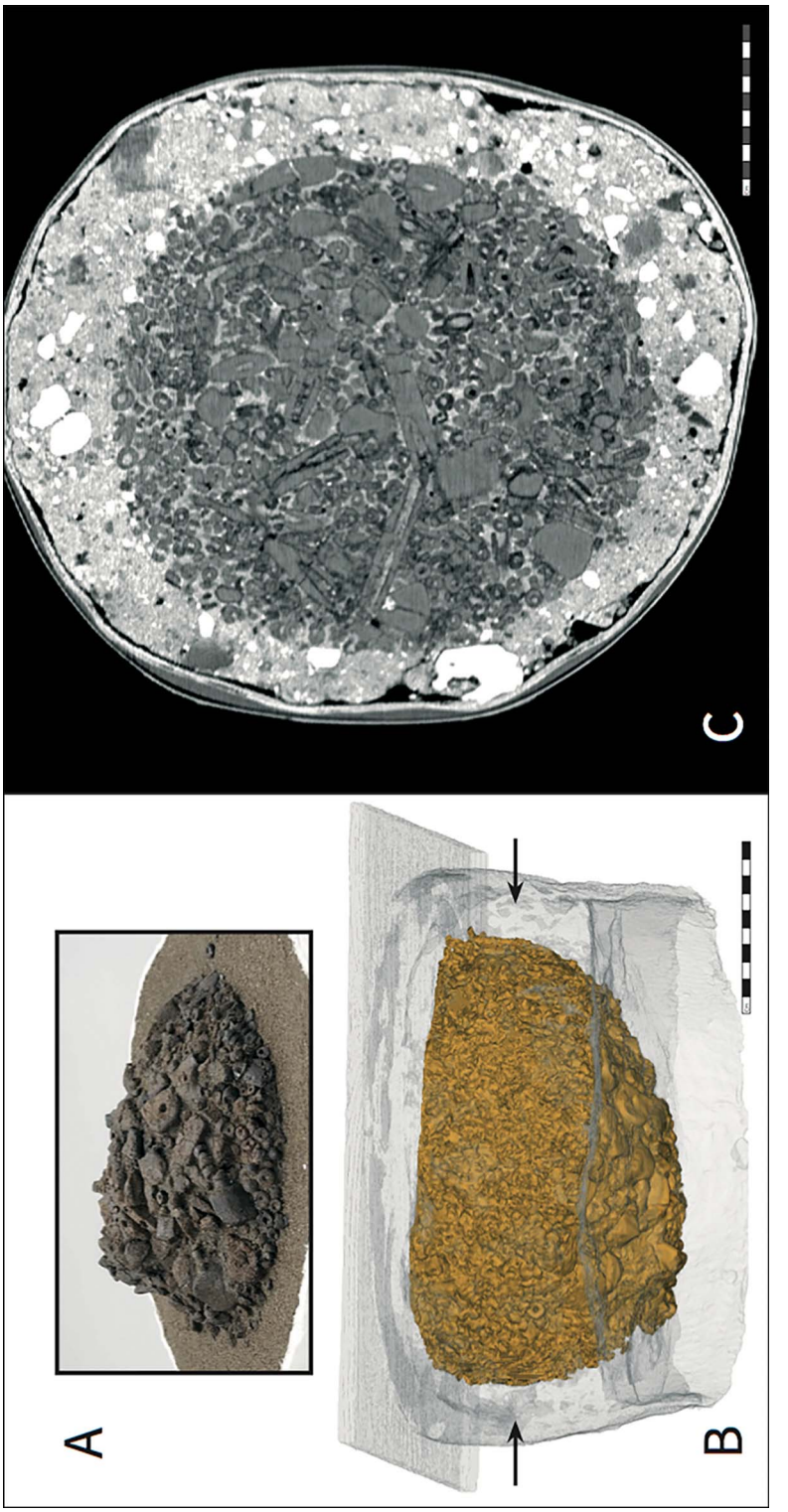

Figure 4. Engholm Early Neolithic amber cache: A) photograph of the amber cache (National Museum, Copenhagen); B) 3D reconstruction from CT images of amber beads, seen from the side (arrows indicate transverse image location); C) transverse CT image showing numerous disc beads and several long tubular beads without evidence of their being strung as necklaces; scales in cm (CT images by the Department of Forensic Medicine at the University of Copenhagen).

