

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/341240125>

AMS Dates and the Chronology of Great Zimbabwe

Article in *Journal of African Archaeology* · May 2020

DOI: 10.1163/21915784-20200006

CITATION

1

READS

270

2 authors:



Thomas Huffman

University of the Witwatersrand

109 PUBLICATIONS 3,105 CITATIONS

[SEE PROFILE](#)



Stephan Woodborne

iThemba Labs - Laboratory for Accelerator Based Science

140 PUBLICATIONS 1,926 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Archaic and Middle Ceramic periods in southeast Colorado [View project](#)



Isotope dendroclimatology in southern Africa [View project](#)

AMS Dates and the Chronology of Great Zimbabwe

Thomas N. Huffman

School of Geography, Archaeology & Environmental Studies, University of the Witwatersrand, PO Wits 2050,
Johannesburg, South Africa
Thomas.huffman@wits.ac.za

Stephan Woodborne

iThemba LABS, Johannesburg, South Africa

Abstract

Salvage excavations in the 1970s uncovered a sizeable commoner occupation at Great Zimbabwe, as well as evidence for the early construction of an elite stonewalled enclosure. As a result of these excavations, we can revise somewhat the chronology of Great Zimbabwe. The most important changes are the extension of Period IVA, lasting from AD 1285±10 to 1395±10, and the appearance of P, P/Q and Q-coursed walling in Period IVA. The small Nemanwa palace was built in P/Q and first dates to Period IVA, as does the Outer Perimeter Wall, and both were linked to the growth of the Zimbabwe state. Period IVb represents the floruit of Great Zimbabwe, while Period IVc encompasses the occupation after the political elite moved north to become the well-known Mutapa dynasty. After the move north, the Mutapa established a *masungiro* ritual centre at Great Zimbabwe, perhaps to maintain territorial rights in the face of Torwa expansion.

Résumé

Fouilles de sauvetage dans les années 1970 ont découvert une importante occupation roturière à Great Zimbabwe, ainsi que pour le début de la construction d'une enceinte stonewalled élite. À la suite de ces fouilles, nous pouvons réviser un peu la chronologie du Grand Zimbabwe. Les changements les plus importants sont la prolongation de la période IVA, une durée de 1285±10 AD 1395±10, et l'apparition de P, P/Q et Q-coursing en période IVA. Le petit palais de Nemanwa a été construit en P/Q et premier remonte à la période IVA, tout comme le mur d'enceinte extérieur et les deux était liés à la croissance de l'état du Zimbabwe. IVb période représente le floruit du Grand Zimbabwe, tandis que la période IVc englobe l'occupation après l'élite politique vers le Nord devenir la célèbre dynastie de Monomotapa. Après le déménagement vers le Nord, le Monomotapa

établi un centre rituel de *masungiro* dans la basse vallée, peut-être afin de maintenir des droits territoriaux face à l'expansion des Torwa.

Keywords

AMS dates – Great Zimbabwe – southern African Iron Age

1 Introduction

Great Zimbabwe is the premier Iron Age site in southern Africa (Fig. 1). As is now well known, it was the headquarters (ca. AD 1300-1450) of an extensive Bantu state based on a combination of human capital and long-distance trade. In the late 1950s, Summers et al. (1961) established a sequence of Periods (Periods I to V) that still forms the chronological framework for all subsequent investigations. At that time, many researchers thought Great Zimbabwe was something like a vacant ceremonial centre, occupied by a few people living inside the stonewalling (e.g. Garlake 1973).

In the 1970s, as Inspector of Monuments for National Museums and Monuments of Zimbabwe (Rhodesia then), one of us (TNH) made various inspection trips to Great Zimbabwe. On one trip in February 1971, the curator, Mrs. Lillian Hodges, pointed out where a waterpipe trench had cut through solid daga (mud) structures on the slope below the museum. A moratorium on excavations applied specifically to the stonewalled structures, and the Director, C.K. Cooke, gave permission for salvage excavations. This was a chance to investigate a residential complex and the beginning of a five-year project.

Various teams excavated one virtually complete residential unit dating to Period IV (the ZI AREA) and portions



FIGURE 1
Great Zimbabwe and other important places in southern Africa.

of three others (the ZII, ZIII and ZIV AREAS). These four areas exposed commoner housing (Fig. 2). The team also test excavated an elite stone enclosure near the Nemanwa School, designating it the ZV AREA. Among others, these excavations helped to refine our understanding of Great Zimbabwe's chronology (Huffman & Vogel 1991; Huffman 2007: 250-253). Here we refine the sequence further with an important new suite of AMS dates, processed by the iThemba LABS in Johannesburg. Period I (*Ziwa* AD 440-460 and *Zhizo* AD 810-850), Period II (*Gumanye* AD 1020-1070) and Period III (*Class 3* AD 1200-1250) pottery represent rain

control activities, while Period IVa (*Early Great Zimbabwe* AD 1285-1395), IVb (*Great Zimbabwe* AD 1395-1450) and IVc (*Later Great Zimbabwe* AD 1450-1550) mark the development of the capital; Period V encompasses a 19th century reoccupation (Table 1). Note that all dates have been calibrated using the SHCal13 data set (Hogg et al. 2013), available online at CALIB 7.1 at <http://calib.org> (Stuiver et al. 2018). Following Vogel (2000), we considered the BP midpoints as the most likely date and then calculated the mean using the $\pm 1\sigma$ span. For greater probability, another $\pm 1\sigma$ should be added to the results. We have eliminated

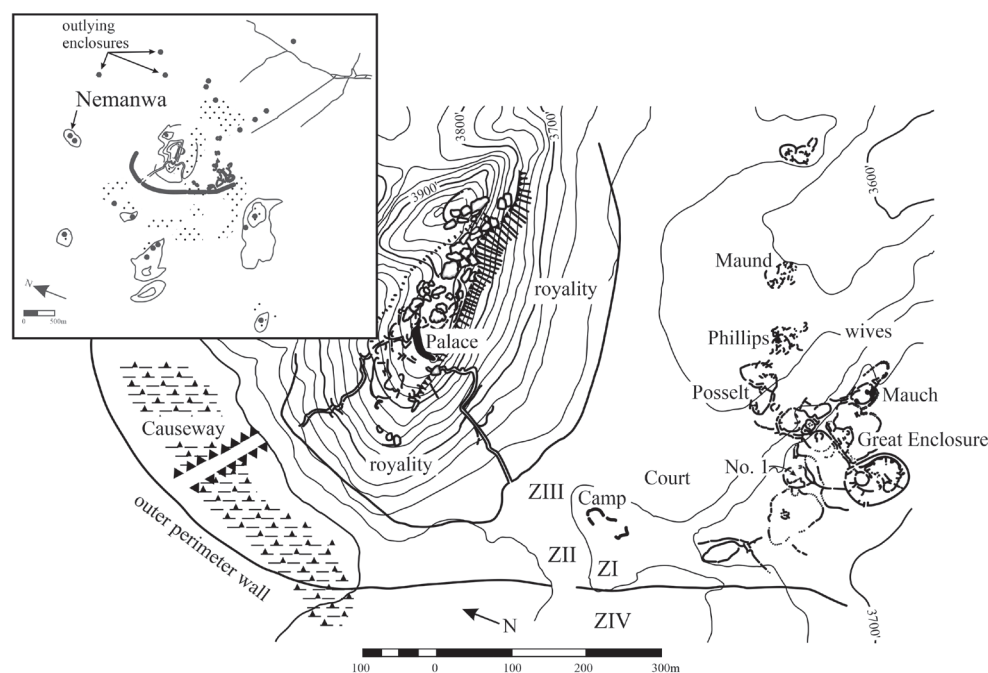


FIGURE 2
Great Zimbabwe and location
of excavated areas. Box shows
Greater Zimbabwe area centred
on Hill Ruin.

