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José da Silva Horta · Carlos Almeida · Peter Mark

AFRICAN IVORIES IN THE ATLANTIC WORLD, 1400-1900

MARFINS AFRICANOS NO MUNDO ATLÂNTICO, 1400-1900



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Ivory in West Africa, c. 100 to 1900 CE: Archaeological evidence and future research priorities

*Marfim na África ocidental, c. 100-1900 CE:
Achados arqueológicos e prioridades de investigação futuras*

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Introduction

Ivory, whether from African forest or savanna elephants or other species, is an inherently transnational material and mobile object. The antecedents of human-ivory relationships were established in the Plio-Pleistocene by our hominin ancestors, and can be traced archaeologically in different parts of the globe over millennia.¹ Ivory's multi-species nature, encompassing a wide range of both extant and extinct terrestrial and marine species,² has ensured that these relationships have been complex, variable and constantly open to reconfigura-

1 Lane 2015; Pitulko et al. 2015; Steguweit 2015.

2 Heckel 2018.

tion and transformation. The biographies of individual pieces of ivory, whether large unmodified tusks, or delicately carved miniatures, inevitably touched the lives of multiple human and non-human actors, and the reconstruction of these biographies necessarily needs to be multi-sited in outlook, both in a geographical sense and in a socio-cultural sense, simultaneously encompassing the 'local' and the 'global' as outlined in George Marcus's conceptualisation of multi-sited ethnography.³

Ivory's value and significance changes from the moment that the ivory is detached from a particular species to become a source of raw material to be exchanged and traded for subsequent modification into desirable objects for a diverse range of utilitarian, symbolic, religious, political, cultural and/or aesthetic purposes. The valuation of ivory has been a key variable in shaping the demands for and flows of ivory, with shifts in the nature of these valuations traceable over the long term via historical and archaeological records. In medieval Europe, African elephant ivory was principally used for the production of ornately worked religious and elite artefacts, including caskets, plaques, diptychs and trumpets.⁴ By the nineteenth century, however, access to African elephant ivory was far more widespread and it was no longer so exclusively associated with elite culture. Yet, its routine incorporation into Victorian middle-class households in the form of piano keys, billiard balls, ornaments, and toiletry items among many other artefact types, continued as a form of marking social distinction, partly because of its 'exotic' origin.⁵ Even the waste material produced as a consequence of this working and reworking of ivory, at times, was reconfigured to serve some additional purpose, such as the ivory dust left over from ivory manufacturing in Victorian England which had a range of uses, including medicinal tonics, ink pigments, and edible jellies.⁶ Moreover, differences in the materiality of ivory from different species, especially variations in density, colour, size, shape, texture and malleability, provide different potentials that humans have learned to exploit.

3 Marcus 1995.

4 Chalkin 2010; Williamson 2010; Guérin 2013.

5 Stahl 2015a; Coutu et al. 2016b; Kelly 2019.

6 Beachey 1967.

Mindful of these observations, in this paper we offer a preliminary synopsis of some of the archaeological data sets that could be used to extend understanding of human-ivory relationships in West Africa over the last two millennia, with a particular focus on the centuries following contact with Portuguese explorers and trading missions.

West African ivories

There has been a wealth of research on the finely carved ivory objects of varied form that circulated in Europe and the wider Atlantic world during the 15th to 17th centuries associated with the expansion of Portuguese trade connections with the African continent in the late medieval and early modern periods. This research originated from the perspectives of art history and, subsequently, more general historical studies.⁷ A common thread in many studies of Afro-Portuguese ivories, for example, has been identification of the cultural and stylistic association of their imagery, both Eurocentric and Afrocentric (see Mark, this volume). It has become increasingly accepted that these are hybrid objects occupying a third space that emerged through cultural contact and exchange, and the fusion of two quite distinct artistic and symbolic traditions (see Jacobs and Afonso, this volume). There has also been a debate over where the corpus of delicately carved hunting horns, saltcellars, spoons and other objects were produced (see Lamp and Hart, this volume). Current consensus suggests that initial production, on commission, was by ‘Sape’ artisans residing in what is now part of coastal Sierra Leone and Guinea-Conakry from c. 1490. Some scholars have also argued that ivories started being commissioned from carvers in Benin after either c. 1550⁸ or 1530⁹ following Mane invasions and destruction of the ‘Sape’ area. This view has been contested by others – notably the historian Peter Mark, who has noted *inter alia* that there is extensive

7 Janzen 2009; Ross 1992; Bridges 2013; Mark 2002; 2007; 2015; Afonso 2016; Afonso et Horta 2013; Soares 2017; van den Boogaart 1992; Bassani 1994; Fromont 2012; Rodrigues 2018.

8 Curnow 1983.

9 Bassani et Fagg 1988; Bassani et McLeod 2000.

historical evidence to suggest that Sape remained active as ivory carvers well after the extension of Mane political control over their area.¹⁰ Other scholars have also argued that ivories produced by Luanda carvers in the former Kongo Kingdom should be included in the Afro-Portuguese corpus,¹¹ but like other views on where Afro-Portuguese ivories were produced, this is not universally accepted. Soares, for example, has argued that West African ivory exported to Portugal during the 15th to 17th centuries originated from three zones: the coast of Senegal/Gambia/Guinea, the Gulf of Guinea, and the coast of Gabon/Congo/Angola.¹² Soares argues that the material from the Luanda coast was perhaps more important in terms of political gift exchange between the Portuguese kingdom and the King of Congo, as reported by Rui de Pina (1440-1522) who details the growing relations between the two kingdoms from 1491, when the first Portuguese embassy arrived at the Kongo court.¹³

Geography of West African elephant distribution

Much less research has been undertaken on establishing the more precise geographical origins of these different kinds of ivory, or on the organisation of the procurement, distribution, circulation and processing of elephant and hippopotamus ivory in West Africa during the medieval and early modern periods. All of these questions are amenable to archaeological investigation. Despite efforts to provide basic quantitative assessments of the source and scale of ivory extraction from the region, it is still unclear where, precisely, this ivory was sourced, or whether the specific geographical origins of elephant ivory entering the Atlantic world economy shifted over time as elephant herds were over-exploited and perhaps even locally extirpated.