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The question of how to interpret the Engholm cache remains, however. Two other comparably large caches are known from northern Jutland. The heaviest, weighing approximately 8.5kg, comes from Læsten and contains 4000 beads, while the cache from Mollerup weighs approximately 4kg and contains 13 000 beads (Becker 1953; Ebbesen 1995) (Figure 1B). Both caches were recovered from wetland contexts that usually typify votive finds. The hilltop location of the Engholm cache is unusual; however, its accidental recovery may suggest that other caches in such locations have been lost due to poor preservation and farming practices. A similar Early Neolithic cache from Årupgård, near Horsens (south-east Jutland), was also found on dry land during gravel extraction, probably within a causewayed enclosure (Madsen 1982). Interpreted as a ritual deposit (Ebbesen 1995; Jensen 2000), it contained an estimated 300–400 amber beads within a funnel beaker and was associated with ornamental copper objects (Sylvest & Sylvest 1960).

Late Bronze Age amber caches at Bjerre 7

Amber continued to be important throughout the Bronze Age in Thy, with the numbers of finds and quantities of pieces increasing through this period, as exemplified by the seven caches from the Late Bronze Age V (900–700 BC) residential site at Bjerre 7. Containing solely unworked amber, these caches were closely associated with domestic activities (Olsen & Earle 2018b; Earle *et al.* 2022). The original site publication (Bech *et al.* 2018) focuses on documenting the excavations and cataloguing the finds and does not emphasise wider social and economic contexts.

The site at Bjerre 7, excavated as part of the *Thy Archaeological Project*, represents an approximately 15m-long Late Bronze Age house and associated activity areas. The structure's small size and light construction, along with its associated artefacts, are suggestive of a 'commoner' farmstead of no particular social distinction (Olsen & Earle 2018b), excepting the presence of amber and some metal working. The site was excavated via a series of 2 × 2m units, 96 per cent of which contained amber; pieces were distributed both inside (29 of 30 units) and around the exterior (39 of 40 units) of the structure (Figure 5). In total, 1795 pieces of raw amber were recovered, with a total weight of 1832.6g. Most pieces are quite small, with only 10 weighing more than 10g, and nothing suggests that the amber had been worked. Concentrations of amber were densest in the western end of the house (three units with >50 pieces), located near a cluster of cooking pits and hearths. This general activity area possibly served for the sorting and storing of the amber. Outside, amber was broadly distributed at low densities, including finds in a low-lying rubbish deposit to the south-east of the house. Twenty-six pieces were found in an irregular stone feature outside and about 3m to the west of the house. Amber exploitation appears to have been integrated within the full range of household activities.

Amongst the recovered amber is evidence for seven caches—defined arbitrarily by the excavators as concentrations of more than 30 amber pieces—closely packed and/or in special-purpose containers. These caches had been partially cleaned out when these storage features went out of use, or when the farmhouse was finally abandoned. Two types of cache were identified: large sunken storage pots (mainly outside the house) and probably organic containers (located inside). The largest concentration of amber (863 pieces, weighing 959.4g) was found associated with pit N163. This pit contained a large, fragmented storage vessel. Several