TABLE 1 Revised chronology of Great Zimbabwe

Period	Dating	Pottery	Comments
V	19th century AD	Class 5	Dispersed homesteads
IVc	AD 1450-1550	Later Great Zimbabwe (Class 4c)	Lower Valley ritual centre
IVb	AD 1395-1450	Great Zimbabwe (Class 4b)	Peak of power
IVa	AD 1285-1395	Early Great Zimbabwe (Class 4a)	P, P/Q, Q & R stonewalling First elite daga structures
III	AD 1200-1250	Z3	Rainmaking
II	AD 1020-1070	Gumanye	Rainmaking
1b	AD 810-850	Zhizo	Rainmaking
1a	AD 440-460	Ziwa	Rainmaking

Note: Period II undated at Great Zimbabwe.

some spans as less likely for archaeological reasons, such as stratigraphy, imports and ceramics (Tables 2 and 3).

We document the location of ceramic spindle whorls because, according to Robinson (1961b: 204), they first appear in Period IVa (his *Class 3/4*).

Some recent research has misunderstood the revised sequence. Two fundamentals are critical for understanding the chronology of Great Zimbabwe: Robinson's (1961a) stratigraphic sequence in the Western Enclosure and the

1991 ceramic re-analysis (Huffman & Vogel 1991). The refined ceramic sequence and periodization appeared in the *Handbook to the Iron Age* (Huffman 2007: 256-257, 396-397), while a more up-to-date revision featured in a discussion on the relationship between Mapungubwe and Great Zimbabwe (Huffman 2009) and in replies (Huffman 2010, 2011) to Chirikure and Pikirayi (2008). For their 2008 paper, Chirikure and Pikirayi adopted the ceramic revisions, but not the Periods. Meanwhile, the two should be co-terminus: *Class 4a* pottery, for example, determines Period IVa. Chirikure et al. (2013a, b) ignore both the Period and ceramic revisions, while Bandama et al. (2016: 167) and Chirikure et al. (2018) follow Summers et al.'s (1961) original out-dated scheme. None of these researchers explain why they depart from the well-established revisions.

Moreover, these researchers reject rain control in the earlier levels, question the dichotomy between elite and commoners and propose new population estimates. We return to these challenges later, contending that our data undermines these alternatives.

2 Commoner Excavations

The comprehensive structural analysis of the use of space at Great Zimbabwe (Huffman 1996) showed that royalty of various sorts occupied stonewalled enclosures throughout the town as well as terrace platforms on the slopes of Zimbabwe Hill. These terraces were all inside the Inner Perimeter Wall. Commoners, on the other hand, lived in high-density housing units outside this protective circle.

TABLE 2 Great Zimbabwe: AMS dates from ZI to ZIV

Lab code IT-C	Excavation code	BP	SHCal13 ±1σ Span (AD)	Mean of ±1σ	Period
1434	ZI H42	360±30	1504-1589 ~~1616-1627~~	1547	IVC
1482	ZI M49	390±33	1464-1511 1551-1558 ~~1574-1622~~	1488 1555	IVC
1468	ZII ZC/190/1	400±36	1458-1510 ~~1577-1621~~	1484	IVC
1467	ZIII H6	440±32	1448-1497 ~~1602-1606~~	1473	IVC
1527	ZIV 2/C/4	440±33	1448-1497 ~~1601-1606~~	1473	IVC
1460	ZIV 5/C/2	430±34	1451-1500 ~~1596-1611~~	1476	IVC
1530	ZIV 3/D/2	450±52	1436-1503 ~~1591-1615~~	1486	IVC
1470	ZI midden level 3	430±33	1451-1500 ~~1597-1611~~	1476	IVC
1466	ZI A48	480±30	1433-1460	1447	IVb
1465	ZI H16/3	480±37	1427-1464 1471-1476	1446 1474	IVb
1427	ZI H2	530±37	1415-1444	1430	IVb
1464	ZI PW2	660±28	1315-1357 ~~1381-1393~~	1336	IVa
1512	ZI midden level 10	700±35	1293-1318 ~~1352-1384~~	1306	IVa

Note: crossed-out spans less likely for ceramic, statistical and stratigraphical reasons.

TABLE 3 Great Zimbabwe: AMS dates from ZV

Lab code IT-C	Excavation code	BP	SHCal13 ±1σ Span (AD)	Mean of ±1σ	Period
1528	3/A/8	570±36	1399-1431	1415	IVb
1451	1/A/4	570±28	1402-1426	1414	IVb
1459	1/A/10	580±30	1397-1425	1411	IVb
1461	3/A/12	640±62	1307-1361 ~~1378-1406~~	1334	IVa
1463	4/A/4	650±51	1308-1361 ~~1378-1400~~	1335	IVa

Contrary to Chirikure et al. (2018), the Outer Perimeter Wall did not define the royal area: it marked the front of the town.

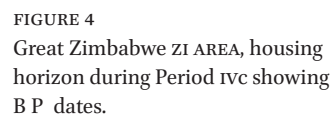
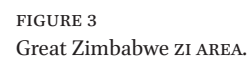
In the 1970s, the teams excavated four commoner housing units (ZI-ZIV), three inside the Outer Perimeter Wall (see Fig. 2).

2.1 ZI Area

The ZI AREA lies near the present-day museum, below what is known as the Camp Ruins. The original goal was to expose a complete residential unit dating to the flourish of Great Zimbabwe (Period IVb). This goal became impossible because of the complex stratigraphy: huts lay under huts; huts lay under middens; and many huts had been rebuilt or renovated (Fig. 3). Furthermore, for various conservation and heritage reasons, well-preserved daga structures would not be destroyed; so, several stratigraphic issues could not be resolved. Nevertheless, the upper housing horizon could be reconstructed (Fig. 4). As a spatial pattern, middens surrounded closely spaced sleeping rooms and kitchens, which were connected by stonewalled drains that channelled rainwater away from doorways. Both sleeping rooms and kitchens were made of solid daga floors and lower walls, and both sometimes contained raised semi-circles against the wall (not in the centre) that functioned as fireplaces.

