Dating the Mapungubwe Hill Gold

Stephan Woodborne, Marc Pienaar & Sian Tiley-Nel

Abstract

This paper presents direct dating evidence for the manufacture of some of the gold artefacts from the Iron Age archaeological site of Mapungubwe Hill (South Africa). The results confirm that the artefacts are contemporaneous with the occupation of the site and are the product of a mature indigenous metalworking tradition. The Mapungubwe Hill gold artefacts were manufactured at a time when a substantial reorganisation of society led to the separation of royals and commoners and a change in the role of cattle as a form of wealth. These changes are clearly manifest in the use of gold. Whereas gold had previously been traded with the East coast, it became symbolic of power, wealth and status at Mapungubwe Hill.

Résumé

Cet article présente les preuves de la datation directe de la production d'objets en or sur le site archéologique de l'Âge du Fer de Mapungubwe Hill (Afrique du Sud). Les résultats confirment que les artefacts sont contemporains de l'occupation du site et qu'ils sont le produit d'une tradition métallurgique autochtone maîtrisée. Les objets en or de la colline de Mapungubwe ont été produits au moment où une réorganisation fondamentale de la société a provoqué la séparation de la famille royale du reste de la population et la revalorisation du bétail en tant que forme de richesse. Ces changements sont clairement visibles dans l'utilisation de l'or. Si le commerce de l'or était précédemment pratiqué de façon courante sur la côte est, ce métal est devenu dès cette époque un symbole de puissance et de richesse, en particulier à Mapungubwe Hill.

Keywords: Mapungubwe, indigenous gold, southern Africa, radiocarbon dating

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Gold grave goods were discovered in three of the twenty-seven excavated graves at the Iron Age site of Mapungubwe Hill in the Limpopo River Valley (Fouché 1937; Galloway 1937; Pearson 1937; Weber 1937). The gold is presumed to symbolise societal status, and the occupation of Mapungubwe Hill is associated with the first physical separation of royalty from commoners in the emerging Iron Age State (Huffman 1986). In contrast, some early authors implied that the gold was not indigenous but was rather imported (Pearson 1937). The gold grave goods comprise anklets, bracelets, beads, foil ornaments and plated objects made by tacking gold foil onto carved wooden forms (Pearson 1937; Weber 1937). The forms include a rhinoceros (***Fig. 1a***), a sceptre, a bowl, a headdress, and several other animal forms (Fouché 1937; Steyn 2007) that are currently being restored. The bowl, sceptre, and in particular the gold rhinoceros have become iconic of South Africa's indigenous cultural heritage. In 1997 they were declared *national treasures* (South African Government Gazette 1997); design elements of an excellence and achievement award conferred by the South African government, known as the *Order of Mapungubwe*, incorporate the rhinoceros and the sceptre (South African Government Information 2007). The Limpopo Valley as a cultural landscape has been declared a World Heritage Site (United Nations Educational and Scientific Organisation 2003).

The dating of the gold grave goods recovered from burials in the royal cemetery of Mapungubwe Hill has been problematic because the associated skeletal remains were too fragmentary to yield sufficient well-preserved collagen for radiocarbon analysis. Many dates have been obtained for the site of Mapungubwe and the adjacent site of K2 (***Tab. 1***), but the direct association of the gold was not demonstrated. Unfortunately, the gold rhinoceros, the gold bowl and the gold sceptre do not provide material that could be dated, but fibres entwined within the helically wound gold anklets during manufacture are organic and could possibly be dated. We have used Accelerator Mass Spectrometry (AMS) to radiocarbon date these fibres and show that they were manufactured in the 13th century AD. This demonstrates that the gold artefacts from Mapungubwe Hill are the oldest indigenous gold artefacts yet discovered in the southern African region.