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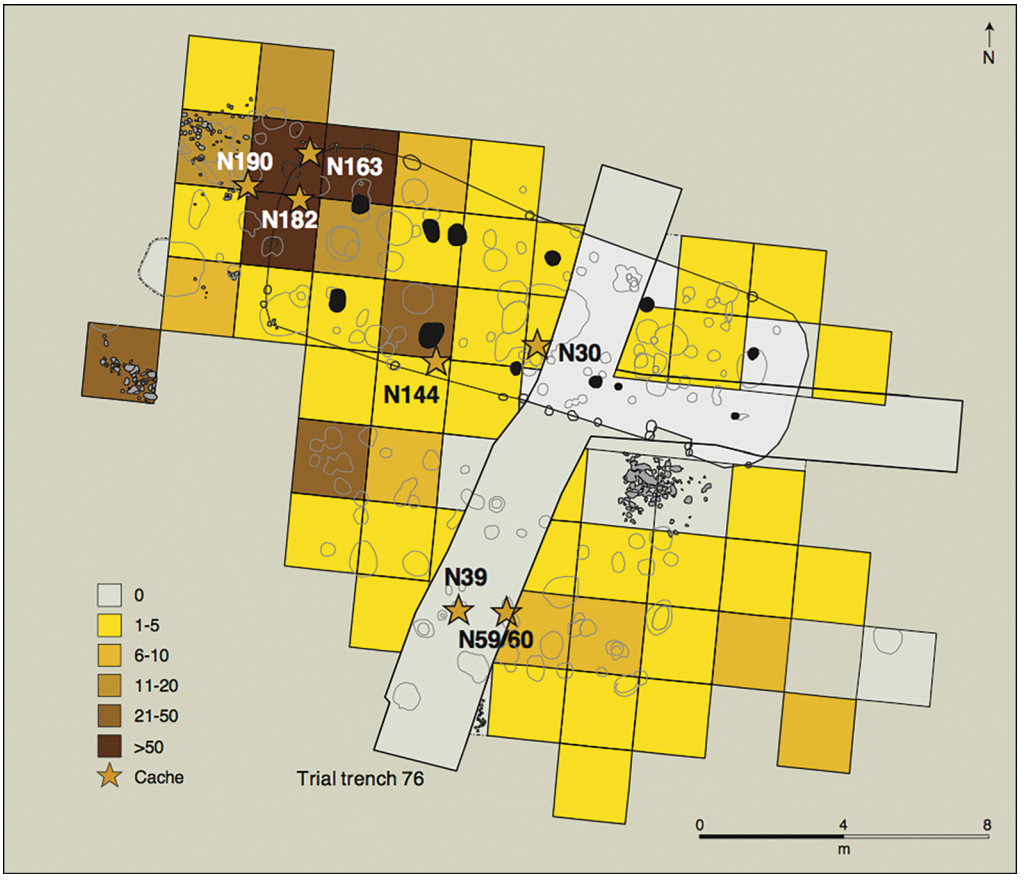

Figure 5. Distribution of amber across Late Bronze Age house and yard, Bjerre 7. Stars indicate the location of caches (illustration by L.F. Thomsen).

hundred amber pieces lay in and around the vessel's base. More pieces were distributed throughout the fill of the pit and in the cultural layer immediately above it. Refitting of the vessel shows that it originally stood 400mm high, with a maximum diameter of 340mm at the rim and with a narrow base (Figure 6); if filled to capacity, it could have contained approximately 14kg of amber. The large rim diameter and absence of a shoulder is unusual for the Late Bronze Age. It is unclear, given its position, whether the cache was accessed from the inside or outside of the building. What is clear, however, is that, given the base of the pit was only approximately 0.24m below floor level, the upper portion of the vessel would have extended above ground, making it visible and accessible.

Three additional pit features, located outside the house, suggest the presence of similar sunken amber storage vessels. N190, located outside the western gable end, near N163, contained the remnants of a similar large barrel-shaped storage vessel, with a rim diameter of 320mm. Two small amber fragments were adhered to its interior surface. In total, five possible amber-storage vessels are recorded at Bjerre 7 (Kristensen 2018). In addition, two other possible vessel-storage pits were noted: N59 displayed a profile matching a storage vessel and

