Research Article

OBJECT BIOGRAPHY OF A DECORATED IVORY ARTEFACT FROM VRYHEID (MNR04), A LATE IRON AGE SITE IN THE LIMPOPO VALLEY OF SOUTH AFRICA

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ABSTRACT

Vryheid (MNR04) is a small, isolated Late Iron Age homestead dated between the 18th and 19th centuries, located in northern South Africa. During excavations in 2014, a carved ivory artefact was exposed on the floor of a burnt-down hut. Because the item was extremely fragmented and fragile, but also a rare local example of carved ivory, directed conservation steps were implemented to reconstruct and conserve it. Microscopy, microtomography and X-ray diffraction analyses were conducted to determine the species of ivory. The results show that it was likely made from the lower incisor of a hippopotamus (Hippopotamus amphibius). *Comparisons with ethnographic objects from the region suggest that the artefact could have been a pommel or decorative knob on the sheath of a ceremonial knife. The fire that consumed the hut seems to have been a sudden event since several valuable objects – in addition to more mundane ones – were still inside the hut when it burned down. This allows us to interpret the ivory object in relation to its multiple contexts. By adopting a 'relational biography' approach (Joy 2009), this article draws together evidence from diverse sources to bring 'drama' to our understanding of the object, and helps situate it within its specific social, economic and material nexus.*

Keywords: hippo ivory, object biography, Venda, knife, Letaba ceramics, Late Iron Age.

INTRODUCTION: OBJECT BIOGRAPHIES

Vryheid (MNR04) is an archaeological settlement located on the farm Vryheid 8 MT, which is part of the Maremani Nature Reserve situated in the Limpopo Valley in the northern part of Limpopo Province, South Africa. The site has two occupation phases: a substantial Middle Iron Age (MIA) settlement dated to the mid to late 13th century, and a much later Late Iron Age (LIA) homestead occupied between the 17th and 18th centuries. During the 2014 excavations of the LIA component the remains of a burnt-down pole and daga hut was exposed. On the hut's floor, a carved barrel-shaped ivory artefact was found and accessioned as MNR04/103/5 in the University of Pretoria archaeology collections. Carved artefacts from archaeological contexts in southern Africa are rare; however, ethnographies, historical accounts, and museum collections all indicate that in the recent past, such items were more common (e.g. Krige & Krige 1943; Stayt 1968; Vogel & Nettleton 1985). In this paper we adopt a multistranded approach to the investigation of the artefact, drawing together conservation, compositional analyses, archaeology, and ethnographies to contextualise the object and understand its biography.

In a 2009 paper, Jody Joy reflected on the value of the biographical approach to archaeological objects, revisiting the metaphor 10 years after Gosden and Marshall's (1999) influential special issue of *World Archaeology*, and following the earlier anthropological impetus from the works of Appadurai (1986) and Kopytoff (1986). Broadly conceived, this approach advocates bringing a biographical perspective to the study of past objects, equating the arc of manufacture, use and discard with the human life cycle, thus 'enlivening' mute objects. In his review, however, Joy identified a dissonance between the anthropological/biographical and archaeological life history approaches. While both place the analytical focus on object histories, the biographical approaches draw on rich narratives from oral, written and museum records, and typically deal with individual objects. Archaeological life history approaches on the other hand, tend to use context, provenance, taphonomy and physical characteristics of objects – as with the use of the *chaîne opératoire* model or the perspectives offered by behavioural archaeology – and are often conceived at a site or assemblage level rather than individual object. The more scientifically orientated life history approach, combined with the comparatively impoverished sources of contextual information, results in a certain absence of "drama" (Joy 2009: 543) compared with object biography studies. Joy (2009), however, argues that a richer and more evocative narrative can be recaptured through an approach that eschews this ontological divide by integrating material science with the biographical.

Biographical information resides in the artefact, in the patina of age, wear and repair it acquires through its life. This information can be uncovered through analysis of the properties 'inscribed', or built into, the object at the time of manufacture "… inferences can also be drawn from the affordant

properties of artefacts … by examining the possible uses for artefacts, it is possible to comment on potential biographical trajectories" (Joy 2009: 545). He further argues that there is a danger in the inherent linearity and unidirectional flow assumed by the idea of a single life biography, and that instead object lives should be seen to be multifarious and emergent, and relationally situated at any one time (see also Ingold 2012; Joyce 2015). The 'biography' of an object therefore does not have to be a linear historical narrative from life to death but can also consist "of a series of connected jumps as the object becomes alive within certain clusters of social relationships and is inactive at other points in time and space, undergoing a series of different lives and deaths" (Joy 2009: 544). This enables archaeologists to pick up the narrative at points where the archaeological context and data permit, and at the same time, relinquishes the perceived burden to reconstruct a "neat linear life story" for archaeological objects (Joy 2009: 544).

Terming this a relational biographical approach, Joy (2009) urges us to draw on physical properties, provenance studies, and morphology of the individual objects, as well as their local archaeological contexts and place(s) within a larger material repertoire of objects and architecture characteristic of a period and area. Through these intersecting data he reclaims both the 'drama' of the piece, but also the value of the different methodological and conceptual approaches shorn of their ontological baggage. In the following article we draw on Joy (2009) and apply diverse investigative avenues and interpretive scales to situate MNR04/103/5 within its multiple spheres of meaning and understanding.

BACKGROUND

Vryheid (MNR04) is located on a rocky ridge, roughly 2 km from the Limpopo River (Fig. 1). The LIA occupation of the site is limited to the ridge spur, and its ceramics are stylistically defined as Letaba – a facies that is widely distributed throughout the northern regions of South Africa after the 17th century. Historically, these ceramics are mostly associated with the ancestors of today's Venda, Tsonga, and some northern Sotho-speaking communities of the area (Huffman 2007).

The LIA deposits of the site sit directly on bedrock and a sterile rocky soil and are only around 10 cm deep in most cases. The shallow deposit, low frequency of material culture and single occupation strata, suggest a short and spatially limited occupation of the site. The 2014 excavations by Antonites and Ashley, exposed the remains of a burnt-down hut which was destroyed by a fire – evident from the mass of burnt daga rubble overburden, baked clay floor, and large amounts of charcoal and ash in the matrix. These were exposed in two staggered 2 × 2 m excavation units: N103/E90 and N102/E91 (Fig. 2).

Sealed below the daga overburden, excavations uncovered several items that were in the hut when it burned. These included fragments of a number of ceramic vessels, corroded iron, glass and shell beads, cuprous wire as well as the piece focused on here, the carved organic object, MNR04/103/5 (Fig. 3). Three radiocarbon assays of the conflagration produced a combined sigma-1 date of 1647–1798 (Table 1), which was calibrated to the southern hemisphere curve (Hogg *et al*. 2013).

Artefact MNR04/103/5 was found approximately 3 cm below

TABLE 1. *Radiocarbon assays.*

Name	Radiocarbon age years BP	Calibrated range AD
D-AMS 008683	253 ± 21	1645–1799
D-AMS 008684	216 ± 25	1650–1937
D-AMS 008686	289 ± 25	1510–1797
Combined assay		1647–1798