Mapungubwe Hill and the Iron Age in the Limpopo River Valley

Extensive archaeological evidence from the Limpopo Valley indicates that political control over the region began in about AD 1000 with the site of K2 being the centre of power (Meyer 1998; Huffman 2000). The first Iron Age State in southern Africa shifted its capital in AD 1220 from K2 to the site of Mapungubwe Hill, only 2 km away, and subsequently to Great Zimbabwe in about AD 1300 (Vogel 2000). Iron Age gold mining is widespread in Zimbabwe (Summers 1969), but gold would have been of little value in a traditionally farming and pastoral society and would initially have been mined for trade purposes. By the 10th century AD there are reports that gold and ivory were among the trade items that were exported from the region (Freeman-Grenville 1962). The emergence of political control was initiated when wealth derived from the East coast trade became a significant factor relative to the traditional cattle economy, and this change is first manifest when K2 was abandoned in favour of Mapungubwe.

The Mapungubwe site is spatially divided into the occupation areas on the hilltop, on the southern terrace and the northern terrace. Gold grave goods are exclusively associated with the cemetery area on Mapungubwe Hill. The status and wealth of those buried in this cemetery are inferred from the location of the graves in the elevated royal area of the site, the burial position of the individuals (Huffman & Murimbika 2003) as well as the presence of grave goods that comprise more than the gold artefacts. The burial described as the *Original Gold Grave*, M1 (Fouché 1937), contained the gold-plated rhinoceros (***Fig. 1a***) and headdress, great quantities of trade glass beads interspersed with gold beads, some ceramics, and several gold and iron anklets. Only fragmentary skeletal remains were recovered, and so the determination of burial position and sex was not possible. The *Sceptre burial*, M5 (Burial No. 10), was of a middle-aged adult male (Steyn 2007), assumed to be buried in a sitting position facing west. Archival photographs suggest that the right hand was 'grasping' the gold sceptre. In addition to the gold sceptre, grave goods including a hundred gold beads, two pierced cowrie shells, another gold-plated animal, possibly a bovine, and two shallow ceramic bowls were found. No glass trade beads were recovered. The *Gold Skeleton*, M7 (Burial No. 14), (Fouché 1937; Meyer 1998) was also buried in a sitting position facing West. From the extent of burial goods presented as personal adornments or jewellery, the skeleton was interpreted to be that of a female, but the fragmentary skeletal remains could not be used to confirm the sex of the individual. This burial was associated with at least 100 coiled gold anklets (***Fig. 1b***), gold plating, about 12,000 gold beads (Galloway 1959) and about 26,000 glass beads.

Two burials from Mapungubwe Hill require further mention. These are M2 (Burial No. 6) of a child of about 9–11 years, whose sex was not determined and with no associated grave goods, and M4 (Burial No. 7), which was also of a child of about 12–13 years

