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Bone, antler and ivory artefacts in the Hanseatic North Atlantic trade

Objets en os, en bois de cerf et en ivoire dans le commerce hanséatique de l'Atlantique Nord

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Abstract: From the 13th to the 17th century the North German towns united in the Hanseatic League played an important role in Medieval and Early Modern trade in Europe. Hanseatic trade with the North Atlantic regions of Northern Norway, Iceland, Shetland, and the Faroes was in several aspects different from other trade destinations. The North Atlantic trade centred around bulk goods like stockfish, but other commodities, which could only be obtained from the far North, feature a small but prominent role as well. Of particular interest from the osseous artefact perspective are walrus and narwhal ivory and reindeer antler, imported as raw material. Apart from raw materials there is a range of artefacts from skeletal materials, which are directly related to the North Atlantic trade and offer insights into social relationships, craftsmanship and trade networks. Such artefacts range from fishing gear over ship's tools to gaming pieces.
Keywords: Middle Age, Early Modern Time, Hanseatic trade, fishing, whale bone, walrus ivory, narwhal ivory, gaming piece, maritime artefact, gun.

Résumé : Du XIIIe au XVIIe siècle, les villes d'Allemagne du Nord réunies au sein de la Ligue hanséatique ont joué un rôle important dans le commerce médiéval et dans celui du début de l'époque moderne en Europe. Le commerce hanséatique avec les régions de l'Atlantique Nord, à savoir la Norvège septentrionale, l'Islande, les îles Shetland et les îles Féroé, différait à plusieurs égards des autres destinations commerciales. Ce commerce était centré sur les marchandises en vrac, telles que le poisson séché, cependant d'autres produits, qui ne pouvaient qu'être obtenus dans le Grand Nord, jouaient un rôle modeste mais important. Du côté des objets en matières dures d'origine animale, l'ivoire de morse et de narval ainsi que le bois de renne – importés en tant que matières premières – présentaient un intérêt particulier. Outre ces matières premières, on trouve toute une série d'artefacts en matière dure d'origine animale qui sont directement liés au commerce nord-atlantique et offrent un aperçu des relations sociales, de l'artisanat et des réseaux commerciaux. Ces objets vont du matériel de pêche aux outils de navigation en passant par des pièces de jeu.
Mots-clés : Moyen Âge, début de l'époque moderne, Europe du Nord, Ligue hanséatique, outil de pêche, pion de jeu, outil maritime, arme à feu.

INTRODUCTION

This paper presents a small aspect of a research project about Hanseatic North Atlantic trade, which began 2015 at the German Maritime Museum (DSM) in Bremerhaven. In order to understand the examples presented here, a short introduction to the historical, political, geographical and cultural background is necessary.

The Hanseatic League developed as a trade network in the 13th century in Northern Germany. There is no founding date; the beginning were agreements of merchant groups to cooperate regarding safe journeys, insurance, exchange of goods etc. With the growing influence of the urban middle classes, whole town councils got involved and since 1356 there were regular meetings of united towns called *Hansetage* (Hanse diet). The League fell apart in the 17th century. The last diet was held 1669,

but it was never officially terminated and trade relations continued. At its bloom 72 towns were part of the League, further 130 were loosely connected. Most towns were located in Northern Germany, but there were also *Hansestädte* in the Netherlands and in the eastern Baltic region. Important towns were Lübeck, Köln, Hamburg, Bremen, Braunschweig, Hildesheim, Rostock, Wismar, Stralsund, Danzig (Gdansk), Riga and Reval (Tallinn). Additionally, there were *Kontore* (branches) in Brügge, London, Novgorod and Bergen. The Hanseatic League always stayed a loose and changing cooperation, rules issued at the diets were agreements between partners, not strict laws. Nevertheless, the Hanse gained substantial political and economic power, influencing social and economic developments in entire Europe (Hammel-Kiesow, 2014; Jahnke, 2014).

The Hanseatic North Atlantic trade deviates from other destinations in Europe, e.g. in scale, commodities, political and organisational structure (Holterman, 2020). The most important Northern destination was Bergen in Norway. Trade of North German merchants in Bergen is documented since the early 13th century, 150 years before the first Hanse diet. Diplomatic complications between the Norwegian king and the German merchants resulted in a 1294 agreement, which gave the latter official staple rights in Bergen, but prohibited trade with places further north, including Iceland, Shetland and the Faroes (Mehler, 2009). This marks the beginning of a stable relationship for several hundred years, in which the Hanseatic merchants nearly had a monopoly on the trade with Northern Norway. The Hanseatic Kontor Bryggen (bridge) in Bergen was founded in 1343. The bulk good sought after in the North was stockfish, air-dried cod and ling, produced in the Arctic and traded via Bergen to mainland Europe (see e.g. Perdikaris, 1999). Apart from stockfish, several other North Atlantic commodities were of interest for the merchants, like sulphur, wool, cloth (*vaðmál*), gyrfalcons or polar bear skins. Trade in Bergen, however, was dominated by merchants from Lübeck, which led merchants from other Hanseatic towns (mainly Bremen and Hamburg) to deviate the Lübeck monopoly and the Norwegian ban by building up direct relations with customers in Iceland, Shetland and the Faroes since the early 15th century. These were initially illegal, but were later officially granted and taxed. The present paper is concerned with two very specific aspects of Hanseatic North Atlantic trade, the trade with skeletal raw materials of North Atlantic origin and the role of artefacts made of hard animal tissues within Hanseatic trade.

1. TRADE WITH SKELETAL RAW MATERIALS

From the economic perspective skeletal raw materials are commodities of minor importance compared to the goods listed above. Yet, the fact that they can only be obtained with high efforts from Arctic regions makes them exotic and precious materials highly sought after by middle European elites, used to demonstrate hierarchy, wealth, exclusivity, social power and supraregional influence (see e.g. Schmölcke, 2022). Skeletal raw materials originating from animal species with an exclusive or predominant North Atlantic range are walrus and narwhal ivory, reindeer and elk antler and whalebone. Each of these examples would offer the opportunity to be become embedded in a historical, social, economic, zoological and ecological context, but the limited text length allows only for a few examples showing Hanseatic involvement here.