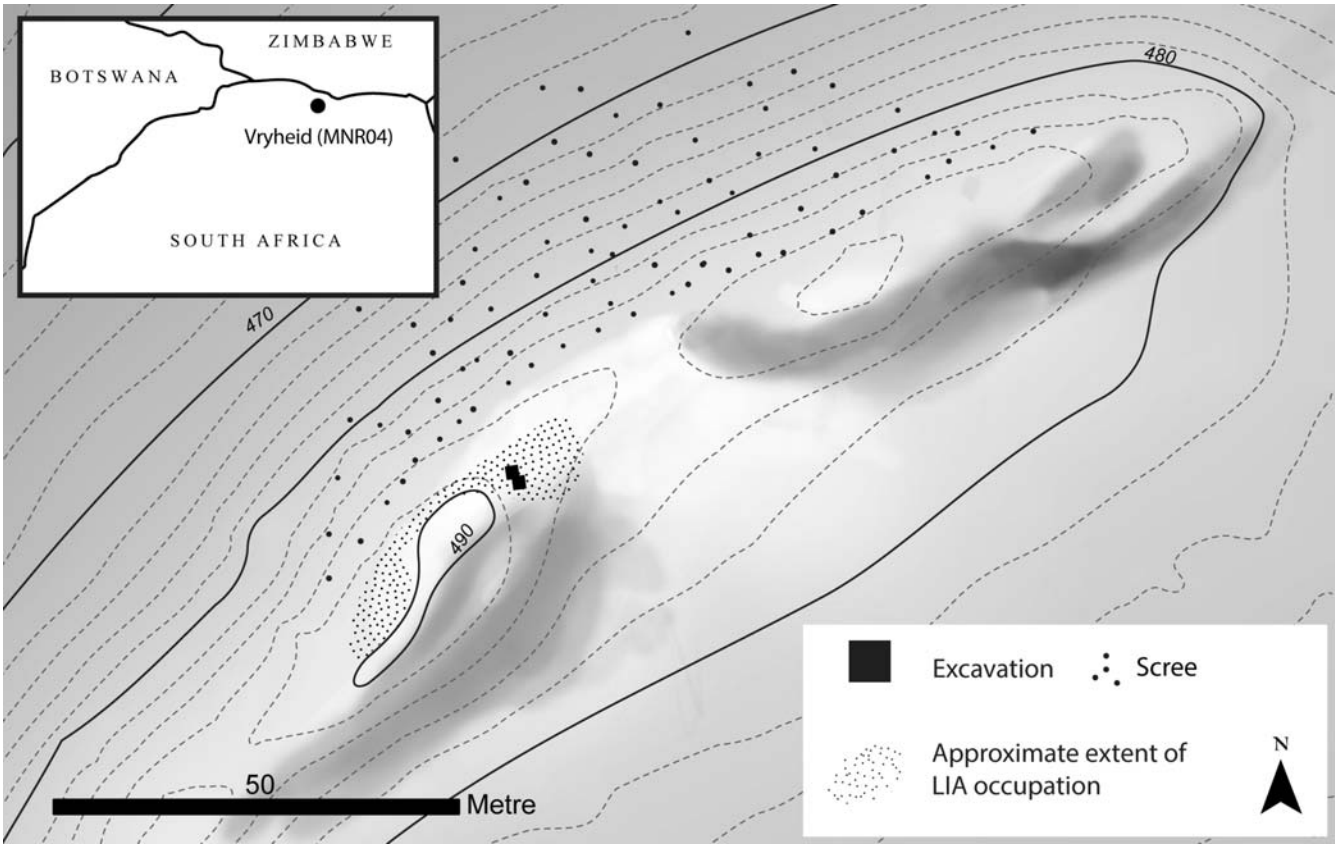

FIG. 1. *Site map of Vryheid (MNR04) with location of excavation units N102/E95 and N104/E90 indicated (major contours are 10 m increments; values absl).*

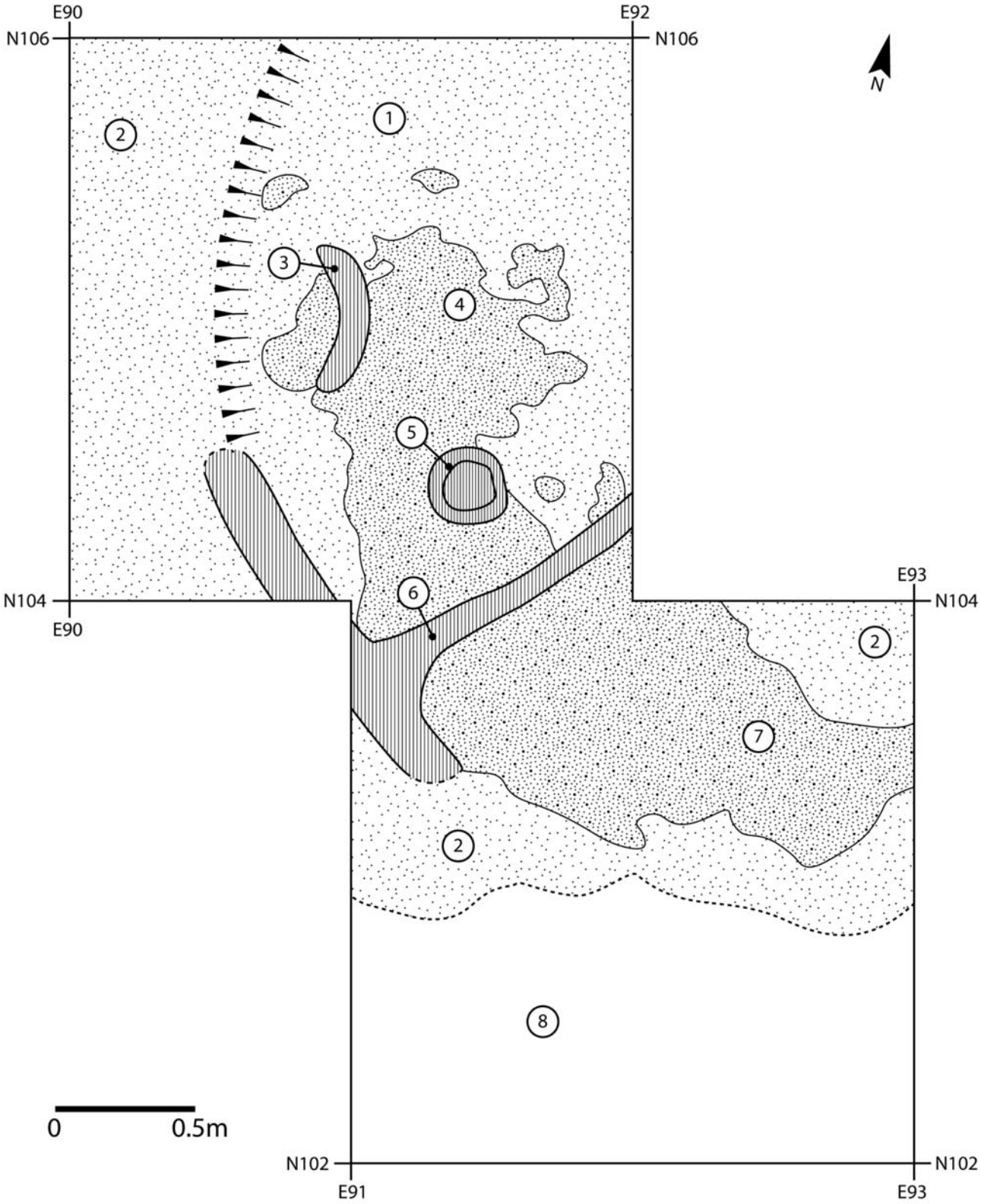

FIG. 2. *Plan of excavation squares N102/E91 and N104/E90. Indicated are: (1) location of ivory artefact MNR04/103/5; (2) compact gravel floor fill; (3) moulded daga kerb; (4) preserved daga floor; (5) moulded daga pot-stand; (6) daga walling; (7) preserved daga floor; (8) sterile rocky surface.*

the surface whilst exposing the hut floor in N104/E90. It was covered by a matrix of burnt soil and daga, and was severely charred and fragmented, lying where it broke under pressure from the surrounding dry deposit (*cf*. Lafontaine & Wood 1982). It proved impossible to completely expose the artefact, so it was carefully block lifted with its original deposit beneath and around it to provide the required support. This basic technique of lifting was quick, affordable, and provided immediate protection, avoiding further exposure to light, which could result in further cracking, desiccation, and splitting. Complete collection of the surrounding matrix also ensured that as many fragments as possible could be retrieved for later identification. The post-excavation conservation and analysis of MNR04/103/5 was conducted at the University of Pretoria in the museum conservation laboratory, which allowed close liaison between the archaeologists, conservator, curator, and analysts.