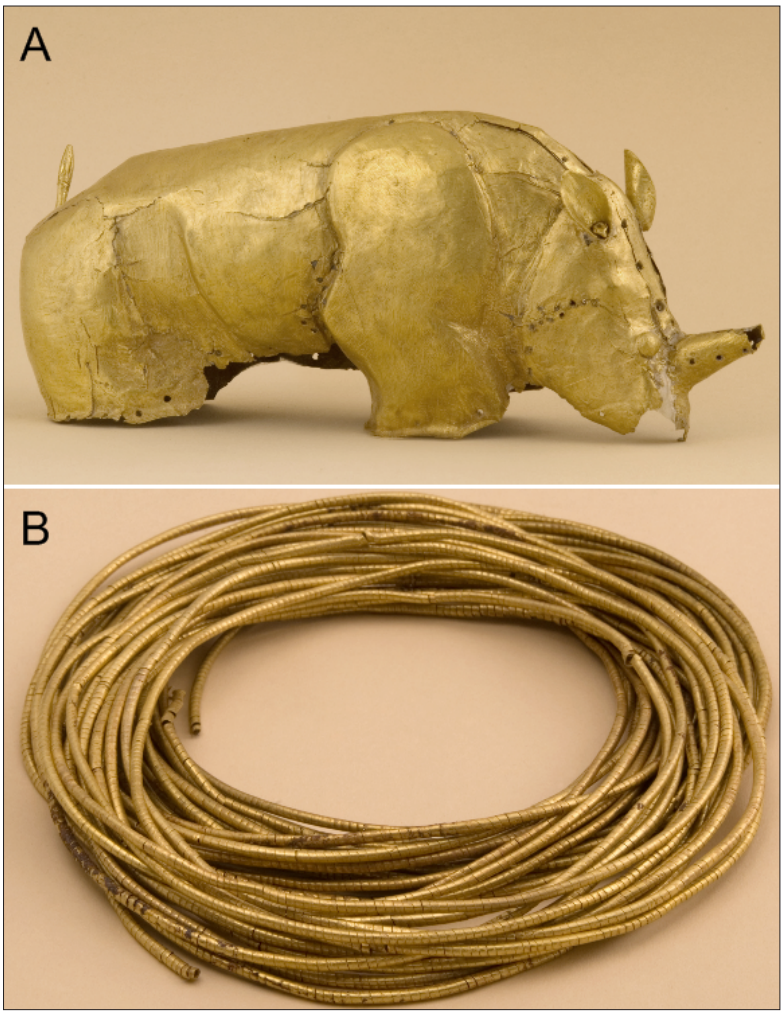

Fig. 1. Photographs of the iconic gold rhinoceros (A) and gold anklet coils (B) recovered from selected graves on Mapungubwe Hill.

with glass beads and iron bangles as grave goods. These skeletons have been dated (***Tab. 1***), but they are not associated with gold grave goods (Vogel 1998). In November 2007, all the human remains were repatriated to the site and reburied, and further research on the skeletons is no longer possible.

Copper and iron grave goods were found with some of the K2 burials, but prior to this the Iron Age burial artefacts were limited to a bored stone, an ivory bracelet, a lion tooth and beads manufactured from ostrich eggshell (Steyn & Nienaber 2000). No gold has been found in Iron Age sites from southern Africa that pre-date Mapungubwe Hill.

Radiocarbon dating of K2 and Mapungubwe Hill

A total of 37 radiocarbon dates have been published for the K2 and Mapungubwe sites and three other dates have been rejected as the correction for carbon isotope fractionation was not done for these analyses (***Fig. 2, Tab. 1***) (Meyer 1998; Vogel 2000). The patterning in the dates indicates that K2 and the Southern Terrace were initially all occupied at the same time, but the focus was on K2 which flourished between AD 1000 and AD 1220. After AD 1220 the Southern Terrace flourished and Mapungubwe Hill was occupied.

Dating the metalworking tradition of the Iron Age in southern Africa has been challenging. Most dates are inferred from the archaeological context, which allows for neither curation nor import of metal artefacts. Iron and copper artefacts are believed to have been manufactured during the millennium before the rise of Mapungubwe Hill, and the technology that was eventually used in gold working was identical (Miller 2001). Metal was beaten into sheets of the required thickness and then cut into narrow strips, or alternatively the strips were made from wire that was hammered and smoothed using an abrasive technique (Beck 1937). The strips were then wound around plant fibres to form either beads or helical structures for anklets and bracelets. Initially, the fibres were incorrectly believed to derive from sisal (Pearson 1937); later they were attributed to grass roots (Beck 1937).