1.1. Walrus and narwhal ivory

An iconic raw material in this respect is walrus (*Odobenus rosmarus*) ivory, which became frequently employed for religious artworks produced in Christian workshops throughout Europe from the 10th century onwards. The increasing body of archaeological evidence suggests that access to walrus ivory may even have been one motivation for the medieval settlement of Iceland and Greenland. Walrus ivory trade has been subject of some recent studies, which can unfortunately only be referred to here (Keller, 2010; Frei et al., 2015; Dectot, 2018; Star et al. 2018; Barrett et al., 2020 and 2022; Barrett, 2021). Artefact distributions show that Northern Germany was part of these exchange networks from the very beginning (Schmölcke, 2022) and that one of the early medieval workshops was located in Köln (fig. 1a), later an important town in the Hanseatic League. Since the 12th century walrus ivory was also increasingly used for everyday items like gaming pieces or handles (fig. 1b). Historical data are likewise expressive, walrus ivory appears not often, but eventually in historical documents. For example, in 1327 a load of walrus tusks comprising a tithe from Greenland was sold in Bergen, almost certainly to Hanseatic merchants at that time. The cargo has been estimated to weigh 802 kg, representing ca. 520 tusks, or some 260 walruses (Keller, 2010, p. 3).

Even more valuable than walrus ivory was narwhal (*Monodon monoceros*) tusk, converted into unicorn horn on its way south (Pluskowski, 2004; Schmölcke, 2022). Two historically documented examples shall highlight Hanseatic involvement. Hamburg merchant C. Bloem stayed in Skálholt, Iceland, in the winter of 1561, where he got a narwhal tusk as present by Icelandic fishermen, who found it in drift ice. He later sold it in Antwerp for a large sum (Holterman, 2020, pp. 53–54). In 1669, captain R. Rulfes caught a narwhal in the Arctic and brought its skull back to Bremen, where it became included in the town chronicle (fig. 1c; Koster and Müller, 2004 [1700], pp. 413–415).

1.2. Antler and whale bone

No historic evidence for trade with antler or whalebone has emerged so far, but the archaeological record provides proof here. Reindeer (*Rangifer tarandus*) antler was part of the cargo found in the 14th century Hanseatic

Fig. 1 – a. Relief with apostle from portable altar, walrus (*Odobenus rosmarus*) ivory, Köln (Germany), 2nd half 12th century, 62×24 mm (Bayerisches Nationalmuseum München, inv. no. MA 173); b. gaming piece, walrus ivory, Köln (Germany), 12th century, Ø 55 mm (Bayerisches Nationalmuseum München, inv. no. MA 178); c. male narwhal (*Monodon monoceros*) caught 16th July 1696 by captain R. Rulfes, reported in the *Bremen Koster-Chronik* (Koster and Müller, 2004 [1700], p. 414, fig. 1); d. reindeer (*Rangifer tarandus*) antler as cargo in the wreck *Darß* 40, sunken after 1335 on the Baltic coast (Landesarchäologie Mecklenburg-Vorpommern; photo R. Obst); e. decorated antler, elk (*Alces alces*), medieval period (Dommuseum Hildesheim, inv. no. DS 23; photo F. Monheim).

***Fig. 1** – a. Relief représentant un apôtre, partie d'un autel portatif, ivoire de morse* (Odobenus rosmarus)*, Cologne (Allemagne), seconde moitié du* XII^e *siècle, 62 × 24 mm (Bayerisches Nationalmuseum, Munich, inv. n° MA 173) ; b. pion de jeu, ivoire de morse, Cologne (Allemagne),* XII^e *siècle, Ø 55 mm (Bayerisches Nationalmuseum, Munich, inv. n° MA 178) ; c. narval mâle (*Monodon monoceros*) capturé le 16 juillet 1696 par le capitaine R. Rulfes, mentionné dans la* Koster-Chronik de Brême *(Koster et Müller, 2004 [1700], p. 414, fig. 1) ; d. bois de renne (*Rangifer tarandus*) faisant partie de la cargaison de l'épave* Darß 40*, naufragée après 1335 sur la côte de la mer Baltique (Landesarchäologie Mecklenburg-Vorpommern ; cliché R. Obst) ; e. bois décoré, élan (*Alces alces*), époque médiévale (Dommuseum Hildesheim, inv. n° DS 23 ; cliché F. Monheim).*

shipwreck Darß 40, sunken at the Baltic Sea coast (fig. 1d; Förster, 2002, pp. 235, 247; Mehler, 2011, pp. 332–333). Another example is a medieval decorated elk antler preserved in the *Domschatz* of Hildesheim, possibly used as a liturgical tool (fig. 1e). See chapter 5 for an example of whalebone as traded raw material.

2. ARTEFACTS OF ANIMAL HARD TISSUES RELATED TO HANSEATIC TRADE

Unlike the above-mentioned raw materials, bone and antler artefacts are usually items utilised in every day's tasks and activities. These, on the contrary, offer insights into technical and economic developments, changing traditions, labour and leisure activities, social and ethnic identities and sometimes even religious and ethic beliefs.

2.1. Fishing gear

The Hanseatic League has no specific relation to osseous artefacts in general, but some artefacts do have a connection to Hanseatic North Atlantic trade and allow wider inferences. Most relevant in this respect are devices related to fishing since they are directly related to the stockfish trade. One important implement here are Norwegian line runners, devices mounted on the gunwale of fishing boats. They prevent the sliding of the fishing line along the gunwale and reduce tension and friction on the line, this way protecting line and gunwale. Find distribution, contextual archaeological evidence and use-wear analysis allows for a direct correlation of line runners to vertical deep-sea fishing with hand lines for large marine fish species like cod, ling, torsk and saithe (Olsen, 2004; Sørheim, 2004; Henriksen et al., 2011). Early, pre-12th century line runners are simple *V*- or *U*-shaped objects, which just guide the line and have been found in Bergen, Borgund and Trøndelag (fig. 2a and 2b). Bones of land mammals and whales or red deer (*Cervus elaphus*) and reindeer antler were used as raw materials here (Olsen, 2004, pp. 41–45; Sørheim, 2004, p. 121; Amundsen, 2014, p. 68). From the 12th century onwards a marked change in the technology of line runners becomes visible in Norway, with the invention of composite devices consisting of two end plates with a rotating cylinder in-between, named *rullevabein* in Norwegian (fig. 2c and 2d). Finds of such 13th–15th century rotating line runners stem from Kongshavn (fig. 2d) and Bergen (fig. 2c) (Olsen, 2004, pp. 43–45; Henriksen et al., 2011, pp. 195–196; Amundsen, 2014, p. 68). Together with other types of fishing gear, like specific types of fish hooks and heavy line sinkers, rotating line runners provide stout artefactual evidence for the intensification and standardisation of the North Norwegian fisheries in this period (Sørheim, 2004; Henriksen et al., 2011).