Nonetheless, despite the lack of systematic analysis, elephant and hippopotamus ivory has been recovered from a selection of archaeological sites in

10 Mark 2007; Mark 2015.

11 e.g. Blier, 1993.

12 Soares 2017, 60.

13 Soares 2017, 61-64; Newitt 2010, 100-108.

West Africa ranging in date from c. 100 CE onward, and from a number of European shipwrecks in the North Atlantic, Indian Ocean and the Pacific. There are inevitably a combination of ‘mentions’ and ‘silences’, to use Michel-Rolph Trouillot’s terms,¹⁴ in these archaeological sources. It is often necessary to triangulate evidence not just with other sources covering the same time period and topic, but also with objects of different date and perhaps origin. Despite such limitations, aspects of these archaeological finds testify to the processing and exchange of ivory within Africa, and its wider, inter-continental circulation. The intricate nature of the carving on some of the ivory exported, and especially the so-called Afro-Portuguese or Luso-African ivories, is also suggestive of older, long-lasting craft traditions that may have been adapted to meet the tastes of European consumers.¹⁵ Archaeological investigation may help to establish the locus and origins of these traditions. The documented scale of export of unworked tusks also attests to the existence of sophisticated trade networks that would have included specialist hunters, porters and middlemen, based on analogy with later trades.

Relative to other parts of the African continent and for other time periods, however, we still know very little about how the trade in elephant and hippopotamus ivory operated across West and Central Africa, how or whether these ivory exchange networks were transformed as a consequence of the incorporation of West Africa into the Atlantic world,¹⁶ or where, how, and in what forms ivory was worked within West and Central African societies.¹⁷ Historically, landscapes in both areas would have been inhabited by both extant species of African elephant, *Loxodonta cyclotis* (forest) and *Loxodonta africana* (savanna). Here, we focus just on the archaeological data from West Africa owing to the greater accessibility of published reports for this part of the continent.

14 Trouillot 1995, 26.

15 Afonso 2016; Afonso et Horta 2013.

16 On these wider international networks in the medieval era, see: Chaiklin 2010; and Guérin 2013.

17 Stahl 2015a; Compton 2017.

Archaeological ivories from West Africa

Archaeological evidence from across the region points to the likely existence of several centres of ivory working and movement of unworked ivory through different exchange networks, some oriented to serve local demands and others directed toward the trans-Saharan trade system.¹⁸ It is important to keep in mind that both the scale of production in specific localities and the direction and motivation for the exchange of raw and worked ivory may have shifted over time as exchange networks expanded and contracted and, as critically, as elephant populations were themselves affected by these fluctuations in demand. Equally, as external tastes and artistic fashions changed, ivory with specific properties may have become less desirable than in earlier centuries.¹⁹ Consequently, elephant ivory from forest elephants, which is typically harder and smaller in size, might well have become less sought after and, in response, the softer yet larger tusks from savannah elephants occupying the Sahelian and Sudanic belts may have become more commonly acquired and traded. Forest elephant tusks, for example, are typically straighter and more slender than those of savannah elephants, and being harder are more suitable for delicate carving. Intriguingly, the *Encyclopédie du commerçant*, published in 1841, states that savanna tusks were significantly rarer than forest elephant tusks in the West African ivory trade to Europe.²⁰ Conversely, today, the distribution of the forest elephant has dramatically reduced due to poaching, habitat loss, and land use change, especially in coastal regions.²¹

There is, as yet, no single corpus detailing all these finds, many of which either pre-date or post-date the period of Afro-Portuguese ivory production. Work by Stahl and Stahl,²² however, provides a useful starting point, as it reviews the evidence for medieval ivory production in Ghana. The locations of the archaeological sites mentioned are shown in Fig. 1; there are, no doubt,

18 Guérin 2017; Haour 2019.

19 As appears to have happened in eastern Africa, for example, between the mid-first millennium CE and the 19th century (Lane 2019).

20 Apud Soares 2017, 60.

21 Breuer et al. 2016; Bouché 2011.

22 Stahl et Stahl 2004.

many more data points that could be added to this map, especially if accompanied by a detailed survey of unpublished zooarchaeological reports – which was not possible to undertake for this chapter. A review of the literature on Central African archaeological sites covering the same timespan would likely also reveal additional examples of local ivory procurement and working. Additionally, many of the finds described here are part of the small finds or artefacts from published archaeological excavations, whereas skeletal elements of ivory-bearing animals such as unworked teeth, tusk, or bone are more commonly reported in separate zooarchaeological reports which were not reviewed when researching this paper. Our list is thus intended as indicative rather than comprehensive to stimulate future work on tying these lines of evidence together by examining geographic patterns in the production and exchange of finished ivory objects based on an assessment of readily accessible published material. Details of the various sites (Fig. 1) where evidence for the presence of ivory has been reported are provided below, listed in approximate geographical order from west to east and north to south. As the map indicates, there are large areas across West Africa for which published archaeological attestation of elephant (and hippopotamus) ivory is currently lacking; this specific ‘absence’, however, should not be taken as indicating either a likely lack of presence of elephants or lack of their exploitation by local inhabitants. Instead, the map highlights precisely why more sustained and targeted archaeological research on these questions is needed.