As gold cannot be dated directly using the radiocarbon technique, the fibres found within the helical gold, iron and copper artefacts provide suitable material to date the manufacture of the decorative items. State permission was obtained to destroy sample fibres from two of the gold anklets from the Mapungubwe Hill cemetery site for the purpose of dating. The excavation methods and curation of the gold artefacts makes it impossible to associate the samples with particular graves, although the description suggests that the grave in question was the *Gold Skeleton*, M7. In order to further verify the suitability of the fibres for radiocarbon dating purposes, additional samples were dated from an iron helix anklet from K2 (Block 1 Section 7) and from a copper helix anklet from the area known as the Southern Terrace (JS 2 b), at the base of Mapungubwe

Lab. No.	Sample	Material	Site	RCY bp	$\delta^{13}C$	cal yr AD 1σ	cal yr AD 2σ
Pta-6680	TS5	Human bone	K2	1250 ± 40	-10.0 ‰	770 – 880	700 – 900
Pta-6576	Rn, D4, La2	Bone	K2	1010 ± 50	-7.9 ‰	1010 – 1060, 1090 – 1150	990 – 1180
Pta-1215	TS3, La15	Charcoal	K2	970 ± 50	-23.5 ‰	1030 – 1180	1010 – 1220
Pta-1214	TS1, La2	Charcoal	K2	980 ± 40	-25.0 ‰	1030 – 1160	1010 – 1190
Pta-1226	TS3, La24	Charcoal	K2	950 ± 50	-24.2 ‰	1030 – 1190	1020 – 1240
Pta-2051	TS3, La 6	Bone	K2	970 ± 40	-10.8 ‰	1030 – 1170	1020 – 1200
Pta-6080	TS3, La7	Bone	K2	940 ± 50	-8.3 ‰	1040 – 1200	1020 – 1250
Pta-1157	TS3, La15	Cereal	K2	950 ± 40	-9.5 ‰	1040 – 1180	1020 – 1220
Pta-6073	TS4, La4	Bone	K2	920 ± 50	-10.7 ‰	1050 – 1100, 1140 – 1220	1030 – 1260
Pta-307	LineA6, La11	Charcoal	K2	930 ± 45	-24.2 ‰	1040 – 1110, 1120 – 1210	1030 – 1250
Pta-305	LineA6, La6	Charcoal	K2	890 ± 50	-24.2 ‰	1160 – 1250	1040 – 1270
Pta-6064	TS1, La2	Bone	K2	880 ± 50	-12.1 ‰	1170 – 1260	1040 – 1280
Pta-304	LineA6, La3	Charcoal	K2	880 ± 40	-24.5 ‰	1180 – 1250	1060 – 1090, 1150 – 1270
Pta-306	LineA6, La8	Charcoal	K2	850 ± 50	-24.2 ‰	1190 – 1270	1160 – 1290
Pta-6570	TS5, La3	Bone	K2	760 ± 50	-8.4 ‰	1270 – 1300	1230 – 1310, 1360 – 1390
Pta-768	SqK8, La16	Charcoal	Southern Terrace	1030 ± 50	-23.0 ‰	1000 – 1040	980 – 1170