Another device related to handline fishing for deep-sea species like cod, saithe or halibut is a wire or stick

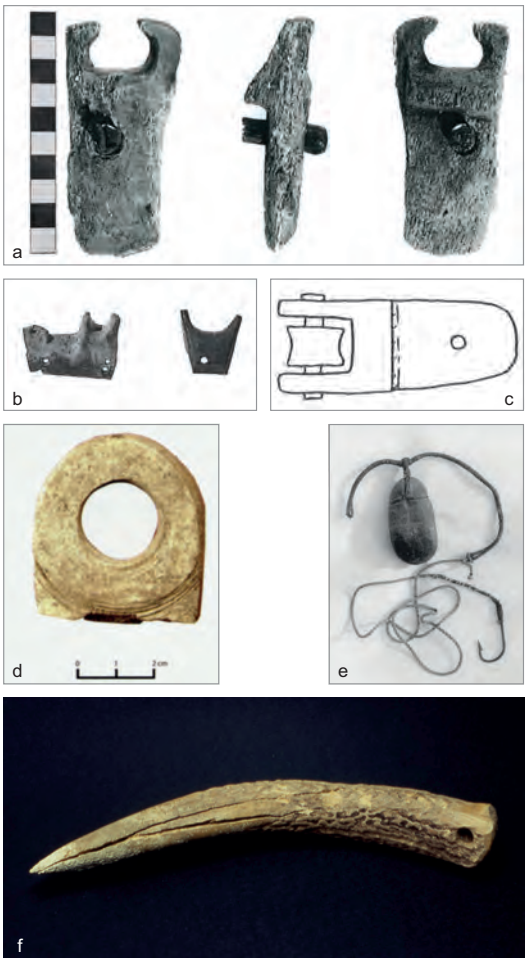

Fig 2 – a. Line runner, whale bone, Borgund (Norway), 1100–1500 (Sørheim, 2004, p. 121, fig. 14); b. line runners, antler, Bryggen – Bergen (Norway), 12th century–1332 (Olsen, 2004, p. 41, fig. 30, inv. nos. 46160, 4133); c. suggested reconstruction of line runner with rotating cylinder, hardwood, Bergen (Norway), 1248–1332 (Olsen, 2004, p. 44, fig. 32); d. end plate of rotating line runner, whale bone, Kongshavn (Finnmark, Norway), 1200–1450 (Henriksen et al., 2011, p. 196, fig. 13.19); e. distal part of handline with *spøte*, made of baleen, line sinker, snood and hook, ethnographic example, Uksnøy – Haram (Sunmøre, Norway), used until 1931 for halibut fishing (Sørheim, 2004, p. 120, fig. 12; inv. no. SM 12285); f. *Marlspieker*, red deer (*Cervus elaphus*) antler, *Fundstelle 2, Reedeplatz* – Wismarbucht (Germany; photo Landesarchäologie Mecklenburg-Vorpommern).

***Fig. 2** – a. Guide-ligne, os de baleine, Borgund (Norvège), 1100–1500 (Sørheim, 2004, p. 121, fig. 14) ; b. guide-lignes, bois de cervidé, Bryggen – Bergen (Norvège), xiie siècle-1332 (Olsen, 2004, p. 41, fig. 30, inv. nº 46160 et 4133) ; c. proposition de restitution d'un guide-ligne à cylindre rotatif, bois, Bergen (Norvège), 1248–1332 (Olsen, 2004, p. 44, fig. 32) ; d. plaque terminale d'un guide-ligne rotatif, os de baleine, Kongshavn (Finnmark, Norvège), 1200–1450 (Henriksen* et al.*, 2011, p. 196, fig. 13.19) ; e. partie distale d'une ligne de pêche à main munie d'un* spøte *[« tige »], fanon de baleine, avec plomb, avançon et hameçon ; exemplaire ethnographique provenant d'Uksnøy – Haram (Sunnmøre, Norvège), utilisé jusqu'en 1931 pour la pêche au flétan (Sørheim, 2004, p. 120, fig. 12, inv. nº SM 12285) ; f. « épissoir » (*Marlspieker*) , bois de cerf* élaphe *(*Cervus elaphus), Fundstelle 2, Reedeplatz – *baie de Wismar (Allemagne; cliché Landesarchäologie Mecklenburg-Vorpommern).*

(Norwegian *spøte*) made of a stiff but flexible material, which connects the line sinker with the so-called snood (Norwegian *forsyn*, German *Vorfach*), at the end of which the hook is attached (fig. 2e). The purpose of this part is to keep the hook clear from the line to prevent entanglement. The *spøte* has frequently been made of baleen in Norway (Olsen, 2004, pp. 55–57; Sørheim, 2004, pp. 120–121). When too many cod were caught to store them all aboard, Icelandic fishers threaded the fish on a line to be towed behind the boat. For this, a special kind of bone needle called *seilarnál*, was employed to pierce the cod through gills, lower jaws or eyes (Kristjánsson, 1985, pp. 148–149, 484). Because of their large size, whale bones have frequently been used as supporting tools for different kinds of work, like anvils, chopping blocks, etc. (Amorosi, 1996; Gardiner, 1997; Mulville, 2002; Redman, 2013; van den Hurk, 2020). One such artefact, which can directly be linked to fishery activities, has been found in Kongshavn. Here, a large piece of a whale rib, showing numerous cut marks, has been found underneath a thick layer of fish bones, indicating its use in fish processing (Henriksen et al., 2011, p. 196). Whale ribs have also been used as rollers for fishing boats, particularly in Iceland and on the Faroes (Redman, 2013).