Fig. 1. Map of archaeological sites in West Africa discussed in this chapter where ivory objects have been found. Dashed lines indicate vegetation zones, following Tappan et al. 2016.

Gao, Mali (10-11th century CE)

A cache of at least 53 hippopotamus tusks was found during excavations at the multi-period site of Gao Ancien (Old Gao), northern Mali in 1993. The tusks had been laid in a pit close to a fired mud-brick building. Two short slivers of wood were found in association with the tusks, thought by the excavator to be the remains of a wooden beam, along with the neck of a pottery jar or bottle and an iron harpoon/spear head. Deposits sealing the cache contained ceramics and glass from North Africa and Spain, typologically attributable to the 11-12th century CE, suggesting that the ivory may have been deposited somewhat earlier, during Period 4 of Gao's occupation from the 10-11th century CE. The original interpretation of the cache was that it was a shipment of ivory intended for the trans-Saharan trade, based on Gao's known role as a trade hub and on evidence for the use of hippopotamus ivory in ivory workshops in North Africa, Egypt and al-Andalus.²³ More recently this inter-

23 Insoll 1995; Insoll et Shaw 1997; McIntosh et al. 2020.

pretation has been questioned in light of the placement of the iron harpoon/spear head on top of the cache, and its association with the foundation of the building.²⁴ An alternative explanation is that the cache instead represents a ritual deposit to mark the foundation of the house, given that the origin myth of the city of Gao is associated with hippopotamus figures.²⁵

Diouboye, Senegal (11-14th century CE)

Diouboye is a settlement site located in eastern Senegal along the Falémé River, occupied from the 11th to the 14th century CE.²⁶ Unlike most occupation sites in Senegal in this period where the faunal remains are largely from domesticated species, those from Diouboye point to hunting of medium-to-large sized animals, including large game such as elephant and hippopotamus. Hence, its occupants were potentially supplying ivory and skins as part of the medieval trade in these products. Bone and ivory ornaments such as beads and pendants, found in occupation areas of this site, suggest there was also some local use of these products. The majority of the evidence here, however, indicates a thriving hunting economy with a focus on the hunting and processing of wild animals, but with limited evidence for craft production.

Birnin Lafiya, Benin (4-13th century CE)

Birnin Lafiya is a large settlement mound covering at least 26 hectares and with over eight metres of stratified deposits situated c. 2 km west of the Niger River, in northern Benin.²⁷ Part of a curved ivory bracelet (in two pieces) was recovered from Context 6 at around 80-90 cm below ground level immediately above a deep pit.²⁸ Another bracelet fragment, possibly of ivory, was recovered from a different trench, at around the same depth.²⁹ Charcoal from the

24 Insoll 2015, 134-137.

25 Insoll 2015, 134-137.

26 Dueppen et Gokee 2014.

27 Haour et al. 2016.

28 Haour 2019, 249, 646.

29 Haour 2019, 695.

same context was radiocarbon dated to between the 11th and late 13th century CE. The absence of other faunal remains of elephants from the site suggests that this was not a primary location for ivory extraction, and that the bracelets may well have been obtained through trade.

Gorouberi GOB-13-SII, Benin

(early first millennium CE to c. 9th century CE)

This is a large settlement mound covering around 2.5 hectares, overlooking the Niger floodplain and close to the modern village of the same name in the Dendi region of northern Benin. Recent test-excavations here recovered part of a bracelet made from elephant ivory from Context 3a in Trench 2, associated with the earlier phase of settlement occupation.³⁰

Banda Region, Ghana (1300-1650 CE)

Ivory has been recovered from several excavations in the Banda region of west central Ghana.³¹ Elephant and hippo ivory were both identified, with most of these objects being items produced for regional exchange. All of the evidence for ivory production at these sites is from deposits which date to the period of trans-Saharan trade, with no evidence found at these sites in later periods when local communities became increasingly integrated into the Atlantic world trade systems.³² The majority of ivory objects found in the Banda region come from the site of Kuulo Kataa, with 52 pieces from 7 different mounds on the site (date range from 1425-1650), including bangles, pins, combs, and blanks.³³ These objects were part of extensive craft production industries at the site, with items made from diverse materials produced locally for regional trade. Other items of personal adornment made from bone, shell and teeth

30 Robion-Brunner 2019.

31 Stahl 2001; Stahl, personal communication, September 2020; see Stahl et Stahl (2004) for a detailed overview of the ivory objects found at Kuulo Kataa as well as other sites in Ghana with evidence of ivory objects or ivory production.