The key to this reconstruction were broken vessels in an outer midden (Squares H/11 and I/11) that could be re-fitted with other fragments in the residential compound. In the midden, about a metre of deposit contained much charcoal, bone and *Class 4c* pottery and two spindle whorl fragments, as well as four arrowheads, two axe/adzes, a tin/lead ingot and iron clasp. The fibre core of a copper-based bracelet in Level 3 has been AMS dated to BP 430±33 (IT-C-1470). The remains of three houses lay underneath the midden deposit (Fig. 5). Underneath, daga walls of House 66 (H66) had rounded surfaces, suggesting they were made with coils somewhat like a pot. An upper floor of House 67 filled the space between an interior division and the outer wall. This outer wall had an inward arc in parallel with the curved wall of H66. Thus, these two structures were paired in an unusual way. The fibre core of a copper-based bracelet from Level 10 has been AMS dated to BP 700±35 (IT-C-1512), placing the lower housing in Period IVa (Table 2). The team did not excavate more of these structures or more of the midden and we are therefore unsure about the peculiar relationship between H66 and H67.

Pottery fragments linked the upper midden deposit to House 42 (H42). A wide plastered veranda surrounded the



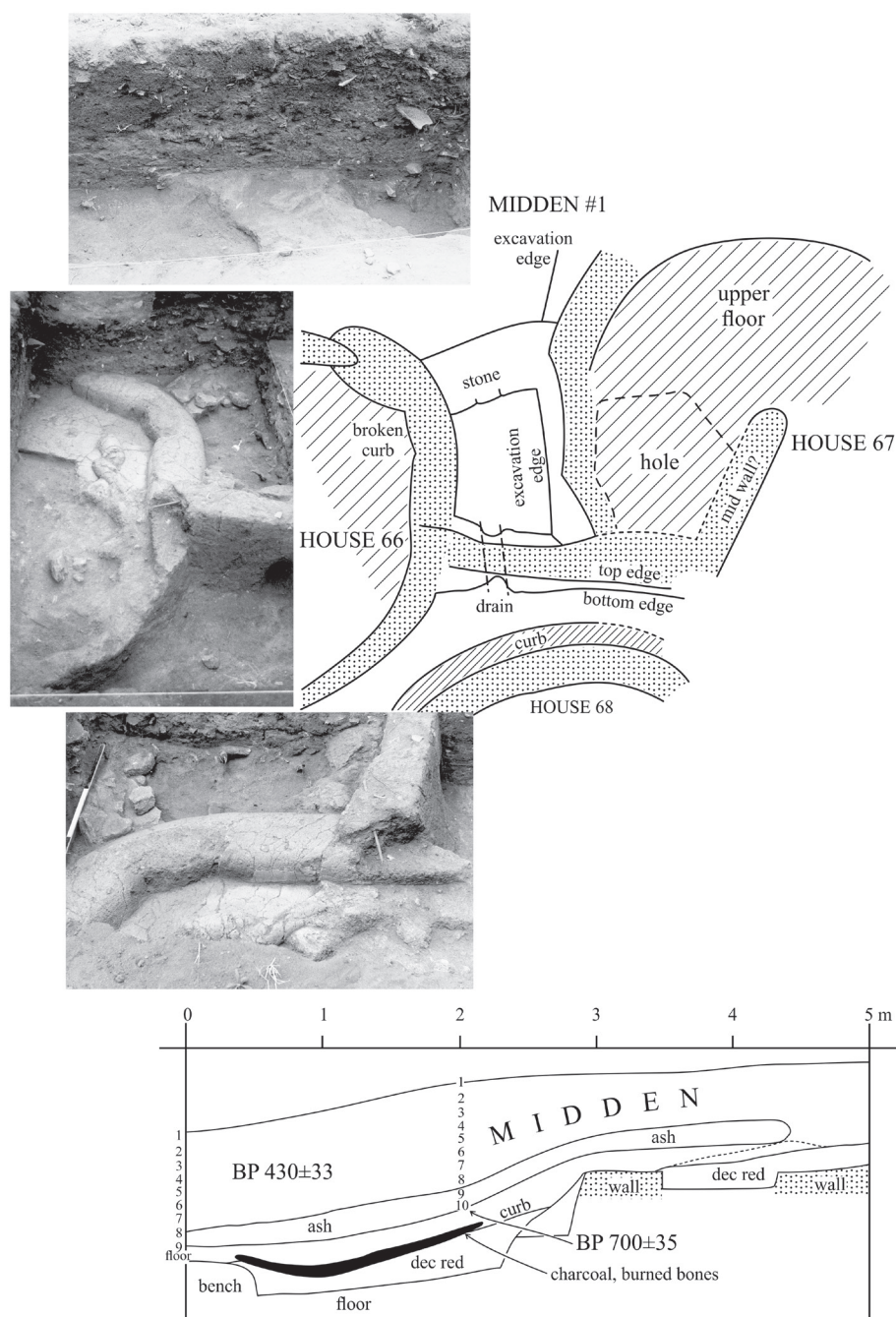


FIGURE 5
Great Zimbabwe ZI AREA, midden in
Square H/11.

entrance step. Inside, four inches of black soil (Level 1) lay on top of red decomposing daga (Level 2, 4-9 inches) which in turn covered ash and dark soil (Level 3, 9-16 inches) on top of the daga floor (Level 4). On the floor, a triangular fireplace was wedged between a bench and interior wall. A large quern with at least five oval grinding hallows rested on the floor beyond the dividing wall, showing that H42 had been a kitchen. Ash on the floor between Levels 2 and 3 contained a few carbonized cow peas (*Vigna sp.*). These seeds have been AMS dated to BP 360±30 (IT-C-1434), and to Period IVC as expected.

A small midden deposit (M49) upslope of H42 has also been AMS dated. The fibre core of a copper-based bracelet from here dates to BP 390±33 (IT-C-1482), placing this midden in Period IVC as well.

House 1 (H1) below M49 marked the bottom edge of the compound. A short daga wall connected H1 to House 10 (H10) under a recent stone stairway leading to the museum. Two floors were separated by nine inches (22.5 cm) of red daga (the floor base) and white clay. A bench on the upper floor had a bevelled curve and faced a south entrance, where a large block of wood helped to

form the entrance step. This wood had been previously radiocarbon dated (Huffman & Vogel 1991) to BP 370±50 (Pta 2711).

House 2 (H2) was another structure cut through by the original pipeline trench (Figs 3 and 6). It was unusual in that a thick wall divided the interior, while a wooden post (3 inch/7 cm) helped to support the roof. The west side was simple although it covered remnants of an older wall. In contrast, the east side, facing House 9, contained a bench with a large grindstone in the north corner, opposite a raised triangular fireplace: this side served as a kitchen. Some carbonized seeds (*Strychnos* sp) on the bench have

been AMS dated to BP 530±37 (IT-C-1427), placing it in Period rvb. It is unclear whether the west side had its own entrance because the pipe trench had cut through the junction of two daga walls: it could have also been entered from the east compartment. In either case, this combined structure may well have belonged to an old woman without a husband (Murimbika, pers. comm. 2018). A stonewall with a drain abutted the western edge, forming the bottom boundary of the Period rvb compound. A lower wall under the west compartment presumably dates to Period rva.