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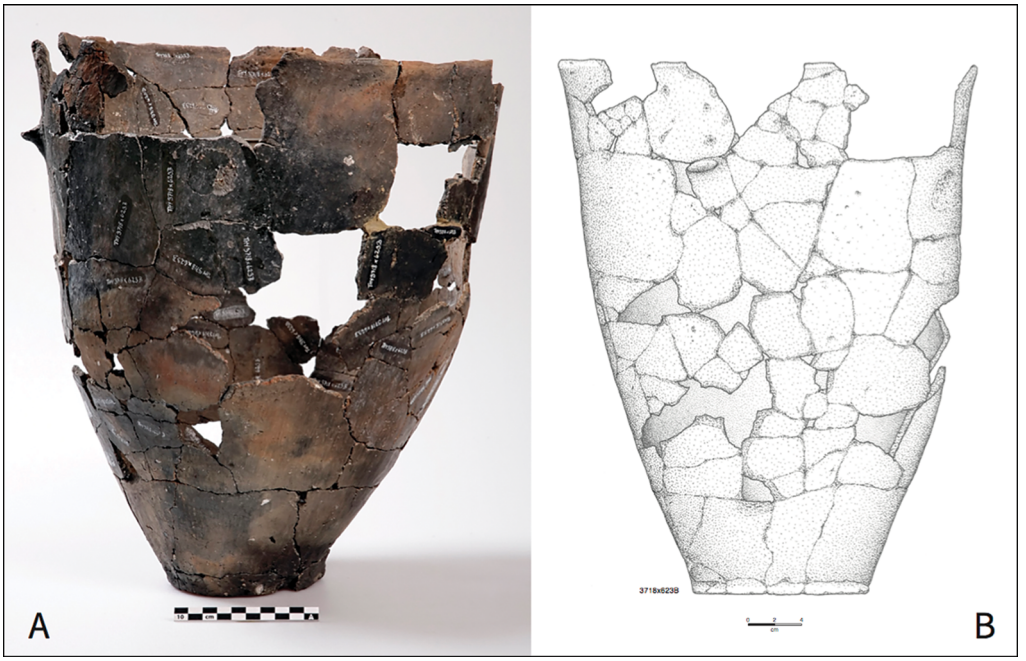

Figure 6. Storage vessel from N163, Bjerre 7: A) photograph and B) illustration of reconstructed 400mm-high vessel, which has been rotated almost 90° to the right; scales in cm (photograph by K. Madsen, illustration by J.B. Jepsen).

contained an inverted narrow storage-vessel base and 80 scattered amber pieces, while amorphous pit N39 contained 127 amber pieces in its fill. The evidence suggests that amber was stored in large sunken jars, mostly located outside of the house; given their visibility, there were evidently few security concerns. Three additional caches were noted within sub-floor features inside the house. Some 158 amber pieces (weighing 132.3g), including the largest piece of amber identified at the site (39.5g), were densely packed into a shallow depression within a large central feature (perhaps a cellar; N30). Although partly disturbed, this concentration was probably originally held within a small container. The cache was associated with no other artefacts or special ritual contexts. Of the other two caches, N182 probably represents a posthole. It contained 33 densely packed amber pieces, as if originally held in a small container. N144, however, was different; this saucer-shaped pit contained several large sherds and 49 scattered amber pieces. Compared with the larger storage vessels outside the house, the caches within the structure were distinctly smaller.

The storage and sorting of amber at Bjerre 7 is remarkable. Its handling appears to have been part of everyday activities. Outside storage was clearly visible, indicating that security concerns were negligible. In addition, the site represents a commoner household, and there appears to be no direct chiefly involvement in the collection of the amber for exchange.

Discussion

The new amber finds from Thy allow us to propose new interpretations, as well as emphasising the need for additional research. First, the Engholm cache is very unusual. Recovered

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from a dry-land context, it differs from contemporaneous Funnelbeaker Culture amber caches from wetland contexts, which are primarily understood as votive offerings. While a ritual cache remains a likely interpretation for this find, alternative explanations should be considered.

The placement of the Engholm cache near to the Liselund causewayed enclosure may be relevant. These monumental enclosures were gathering places for people (Andersen 1997; Klassen 2014; Artursson *et al.* 2016). Such gatherings were ceremonial, and created opportunities for social exchange, involving the gifting of valuables and trading of commodities. As multi-functional events, the massing of multiple unstrung beads might represent preparations for political display, as seen in Potlach ceremonies or, alternatively, the trade of commodities, as associated with Kula ceremonies (Johnson & Earle 2000). Further research on Funnelbeaker Culture gathering places should evaluate regional roles in wealth exchanges across southern Scandinavia.