Pta-2024	SqF4, La10	Post	Southern Terrace	1030 ± 40	-24.4 ‰	1010 – 1040	990 – 1160
Pta-2023	SqH5, La6	Post	Southern Terrace	930 ± 40	-24.8 ‰	1050 – 1100, 1140 – 1200	1030 – 1240
Pta-1156	SqK8, La15	Charcoal	Southern Terrace	860 ± 40	-24.1 ‰	1190 – 1260	1160 – 1280
Pta-439	SqE2, La10	Charcoal	Southern Terrace	840 ± 50	-23.4 ‰	1200 – 1270	1160 – 1290
Pta-438	SqE2, La7	Charcoal	Southern Terrace	820 ± 60	-22.9 ‰	1210 – 1280	1160 – 1300
Pta-766	SqK8, La3	Charcoal	Southern Terrace	860 ± 40	-23.8 ‰	1190 – 1260	1160 – 1280
Pta-437	SqE2, La5	Charcoal	Southern Terrace	810 ± 45	-23.9 ‰	1230 – 1280	1190 – 1290
Pta-752	SqK8, La2	Charcoal	Southern Terrace	790 ± 50	-24.6 ‰	1250 – 1290	1200 – 1300
Pta-1209	SqK8, La1	Charcoal	Southern Terrace	770 ± 50	-24.7 ‰	1260 – 1290	1220 – 1310, 1370 – 1380
Pta-1138	SqH5, La2	Charcoal	Southern Terrace	590 ± 50	-24.2 ‰	1320 – 1350, 1390 – 1420	1300 – 1440
Pta-372	MK4, 6-4	Cereal	Mapungubwe Hill	880 ± 45	-10.8 ‰	1170 – 1250	1050 – 1100, 1140 – 1270
Pta-1145	MK3, La3	Charcoal	Mapungubwe Hill	880 ± 40	-24.3 ‰	1180 – 1250	1060 – 1090, 1150 – 1270
Pta-1158	MK1, La11	Charcoal	Mapungubwe Hill	850 ± 50	-23.9 ‰	1190 – 1270	1160 – 1290
Pta-3489	Skeleton 621	Human bone	Mapungubwe Hill	850 ± 40	-12.8 ‰	1200 – 1270	1170 – 1280
Pta-1159	MK1, La11	Charcoal	Mapungubwe Hill	840 ± 40	-23.5 ‰	1210 – 1270	1180 – 1280
Pta-3480	Skeleton 622	Human bone	Mapungubwe Hill	770 ± 40	-9.5 ‰	1270 – 1290	1240 – 1300
Pta-6692	MK4, 6-4	Charcoal	Mapungubwe Hill	720 ± 40	-10.2 ‰	1280 – 1300	1270 – 1320, 1350 – 1390
Pta-6577	TS1, A11, La3	Bone	Northern Terrace	750 ± 30	-11.1 ‰	1280 – 1290	1270 – 1300
Pta-6573	TS2, La2, MAP12	Bone	Northern Terrace	640 ± 50	-10.9 ‰	1300 – 1410	1290 – 1420
Pta-6567	TS1, A3, La2	Bone	Northern Terrace	360 ± 20	-13.5 ‰	1520 – 1590, 1620 – 1640	1500 – 1640
Pta-6575	TS1, La2, MAP12	Bone	Northern Terrace	280 ± 50	-10.8 ‰	1640 – 1670, 1780 – 1800	1520 – 1590, 1620 – 1690, 1730 – 1810, 1940 – 1950
Y-137-17	Block 4, section 6	Charcoal	K2	900 ± 65			
Y-135-14	Block 6, strip 4	Charred millet + wood	Mapungubwe Hill	570 ± 60			
Y-135-9	Block 2, strip 4	Charred millet	Mapungubwe Hill	530 ± 60			