Upslope, House 16/17 was a large complex of walls and benches built on the steep slope over and around granite

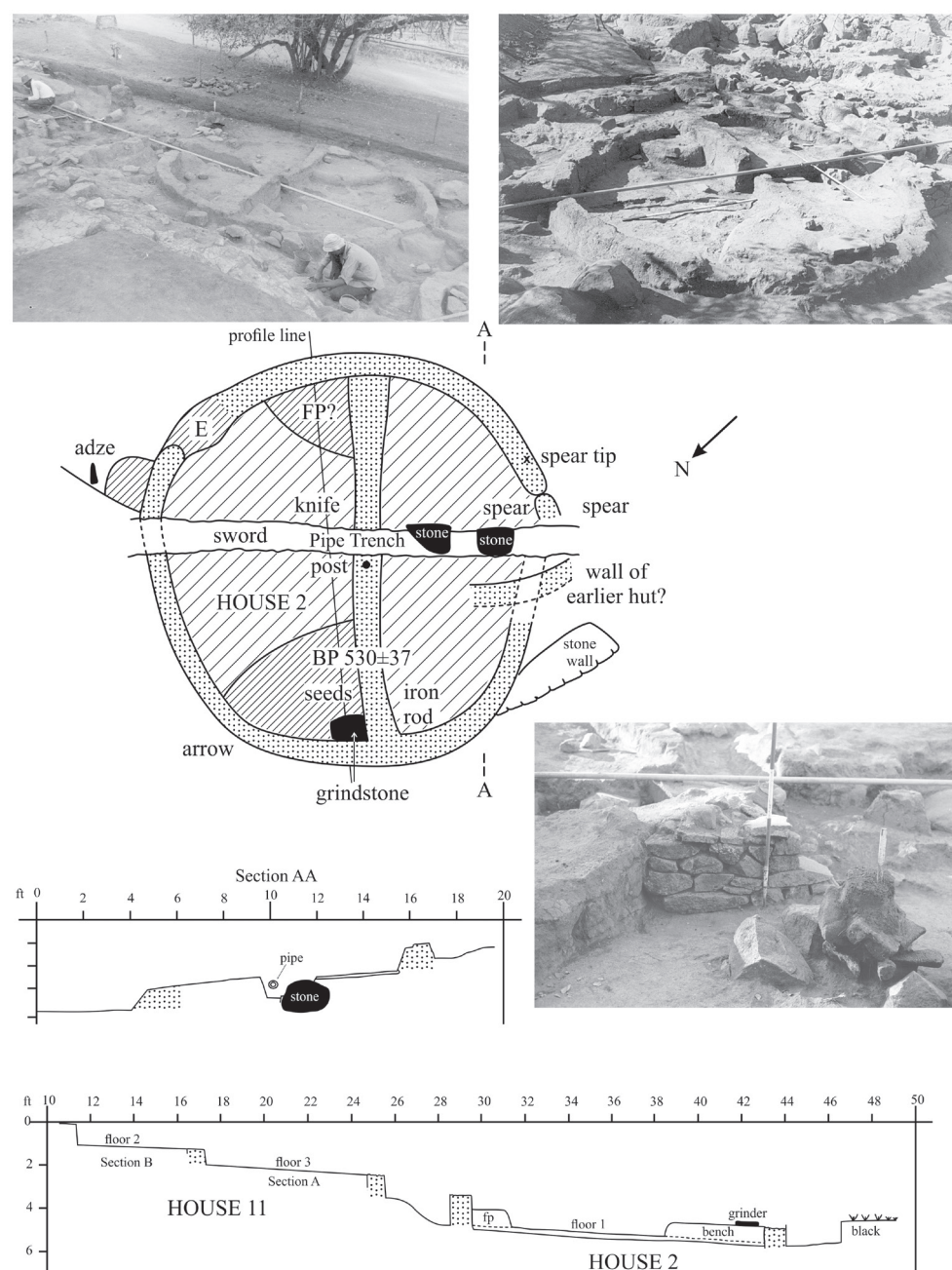


FIGURE 6
Great Zimbabwe ZI AREA, House 2.

boulders. Clearly, the benches served to level the ground for the house(s). It was given two numbers because there were two entrances: H16 faced House 11 and House 27, while H17 faced upslope towards the back of House 24 (see Fig. 3). A complete spindle whorl came from the fill in H17 (square E/3). The fibre core of a bracelet from H16 has been AMS dated to BP 480±37 (IT-C-1465), placing the

structure and finds at the end of Period IVb. Some renovations may date to Period IVc.

The House 50/51 complex (H50/51) further upslope was a complicated area involving M49 (dated to Period IVc), Area A30/47, House 48 and Area A48b (Fig. 7). The earliest components appear to have been the daga wall and drain separating A30/47 and A48b. The fibre core of a