Second, the Late Bronze Age caches from Bjerre 7 represent amber collection by a commoner household located close to an abundant source. Early Bronze Age settlement in Thy (Bech *et al.* 2018) suggests a social hierarchy, which then disappeared in the Late Bronze Age. Although the collection of amber has been interpreted as representing a regional comparative advantage for elite traders in search of metal, the observed volume of amber at Late Bronze Age Bjerre 7 suggests otherwise. Large-scale amber collection was a bottom-up initiative—an opportunity for local households to collect amber and engage in international trade.

We suggest that this activity provided a means through which households could obtain the materials to manufacture simple metal tools and objects. Outside the Bjerre 7 house, pyrotechnic metal-working tools included crucible fragments and a mould piece. Inside, four distinctive stone tools—two whetstones, a crushing stone and a possible mould—may be linked to metal working (Earle *et al.* 2022). Excavations at Bulbjerg have also yielded raw amber and metal crucible fragments (Müller 1919), similar to those described for Bjerre 7. In Thy, metal working appears to have become an elemental pyrotechnology conducted by some commoner households (cf. Kristensen 2015).

The question to answer is: what did part-time, commoner metallurgists offer in exchange for metal for working? One opportunity was possibly the household proximity to an amber coast. Recent work south of Thy also documents co-occurring metal-working debris and raw amber (Larsen *et al.* 2015). As household excavations continue in Scandinavia, the association between coastal amber finds and small-scale metal production should be investigated further. In regions removed from amber coasts, metallurgist households must have employed alternative means to obtain metal. How did these vary in response to changing metal production strategies? As documented by Bjerre 7, Late Bronze Age metal production, apparently for utilitarian tools, took place in a non-elite context, facilitated by bottom-up household initiatives.

The connection of local economies with regional and international trade is well documented, but its transformative role on local societies must consider micro-regional variation. Based on our findings, we encourage non-burial and non-votive studies of amber collection, accumulation and export throughout Scandinavia.

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Conclusions

Thy was a major source of North Sea amber during late prehistory. During the Early Neolithic, amber was collected for the production of beads used for personal jewellery and ornamentation, and which are predominantly found in burial and ritual contexts at this date. The context and status of the Engholm cache, however, differ from other Early Neolithic examples. While it may represent a ritual deposit, its size (one of the largest of that date from southern Scandinavia) and discovery in a dry-land location, close to a causewayed enclosure, may suggest the stockpiling of amber-beads intended for regional display or exchange. Thus, developing local specialisation in the collection and crafting of amber may have been linked to expanding ceremonial-based regional exchange networks.

Although a few finished amber pieces have been found after 2000 BC and into the Early Bronze Age, almost all amber finds from Thy at this date are in the form of raw pieces collected from coastal sites. Amber was rarely used locally and was directed instead into long-distance exchange networks (Nørgaard *et al.* 2019). While amber collection does not appear to have been associated with large elite sites, long-distance exchange networks were probably controlled by chiefs (Ling *et al.* 2018). Households appear to have independently collected amber, which may have been intended for exchange in order to acquire metals.

By the Late Bronze Age, amber was collected in bulk by these households, as documented at the commoner site of Bjerre 7. Amber was widely used for personal adornment across Central and Southern Europe at this time; the contemporaneous site of Campestrin in the Po Valley, Italy, for example, has "yielded more than 6kg of amber: mainly working flakes, but also semi-worked and worked artefacts" (Bellintani 2015: 116). Amber had become a relatively high-volume commodity for a continent-wide exchange system.

The amber finds from Bjerre 7 illustrate how this international trade and consumption of amber, metal and other commodities transformed local economies. No evidence exists from Thy at this time for the extensive use or social valuing of amber. During the peak of amber collection in the Late Bronze Age, metal finds from Thy appear less common than earlier (Kristiansen 1978, 2018) and metal production now took place in commoner households. Amber collection appears to have been a strategy used to obtain metals for the local household production of tools. The local collection of amber in Thy was scaled up to supply increasing international demand—a response that unexpectedly appears to have been independent of elite control.

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