Tab. 1. List of published radiocarbon dates for the Iron Age sites of K2 and Mapungubwe (after Deevey *et al.* 1959 and Vogel 1998). Differentiation is made between the common area of Mapungubwe called the Southern Terrace and the Northern Terrace and the royal area called Mapungubwe Hill. Three dates listed at the bottom of the table were determined before correction for carbon isotopic fractionation was routinely performed and thus have been rejected.

Sample No.	n	Average mass (mg)	$\delta^{13}C$(‰)
C179	10	1.8 ± 0.2	-24.2 ± 0.2
C182	10	1.9 ± 0.2	-23.1 ± 0.2
C185	10	1.8 ± 0.2	-24.2 ± 0.2

Tab. 2. Summary of carbon isotope values measured on three fibres from within the gold helices from the royal grave area on Mapungubwe Hill. These fibres are additional to those that were dated.

Lab. No.	Sample	Association	Material	Site	RCY bp	$\delta^{13}C$	cal yr AD 1σ	cal yr AD 2σ
GrA-34624	A	Gold anklet	Fibre	Mapungubwe Hill	880 ± 35	-24.8 ‰	1179 – 1243	1157 – 1266
GrA-34631	B	Gold anklet	Fibre	Mapungubwe Hill	810 ± 35	-26.6 ‰	1243 – 1278	1210 – 1288
GrA-34633	C	Iron helix	Fibre	K2	965 ± 35	-26.7 ‰	1033 – 1167	1021 – 1198
GrA-34627	D	Copper helix	Fibre	Southern Terrace	905 ± 35	-24.1 ‰	1162 – 1217	1044 – 1107, 1115 – 1253
GrA-34628	E	J S2 (B)	Charred grass	Southern Terrace	800 ± 35	-26.4 ‰	1253 – 1281	1217 – 1291
GrA-34632	F	Eastern grave area	Basket remain	Mapungubwe Hill	675 ± 35	-24.3 ‰	1296 – 1322, 1346 – 1393	1287 – 1404,
GrA-34630	G	'treasure pot'	Cordage	Bambandyanalo	150 ± 35	-26.1 ‰	1683 – 1736, 1807 – 1899, 1906 – 1946	1673 – 1775, 1799 – 1955

Tab. 3. Accelerator Mass Spectrometry radiocarbon dates for gold artefacts from Mapungubwe Hill with associated comparative analyses.

Hill. Three other samples of plant material representing short-lived species were also dated. The first was charred grass remains from the Southern Terrace (JS 2 b), the second was fragmentary basket remains from the eastern side of the cemetery area, and the third was twisted rope cordage from the site known as Bambandyanalo Hill to the north-east of K2.

In order to test the suitability of the fibres from the gold artefacts for dating purposes, stable isotope measurements were preformed on successive short segments along three fibres (C179, C182, C185) to better understand their plant origin.

Methods

Fibre samples were pre-treated using a 1 % HCl followed by a 1 % NaOH solution at low temperatures. After each stage of the pre-treatment procedure samples were rinsed to pH5 with distilled water and then analysed by Accelerator Mass Spectrometry at the University of Groningen, Netherlands. Previous results reported in ***Table 1*** were calibrated using a calibration dataset based on INTERCAL 98 (Stuiver *et al.* 1998) with a 40 year southern Hemisphere offset (Talma & Vogel 1993) and compare very well with the most recent calibration datasets (Reimer *et al.* 2004). This calibration has been used for most of the Iron Age archaeology of southern Africa, and has been used in this study to allow direct comparison between these results and previous dating analyses.

Carbon isotope analyses were done on samples that were pre-treated in exactly the same way as the dating samples. Results were obtained using a Isogas SIRA 24 Light Isotope Ratio Mass Spectrometer coupled with a *ThermoQuest EA1110* elemental analyser.

Results

The low standard deviation in the stable isotope analyses (***Tab. 2***) is consistent with a fast-growing plant of C3 origin. This would present an ideal sample for radiocarbon analysis as no "old wood" effects need to be considered.

The radiocarbon dates obtained in this study (***Tab. 3, Fig. 2***) for the iron helix from K2 overlap all the other K2 dates at the 2-sigma range with the exception of one outlier. The date for the copper helix from the Southern Terrace matches the range of dates for the first occupation of this area. This further confirms the suitability of the fibres for radiocarbon dating purposes. It is interesting to note that the gold anklets from Mapungubwe Hill match one another in age, as might be anticipated as they may be from the same manufacturing event, but