2.2. Rope making tools

Discussing the (in)visibility of marine trade related crafts in the archaeological record, N. Mehler (2015, p. 365) states that "specific rope-making tools such as strand-layers are rarely found or correctly identified among the archaeological finds." There is, however, at least one exception, which has been found in considerable numbers. The tool consists of a tine of a (red deer) antler, often with a notch or a hole in the proximal end. These artefacts are usually interpreted as tools employed in rope manufacturing (see e.g. Becker and Schallmeyer, 1996, p. 144; Biró, 2003, p. 20). A few of these so-called *Marlspieker* have been found related to Hanseatic ships and harbours, e.g. in Wismar (fig. 2f), Greifswald, Flevoland and Almere (Vlierman, 1992, pp. 12, 14–16; Förster, 2002, pp. 245, 263). *Marlspieker* are simple and unspecific tools and it is likely that many of them may have been misidentified or were not noticed. That these tools may also have played an important role in fishing becomes evident when they are compared with the morphologically and functionally similar tools likewise called *seilarnál* in Iceland.

2.3. Gaming pieces

Gaming pieces are common archaeological finds and offer the opportunity to monitor diachronic and geographic developments of games. The detailed stratigraphic excavations in Bergen and Trondheim even allow the assignment of games to residential quarters of specific population groups addressing social questions and highlight the influence of Hanseatic merchants as mediators of leisure activities and changing fashions and customs.

Gaming pieces with a direct relation to Hanseatic (North Atlantic) trade are bone dice and lathe-turned antler counters found in the wreck of Wismar-Wendorf (built 1476; fig. 3a; Förster, 2002, pp. 241, 261; Lehmkuhl and Schäfer, 2005, p. 362) and at the roadstead of Wismar (Förster, 2002; Lehmkuhl and Schäfer, 2005). Dice and counters found in wrecks shed light upon social life aboard Hanseatic ships during the crew's spare time. Dice are also regular finds in Hanseatic port towns, but they are comparatively rare in North Atlantic sites (see

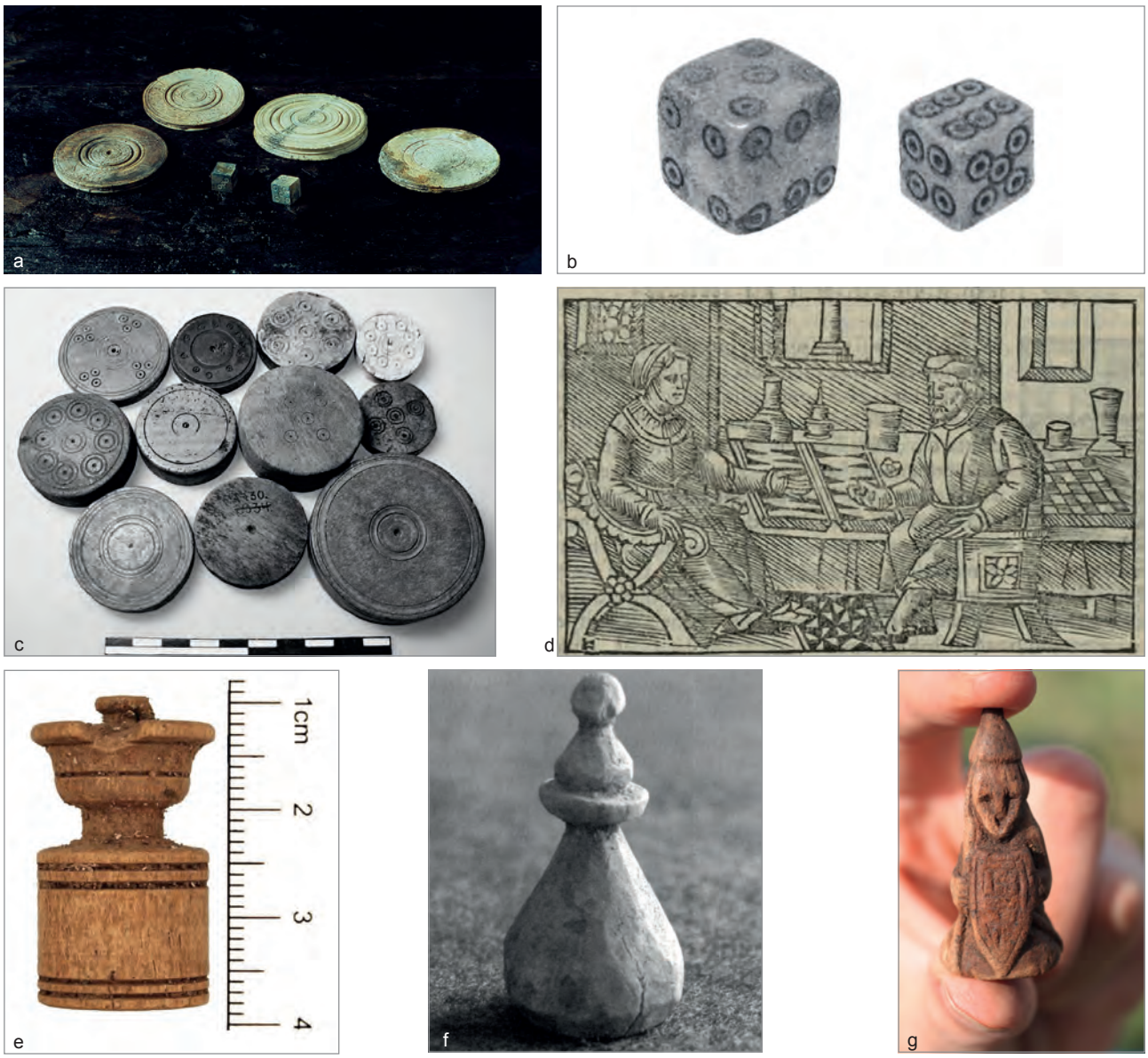

Fig. 3 – a. Counters and dice, antler and bone, respectively, wreck Wismar-Wendorf (Germany), built 1476 (photo Landesarchäologie Mecklenburg-Vorpommern); b. dice, bone, Bergen (Norway; Lund, 2013, p. 128, fig. 4.17, inv. nos. B6396/c, B6328/f); c. counters, bone, Bergen (Norway; Lund, 2013, p. 112, fig. 4.6); d. a couple playing *kvátrutafl*, on the right a chessboard is visible, woodcut (from Magnus, 1555, liber 15, cap. 12); e. chess king, turned whale bone, Gufuskálar (Iceland), 14th–15th century (Pálsdóttir et al., 2009, p. 33, fig. 1, find no. 08-005); f. chess king, carved haddock cleithrum, Steinbogi (Iceland), 12th–13th century (Batey, 2005, p. 353, fig. 4; photo T. McGovern; Þjóðminjasafni Íslands, inv. no. 2002-74-47); g. chess rook, carved haddock cleithrum, represented as berserker from Siglunes (Iceland), 1300 (Lárusdóttir et al., 2012; photo H. M. Roberts).