FIG. 3. *MNR04/103/5 exposed before lifting.*

CONSERVATION

Once in the environment-controlled museum laboratory, MNR04/103/5 was carefully removed from its metal containment and the matrix was further sieved to secure any smaller fragments. Fragments were dry dusted using a soft natural brush to remove the surface dirt. It was then consolidated and stabilised with Paraloid B72® and partially reassembled where possible. For the specialist study, gap-filling of missing areas was not considered. This could potentially obscure evidence, such as the texture of the fractured surfaces, that could have been important in understanding the object's taphonomic history or in refining the material's identification. In fact, the gaps proved useful for the identification of the object's material as break areas provided ideal structural views. The level of reconstruction was preventive, minimal, and aimed at preservation given its fragile state and uniqueness within a South African archaeological context.

Despite the fragmented nature of the artefact, the removal did allow for the large identifiable fragments to remain somewhat in place. As the micro-excavation in the laboratory

FIG. 4. *Decorated exterior fragments of MNR04/103/5. Image by M. van Aswegen.*

progressed, it became clear that the material was extremely friable, and the object interior was more fractured than its external appearance suggested. It became apparent from the general shape of the fragments that the material had both cracked longitudinally and split into curved layers with the largest surviving fragments clearly depicting the exterior of the object (Fig. 4). In total, 165 fragments were collected with 40 fragments attributed to the decorated exterior (Fig. 5). Despite its poor preservation, there is little doubt that all the fragments are from the same object.

All the fragments were recorded photographically, and working under a low-power binocular microscope, a soft, fine-tipped natural hair soft brush was used to gently swab away adhering matrix and accretions. More intransigent surface accretions were removed with a conservation-grade eraser pencil, since this technique does not leave surface marks yet removes soft and crumbly accretions. Cleaning was kept to a minimum, but this 'light touch' did reveal the detail of the decoration, without causing scratching or polishing. A greater degree of cleaning was required for the fractured surfaces to ensure a good fit for the reconstruction, and this could only be achieved through additional, controlled, minimal wet cleaning with natural cotton swabs, i.e. lightly moistened with deionised water and applied briefly to pick up the fine debris without wetting the surface below.

An organic polymer was used to provide structural strength to the fragile material and reinforce the fractured surfaces prior to the application of an adhesive. Ideally, a consolidant needs to penetrate to the core of the deteriorated osseus material and must be evenly distributed, and not concentrated at the surface where it can form an undesirable glossy finish that prevents the close fitting of joins. The acrylic resin Paraloid B-72® was used in a 5% volume solution in acetone and applied with a small brush. This is widely used in conservation both as an acceptable consolidant and adhesive as it dries to a clear transparency, is resistant to discolouration, and is more durable and chemically stable over time than PVA. However, many of the smaller fragments of MNR04/103/5 still proved too fragile to be handled during the reconstruction phase and needed a second application of the resin, which resulted in a slightly glossier surface than anticipated. Paraloid B-72® was also selected as the adhesive, diluted to a suitable viscosity, and applied from a preparatory pipette for the refitting of the fragments of MNR04/103/5.

The process of refitting or reconstruction in combination with the process of passive conservation served to passively stabilise the artefact (*cf.* Cronyn 1990; Vinçotte *et al*. 2019). At the conclusion of this process, 13 surface portions ranging between 5.7 mm and 34.0 mm in length with a mean of 20.0 mm were refitted, accounting for 35% (10.3 g) of the total weight and,

FIG. 5. *Examples of interior fragments. Image by M. van Aswegen.*

when combined with loose surface pieces, comprised 45% (13.3 g) of all the fragments. The remaining 125 pieces from the interior had a mean weight of 0.1 g and ranged in length between 3.6 mm and 27.8 mm, with a mean of 11.0 mm (total 15.8 g; Fig. 5).

Thanks to the specialist conservation interventions, it is evident that the original object was roughly barrel-shaped but with a taper at the bottom end. It was at least 100 mm long and 33.7 mm at its widest portion. The flat appearance of both ends was due to modification rather than loss. Enough of the wider, top portion could be exposed during excavation to indicate that this end was originally solid (Fig. 3). In contrast, excavators raised the possibility that the narrow, tapered end may have been hollow. While this could not be confidently confirmed by the reconstruction, a hollow core could account for this portion's poorer state of preservation as it was likely thinner and less able to survive.

Cleaning also made the decorations more visible and clearer. This revealed six bands of carved decorations (Fig. 6). These are all variations of carved triangles and diamonds which fall into two categories. The first are finely carved, narrow triangles with their long ends pointing towards one another. There are four of these bands (from top to bottom, bands 1, 4, 5 and 6). The second group are a linked X-pattern, created by carved diamonds and triangles (bands 2 and 3).

ANALYTICAL METHODS

Following the cleaning and conservation process a range of methods including visual examination, microscopy, X-ray diffraction (XRD) and microtomography (micro-CT) were used to determine the state of preservation, chemical composition, and identification of the ivory species of MNR04/103/5.

MICROTOMOGRAPHY (MICRO-CT)

Micro-computed tomography (micro-CT), using a Zeiss SterREO Discovery V20 microscope in the Laboratory for Microscopy and Microanalysis at the University of Pretoria, was used on a loose fragment from the interior of the object as a non-destructive 3D imaging technique. This produced high-resolution images of the interior of the material and aided characterisation of the micro- and macro-structure of the material. The micrographs also proved useful to view the deteriorated articular surface areas allowing us to fully explore the extent of damage and deterioration for condition reporting of the artefact.

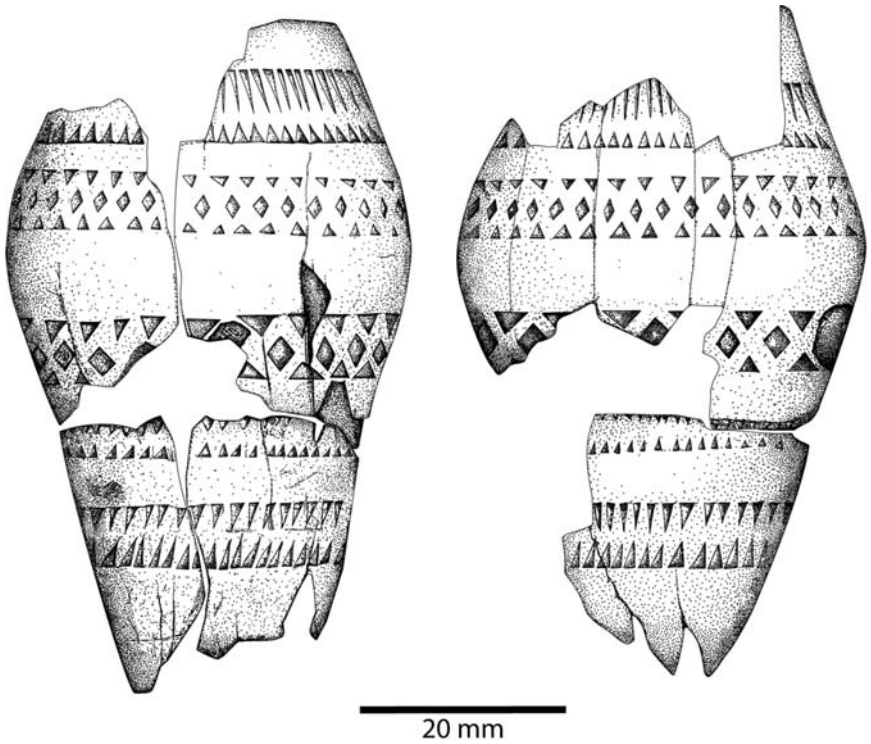

FIG. 6. *Reconstructed view of refitted ivory artefact MNR04/103/5.*

X-RAY DIFFRACTION (XRD)

To aid identification and characterisation, a loose fragment was also analysed by qualitative X-ray diffraction at the XRF and XRD Laboratory of the Department of Geology at the University of Pretoria. The samples were hand-milled and top loaded onto a zero-background sample chamber and analysed using a PANalytical X'Pert Pro powder diffractometer in θ–θ configuration with an X'Celerator detector and variable divergence and fixed receiving slits with Fe filtered Co-Kα radiation (λ = 1.789Å). The phases were identified using X'Pert Highscore plus software.