32 Stahl et Stahl 2004, 92, 99.

33 Stahl et Stahl 2004, 92.

were also found. Warthog, giant forest hog, and hippo were all found in the faunal remains of Kuulo Kataa, but no elephant bones were found. As many as 23 bangle fragments have been identified as being made from elephant ivory, and seven from hippopotamus ivory.³⁴ The ivory found was either associated with structural features, or recovered from large rubbish dumps (middens). The presence of ivory fragments in middens suggests that production occurred on site; the discarded items could represent partially produced or failed objects. The objects were distributed throughout a variety of contexts on site, but the excavators suggest that some of the evidence represents household working deposits and is certainly evidence of localised craft production of ivory. The absence of elephant remains suggests that raw ivory was being brought into the site ready to be worked.³⁵ Bangle fragments, one pin, and one plug or stopper of ivory (most unidentified to species, with some confirmed elephant) were found at four neighbouring sites: Ngre Kataa, Banda 41, Banda B123, and Banda 13.³⁶ A fragmentary unworked elephant tusk was also found at the site of Ngree Kataa as part of what the excavators interpreted as a shrine associated with a metalworking workshop.³⁷ Logan and Stahl argue that the ivory found at these Banda region sites provide evidence for both local production and trade as part of connections with trading centres along the Niger River in the 15th and 16th centuries.³⁸ After 1600, however, as this region became fully encompassed in Atlantic trade, the presence of ivory in these settlements declined, perhaps as a result of increased external demand for raw ivory, and a shift toward an export-driven economy removing ivory from local circles of production and use.³⁹

34 Stahl et Stahl 2004, 92.

35 Stahl et Stahl 2004, 97.

36 Stahl, personal communication, September 2020.

37 Stahl 2015b; Stahl 2013, 61.

38 Logan et Stahl 2017.

39 Logan et Stahl 2017.

Bono Manso, Ghana (13-18th century CE)

Bono Manso was a large, early urban centre and trade hub in the southern Volta basin, located at the savanna-forest margin. The site is estimated to cover 2.3 km², and to have served as the apex of a four-tier regional settlement hierarchy. Three broad phases of occupation were identified, with its peak from the 16th – 17th centuries. Recovered archaeological materials and oral traditions indicate it was linked to the trans-Saharan trade. Although the site was strategically well placed to access both savanna and forest elephant populations, only a few ivory artefacts have been recovered. These included fragments of ten ivory bangles, four carved ivory bracelets and a fragment of an ivory cup. Both the carved bracelets and the ivory bangles resemble those recovered from the sites of Dawu and Asebu in Ghana.⁴⁰ No ivory working debris or elephant bones were recovered.⁴¹

Dawu, Ghana (15-17th century CE)

The site of Dawu, in the Akuapim area of south-eastern Ghana, comprises a series of large middens which were first excavated in 1942 and later found to be part of an extensive landscape of at least eighteen middens.⁴² These middens were formed through the occupation of a large town at Dawu and nearby Awukugua in the 17th century, when this area became an important crossroads for trade, especially the movement of gold to the coast.⁴³ In the lower, and therefore earliest, levels of the midden, 28 bangle fragments were found, with 25 made of ivory and three made of bone.⁴⁴ Some of the fragments were highly polished and decorated with raised dot and circle patterns. Further evidence of craft production at the site was found throughout the midden sequence, such as bone working waste alongside carved objects made from bone and shell, including perforated pendants, combs, and awls.⁴⁵

40 Nunoo 1957.

41 Effah-Gyamfi 1985, 89, 93-94.

42 Shaw 1961, 86; Sutton 1981, 11-13.

43 Sutton 1981, 11-13; Osei-Tutu 1992.

44 Shaw 1961, 64-65.

45 Shaw 1961, 64-68.

Begho, Ghana (15th-18th century CE)

Begho, a large town inhabited from 1400-1725 CE, was important geographically due to its location in the savanna belt, on the edge of the forest zone and on a route north toward the major trading centre of Djenné. Excavations revealed a range of imported goods such as Chinese porcelain, copper, and glass beads, which attest to its foundation as a marketplace.⁴⁶ Excavations also unearthed a range of traces generated by the working of various materials including iron, textiles, beads, ceramics, and ivory. The ivory found on site was both in raw form, unworked, and worked into bracelets, suggesting that it was part of craft working at the site. Based on place name evidence in the region, elephants would have been common in the landscape.⁴⁷ The most striking of the ivory finds are the ends of two side-blown trumpets, decorated with incised lines and ring and dot motifs, found in a 16-17th century context outside a house.⁴⁸ These objects (now held in the British Museum – accession numbers 73.68 and 73.69) measured 15.3 x 3.2 cm and 9.1. x 2.3 cm, respectively. They were likely for ceremonial use, as side-blown trumpets are used and depicted in various other contexts from West Africa in this period, most notably in the Benin kingdom.⁴⁹

Elmina, Ghana (15th-19th century CE)

When Portuguese traders established a fort at Elmina on the coast of Ghana in 1482, large African settlements were located in the interior, orientated towards trans-Saharan trade. Coastal settlements were small and dispersed. This pattern changed dramatically as coastal trade with the wider Atlantic world increased, especially as Elmina became an important entrepôt for ships sailing along the West African coast from the 15th to the 19th century. Excavations at the site have provided important information about the local economy, as well as changes and continuities in material practices. Unfortunately, however, the

46 Posnansky 1971, 120.

47 Posnansky 1971, 120.

48 Posnansky 1976, 53-55; Posnansky 2015, 109.

49 Kaminski 2007; Posnansky 2015, 109.

ivory and bone objects found at Elmina were recovered from poorly dated, disturbed deposits. For example, several ivory bracelet fragments, a bone comb, as well as a section of tusk that had been worked were all found in deposits containing material dated to the 17th, 18th, and 19th centuries, so it is impossible to know the original date and depositional context of these finds, although their presence does suggest that ivory working occurred within the town at some point in its history. Several small ivory objects, described as stamps, were also found in 19th century deposits. These stamps might have been used with paint for body stamping, but their exact function is unknown as there are no parallels in the archaeological or ethnographic record.⁵⁰

Daboya, Gonja, Ghana (12 - 18th century CE)

Daboya is located on the west bank of the White Volta River, northern Ghana, close to an important crossing point and valuable salt deposits. The area has a long history of human occupation from at least 500 BCE associated with the transition to food production, and ultimately Daboya became an important town within the Gonja kingdom by the 17th century. An area covering 0.75 square kilometres was intensively sampled by small scale test-excavation between 1978 and 1983. Seven ivory artefacts were recovered during these excavations. Five were bracelets, including a nearly complete example found on the wrist of an inhumation burial of a young adult female (burial 11, area H5).⁵¹ The other two items consisted of a small, barrel-shaped bead and a roughly square plaque measuring 3.3x3.8x0.6 cm, with two parallel incised lines.⁵² The date of deposition of these pieces is uncertain, but probably lies toward the later phases of the site's occupation.