***Fig. 3** – a. Jetons et dés, respectivement bois de cervidé et os, épave de Wismar-Wendorf (Allemagne), construite en 1476 (cliché Landesarchäologie Mecklenburg-Vorpommern) ; b. dés, os, Bergen (Norvège; Lund, 2013, p. 128, fig. 4.17, inv. nos B6396/c et B6328/f) ; c. jetons, os, Bergen (Norvège; Lund, 2013, p. 112, fig. 4.6) ; d. couple jouant au* kvátrutafl *; à droite, un échiquier est visible, gravure sur bois (Magnus, 1555, livre 15, chap. 12) ; e. pièce de jeu d'échecs (roi), os de baleine tourné, Gufuskálar (Islande), XIVe-XVe siècle (Pálsdóttir* et al.*, 2009, p. 33, fig. 1; numéro de découverte 08-005) ; f. pièce de jeu d'échecs (roi), cleithrum d'aiglefin sculpté, Steinbogi (Islande), XIIe-XIIIe siècle (Batey, 2005, p. 353, fig. 4 ; cliché T. McGovern ; Þjóðminjasafn Íslands, inv. no 2002-74-47) ; g. pièce de jeu d'échecs (tour) figurée sous les traits d'un berserker, cleithrum d'aiglefin sculpté, Siglunes (Islande), avant 1300 (Lárusdóttir* et al.*, 2012 ; cliché H. M. Roberts).*

e.g. Falk, 1983; Küchelmann, 2018), with the exception of Bergen. Here, at least 31 dice have been recovered, 21 made of bone or antler (fig. 3b) and three of walrus ivory. The majority of these was found in mid 13th to late 15th century contexts from Bryggen, the Hanseatic merchant's quarter (Lund, 2013). Flat circular bone and antler counters have been found in Bremen, Gdansk, Lübeck, Rostock and Stralsund (see e.g. Falk, 1983; Lehmkuhl and Schäfer, 2005). Counters of bone, antler, walrus ivory, wood and stone are also common finds in Bergen (fig. 3c) and Trondheim (McLees 1990; Lund, 2013). Flat circular counters appear in Bergen in the early 12th century and persist to the 17th century. Such counters have been used for board games like backgammon (Norse *kvátrutafl*; fig. 3d) or *Mühle* (merels or nine men's morris).

Another common board game in North Atlantic societies was chess. Chess was introduced in Norway and Iceland in the 12th century and became a popular game in the 13th century (McLees, 1990; Henriksen et al., 2011; Lund, 2013). According to historical sources as well as archaeological finds, chess seems to have been a widespread game in the North Atlantic region. An interesting source in this respect is the Tristan poem, written around 1210, in which Norwegian merchants play chess with ivory pieces and confirm that many of them are familiar with the game (von Straßburg and Simrock, ca. 1855 [1210], Kap. 4). O. Magnus (1555, Liber 15, Cap. 12, Liber 21, Cap. 29) describes playing chess as a common practice among all northern people in 1555 and claims walrus ivory to be a raw material commonly used for chess pieces. The Dutch whaling captain C. Zorgdrager (1723, p. 98) mentions chess to be "old and common" in all Nordic countries. Likewise, the Hamburg mayor J. Anderson (1746, p. 138) reports Icelanders to be chess enthusiasts. The archaeological record is likewise rich: Chess pieces made of mammal bone, antler, walrus ivory and wood have been found in Bergen, Trondheim and Kongshavn in Norway, as well as in Gufuskálar (fig. 3e), Þjórsárdalur, Kollsvík and Reykjadalur in Iceland (see e.g. McLees 1990; Pálsdóttir et al. 2009; Lund, 2013). Of particular interest here are chess pieces made from haddock (*Melanogrammus aeglefinus*) cleithra. Haddock cleithra regularly grow to an extraordinary thickness, a phenomenon called hyperostosis, which makes them suitable for bone carving (von den Driesch, 1994; Harland and Van Neer, 2018). Carving of haddock bones is a craft evident in Iceland since the 10th century (Kristjánsson, 1985; Batey, 2005). Chess pieces made of haddock cleithra have been recovered from the 12th–15th century sites of Siglunes and Steinbogi, Iceland (fig. 3f and g) and Kongshavn, Norway (Batey, 2005, p. 353; Harrison et al. forthcoming; Henriksen et al., 2011, pp. 200–201; Lárusdóttir et al., 2012, p. 22). They provide a direct relationship between fishing and gaming through the applied raw material. A particularly vivid example of this tradition is again given by C. G. Zorgdrager (1723, p. 97), who reports that every Icelandic farmer had a chess game, which he carved himself out of fishbone.

In comparison, chess pieces are rare finds in Hanseatic towns. A noteworthy find in this respect is a leather bag recently found in a 15th century cess pit in Wismar, the cover of which shows a chess-playing couple (Jantzen, 2023). That chess games were also commodities of trade, at least sporadically, is proven by an entry in the donation register of the Hamburg *Annenbruderschaft* (confraternity of St. Anne), a caritative sailor's organisation. The merchant Asmus Schulte paid 5 *Mark Lübsch* and 16 *Schillinge* to the confraternity as share for a chess game he acquired in Iceland in 1637 (Holterman, 2020, p. 54). The amount paid is comparatively high, which allows for the assumption that the profit made from the sale of the game may have been substantial. It may therefore have been an elaborate carving artwork, maybe of walrus ivory?