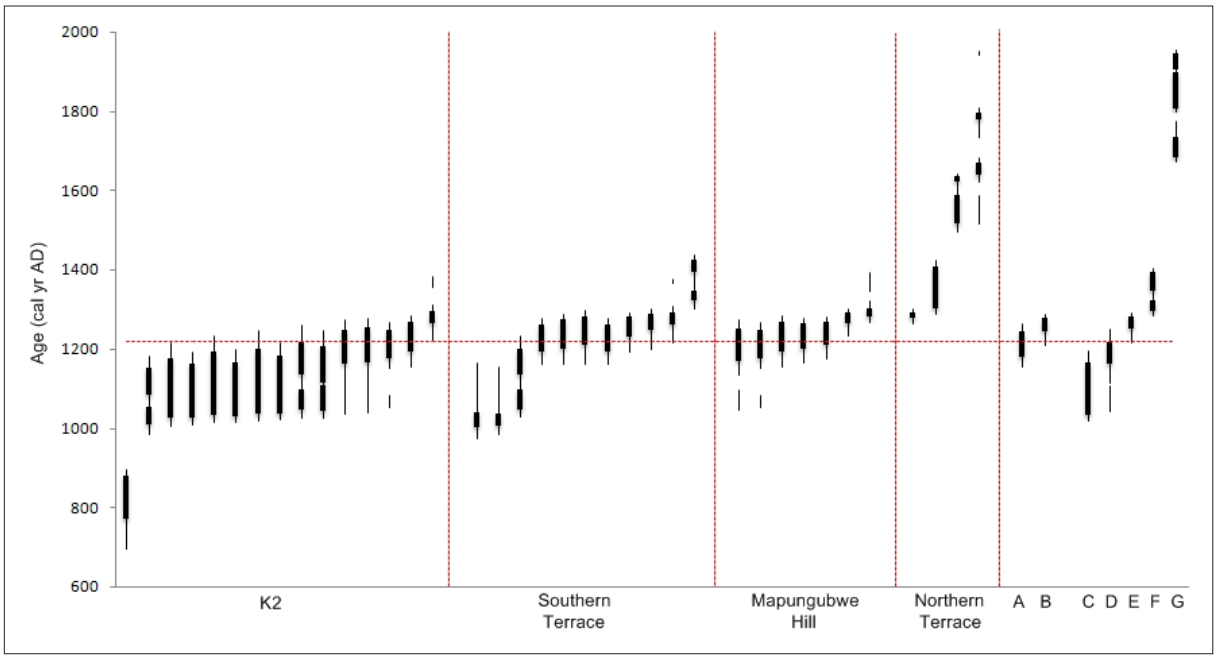

Fig. 2. Schematic representation of the radiocarbon dates from the Iron Age sites of K2 and Mapungubwe. The x-axis is arbitrary beyond the separation of the different site components and the gold artefacts and control samples analysed in this study. The samples dated in this research are fibres from gold anklets from Mapungubwe Hill graves (A) and (B), fibres from an iron helix from K2 (C), fibre from a copper helix from the Mapungubwe Southern Terrace (D), charred grass from the Mapungubwe Southern Terrace (E), basket remains from the eastern grave area on Mapungubwe Hill (F), and cordage from Bambandyanalo. The data from which this is derived is presented in ***Table 1***.

they also match the dates during which the Southern Terrace flourished and Mapungubwe Hill was the seat of power. The date for the gold also matches the date of the two human skeletons from the royal cemetery. The cordage from Bambandyanalo is not contemporaneous with the Mapungubwe occupation but is aligned with another late occupation date from the area.

Discussion

The dating results indicate that the helical gold artefacts recovered from the Mapungubwe Hill burials are contemporaneous with the occupation of the site and are therefore the earliest gold artefacts yet to be discovered in southern Africa. It appears that at precisely the time that political power emerged in the Limpopo Valley gold changed its social significance. Whereas gold had previously been traded for glass beads, and glass beads thus had conferred local wealth status, gold became a symbol of wealth, status and power as the Mapungubwe State emerged. Gold traded with the Swahili on the East coast for the previous century was redirected into the manufacture of adornments that symbolised power, authority and wealth (Calabrese 2000). This was also the time when cattle ceased to be a feature in the spatial layout of the capital and a symbol of state wealth (Huffman 1986). The implicit social and economic restructuring was independent of the East coast trade that had been in place for more than a century when Mapungubwe Hill was occupied, and may be the result of favourable environmental conditions that supported agriculture in the otherwise inhospitable Limpopo Valley (Huffman 1996).

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