VISUAL IDENTIFICATION OF MATERIAL AND SPECIES

The identification of the material of MNR04/103/5 was undertaken by one of us (O'Connor). Her material identifications are based on an understanding of the meso- and macrostructure of animal hard tissues (such as bone, ivory and horn), how these features are expressed on worked or damaged surfaces formed at various angles through the material, and how these features are changed by different working techniques, ageing or deterioration in particular burial environments.

STATE OF PRESERVATION AND CHEMICAL COMPOSITION

The artefact was characterised by cracking, laminating, warping, chipping and fracturing, as well as a degree of surface coarsening. In places, the surface was textured, possibly with marks from the working of the exterior. Overall, the internal fragments showed more flaking and fracturing. The surfaces were also covered with dense patches of particulate materials and marked by soluble accretions which appear as solid pieces of foreign material attached to the surface, obscuring the surface detail. Initial microscopic examination of the unplaced fragments indicated that the material was not porous on the scale that would have indicated vascularisation (having a blood vessel system) but was dominated by a curved, laminated structure

Diagenesis (the physical and chemical changes that occur post-deposition to bone or ivory artefacts as a direct result of their burial environment) is visible in both the chemical and physical deterioration, revealing that damage was caused by both soluble salts such as nitrates and chlorides, and by insoluble salts, mainly calcium carbonates. These changes are often visible through the naked eye, microscopy, and elemental characterisation techniques (Collins *et al*. 2002; Hedges 2002; Beasley *et al*. 2014; Kendal *et al*. 2018). In MNR04/103/5, these salts produced accretions and fragmentation of the material.

X-ray diffraction identified the main mineral phase of the object as calcium phosphate, or hydroxyapatite (90.4%), with smaller amounts of whitlockite-magnesium (6.4%) and calcite (3.2%) which confirmed an osseous tissue, such as bone or dentine. Dentine, the material of the body of teeth and bone, is an organic/mineral bio-composite and is largely composed of the mineral calcium hydroxyapatite embedded in a framework of the structural protein collage. Therefore, although the XRD results confirmed that the fragment analysed was an osseous tissue, it could not confirm which. However, the highly lamellar structure revealed by the microscopy and the micro-CT images, coupled with the lack of a vascular system showed that this was dentine rather than bone.

IDENTIFICATION TO SPECIES

Ivory is the term applied to dentine acquired from large teeth used in the production of objects. Although mostly associated with the tusks of elephant, other sources of ivory include the tusks and teeth of hippopotamus, warthog, sperm whale and narwhal. A feature common to all these teeth is that they are open rooted, which means that they continue to grow throughout the life of the animal. Although the surviving portion of MNR104/03/5 is quite small, its size and shape and the orientation of its lamellae indicate that it was cut from ivory. In southern Africa there are three likely sources: the upper incisors of the savannah African elephant (*Loxodonta africana*); the anterior dentition (principally the upper and lower canines and medial incisors) of the hippopotamus (*Hippopotamus*

amphibius); and the upper and lower canines of the suids such as warthog (*Phacochoerus africanus*) and bushpig (*Potamochoerus larvatus*). Unworked, these teeth are sufficiently different in size and shape to be easily distinguished but once worked, their identification largely comes down to the finer details of the dentine itself.

Dentine is formed in minute, incremental layers over the pulp of the tooth, producing a cone-within-cone structure. The transverse section of the tooth and the path of the dentine layers within it largely reflect the shape of the pulp cavity. In elephant tusks, this is oval. Hippopotamus incisors have a similarly rounded transverse section, whereas hippopotamus canines are triangular, and the deeply grooved tusks of the warthog have a cross-section that almost resembles a figure of eight. From the surface of the pulp cavity minute canals, or tubules, run through the dentine. Although individually not visible to the eye, together these closely packed tubules help create features, such as bands of differently reflective dentine that can be species specific. In elephant ivory they give rise to what is known as the Schreger pattern (Miles & White 1960). These intersecting arcs of dark and light patching, seen in the transverse section of the tusk, are characteristic of extant and extinct elephant species (Espinoza & Mann 1992). Taking these and other structural features together it is possible to identify the taxa of ivory with a certain degree of confidence.

Visually, MNR04/103/5 shows no sign of a Schreger pattern, but this feature is not always very evident in elephant ivory and can be particularly difficult to detect on small or charred objects where so little of the surfaces approximate to the transverse section of the tusk remains. However, the worked surfaces of MNR04/103/5 clearly show periodic banding following the curved line of the dentine layers, a feature of the inner dentine of hippopotamus ivory.

Although the hippopotamus has four large teeth used as sources of ivory these teeth have large pulp cavities, which limit the amount of material for working to a tube and a relatively small amount of solid material at the distal end. The curving of the dentine layers in MNR04/103/5 is consistent with hippopotamus incisor but because of its small size and fragmented state, it is not possible to be certain if this object was cut from the tip of the large medial incisor or one of the smaller 'peg' teeth of the hippopotamus anterior dentition. A large pulp cavity would account for the field and conservation observations that suggested that the tapered end may have been hollow.

CONTEXTS AND ASSOCIATIONS

The material analysis of the object always runs the danger of fetishising both the object and method, and as such, we also draw on the network of associations that surround the object in the process of interpreting its meaning (*cf.* Hodder & Hutson 2003: 189). In the case of the Vryheid object, these networks of associations are particularly rich: the object was recovered from a well-documented archaeological excavation which is rare for these types of materials, which are more often chance finds or from unprovenanced collections. Meanwhile, the specific context of deposition – house collapse – ensures that the individual object can be set among a larger assemblage of contemporaneous and directly related materials and spatial features. Following Joy, this can be seen as one of those points where "the object becomes alive within certain clusters of social relationships" (Joy 2009: 544). It is also at this point that the living context of use and archaeological context of analysis are joined, enabling the relational approach and drawing together the diverse methodologies used here.

SPATIAL CONTEXT

The floor plan (Fig. 2) indicates that the structure in which the object was recovered was evidently a rondavel-type hut: a circular structure with cone thatched roof. These structures were the main dwelling type throughout the southern African Iron Age and remain common even into recent periods (Frescura & Myeza 2016: 43). As is typical for these structures, the walls of the Vryheid example were daga (daub/daka) plastered over a frame of timber poles and woven branches (wattle and daub). Left on its own, the daga will break down naturally over time; however, if it is exposed to high temperatures from a fire, it bakes brick hard – as is the case here. Because the ivory object and other artefacts inside the hut were covered by baked daga overburden, the suggestion is that these objects were inside the hut when it burned down.

Typically, during the deliberate or systematic abandonment of Iron Age homesteads or households, objects were removed – an act that results in 'clean' floors – devoid of the everyday residue that populates a living home. In living contexts though, sleeping huts would contain items of everyday life. In the case of the Vryheid site, the event seems to have been sudden and unplanned since together with the ivory object, ceramic pots, glass beads and metal items were also buried by the collapsed daga walls.

Among historical Venda-speakers of the region, sleeping/living huts (*nndu*) were typically associated with men and, although wives would sometimes share the living hut, her domain and quarters were typically the cooking hut (*tshitanga*) which she shared with her young children (Van der Waal 1979: 15). In the living hut itself, the back areas were where men kept their personal items. Objects stored here included the man's personal washing dish/basin, blankets, clothes, weapons, baskets, and clay pots with medicine and foodstuffs as well as sacred or ritual items (Van der Waal 1977: 95). Such a spatial configuration illuminates the context of the Vryheid finds since the pots, beads and metals were for the most part found in the same area, close to the eastern extent of the hut, while the rest of the floor was devoid of artefacts. Although excavations could not definitively establish the hut's entrance, the concentration of objects suggest that these were all clustered in the private 'back' area of the hut.