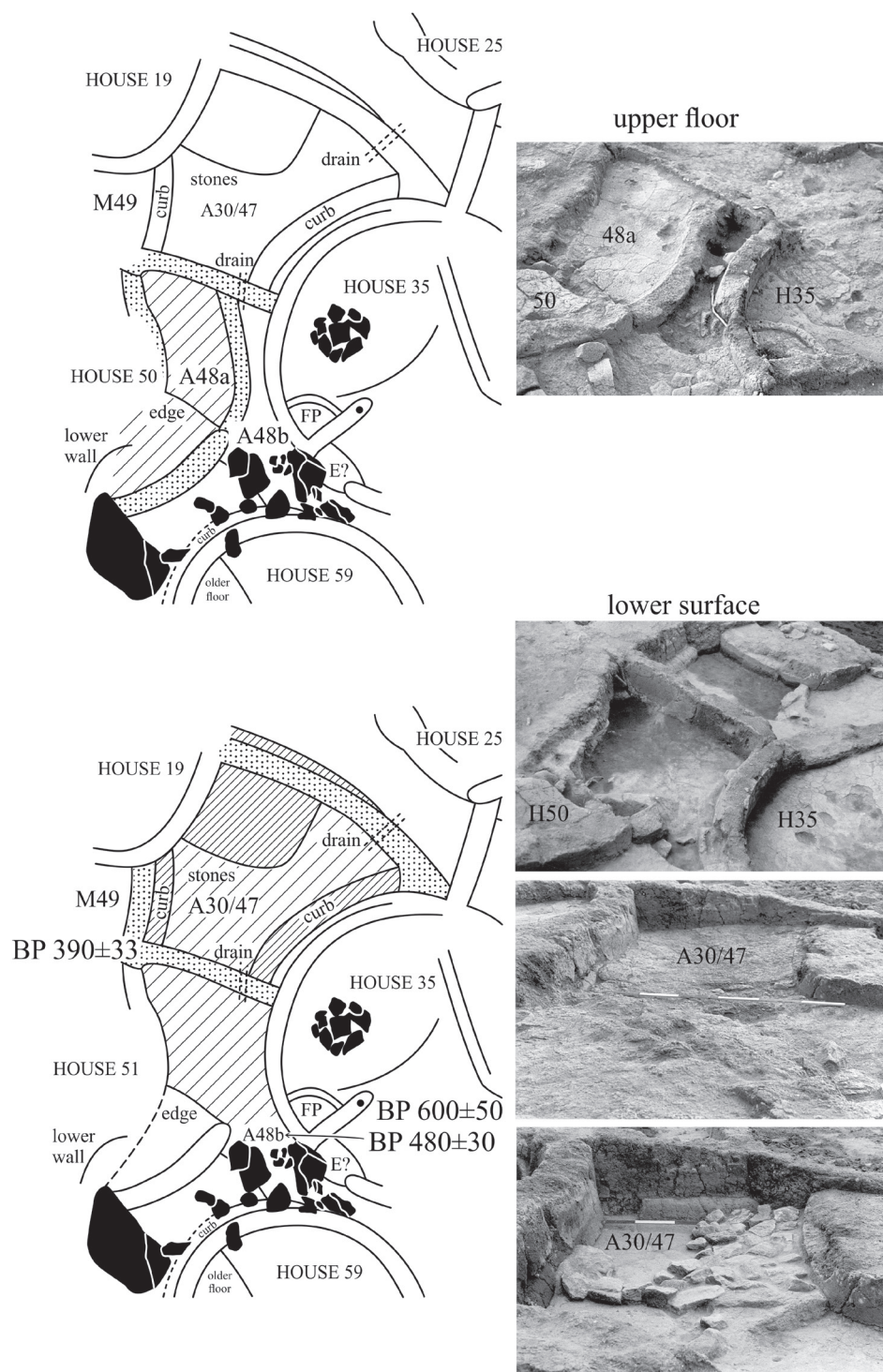


FIGURE 7
Great Zimbabwe ZI AREA, House 50/51,
A47/30, A48 and House 35.

copper-based bracelet from A48b was AMS dated to BP 480±30 (IT-C-1466), placing this feature at the end of Period ivb, like H16.

The nearby House 35/36 complex was also complicated (Fig. 8). The earliest version of H35 was connected to H50 by way of a daga-covered drain. The lower floor of H35 contained a bench with several curves, and perhaps a doorway on the east side. A fireplace to the northwest next to a small bench may have been associated although its base was 17 cm above a lower floor. A later third floor

covered the fireplace. This later upper floor had its entrance to the south. A short wall, presumably shielding this upper fireplace, extended for about one metre. A carbonized post at the end of this wall had been previously dated to BP 600±50 (Pta 1208), placing it at the beginning of Period ivb (Huffman & Vogel 1991). If we allow ten years for each earlier renovation (a reasonable estimate of structural integrity), the first H35 may date to Period iva. Sometime later, the walls of H36 (resting on 12 cm of ash) were built on top of H35, and the drain area filled with

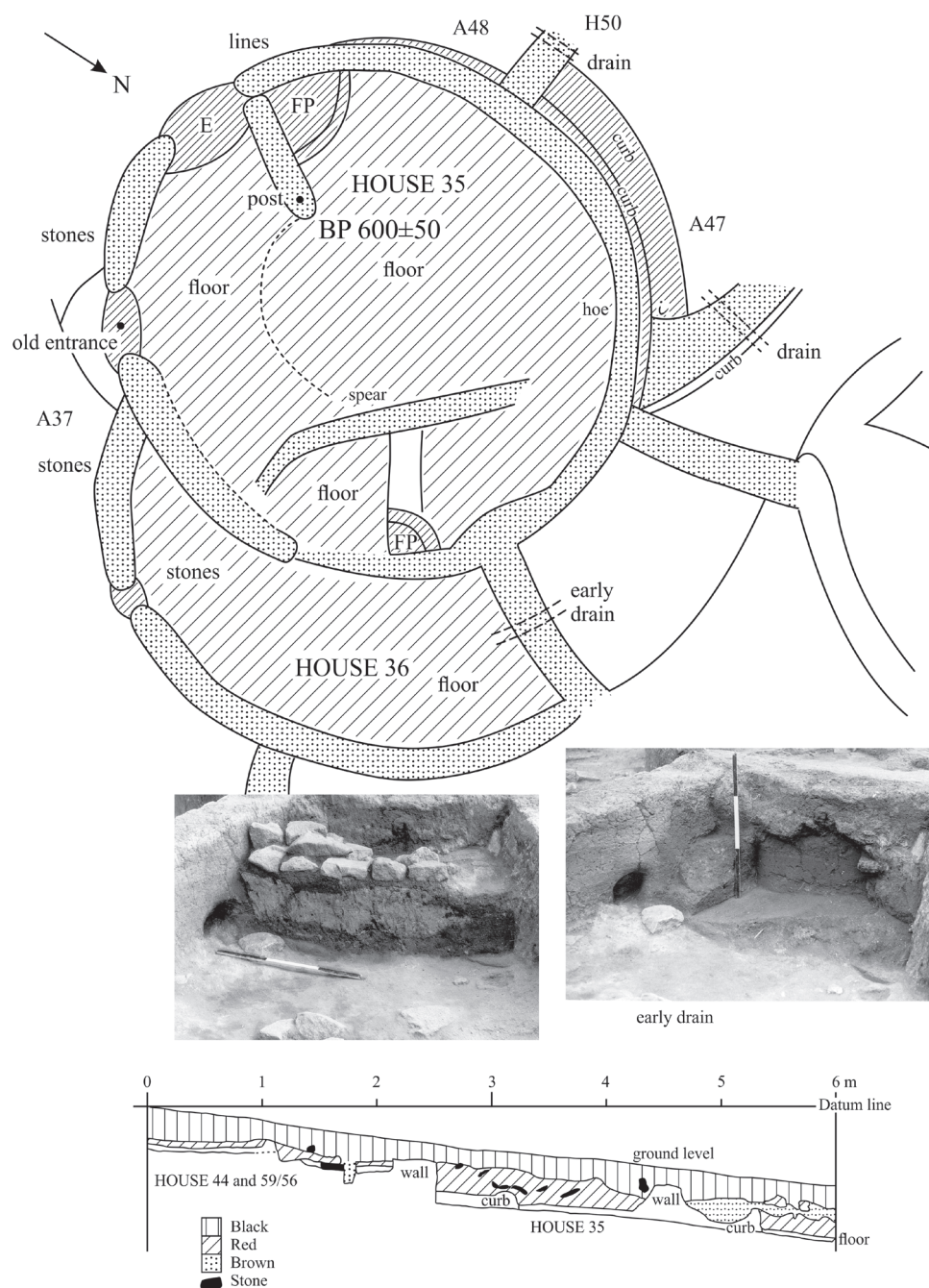


FIGURE 8
Great Zimbabwe ZI AREA, House
35/36 complex.