50 DeCorse 2001, 138-139.

51 Also described as DBH burial 33, Shinnie et Kense 1989, 220.

52 Shinnie et Kense 1989, 189.

New Buipe, Ghana (16 - 18th century)

At New Buipe, rescue excavations uncovered three large mounds along the north bank of the Black Volta River, ranging in date from the 7-9th centuries to the 16-18th centuries CE. One large elephant ivory ring, as well as three other ivory objects described as spatulae were found in deposits dating from the 17th to mid-18th century. The three spatula-like ivory objects may be from warthog tusk, as a portion of worked warthog tusk was found in the same mound. The spatulas were decorated with circle and dot motifs and, due to the presence of a hole through the upper end, are thought to have either been pendants for suspension on a string or handles for a fan or fly whisk. Notably, their design and form is uniform and a similar fragment was found at the nearby site of Krunkrunmboi.⁵³

RS/63/32, Kanji Dam, Nigeria (100-700 CE)

This site, along with Igbo-Ukwu (see below), although pre-dating direct European engagement in the trade in African ivory, attests to the longer history of the exploitation and circulation of ivory in West Africa. The site comprised a mound of settlement debris, c. 10 m high on the west bank of the Niger River near Yelwa, Sokoto Province, central Nigeria, downstream from the Dendi area. The site was partially investigated as part of rescue excavations undertaken between 1966 and 1968 in advance of the construction the Kanji Dam. Typological changes to pottery from the site suggest two phases of occupation, both associated with early farming (or Iron Age) communities. A large assemblage of iron objects, including items of personal adornment and various tools such as axes and arrowheads were recovered. Other finds included stone beads and lip-plugs, terracotta figurines distinct from the better-known Nok tradition, and a single fragment of an ivory bracelet. No ivory-working debris was recovered.⁵⁴

53 York 1973, 59-61.

54 Priddy 1970, 20-32.

Igbo-Ukwu, Nigeria (9-13th century CE)

Occupied between the 9th and 13th century CE, Igbo-Ukwu in south-eastern Nigeria was a prominent elite centre connected to trans-Saharan and West African trade networks. Over 150,000 glass beads were recovered from excavations in three distinct areas.⁵⁵ Although chemical analysis of the beads is ongoing, the compositional groups of the 97 glass beads analysed so far suggest the beads derive from a variety of sources.⁵⁶ The most recent research suggests that some beads were produced locally at the glass workshop of Igbo Olokun, whilst others were sourced through trade networks from Egypt and the Mediterranean.⁵⁷ Other prominent finds included 685 copper and bronze objects exhibiting distinctive designs and motifs, textile fragments and over 20,000 pieces of locally produced pottery. Ivory was only recovered from the Igbo-Richard site. Three elephant tusks were found as part of an elite male burial, associated with a range of chiefly regalia, a human skull and limb bone fragments.⁵⁸ Two tusks were virtually intact, and measured 99.1 cm and 86.4 cm long, respectively, while the third was incomplete, measuring only 66 cm.⁵⁹ In addition to the three tusks, a single fragment of carved ivory, measuring c. 3 cm, was also recovered from the burial complex.⁶⁰ The tusks were decorated with symbols of office reminiscent of those used by Igbo in the 19th and 20th century. The burial is dated to between 880 and 1160 CE.⁶¹ No other traces of ivory were found at the other two excavated locales (Igbo-Isaiah and Igbo-Jonah).

Benin City, Nigeria (13th century CE to present day)

Eighteen elephant ivory tusks were found in the excavations of the Clerks' Quarters site in three different deposits, all in a poor state of preser-

55 Shaw 1970, 237-239.

56 Wood 2016 75-76; see McIntosh et al. 2020 for an overview of West African glass bead sources.

57 Wood 2016; Babalola et al. 2018; the geography of trade networks into Igbo Ukwu is debated: see Insoll et Shaw 1997; Sutton 2001.

58 Shaw 1970, 265.

59 Shaw 1970, 249.

60 Shaw 1970, 249.

61 Shaw 1975, 509.

vation. In one deposit dated to the 15th century, three tusks were found lying on top of one another, one which had some surface carving visible.⁶² In the second deposit, one elephant tusk was found between occupation layers, and in the third deposit, the remains of 14 elephant tusks dated to the mid-13th century were recovered. This deposit was part of the infill of a cistern originally used for domestic purposes, but later used for sacrificial victims, as indicated by the presence of human remains within a deposit of sand, clay and infilled building materials.⁶³ The excavator suggested that the elephant tusks were placed on the top of this infilling to mark the importance of the materials (human remains, cloth fragments, and bronze objects) buried in the cistern.⁶⁴