MATERIAL CONTEXTS

Fragments of at least eight vessels were securely associated within the interior of the hut. Although severely fragmented, portions of several of the vessels could be reconstructed from sherds, which suggest *in situ* breakage. Stylistically, the pots are classified as Letaba – a regional facies present in northern South Africa from the 17th century onwards into the 20th century. Six were variations of constricted spherical jar shapes, one an open bowl, and one vessel a 'miniature' pot. One vessel was decorated with an elaborate incised band of red triangles and black graphite (*phomo*) zigzags; however, the remainder of the decoration repertoire were single bands of incised cross-hatching placed between the shoulder and the rim (Fig. 7). Barring the miniature vessel, the pots were relatively consistent in size with an average opening of 20.75 cm. In addition, all vessels except the miniature were finished with a black graphite burnish.

Other material culture from the hut in which the ivory artefact was found include eight opaque glass beads: one white and three blue, two blueish-green, and two turquoise glass beads (Fig. 8). Historical ethnographies of Venda-speakers of the region, mention the latter as "beads of the water" (*vhulungu ha madi*). Van Riet Lowe (1937: 368) states that "(t)hey are …

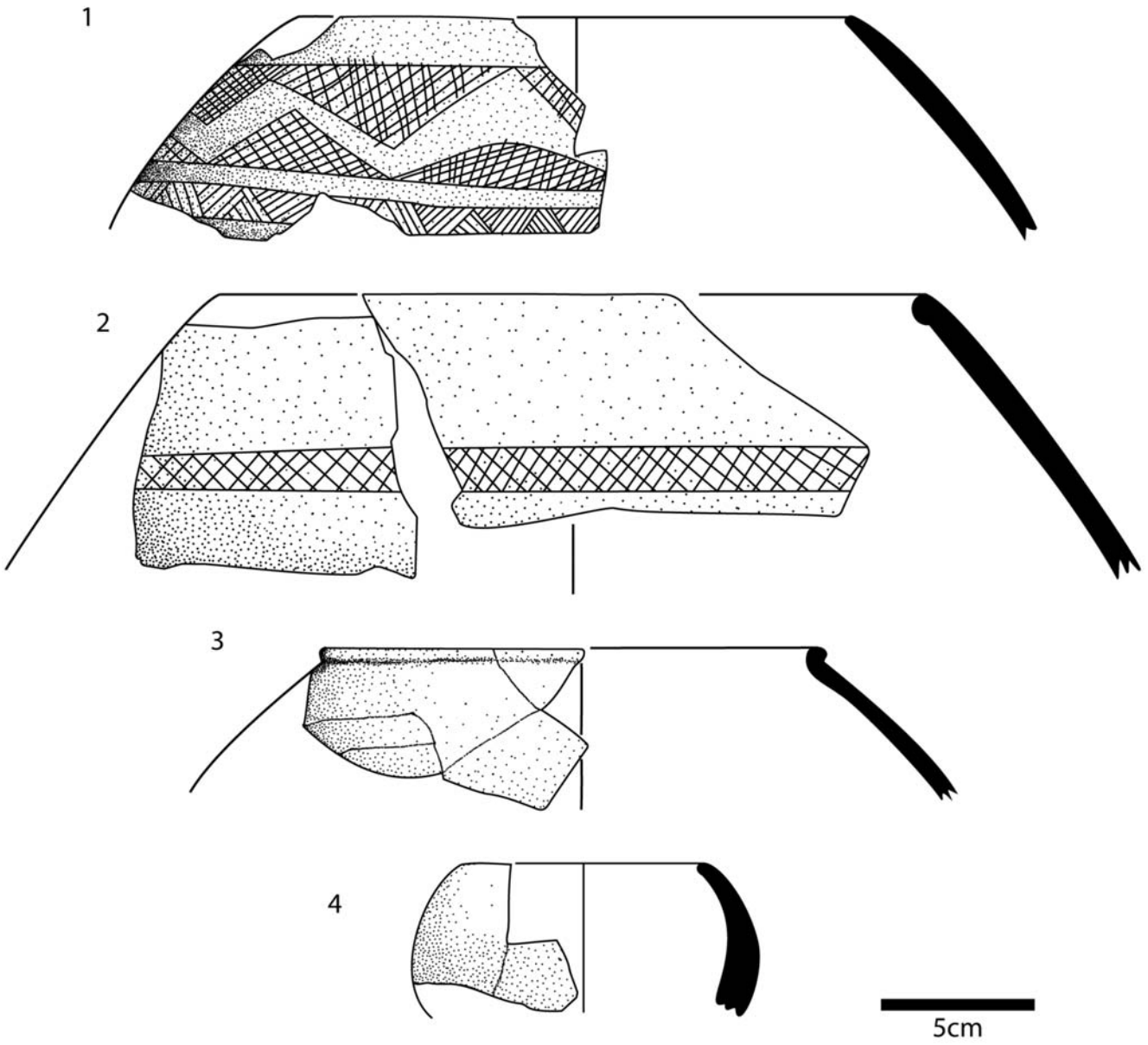

FIG. 7. *Examples of ceramic vessels found inside the hut:* (**1**) *is decorated with alternating bands of graphite and incised red triangle variations;* (**2**) *has a black-graphite burnish and incised band of crosshatching;* (**3**) *undecorated vessel with a black-graphite finish;* (**4**) *is an undecorated miniature vessel.*

most highly prized among the Venda who use them in ceremonies connected with ancestor worship" and they are closely associated with high social rank (see also Stayt 1968: 26).

The surrounding matrix also contained metal items. Several fragments of fused and corroded iron beads were evidently part of a strung necklace (Fig. 8). There were also fragments of thin, cuprous wire, of which a section of plaited strands still survived (Fig. 9). Ethnographic and museum examples show that such wire was used in wirework embellishments on items such as spears, knives, and axes (Dewey 1991: 54–59). In some cases, wirework adornment would set an object apart as ceremonial (Dewey 1991: 54). More ambiguous metal pieces included fragments of iron plate so severely corroded that their original form could not be determined.

SITUATING MNR04/103/5 IN ARCHAEOLOGICAL AND ETHNOGRAPHIC CONTEXT

The state of preservation means that the function of MNR04/103/5 itself remains obscure, though some interpretations can be offered, especially when compared with ethnographic and historical artefacts from the region. From these comparisons, MNR04/103/5 closely resembles a pommel of a fly whisk or knife, or the decorative knob on a knife sheath end (Burchell 1824: 575; Bent 1895: 71; e.g. Dewey 1991: 272–274, figs 38–40; Anitra Nettleton, pers. comm. 2020). The fact that it resembles the pommel shape of the ivory hilt excavated at Tshirululuni – a Venda settlement 90 kmto the south and contemporaneous with Vryheid – could add motivation for it being a component of a knife sheath or hilt (Loubser 1991: 354, fig. 127:10). Such items were typically carved from wood, but several ivory or wood-ivory composite examples have been described historically and are found in museum collections (Burchell 1824: 575; Moffat 1846: 140; Bent 1895: 71; Dewey 1991: figs 38–40). These items were typically ornamented with copper alloy wirework (Dewey 1991: 42, 114). It is therefore significant that several fragments of plaited cuprous wire were found in the surrounding deposit – although in such a fragmented state that *in situ* definition and their direct relationship to MNR04/103/5 was impossible to determine. The contextual relationship does, however, raise the possibility that both the iron and wirework may have formed part of a composite object akin to archaeological (e.g. Robinson 1959: plates IX &