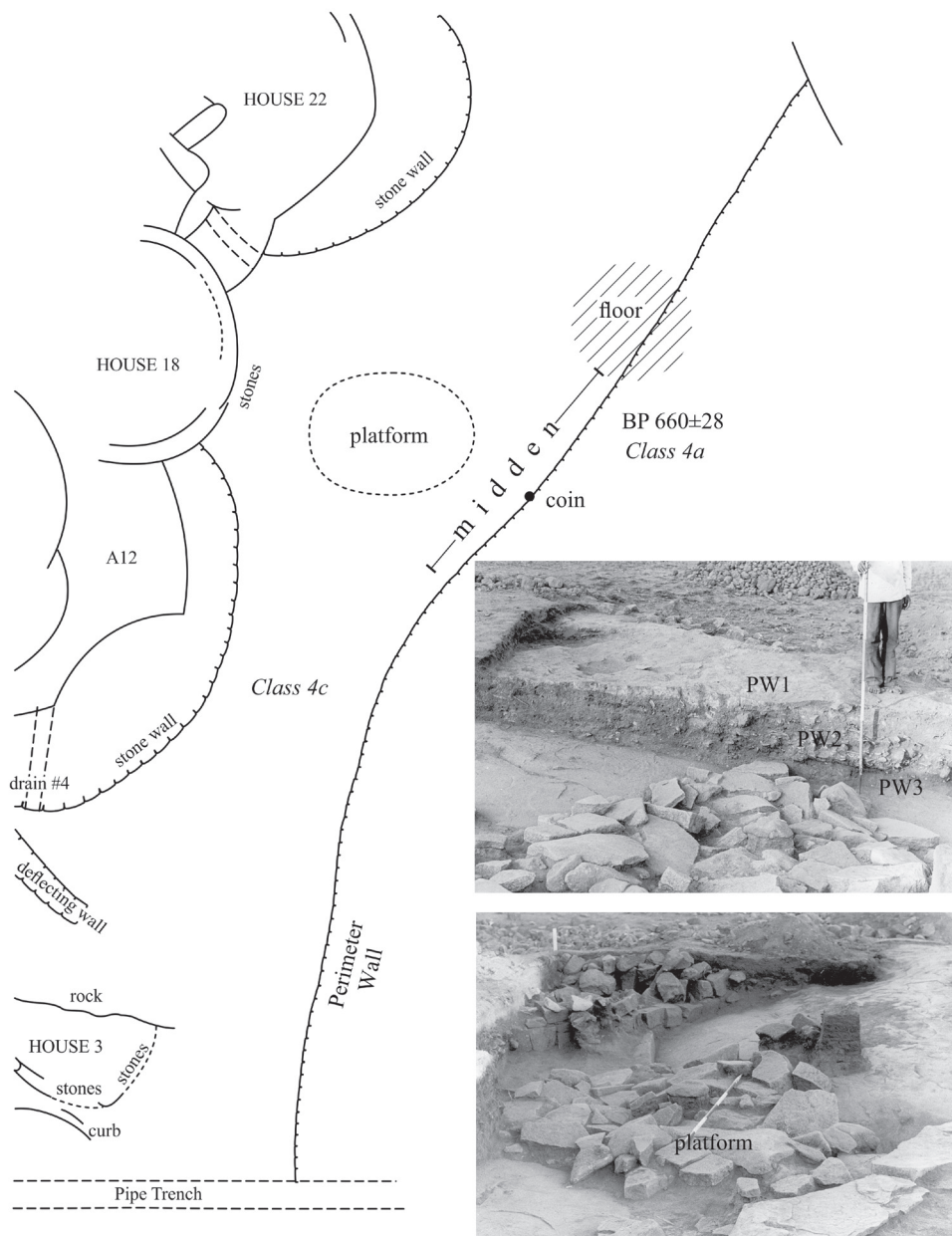


FIGURE 9
Great Zimbabwe ZI AREA, midden
(PW2) against Outer Perimeter Wall.

rocks and broken daga. Later still, Area 37, next to H35, was filled with stone. Clearly, this area had undergone multiple renovations.

At the western edge of the compound the Outer Perimeter Wall was built on bare granite near House 3 (Fig. 9). A midden deposit had accumulated against the wall (PW2) a few metres upslope. This midden contained *Class 4a* pottery, bone, a spearblade, a long-shafted spear (Square E/-3 in Fig. 3) and a small copper Arab coin (D/-2), 18 inches below present surface level (bpsl) in the wall. The coin itself bore the name *al-Hasan (bin) Sulaiman*, a sultan of Kilwa who reigned from about AD 1320 to 1333 (Chittick 1965). The fibre core of a bracelet from PW2 dates to BP 660±28 (IT-C-1464) – more or less the same date as the coin. Underneath, a soil layer (PW3) contained

more *Class 4a* pottery. Above the midden, a thin patch of daga flooring rested on black soil (PW1) and dates to Period v and thus the 19th century.

2.2 ZII Area

In June 1971, we turned our attention to house circles exposed in the road below AREA I. We extended the grid system from AREA I (Z A, Z B, etc.) and continued the house numbers. Thus, Houses 4, 5, 7 and 8 stood in the ZII AREA (Fig. 10).

House 5 (H5) was part of a circular wall and floor built against the granite dome of the museum hill. One long spearhead and an axe/adze came from the floor along with typical *Class 4* pottery. Level 1 in H5 (Square Z C /190) yielded a copper-based bracelet which has

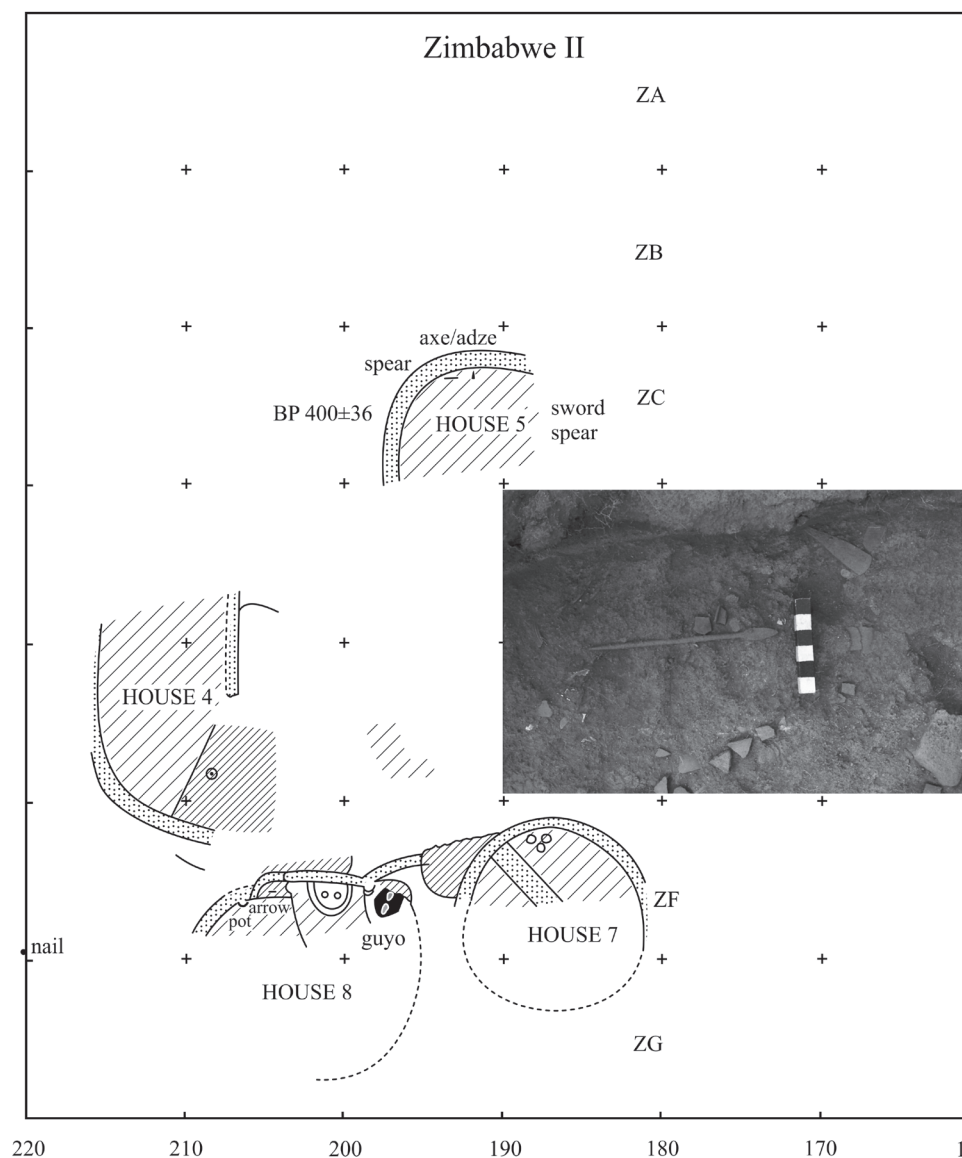


FIGURE 10
Great Zimbabwe ZII AREA.

been AMS dated to B P 400 ± 36 (I T-C-1468), placing it in Period Ivc.