Future considerations

Isolated elephant or hippo faunal remains have been found across the region in contexts dating from the late first and second millennium CE. For example, single skeletal elements of elephants have been found at Oursi hu-beero and Saouga in Burkina Faso, from Daima and Ngala in Nigeria, Ble Mound E in Cameroon, and a hippopotamus molar root at Jenné-jeno.⁶⁵ Absence of elephant or hippo skeletal remains or ivory across areas of the region which have been more intensively surveyed and excavated, such as southeastern Burkina Faso, Kirikongo, and northern Benin (with exception of Birnin Lafiya, mentioned above) and from important trading sites such as Essouk-Tadmekka and Ile-Ife is interesting and should be investigated further.⁶⁶ Linseele⁶⁷ suggests that although elephant and hippo ivory were important materials in the trans-Saharan trade, this ivory seems to have been primarily exported from forested zones south of the savanna based on the available archaeological evidence. As shown on Fig. 1, the distribution of sites in Ghana with reported

62 Connah 1975, 48-49.

63 Connah 1975, 59-60.

64 Connah 1975, 67.

65 Linseele 2007; MacDonald 1995.

66 Dueppen et Gallagher 2013; Dueppen 2014; Haour 2019; Nixon 2017; Garlake 1974; 1977.

67 Linseele 2007, 63, 120.

ivory finds cluster along the forest-savanna ecotone, in the same area where sites with evidence for trans-Saharan trade are clustered. This may be an indication that ivory extraction and production was closely associated with the forest zones south of the savannah regions. Historically, substantial populations of both savanna (*Loxodonta africana*) and forest (*Loxodonta cyclotis*) elephants are known to have occupied both types of vegetation zone, with hippopotamus living in riverine ecosystems.⁶⁸ Because the two elephants are distinctive species, it would be worth investigating whether the elephant ivory worked on these sites derives from savanna or forest elephants, using the analytical methods discussed in the next section. Another fruitful line of future research would be to relate information on changing land use and food production to the evidence for hunting and changing wildlife densities in these landscapes.⁶⁹

There are also implications related to the chronological patterning of the ivory finds discussed above, thinking specifically about how an increase in demand for ivory in Europe in the 18th and 19th centuries affected patterns of local production and acquisition across the region. For example, Logan and Stahl⁷⁰ suggest the apparent decline in the working of ivory in Ghana from c. 1600 CE was linked to the changing importance of ivory as an export commodity once the region was integrated into Atlantic trade networks. Before this, from circa 1200 CE, the ivory found at the sites in the Banda region (northern Ghana) was likely produced both for local consumption and for export to entrepôts along the Niger River.

The large number of glass beads found at Gao and Igbo Ukwu suggest that these were important trade hubs, and chemical analyses of beads from both sites connect these sites to a possible north-south interregional trade network linked to trans-Saharan trade,⁷¹ as is also suggested by the distribution of sites in Fig. 1. Archaeological evidence around the eastern Niger River bend attests to movement of goods from the Sahel zone across the Sahara by

68 Linseele 2007.

69 Kay et al. 2019; Dueppen et Gokee 2014.

70 Logan et Stahl 2017, 1389-1390.

71 McIntosh et al. 2020.

the 3rd century CE,⁷² and by the 9th century entrepôts across the West African region were producing and trading widely, as evidenced by objects such as the gold coin moulds found at Essouk/Tadmekka.⁷³ Ivory was certainly a part of this early medieval trade, yet there are few finds attesting this prior to the late first millennium CE.

Archaeological Ivories in Other Contexts

Shipwreck cargoes are a potentially rich, and under-investigated, source of information concerning ivory exports from Africa, their global circulation and changes in the geographical origins of ivory entering particular markets. With the expansion of underwater archaeology in recent decades, more examples are now known (Table 1). Some, such as the 17th century wreck of a Portuguese vessel on Sunchi reef, Goa, India, were carrying hippopotamus ivory as well as complete elephant tusks;⁷⁴ others, such as the early 18th century British wreck (BH-001) off Faial Island in the Azores, from which 101 ivory tusks (including some with incised marks) between 0.30 and 1.86m in length were recovered,⁷⁵ appear to have been carrying ivory in bulk.

72 Magnavita 2013.

73 Nixon et al. 2011.

74 Tripathi et Godfrey 2007.

75 Bettencourt et Carvalho 2011.

Table 1
Early Modern shipwrecks with reported ivory finds

Date wrecked	Location	Name/Type of Vessel	Details	Reference/s
1533	Southern Namibia	<i>Bom Jesus</i> , Portuguese nau	20 tons Augsburg copper ingots, 3.5 tons tin, gold and silver coins; 100 elephant tusks	De Flamingh et al. 2020 ; Chirikure et al. 2010; Werz 2010, 2015
16 th century	Malindi, Kenya	'Ngomeni wreck', possible Portuguese nau	Cargo included copper ingots and elephant tusks; 6 'large and complete' tusks (max. length 1.5 m, min. 1.0 m) 20-40 kg; and one piece	Bitu 2018
1601	Mariana Islands, US Territory	<i>Santa Margarita</i>	Over 300 carved ivory sculptures	Trusted 2013
1615	Samar, Philippines	<i>Nossa Senhora da Luz</i>	Ivory sculptures and decorative items	Silva 2013; Porras 2020
Between 1635 and 1648	Off Texel, Netherlands	<i>Aanloop Molengat</i> , Dutch vessel	Cargo included woollen textiles, leather, lead ingots, barrels of rolled tin, wrought-iron bars and elephant ivory	Maarleveld et Overmeer 2012
1656	Reef close to the Southland c. 120 km north of Perth, Australia	<i>Vergulde Draeck</i> , Dutch East Indiaman jacht	Thirteen elephant tusks, probably re-exported; 103 other pieces of ivory	Green 1973, 1977
1697	Tudor Creek, Mombasa, Kenya	<i>Santo Antonio de Tanna</i> , Portuguese nau	Two hippopotamus tusks	Piercy 1981
17 th century	Sunchi reef, Goa, India	Portuguese vessel	Hippopotamus ivory and complete elephant tusks	Tripati et Godfrey 2007
17 th century	Mozambique Island	<i>IDM3</i> , Portuguese vessel	Salvaged by the treasure hunting company Arqueonautas S. A	Mirabal 2007
Late 17 th century, poss. c. 1685	English Channel, Western Approaches	<i>Site 35F</i> , possible Royal Africa Company vessel	Mapped and investigated by Odyssey Marine Exploration; 9 tusks on surface, other buried in sediment; 2 recovered	Dobson et Kingsley 2011
Early 18 th century	Faial Island, Azores	British wreck (BH-001)	101 ivory tusks (including some with incised marks)	Bettencourt et Carvalho 2011.
Early 18 th century	Saint Quay Islands, Brittany France	Not known, possibly sank 1711 or 1719	Findings include >100 elephant tusks, glass beads and a brass manilla	Herry 2004
1701	New Ground Reef, 22km off Marquesas Keys, Florida	British merchant vessel <i>Henrietta Marie</i>	6 elephant tusks, c. 11,000 Venetian glass beads, pewter wares, iron bars	Moore et Malcom 2008