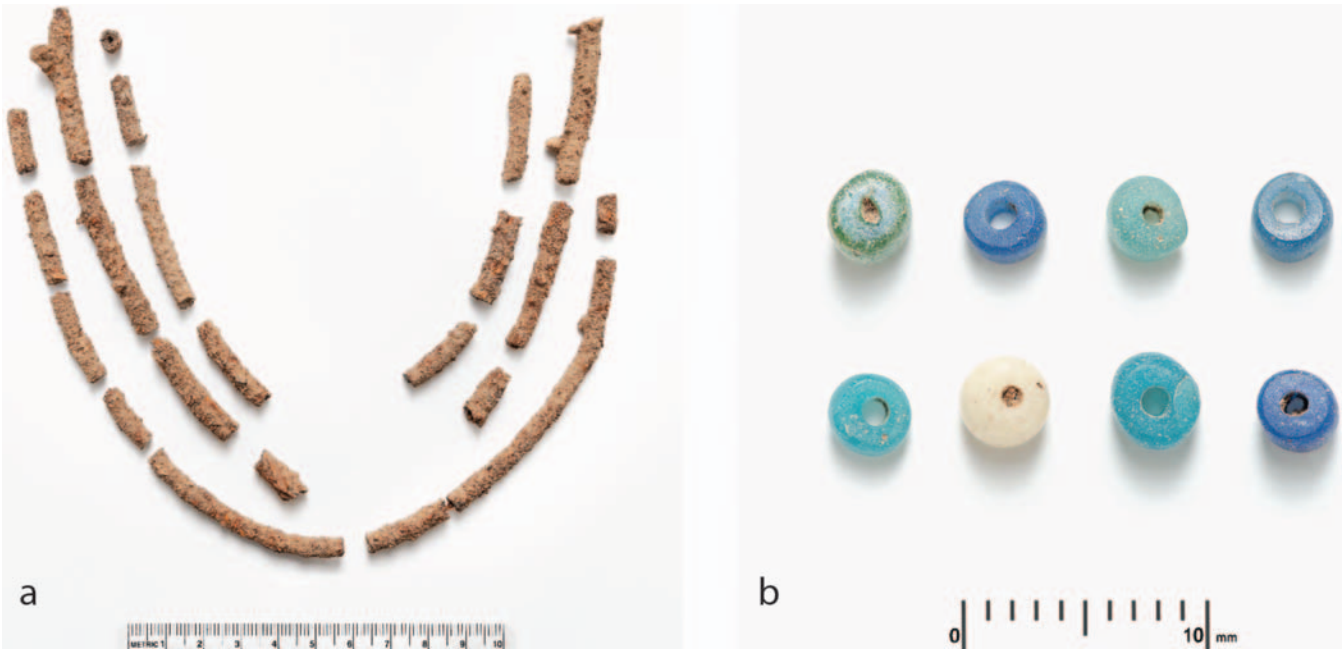

FIG. 8. *Fused iron beads* (**a**) *and glass beads* (**b**) *from the same context and in close spatial association to MNR04/103/5. Image by M. van Aswegen.*

FIG. 9. *Plaited cuprous wire from the same context and in close spatial association to MNR04/103/5. Image by M. van Aswegen.*

XV) and ethnographic examples (e.g. Dewey 1991: examples in figs 49 & 50).

If MNR04/103/5 were part of a knife sheath, its material and carving set it apart from an ordinary utilitarian object. In support of this observation, it also closely resembles ceremonial knives referred to as *bakatwa* by Shona-speaking groups of the region. The decorations of MNR04/103/5 are strikingly similar to the description provided by Dewey (1991: 115), which notes that *bakatwa* are often decorated with "areas of crisscross or diamond motifs … but the most common pattern is a single row of large X's bisected and outlined by smaller bands of zigzag or diamonds". While these knives had a clear utilitarian purpose, their ceremonial role comes from their association with the ancestors and/or alien spirits (Dewey 1994: 362). These ceremonial knives often serve as a focus point when ancestors are addressed in ceremonies and rituals. As such, they also form part of the instrument sets used by diviner-healers and spirit-mediums – both specialists who communicate with the ancestors and through whom they make their intentions known (Dewey 1991: 118).

DISCUSSION

The positive identification of MNR04/103/5 as made from hippopotamus ivory is, in itself, important. According to Dewey (1991: 61), most of the historic ivory objects in or from southern Africa are typically from elephant tusks. Recent research using the technique of Zooarchaeology by Mass Spectrometry (ZooMS) has supported this preference in the archaeological record as well, with the identification of elephant ivory objects and working debris from 7th to 10th century AD Early Iron Age sites in KwaZulu-Natal, despite the presence of hippopotamus bone and unworked hippopotamus teeth (Coutu *et al*. 2016). Although we are currently unable to definitely identify species, archaeological evidence from the 10th to 13th century sites in southern and eastern Africa indicates that ivory continued to be exploited and was probably a major export item from within the Indian Ocean trade network (Voigt 1980, 1983; Meyer 2000), and may even have been a driving economic factor (Forssman *et al*. 2014). By the second half of the second millennium, when a wide variety of historical and archaeological records are available, the systematic exploitation of elephant ivory for external trade is a well-established enterprise (e.g. De Flamingh *et al*. 2019; Gooding 2020). Analysis of the largest archaeological cargo of African ivory ever found – from the excavation of the *Bom Jesus* shipwreck (AD 1533) off the coast of Namibia – revealed that the cargo originated from West African forest elephants (De Flamingh *et al*. 2019). Despite this overwhelming evidence for the movement and trade of elephant ivory, careful reading of sources demonstrates that hippopotamus ivory was *also* a valued trade item (e.g. Fynn 1733 in Theal 1898: 474; Dos Santos 1606 in Theal 1901: 331) and would have likely been sourced from large rivers, such as those close to Vryheid (e.g. Limpopo, Sand and Nzhelele).

The opportunity to explore an object definitively made from hippopotamus ivory within this context is therefore unusual and potentially significant. Furthermore, while the quantity of ivory leaving Africa *via* the East Coast was vast, knowledge of ivory objects and their use within Africa itself are comparatively rare (Lane 2015). In an examination of ivory use in precolonial Uganda, Reid (2015) explicitly focused on indigenous patterns of ivory processing and consumption rather than the more usual narratives around international trade networks; however, this opportunity remains unusual given the impact of global trade networks on ivory use in Africa (*cf*. Logan & Stahl 2017). While MNR04/103/5 dates to a time when ivory was commodified for international trade, it was an item used within a local context, and as such, offers just such an opportunity to examine ivory – and hippopotamus ivory in particular – within a network of indigenous values and practices.

By the 18th century, both elephant and hippopotamus ivory were royal entitlements for communities in northern South Africa. For example, Beachey (1967: 275), indicates that the "ivory trade was largely controlled by the ruler, with whom negotiations were carried on; one tusk of every pair belonged *de jure* to the king, who also possessed the right to purchase the remaining one. Ivory also fell into the ruler's hands in the form of tribute from subject states" (also refer to Junod 1913: 378, for taxing of ivory by African rulers). Accounts that specify the extent of hippopotamus ivory trade, while rare, do also indicate that the teeth and even feet were the ruler's property (Jackson 1950). The missionary Henri Junod, writing on the practices of Tsonga communities in 19th century northern South Africa, indicates that "[t]he hippopotamus is taxed more heavily than any other beast. The hunter who has succeeded in killing one has not the right of cutting it open. Should he do so, it would be considered a serious offence. He may be put to death … He must at once send word to the capital and the men of the court will come immediately and cut up the animal, taking half the joints to the chief" (Junod 1913: 375, as told by his key informant Mankhelu). Several sources also mention the destruction that hippopotamuses cause to crops and, as a result, that they were actively pursued and hunted, with ivory, skin and meat as obvious by-products (Shooter 1857: 20; Das Neves 1879: 37; e.g. Dos Santos 1609 in Theal 1901).

The choice of hippopotamus ivory is, however, significant on another level altogether. Gooding (2020) argues that the increased demand for ivory and ivory products in the wider Indian Ocean world, Europe, and North America, led to a decline in the ownership, usage, and display of ivory in African societies. This change signalled a transformation in the value of elephant ivory: from symbolic capital to that of a capital commodity. It is therefore telling that Early and Middle Iron Age examples of ivory usage in southern Africa, where the ivory has been positively identified, have all entailed elephant ivory (Reid & Segobye 2000; Coutu *et al*. 2016). The use of hippopotamus ivory can therefore also be read against the decreasing use of elephant ivory in local displays of power, as offering an alternative source of ivory for symbolically meaningful objects.