Playing is an important part of humanity and social life in general and evidence for games allows inferences about social interactions (see e.g. Huizinga, 1980). But different games are played by different people and the type of games played is an expression of social affiliation and identity. Further, playing is an activity for leisure times, not essentially needed to survive. Playing games can therefore be used to express social status (Lund, 2013, p. 92) and gaming pieces are thus meaningful objects to monitor trade relations. The careful stratigraphic excavations in Bergen and Trondheim yielded a large number of gaming pieces (McLees, 1990; Lund, 2013), and enable inferences about ethnic or social relations and developments. Concerning ethnic affiliations, the time of occurrence and the increasing frequency of finds of gaming pieces for backgammon, merels and chess in Bergen is consistent with the development of Bergen as a trading centre. It is thus likely that there is a relation to foreign merchants introducing new games to the town. However, there are differences in detail. The typological similarity of the flat round counters found in the Wismar wreck and in the *Bryggen* area of Bergen is striking and the fact that they occur in Hanseatic towns as well as in Bergen, but less often in other North Atlantic sites, allow for the assumption merels and backgammon may have been introduced to Norway by German merchants. Likewise, dice games may have become popular in Bergen by Hanseatic mediation, although dice were known in the Norse culture before Hanseatic contact. Chess was known in England and Germany in the 11th century and the occurrence of chess pieces in Norway in the 12th century lead to the assumption that they may have been introduced into Bergen by English or German merchants as well (McLees, 2009, p. 319; Lund, 2013, p. 143). This is supported by the fact that chess pieces are more frequent in Bryggen, the German merchant quarter, than in the residential areas of Norwegian people, where round counters were more common. It seems that in Bergen merels and backgammon reached a higher distribution in the Norse public than chess. This assumption is contradicted, however, by the fact that chess pieces, even of an early date, have been found widely distributed in the Norse world, whereas they are rare finds in Hanseatic towns. A more

obvious shift, probably related to ethnicity, can be seen in the disappearance of the old Norse game *hnefatafl*. *Hnefatafl* pieces occur in Bergen in the mid 12th to late 14th century, but evidence is scarce and seizes completely later. The game may thus have been replaced by chess (McLees, 1990; Lund, 2013). Possibly, Hanseatic influence played a role here.

Regarding social status games are often mentioned in Nordic Sagas, usually related to elites, which lead to the general assumption of gaming being an elite activity. G. K. Lund (2013, p. 145–146) further argues that strategy games like chess and *hnefatalf* "were the most mentally demanding and socially distinguishing" games and may thus "very well have been reserved for the upper classes in the early town, whereas merels and *kvátrutafl* also seem to have been played by common people." The Bergen gaming pieces display differences in quality. Specimens made of bone or walrus ivory are consistently more elaborately produced, e.g. lathe-turned or accurately decorated. These artefacts will have been more expensive than simple hand-carved wooden pieces and may therefore be an indication of higher wealth or social status of the owner. However, the proposed restriction of gaming to the social upper-class is questionable. Some chess pieces stem from high status ecclesiastical sites like Trondheim, but likewise elaborately carved pieces have been found in fishing communities like Kongshavn or Siglunes and in farmsteads like Steinbogi. The description of C. G. Zorgdrager shows that playing chess was a common practice of farmers in Iceland at the beginning of the 18th century. Medieval Norwegian chess pieces display a range of raw materials, forms and artistic skills, suggesting "a demand from a somewhat broader segment of society" (McLees, 1990, pp. 30–31, and 2009, p. 319). Particularly in Iceland the game seems to have been "not the preserve of the literate and leisured classes" (McLees, 1990, pp. 29–30). That gaming was obviously a popular activity of ordinary folk in medieval Bergen and Trondheim as well, is suggested by the spatial distribution of the gaming pieces, which were found in the area of the living quarters and assembly halls of *Bryggen* as well as in Norse residential quarters. Gambling for money was apparently so common in 13th century Bergen that it was seen as a social problem by the authorities and became prohibited by law in 1276 (McLees, 1990; Lund, 2013).

2.4. Guns

Early wheellock and flintlock guns feature a prominent role in the 17th century Hanseatic trade with Shetland. They were masterpieces of technical craftmanship, whose wooden parts (body and butt) were richly decorated with inlays of bone, antler or horn and even more precious raw materials like mother of pearl or ivory (fig. 4a and 4b; see e.g. Schöbel, 1978; Glage, 1983). As part of the annual fee for the trading licence, German merchants had to deliver a gun to the Shetland tacksmen. This custom is historically documented at least from the late 16th century onwards and it became an inevitable part of the fee through the whole 17th century until at least 1698. Such guns were prestigious status symbols, highly esteemed by the Shetland nobility, which clearly speaks out of the

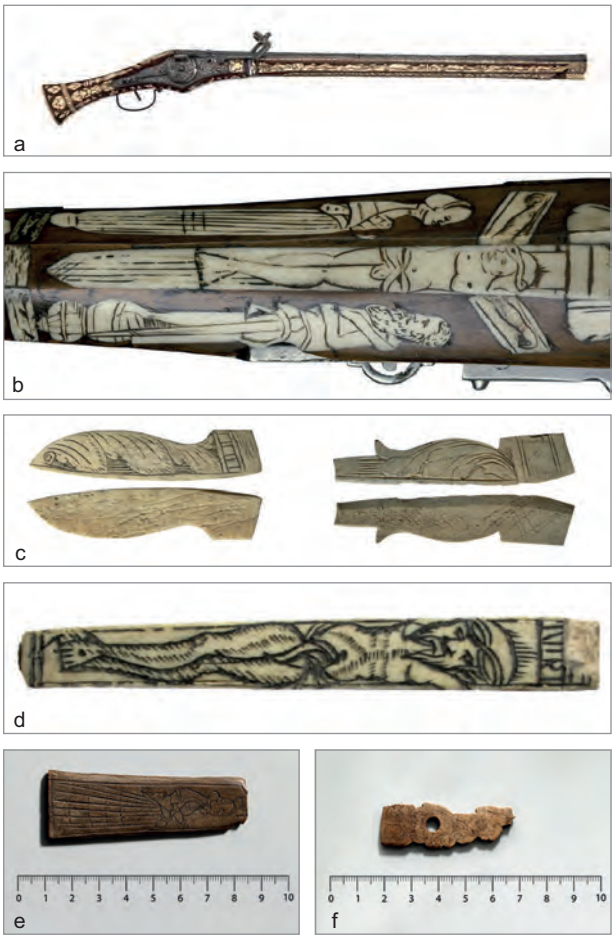

Fig. 4 – a. Decorated wheellock gun, Braunschweig (Germany), 1555, length 930 mm (Finer, 2010, p. 37); b. detail of a wheellock gun, Braunschweig (Germany), 1550–1555 (Staatliche Kunstsammlungen Dresden/Rüstkammer, inv. no. J559; Radohs and Ansorge, 2016, p. 181, fig. 26.1); c. and d. weapon inlays, red deer antler, Kleinschmiedstraße 8 – Stralsund (Germany), 1570–1580 ; c. floral motifs, length 75 and 78 mm; d. crucified Jesus, length 103 mm (Radohs and Ansorge, 2016, pp. 151–152, fig. 4.1 and 5.3-4); e and f. inlays, site 253/Altstadt Am Wall – Bremen (Germany), 2nd half 16th century, e. with woman in Renaissance clothing, antler; f. male motif, bone or antler (ID-nos. 458, 461; photos A. Plundrich, Landesarchäologie Bremen).