c. 1724-1727	Half Moon Reef, Pelsaert Group of the Houtman Abrolhos Island, Western Australia	Potentially <i>Zeenwijk</i> , a VOC <i>retourschip</i> , wrecked 1727; OR <i>Aagtekerke</i> , wrecked c. 1726; OR <i>Fortuin</i> , wrecked c. 1724	Several elephant tusks; at least seven in Australian museum collections; others in private collections	Green 2015; 2018
1727	Near Mersing, east coast of Malaysia	<i>Risdam</i> , VOC East Indiaman	90 elephant tusks recovered; these may have come from Asian elephants	Green 1986
1743	Cape Verde	<i>Princess Louisa</i> , a British East Indiaman	Reportedly carrying 800 tusks; Single tusk recovered; salvaged by Arqueonautas S. A	Bettencourt et Carvalho 2011
1768	Arendal Island Norway	<i>Fredensborg</i> , Danish–Norwegian	Carrying slaves, and at least 927 kg of elephant tusks, n=51, plus hippopotamus tusks	Svalesen 2000
1850	Dassen Island, South Africa	<i>Child Harold British</i>	Carrying 1,336 pieces of ivory, cotton, deer horns, pearl shells and cardamom	Turner 1988, 53, apud Tripathi et Godfrey 2007
Undated	Loup Garou, Martinique	<i>Not known</i>	Single tusk recorded	Webster 2008

By far the most significant recent discovery is the wreck of the *Bom Jesus*, a Portuguese vessel that sank off the coast of Namibia in 1533.⁷⁶ This wreck, remarkable for the vast amount of cargo that was preserved,⁷⁷ was discovered during offshore diamond mining operations on the southern coast of Namibia. Whilst sieving the sand for diamonds, excavators unearthed copper ingots, large timbers, and elephant tusks. Archaeologists determined that the remains came from the *Bom Jesus*, a Portuguese *nau* of the kind designed for carrying goods to India and recorded as lost at sea before rounding the Cape of Good Hope in 1533 AD.⁷⁸ Samples of the tusks recovered from the site were taken for scientific analysis to determine their geographical origins, using a combination of ancient DNA and stable isotope analyses, results of which are discussed in the next section.⁷⁹

76 Werz 2010; Chirikure et al. 2010.

77 Werz 2015; Hauptmann et al. 2016.

78 Xavier 1989; *Memória das Armadas* 1979.

79 De Flamingh et al. 2020.

Analytical techniques to identify and source ivories

In the case of Afro-Portuguese ivories, or other ivory objects where the identification of the animal species is known, stable isotope analyses and ancient DNA could help determine the geographic locations where the African elephants were hunted. This, in turn, could tell us about the extraction zones and local trade routes used to move ivory from hunting zones to carvers and market places.⁸⁰ Destructive techniques are necessary to determine the geographic origin; both stable isotope and ancient DNA analyses have been used to characterise populations of ivory-bearing animals, both in modern populations where knowing geographic origin is of utmost concern to combatting illegal poaching, and in historic contexts where these analyses reveal the historical ecology of hunting and trade.⁸¹

Multi-isotope investigations have been used to characterise groups of modern elephants on a continental-scale from different habitats across Africa, especially using a combination of carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotope analyses to differentiate between elephants living in open savannas or closed canopy forested environments and using strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) to understand movement between different geological zones.⁸² Mitochondrial DNA (mtDNA) can be used to establish the geographic origin of elephant ivory because female elephants are matrilineal and matriarchal herds live in a relatively small geographic range. Because mtDNA is transmitted only by females, the mtDNA extracted from a tusk provides a good indication of the locality where the elephant lived.⁸³ Ishida and colleagues have tested a range of modern elephant populations across Africa to establish the geographic distribution of mtDNA groups, showing that many groups are geographically restricted, some isolated to one country and others within a single region.⁸⁴ Although historic elephant populations were more genetically diverse than modern populations, especially

80 Wasser et al. 2004, 2018; Ishida et al. 2013; Coutu et al. 2016a; Ziegler et al. 2016; Star et al. 2018.

81 Wasser et al. 2004, 2018; Star et al. 2018.

82 Van der Merwe 1990 is the seminal study, see also Ziegler et al. 2016 for provenancing modern ivory and Rijkelijkhuisen et al. 2015 and Coutu et al. 2016b for provenancing historic ivory using a multi-isotope approach.