In addition to historical and ethnographic evidence pointing to hippopotamuses as a source of ivory and meat, archaeological evidence also hints at the symbolic and ritual significance of carved ivory items. Objects of hippopotamus ivory have been recorded from at least three Venda settlements besides Vryheid (MNR04). At the 18th-century Venda capital Dzata, four hippopotamus ivory divining dice were excavated from a royal audience chamber (Huffman 1996: 41). Other Venda sites with ivory objects include Tshirululuni, where an ivory bodkin and a carved ivory knife hilt were found (Loubser 1991: 337, 325, fig. 127.10)[1], as well as the point of a hippopotamus tusk from Verulam (Loubser 1991: 291).

The carved motifs on MNR04/103/5, closely resembles the triangle and diamond decorations which appears on knives, headrests, axe handles and divination dice from Venda, Shona, Tswana and Tsonga communities of northern South Africa (e.g. Dewey 1991: figs 35, 39, 40). The overarching similarities between motifs on everyday items and ritual divination dice in Venda and Shona society, has led Nettleton (1984) to suggest

symbolic meaning can be read into the motifs. However, Dewey (1991: 122), on questioning Shona artists, found that in most cases, "the decorative motifs were placed on such objects (other than divination dice) to make the objects look good (*zvinake*) or to make them look like those that had always been made in a particular area". This does not, however, preclude that a symbolic meaning may have been imbued in these motifs in the past or in other instances. Meaning may also be forcefully communicated in the choice of ivory in manufacturing the object. Making items from ivory, or including ivory components in the composition, clearly sets them apart as prestige items since ivory was used to enhance and/or reflect the status of the owner (Dewey 1991: 61; *cf*. Lane 2015: 324). To the Shona informants Dewey consulted for example, such ivory items were specifically mentioned as being the prerogative of a chief or spirit mediums. A closer consideration of the wider archaeological context of MNR04/103/5 is therefore important in this regard.

The LIA occupation of Vryheid is small, with only one hut presently identified – though more may have existed that were not preserved. Van der Waal (1979: 13) notes that prior to 1900, it was uncommon to find isolated settlements in the region – households were concentrated in villages or widely spread neighbourhoods. In addition, villages were typically defensively inclined, with large amounts of stone walling and palisades being defining characteristics (Van der Waal 1979; Loubser 1991). None of these features are present on Vryheid. The site – and to an extent the material culture – does not fit the expected location, size or spatial expression of a headman or someone of political importance who are typically associated with possessing ivory objects. Instead, it conforms to the homestead of a person with occult or spiritual power such as spirit medium, rainmaker, diviner or blacksmith – individuals who typically maintain a semi-isolated state of existence (*cf*. Daneel 1970; Murimbika 2007).

The overt similarity of the decorations to the elaborately decorated pot and to a regional aesthetic tradition more generally (*cf*. Nettleton 1984; Dewey 1991: 122), suggests that MNR04/103/5 forms part of a symbolic reservoir shared by societies in northern South Africa in the second millennium (*cf*. McIntosh 1989; Sterner 1992). McIntosh (1989) originally used the term 'symbolic reservoirs' to refer to the shared symbols, beliefs, values, and ideas that subgroups of a society call on as visual expression of underlying meanings. Owning and displaying an ivory object like MNR04/103/5, dips into the 'symbol set' (*cf*. MacEachern 1994) that would convey, among other things, messages of power and prestige in 17th century northern South Africa.

The investigation of the MNR04/103/5 and its archaeological and societal context then builds out the relationships that brings the original object of which MNR04/103/5 formed part, to life (*sensu* Joy 2009). The object, which we posit was most likely a ceremonial knife, acted as a 'material metaphor' (Tilley 1999) in which meaning was inscribed by the use of ivory as a material with clear social implications and significance, while the carved motifs refer to a larger pool of shared, culturally meaningful 'symbol sets'. Meaning was further imbued through its relationship to other, valuable objects found around it, and its spatial context: in the private, male area at the back of a hut which itself was isolated and secluded. If MNR04/103/5 was, as we posit, a component of a ceremonial bakatwa knife, these relationships set it apart as a powerful and potent object immediately recognisable as such by those who saw and interacted with it.

CONCLUSION

In this article we have combined a range of techniques and sources to understand MNR04/103/5 and parts of its life history. Following the relational biography template developed by Joy (2009), the value in joining up diverse data and sources of information is demonstrated, enabling a single-object focused study to draw in wider knowledge at both a site and typological level of discussion. The result is a drilled-down biography of the material object, its properties and taphonomic histories set within a broader social, economic and symbolic milieu of use, meaning and value – the symbolic reservoir in which MNR04/103/5 operated. Through this approach we can see MNR04/103/5 as being part of a composite object, most likely a ceremonial knife made from hippopotamus ivory and designed within a stylistic repertoire of symbolic representation associated with ritual knowledge and power. The context of recovery reinforces its ritual association rather than it being emblematic of political leadership or status. The fact that we cannot necessarily build a full life history for the object, as originally conceived in the traditional object biography metaphor, is, following Joy (2009), not a barrier to understanding the artefact and where it biographically existed in a specific set of relations, intersections and events; the object-focus allows us to look out to the larger nexus of its use, as well as looking at the artefact in microscopic detail to understand its specific material path at that time.

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NOTE

[1]As the analytical work involved in this study demonstrates, it is not easy to definitively identify ivory objects as either elephant or hippopotamus macroscopically; we assume the identifications made in these cases were based on the smaller size of the objects, suggesting sourcing from hippopotamus rather than elephant

REFERENCES

Appadurai, A. 1986. Introduction: commodities and the politics of value. In: Appadurai, A. (ed.) *The Social Life of Things*: 3–63. Cambridge: Cambridge University Press.

Beachey, R.W. 1967. The East African ivory trade in the nineteenth century. *The Journal of African History* 8:269–90. DOI: 10.1017/S0021853700007052

Beasley, M.M., Bartelink, E.J., Taylor, L. & Miller, R.M. 2014. Comparison of transmission FTIR, ATR, and DRIFT spectra: implications for assessment of bone bioapatite diagenesis. *Journal of Archaeological Science* 46: 16–22.

Bent, T. 1895. *The Ruined Cities of Mashonaland*. London: Longmans, Green and Co.

Burchell, W.J. 1824. *Travels in the Interior of Southern Africa*, Vol. II. London: Longman, Hurst, Rees, Orme, Brown and Green.

Collins, M.J., Nielsen-Marsh, C.M., Hiller, J., Smith, C.I., Roberts, J.P., Prigodich, R.V., Wess, T.J., Csapò, J., Millard, A.R. & Turner-Walker, G. 2002. The survival of organic matter in bone: a review. *Archaeometry* 44: 383–394.

Coutu, A.N., Whitelaw, G., Le Roux, P. & Sealy, J. 2016. Earliest evidence for the ivory trade in southern Africa: isotopic and ZooMS analysis of seventh – tenth century AD ivory from KwaZulu-Natal. *African Archaeological Review* 33: 411–435. DOI: 10.1007/s10437-016-9232-0

Cronyn, J.M. 1990. *Elements of Archaeological Conservation*. London: Routledge.