2.3 ZIII Area

At the same time as the team excavated the ZII AREA, investigations began in a large mound near the Outspan Gate. The grid here was independent of ZI and ZII although house numbers continued. The team investigated one house circle (House 6), 13 feet and nine inches in diameter (4.125 m), which contained a rich upper layer (6 inches/15 cm). This layer yielded copper-based bangles, glass beads (Indian red and yellow), an iron needle, six iron arrowheads, one long spearhead, two long-shafted spearheads (one with a twisted tang), one knife, two hoes, one carving blade, one razor and one iron needle, as well as cattle bones, many pot shards and a spindle whorl. Clearly, House 6 had been used as a dump once it was abandoned.

The fibre core of a copper-based bracelet from this dump has been AMS dated to B P 440 ± 32 (I T-C-1467), placing it in Period Ivc. The house itself is older.

2.4 ZIV Area

The original pipe trench extended west beyond the Outer Perimeter Wall where it cut through a deep midden and more house circles (Fig. 11). In 1972, the team established a new 10-foot grid and house numbering system. Later, we switched to the metric system and excavated in 3 m squares.

House 6 was a 19th century pole-and-daga structure associated with historic metal, historic glass and blue hexagonal glass beads. It may mark a store established by Adam Render (Hodges, pers. comm. 1972), the man who escorted Carl Mauch to Great Zimbabwe in 1871 (Burke 1969).

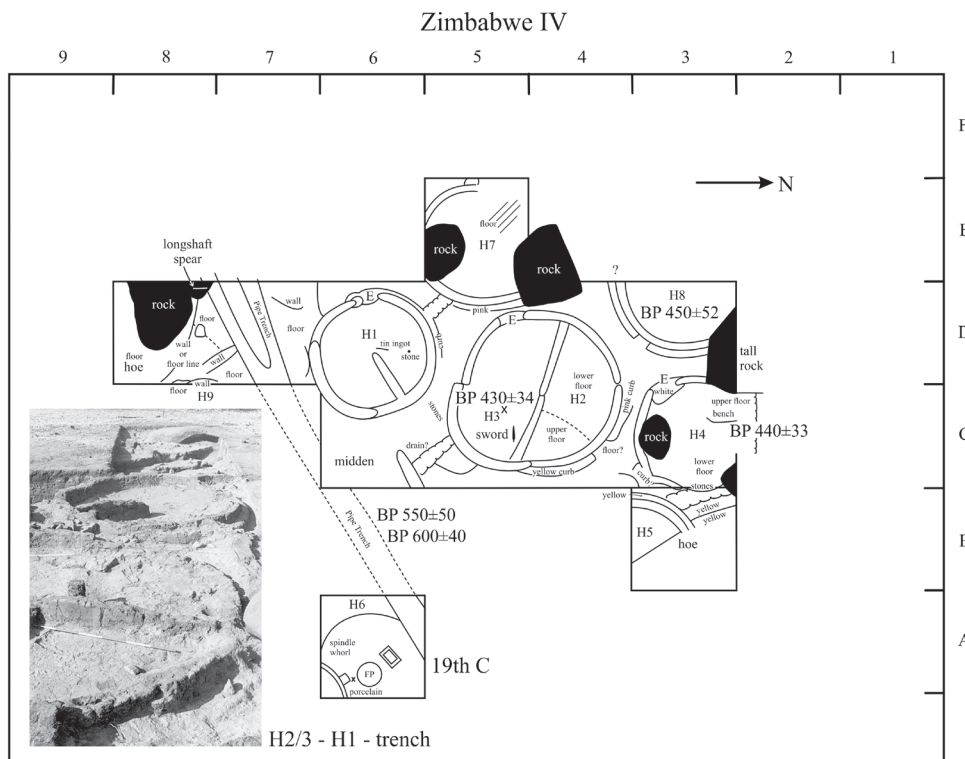


FIGURE 11
Great Zimbabwe ZIV AREA.

Although not dated, House 1 is of interest because a long tin ingot lay on the floor. The tin came from the Rooiberg Mines 700 km to the south (Grant 1999).

Stones filled the space between House 1 and House 3 (H3). H3 appears to have had two floors, while a red mass on the lower floor may have been the remnants of a bench. A probable entrance step was in the opposite wall. The wall arc of H3 opposite this entrance did not align with those of House 2 (H2); and so, at least two houses had been in this location; alternatively, the first house had been remodelled. A central wall separated H3 from H2. In the H2 portion, some 9-12 inches (22-30 cm) of deposit separated two floors. A fragment of Chinese-blue-and-white porcelain (probably late 15th century) came from the black topsoil outside H2. The fibre core of a copper-based bracelet from Level 2 inside H3 has been AMS dated to B P 430±34 (IT-C-1460), placing this complex in Period ivc.

House 4 (H4), next to H2, was smaller (±3 m) and built against a granite boulder. A stone revetment spanned the short distance between this and another boulder. On the opposite side the clay walls had been built in pink (red & white), white, red and yellow sections to create a single structure; and thus, different clays have little chronological value in this compound (cf. Summers 1961). The fibre core of a copper-based bracelet from Square 2/C/4 has been AMS dated to B P 440±33 (IT-C-1527). The west entrance of H4 faced House 8 (H8), which was built against the same boulder. This large boulder served as a portion of

the H8 wall, while good flooring existed within the house. The fibre core of a copper-based bracelet from 3/D/2 has been AMS dated to B P 450±52 (IT-C-1530), the same as House 4.

In Square 6/C, the pipe trench had cut through a deep midden containing *Class 4* pottery and much bone. After the black topsoil was removed, excavations preceded in 6-inch (15 cm) levels. A charcoal sample from 12-17 inches (30-43 cm) was previously radiocarbon dated (Huffman & Vogel 1991) to B P 550±50 (Pta 2423), while charcoal between 28 and 33 inches (71-83 cm) dated to B P 600±40 (Wits 774). Thus, this midden dates to Period ivb, earlier than the middle housing horizon.