***Fig. 4** – a. Arquebuse à rouet décorée, Brunswick (Allemagne), 1555, longueur 930 mm (Finer, 2010, p. 37) ; b. détail d'une arquebuse à rouet, Brunswick (Allemagne), 1550-1555 (Staatliche KunstsammlungenDresden/Rüstkammer, inv. n° J559 ; Radohs et Ansorge, 2016, p. 181, fig. 26.1) ; c et d. incrustations sur une arme, bois de cerf élaphe, Kleinschmiedstraße 8 – Stralsund (Allemagne), 1570–1580; c. motifs floraux, longueur 75 et 78 mm ; d. Christ crucifié, longueur 103 mm (Radohs et Ansorge, 2016, p. 151-152, fig. 4.1 et 5.3-4) ; e et f. incrustations, site 253/Altstadt Am Wall – Brême (Allemagne), seconde moitié du XVI^e^ siècle ; e. femme vêtue à la mode de la Renaissance, bois de cervidé ; f. motif masculin, os ou bois de cervidé (numéros d'identification 458 et 461 ; clichés A. Plundrich, Landesarchäologie Bremen).*

sometimes admiring and detailed descriptions in customs documents (Smith, 2019, pp. 149–150). Given the facts that this obligation lasted over a hundred years and that 10–15 German merchants visited Shetland each year during the 17th century (Friedland, 1983), several hundreds of such decorated guns must have been imported to Shetland from Germany. This raises the question of production places in Germany and local trade networks. The main production centre for guns in the Hanseatic realm was Braunschweig (fig. 4a and 4b; Glage, 1983). A rare archaeological evidence for a late 16th century *Büchsenschäfter* workshop, a craftsman producing and decorating the wooden parts of guns, has been found in Stralsund (Radohs and Ansorge, 2016). The workshop remains contained raw material, half finished products, working waste and finished inlays. Employed raw materials were red deer antler and bones of horse and cattle. The engravings on the inlays consisted mainly of floral motifs (fig. 4c), with a few animals and religious motifs (fig. 4d). Contextual evidence allowed to infer a deposition date between 1570 and 1580. Additional archaeological evidence for this kind of handicraft is scarce and sporadic. Of particular interest here, in respect of the known Bremen – Shetland connections, are a couple of 16th century bone and antler plaques found in Bremen (fig. 4e and 4f; Bischop and Küchelmann 2018).

2.5. Other artefacts

Other objects intimately related to Hanseatic trade activities are signets, used to seal documents closed with sealing wax. These consist of a metal seal, sometimes with an attached handle. An example illustrating the daily use of this tool is given in the portrait of the Danzig merchant G. Gisze, painted 1532 by H. Holbein the Younger in his *Kontor* in the *Stalhof* (Steelyard) in London (fig. 5a). Signets are not specific to North Atlantic trade, but one specimen with a bone handle has been found in the harbour of Avaldsnes, Norway (fig. 5b; Mehler, 2009, 2011 and 2015). Two more of these rare archaeological finds, tentatively dated 15th–16th century, stem from Lübeck, one of these has been lathe turned from red deer antler (fig. 5c; Falk, 1983).

Artefacts with a similar significance as hard evidence for Hanseatic trade connections with Iceland are two knife handles found at the fishing settlement of Gufuskálar, Snæfellsnes (fig. 5d). The handles are made of red deer antler, a species not living in Iceland. The ends of the handles depict the open mouth of a whale. Gufuskálar is located ca. 10 km SW of the trading site of Rif (*Reff, Gammelwick*), where Hamburg merchants were trading from the 1520s to 1603 (Holterman, 2020, pp. 265–267). Typologically and chronologically similar knifes have been found in Bremen (fig. 5e; Küchelman, 2014, pp. 39–41).

Another tool directly related to trade activities, is the *Elle* (ell), an instrument used to measure cloth. Again, ells are not specific to North Atlantic trade and were usually made of wood, but one specimen in the collection of the St. Annen-Museum Lübeck (inv. no. 1539) has to be put forward here (fig. 5f). The Elle has a length of 75 cm and is carved from a single piece of whalebone. It is elaborately decorated and bears an owner's mark of Kasten Olerkes and the year 88, most probably 1588. Two linear measures are marked on the bone, the *Hamburger Elle* and the *Brabanter Elle*. The *Elle* may have either been manufactured at a North Atlantic site, ordered by Kasten Olerkes or, probably more likely, the whale bone has been imported as raw material and carved by a Lübeck artisan to its final shape. Persons with the family name Olricks/Ulricks/Olerckes appear as merchants or ships folk in Iceland in the donation register of the *Annenbruderschaft* in Hamburg from 1548 to 1603 (Holterman, 2020, pp. 177, 179, 465, tab. 4.2). They traded predominantly in Hafnarfjörður. The *Hamburger Elle* was adopted as the official linear measure in Iceland in the 15th century and stayed in use until 1776. On the Faroes it was the official measure from the 14th century until 1684 (Baasch, 1889; Mehler, 2009; Arge and Mehler 2012; Holterman, 2020).

Finally, an extraordinary object has to be mentioned here, a combination of a sundial with a compass shaped as a book, allegedly made of elephant ivory, which has been found in Hallsstaðir, N-Ísafjarðarsýsla, NW-Iceland (fig. 5g). The provenance of this navigational instrument is not exactly clear, but it has been interpreted as a 16th century object of either Spanish or German origin. German merchants were active in the Isafjörður in the 16th century (Holterman, 2020, pp. 285–287), adding weight to the possibility of this item being related to Hanseatic trade. The device combines technical with cultural history and is an outstanding example for the influx and exchange of knowledge and technical innovations mediated by North Atlantic trade.