83 Fishlock et Lee 2013; Archie et al. 2007.

84 Ishida et al. 2013.

in West Africa where elephants have been hunted out of many habitats, this method of mapping mtDNA groups is promising for understanding the geographic distribution of unknown historic and archaeological ivories.⁸⁵

One relevant case study using these techniques to understand source regions of historic West African ivory analyzed 21 artefacts excavated from 17th and 18th century deposits in Amsterdam.⁸⁶ Based on historic trade records, the ivory used to produce these objects was probably imported via the Dutch West India Company (WIC), which had trade connections along the West African coast. Strontium isotope analysis (⁸⁷Sr/⁸⁶Sr) indicated that this ivory originated from elephants that roamed in three distinctive geological zones of West Africa. The carbon and nitrogen isotope analyses ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) further suggested that the ivory originated from elephants that lived in at least three different habitat zones, from open savanna to densely forested environments. Although it was difficult to establish exact provenances for this ivory, the study demonstrates that ivory imported into Amsterdam during the 17th and 18th centuries originated from a diversity of habitats, even if it was shipped from the same centre of export (likely the port of Elmina).

In a preliminary study, ancient ivory DNA from the two VOC shipwrecks *Zeevijk* and *Vergulde Draeck*, found off the coast of eastern Australia, had DNA sequences that matched African forest elephants (*Loxodonta cyclotis*) from West Africa.⁸⁷ In the context of the history of the *Zeevijk*, these DNA results are particularly interesting, as the ship never sailed along the West African coast, prompting the suggestion that the ivory was part of an illegal cargo put on board in the Netherlands.⁸⁸

In the case of the *Bom Jesus* shipwreck, a study combining stable isotope and ancient DNA analyses of 100 tusks of elephant ivory found during excavations of the wreck has developed insight into historic elephant ecology, West

85 Bouché et al. 2011; Breuer et al. 2016; de Flamingh et al. 2020.

86 Rijkelijkhuisen et al. 2015.

87 Green 2018, 38-40: the report noted that the DNA sequences of the ivory tested matched the sequences of elephants with mitochondrial DNA of the west-central group reported in Ishida et al. (2013, 255), however, the report did not specify whether they extracted nuclear or mitochondrial DNA and did not provide any methodology for the work carried out, as the ancient DNA results are only reported as preliminary results.

88 Green 2018, 40.

African networks and Atlantic coast trade.⁸⁹ The stable isotope evidence from 97 tusks ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) confirmed that these elephants were hunted from savanna or mixed woodland habitats, but not deep tropical rainforests.⁹⁰ Yet the ancient DNA results from 44 of the tusks showed that the cargo derived from forest elephants (*Loxodonta cyclotis*) in different regions of West Africa. Today, forest elephants range outside of the deep tropical forest and into savannah environments; this study proves that this also occurred in the 16th century. The ancient DNA analyses also showed that the cargo derived from at least 17 different herds of elephants, based on distinct haplotypes found in the samples.⁹¹ Only four of the haplotypes found in the shipwreck ivory exist in modern populations of West African elephants, suggesting a lack of diversity and loss due to hunting of elephants for ivory since the 16th century.

Suggestions for future work

A wide variety of analytical techniques may be used to analyse ivory. Research priorities need to consider the state of preservation of the objects under analysis, and which specific analyses are needed, as sample sizes can range from 10 – 500 milligrams, and method development is currently underway to minimise the sampling necessary for these analyses.⁹² If destructive techniques are attempted, especially on archaeological ivories, it is crucial that the sample be pre-screened for organic preservation before sampling begins.⁹³ Using biomolecular methods successfully to identify and source ivories first requires that there is enough protein (collagen or DNA) preserved in the sample. It is thus useful to characterise the organic content of the ivory prior to sampling using spectroscopic methods.⁹⁴ Although these screening methods are not completely fail-proof (it may still not be possible to extract collagen or an-

89 De Flamingh et al. 2020

90 De Flamingh et al. 2020

91 De Flamingh et al. 2020 – Ancient DNA analyses included mitochondrial, nuclear, and mitogenome analyses

92 Drayman-Weisser et Hornbeck 2018; O'Connor 2016; Sahlstedt et Arppe 2020; Korlević et al. 2018.

93 Bouchard 2019; Sponheimer et al. 2019.

94 Bouchard 2019; Sponheimer et al. 2019; Kontopoulos et al. 2020.

cient DNA from samples, despite screening and good organic preservation), they can prevent unnecessary sampling in situations where the ivory is too degraded.

Sampling a selection of Afro-Portuguese ivories could clarify where elephants were being hunted, but obtaining permission to sample carved museum pieces is always challenging. Additional archaeological surveys and excavations might be a more effective way forward (especially towns known to have had a tradition of producing elaborate carved pieces), aimed at recovering working debris and fragments that might be sampled for ancient DNA and isotopic analysis. As Fig. 1 illustrates, the distribution of evidence for local use and working of ivory is widespread, if incomplete. New survey work and targeted excavations in areas where archaeological ivories have yet to be reported might help fill these gaps. Inland towns such as Benin and Ile-Ife, as well as the major 15th to 18th century coastal ports, all warrant further archaeological survey and test-excavation to locate ivory working sites. An interdisciplinary approach using archival, archaeological, and bioarchaeological data is crucial when analysing ivory with its many life histories, from the life of the elephant, to the journey of the material in its various relationships with humans along the way.

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