Daneel, M.L. 1970. *The God of the Matopo Hills: an Essay on the Mwari Cult in Rhodesia*. The Hague: Mouton.
Das Neves, D.F. 1879. *A Hunting Expedition to the Transvaal*. London: George Bell and Sons.
De Flamingh, A., Coutu, A., Chirikure, S., Sealy, J., Malhi, R. & Roca, A. 2019. Using DNA to determine the species and geographic origins of elephant ivory discovered in a 16th century Portuguese shipwreck. *American Journal of Physical Anthropology* 168: 55.
Dewey, W.J. 1991. Pleasing the ancestors: the traditional art of the Shona people of Zimbabwe. Unpublished PhD thesis. Indiana: Indiana University.
Dewey, W.J. 1994. AK-47s for the ancestors. *Journal of Religion in Africa* 24: 358–374.
Espinoza, E.O. & Mann, M.J. 1992. *Identification Guide for Ivory and Ivory Substitutes*, 2nd edn. Washington DC: World Wildlife Fund & Conservation Foundation.
Forssman, T., Page, B. & Selier, J. 2014. How important was the presence of elephants as a determinant of the Zhizo settlement of the Greater Mapungubwe landscape? *Journal of African Archaeology* 12: 75–87. DOI: 10.3213/2191-5784-10250
Frescura, F. & Myeza, J. 2016. *Illustrated Glossary of Southern African Architectural Terms: English-IsiZulu – an Illustrated Survey of Historical Terms Appertaining to the Indigenous, Folk and Colonial Architectures of Southern Africa*. Scottsville: University of KwaZulu-Natal Press.
Gooding, P. 2020. The ivory trade and political power in nineteenth-century East Africa. In: Chaiklin, M., Gooding, P. & Campbell, G. (eds) *Animal Trade Histories in the Indian Ocean World, Palgrave Series in Indian Ocean World Studies*: 247–275. Cham: Springer International Publishing.
Gosden, C. & Marshall, Y. 1999. The cultural biography of objects. *World Archaeology* 31: 169–178.
Hedges, R.E.M. 2002. Bone diagenesis: an overview of processes. *Archaeometry* 44:319–328.
Hodder, I. & Hutson, S. 2003. *Reading the Past: Current Approaches to Interpretation in Archaeology*, 3rd edn. Cambridge: Cambridge University Press.
Hogg, A.G., Hua, Q., Blackwell, P.G., Niu, M., Buck, C.E., Guilderson, T.P., Heaton, T.J., Palmer, J.G., Reimer, P.J., Reimer, R.W., Turney, C.S.M. & Zimmerman, S.R.H. 2013. SHCal13 Southern Hemisphere calibration, 0–50,000 years cal BP. *Radiocarbon* 55: 1889–1903. DOI: 10.2458/azu_js_rc.55.16783
Huffman, T.N. 1996. *Snakes & Crocodiles: Power and Symbolism in Ancient Zimbabwe*. Johannesburg: Witwatersrand University Press.
Huffman, T.N. 2007. *Handbook to the Iron Age: the Archaeology of Pre-Colonial Farming Societies in Southern Africa*. Scottsville, Pietermaritzburg: University of KwaZulu-Natal Press.
Ingold, T. 2012. Toward an ecology of materials. *Annual Review of Anthropology* 41: 427–442.
Jackson, A.P. 1950. Native hunting customs. *Nada* 27: 39–40.
Joy, J. 2009. Reinvigorating object biography: reproducing the drama of object lives. *World Archaeology* 41: 540–556. DOI: 10.1080/00438240903345530
Joyce, R.A. 2015. Things in motion: itineraries of Ulua marble vases. In: Joyce, R.A. & Gillespie, S.D. (eds) *Things in Motion*: 21–38. Santa Fe, NM: School for Advanced Research Press.
Junod, H.A. 1913. *The Life of a South African Tribe: the Social Life*, Vol. 1. London: Macmillan.
Kendall, C., Eriksen, A.M.H., Kontopoulos, I., Collins, M.J. & Turner-Walker, G. 2018. Diagenesis of archaeological bone and tooth. *Palaeogeography, Palaeoclimatology, Palaeoecology* 491: 21–37.
Kopytoff, I. 1986. The cultural biography of things: commoditization as process. In: Appadurai, A. (ed.) *The Social Life of Things*: 64–92. Cambridge: Cambridge University Press.
Krige, E.J. & Krige, J.D. 1943. *The Realm of a Rain-Queen: a Study of the Pattern of Lovedu Society*. London: Oxford University Press.
Lafontaine, R.H. & Wood, P.A. 1982. The stabilization of ivory against relative humidity fluctuations. *Studies in Conservation* 27: 109–117. DOI: 10.1179/sic.1982.27.3.109
Lane, P.J. 2015. Introduction: Archaeological ivories in a global perspective. *World Archaeology* 47: 317–332. DOI: 10.1080/00438243.2015.1046252
Logan, A.L. & Stahl, A.B. 2017. Genealogies of practice in and of the environment in Banda, Ghana. *Journal of Archaeological Method and Theory* 24: 1356–1399. https://doi.org/10.1007/s10816-017-9315-5
Loubser, J.H.N. 1991. The ethnoarchaeology of Venda-speakers in southern Africa. *Navorsinge van die Nasionale Museum, Bloemfontein* 7: 148–463.
MacEachern, S. 1994. 'Symbolic reservoirs' and inter-group relations: West African examples. *African Archaeological Review* 12: 205–224. DOI: 10.1007/BF01953043
McIntosh, R.J. 1989. Middle Niger terracottas before the Symplegades Gateway. *African Arts* 22: 74. DOI: 10.2307/3336721
Miles, A.E.W. & White, J.W. 1960. Ivory. *Proceedings of the Royal Society of Medicine* 53: 775–780. https://doi.org/10.1177/003591576005300913
Meyer, A. 2000. K2 and Mapungubwe. *South African Archaeological Society Goodwin Series* 8: 4–13. DOI: 10.2307/3858042
Moffat, R. 1846. *Missionary Labours and Scenes in Southern Africa*. London: John Snow.
Murimbika, M. 2007. Sacred powers and rituals of transformation: an ethnoarchaeological study of rainmaking rituals and agricultural productivity during the evolution of the Mapungubwe State, AD 1000 to AD 1300. Unpublished PhD thesis. Johannesburg: University of the Witwatersrand.
Nettleton, A.C.E. 1984. The traditional figurative wood carving of the Shona and Venda. Unpublished PhD thesis. Johannesburg: University of the Witwatersrand.
Reid, A. 2015. Archaeological ivory and the impact of the elephant in Mawogola. *World Archaeology* 47: 467–485. DOI: 10.1080/00438243.2015.1029592
Reid, A. & Segobye, A.K. 2000. An ivory cache from Botswana. *Antiquity* 74: 326–331. DOI: 10.1017/S0003598X0005938X
Robinson, K.R. 1959. *Khami Ruins: Report on Excavations Undertaken for the Commission for the Preservation of Natural and Historical Monuments and Relics, Southern Rhodesia, 1947–1955*. Cambridge: Cambridge University Press.
Shooter, J. 1857. *The Kafirs of Natal and the Zulu Country*. London: E. Stanford.
Stayt, H. 1968. *The Bavenda*. London: Frank Cass.
Sterner, J.A. 1992. Sacred pots and 'symbolic reservoirs' in the Mandara Highlands of northern Cameroon. In: David, N. & Sterner, J.A. (eds) *An African Commitment: Papers in Honour of Peter Lewis Shinnie*: 171–179. Calgary: University of Calgary Press.
Theal, G.M. 1898. *Records of South-Eastern Africa Collected in Various Libraries and Archive Departments in Europe*, Vol. 2. London: William Clowes and Sons.
Theal, G.M. 1901. *Records of South-Eastern Africa Collected in Various Libraries and Archive Departments in Europe*. Vol. 7. London: William Clowes and Sons.
Tilley, C. 1999. *Metaphor and Material Culture*. Oxford: Blackwell.
Van der Waal, C.S. 1977. Die woning en woonwyse onder die Venda. Unpublished MA dissertation. Pretoria: University of Pretoria.
Van der Waal, C.S. 1979. Woonwyse van die Venda. *South African Journal of Ethnology* 2: 11–27.
Van Riet Lowe, C. 1937. Beads of the water. *Bantu Studies* 11: 367–372. DOI: 10.1080/02561751.1937.9676061
Vinçotte, A., Beauvoit, E., Boyard, N. & Guilminot, E. 2019. Effect of solvent on Paraloid® B72 and B44 acrylic resins used as adhesives in conservation. *Heritage Science* 7: 42. DOI: 10.1186/s40494-019-0283-9
Vogel, C.A.M. & Nettleton, A.C.E. 1985. The arts of southern Africa. *African Arts* 18: 52–53. DOI: 10.2307/3336355
Voigt, E.A. 1980. Reconstructing Iron Age economies of the northern Transvaal: a preliminary report. *South African Archaeological Bulletin* 35: 39–45. DOI: https://doi.org/10.2307/3888724
Voigt, E.A. 1983. *Mapungubwe: an Archaeozoological Interpretation of an Iron Age Community*. Pretoria: Transvaal Museum.