3. DISCUSSION

The presented examples of bone artefactual evidence related to Hanseatic trade are of very uneven nature. Some artefact classes occur in the archaeological record in significant numbers, like walrus ivory objects, line runners or gaming pieces, allowing the analysis of spatial and diachronic developments. In case of gaming pieces even ethnic preferences become visible. Other items, like the Lübeck *Elle*, the Hallsstaðir compass or the Hildesheim elk antler are singular objects, which cannot be used to infer general trends, but offer in-depth spotlights, sometimes even highlighting activities of single individuals.

Like ceramics, bone artefacts can be definite evidence for trade relations, e.g. in case of a raw material of restricted geographical provenance or by typological features proving a specific cultural origin. Good examples for both arguments are the red deer antler knife handles of a North German type found at the fishing site of Gufuskálar, Iceland. Elk and reindeer antler or walrus and narwhal ivory found outside of the species' range are other examples.

Fig. 5 – a. Hanseatic merchant Georg Gisze in the Stalhof in London, painted 1532 by H. Holbein the Younger, note signet at the front of his table (Mehler, 2009, p. 100, fig. 7); b. Hanseatic signet with lathe turned bone handle, found during underwater prospections, Hanseatic trading site of Avaldsnes (Norway; Mehler 2009, p. 99, fig. 6; photo A. Opedal and E. Elvestad); c. lathe turned red deer antler signet, site no. 238 city center – Lübeck (Germany) 15th–16th century, 71×24 mm (photo Archäologie Lübeck); d. knife handle, red deer antler (*Cervus elaphus*), fishing site of Gufuskálar (Iceland; photo L. Pálsdóttir); e. knife handle, red deer antler, site 253/Altstadt Am Wall – Bremen (Germany), 2nd half 16th century (inv. no. 353; photo A. Plundrich, Landesarchäologie Bremen); f. Elle, whale bone, Lübeck (Germany), 1588, length 750 mm (St. Annen-Museum Lübeck, inv. no. 1539; photo H. C. Küchelmann); g. nautical instrument combining a sundial and a compass, allegedly elephant ivory, Hallsstaðir (NW-Iceland), 16th century, 130×89×65 mm (Þjóðminjasafni Íslands, inv. no. 307/1866-4).

***Fig. 5** – a. Le marchand hanséatique Georg Gisze au Stalhof de Londres, peint en 1532 par H. Holbein le Jeune ; notez le sceau matriciel posé au premier plan sur la table (Mehler, 2009, p. 100, fig. 7) ; b. sceau matriciel hanséatique muni d'un manche tourné en os, découvert lors de prospections subaquatiques, comptoir commercial hanséatique d'Avaldsnes (Norvège ; Mehler, 2009, p. 99, fig. 6 ; cliché A. Opedal et E. Elvestad) ; c. sceau matriciel, bois de cerf élaphe tourné (*Cervus elaphus*), site n° 238 centre-ville de Lübeck (Allemagne), xv^e^-xvi^e^ siècle, 71 × 24 mm (cliché Archäologie Lübeck) ; d. manche de couteau, bois de cerf élaphe (*Cervus elaphus*), site de pêche de Gufuskálar (Islande ; cliché L. Pálsdóttir) ; e. manche de couteau, bois de cerf élaphe, site 253/Altstadt Am Wall – Brême (Allemagne), seconde moitié du xvi^e^ siècle (inv. n° 353 ; cliché A. Plundrich, Landesarchäologie Bremen) ; f. aune, os de baleine, Lübeck (Allemagne), 1588, longueur 750 mm (St. Annen-Museum Lübeck, inv. n° 1539 ; cliché H. C. Küchelmann) ; g. instrument nautique combinant un cadran solaire et une boussole, supposément ivoire d'éléphant, Hallsstaðir (nord-ouest de l'Islande), xvi^e^ siècle, 130 × 89 × 65 mm (Þjóðminjasafn Íslands, inv. n° 307/1866-4).*

Another relevant question is the relation between function and raw material. For some artefact types this relation is not strict. Different raw materials could be used for the manufacture of the same type of artefact and raw material availability may have had a major influence on the choice. For other artefacts a closer or even strict dependency between function and raw material can be observed. Line runners, for instance, have been found in similar shapes made of bone, antler and hardwood. They could thus have been produced from different raw materials. Nevertheless, of the 43 finds from medieval Bergen 26 (60,5%) were made of antler and nine (20,9%) of bone (Olsen, 2004, pp. 42–43, tab. 8). The material properties of bone and particularly antler have apparently been sought after as being most appropriate for the desired purpose. The fact that all known examples of *Marlspieker* are made of red deer antler is another example. This intentional choice becomes even more apparent when we link it to the raw material availability. Wood was easily accessible in Southern Norway, but was rare and precious in Northern Norway, Iceland, Shetland and the Faroes. Bones of domestic mammals are a regular by-product of stock breeding and were available throughout the whole North Atlantic region. Red deer antler, however, requires either active hunting or gathering of shed antler, which implies a high effort to get access to it. This situation of high demand and low availability is reflected in numerous zooarchaeological assemblages, which contain significant numbers of deer antler pieces, while post-cranial deer bones are rare or missing completely (see e.g. Schleswig; Ulbricht, 1984). Such an imbalance between demand and supply made deer antler a profitable commodity for trade.

Bone and antler artefacts used as fishing gear add significant evidence to our knowledge about the development of stockfish production in Northern Norway. Together with specific fish hooks and line sinkers, the appearance of rotating line runners points towards a major development of the North Norwegian fishery to an industrial scale and to a change in the economy from the 12th century onwards. This development coincides with the establishment of export oriented foreign trade from Bergen, particularly of stockfish, and can be linked to the Hanseatic trade. From the Hanseatic point of view, the availability of stockfish for export was the prerequisite for North Atlantic trade in general (Holterman, 2020).

Gaming pieces shed light on aspects of social life within the Hanseatic as well as the North Atlantic communities. The elaborate bone and antler decorations of early modern guns, on the other hand, allow insights into production and trade networks if archaeological, historical and art historical evidence is combined.

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