3 Elite Enclosure

In 1975, we turned our attention to the small hill above the Nemanwa School (later the regional Museum and Monuments headquarters) to investigate a small elite enclosure (Fig. 12). Whitty (1961) had classified the Nemanwa Ruin as 'R-coursing' (rough coursing in a vertical face) and dated it to the 19th century, but it actually dates to Period iv (Huffman & Vogel 1991: 66-67): some walls are P/Q (fairly regular sized-blocks placed in a vertical face without foundations) and Q (even coursing in an inward-sloping wall with foundations). This Period iv building was a small palace which was

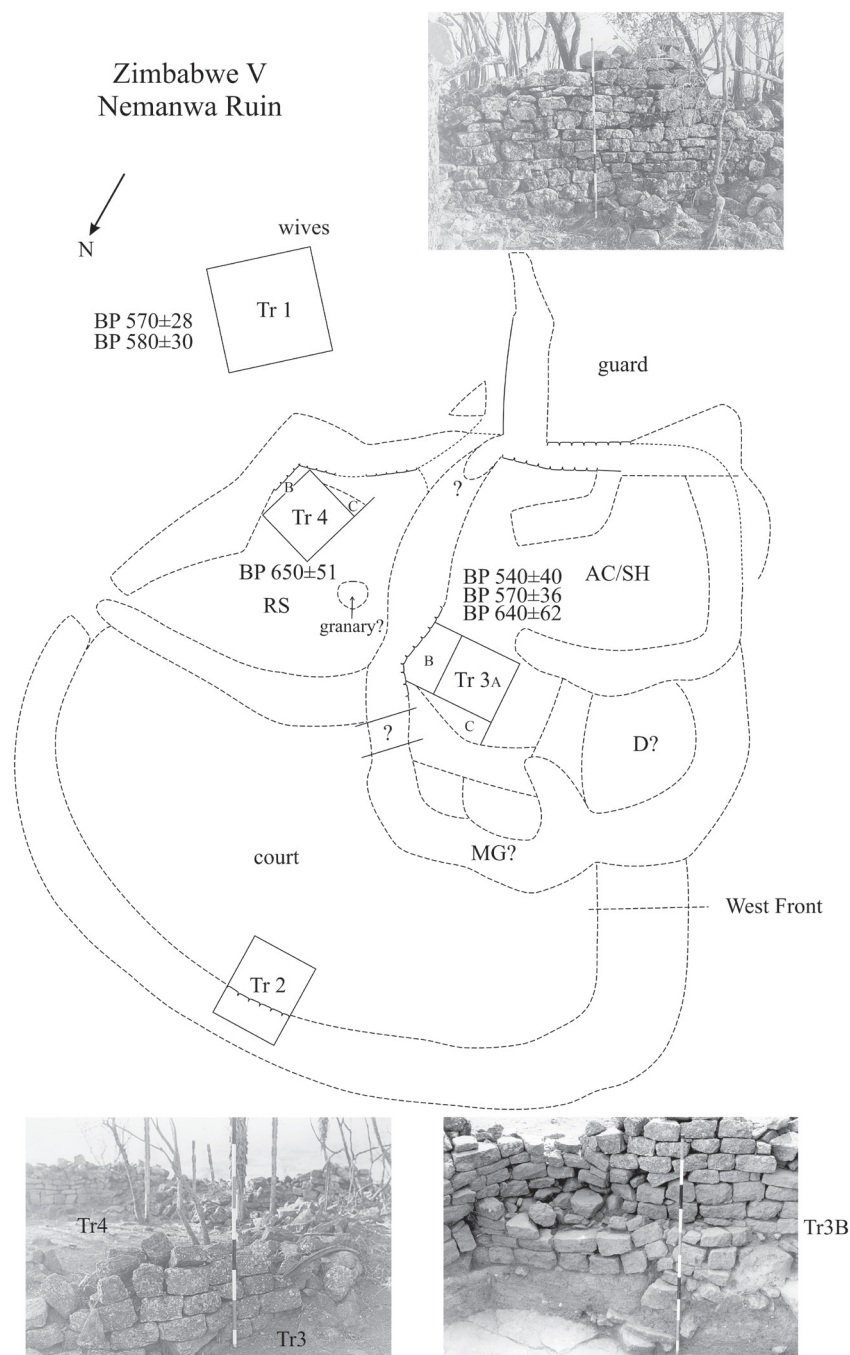


FIGURE 12
Great Zimbabwe ZV AREA. A C / S H = audience
chamber/sleeping hut; D = diviner; M G =
messenger; R S = ritual sister.

probably occupied by a regional leader who visited the capital from time to time to bring tribute and to attend court cases and other activities involving his district (for details see Huffman 1996). Because district leaders were rivals of the king, they could not stay in the town centre. Because they were sacred leaders in their own districts, the spatial organization of their town residence should follow the typical Zimbabwe Pattern. In this pattern, the front is associated with secular activities while the back is reserved for private and sacred functions (this is also true for other Eastern Bantu speakers). Following this convention, we believe the back portion enclosed a

section for the leader that included offices for a senior messenger and a diviner, as well as the king's private sleeping quarters and sanctuary, and an audience chamber where visitors could meet the leader and his entourage in private. In the Hill Ruin at Great Zimbabwe, the leader's compartment also included a beer hut where he could meet his close confidants in private. The leader's area should also include structures for storing beer and meat. In addition, a separate compartment was reserved for the leader's senior sister. This institutionalized position recognized a sister as the senior female of the ruling line: she should be present at all important occasions,

both secular and sacred, and she should keep sacred medicines that protected her brother's life and allowed him to govern. Her compartment was usually to the side and behind that of the leader (Huffman 1996: 63-67).

If we apply this pattern to Nemanwa, the open compartment in the front north would have been the court; the messenger's office probably straddled the wide stonewall; interior compartments would have enclosed beer and meat huts, the diviner's office and the audience chamber; and the leader would have stayed in the back. The ritual sister would then have been on the east side where doorways led inside to other compartments and outside to the wives' area. It may be that the officials themselves were not present, but they nevertheless would have been represented. To investigate this small palace complex, the team placed one trench in a low house mound outside the stonewalling (Tr 1) and three inside (Tr 2, 3 and 4).

Trench 1 outside exposed a series of stratified house floors. In Level 8, two house remains (House 3 and House 4) appeared under the doorway of H2 and the east wall. House 4 (H4) contained a triangular fireplace wedged between the west wall and an interior bench. Another bench, made with yellow and pink clay, was on the north side. House 3 (H3) at the same level, 85 cm bpsl, also contained an interior bench. Three peculiar daga cones stood in front of this bench: they appear to have been the supports for a large pot. The team did not want to destroy the peculiar H3 and so they excavated a smaller area on the side. Three small sections of daga walls and curbing marked the bottom house horizon in Level 12: one curb appeared at about 28 cm below H4. Daga flooring in-between the daga walls and curbing varied from 10 to 15 cm above granite bedrock. Charcoal from Square 1/A/4 has been AMS dated to B P 570±28 (IT-C-1451), and the fibre core of a cuprous bracelet from Square 1/A/10 to B P 580±30 (IT-C-1459). We had hoped to date the beginning of occupation here, but the bracelet came from loose fill near animal disturbance and must have been introduced from a higher level. Both dates belong to Period ivb (Table 3).

The team placed Trench 2 against the north wall of the court area. The deposit comprised one hut floor and several levels of midden deposit underneath (Fig. 13). The surface and Level 1 yielded a few 19th century shards. The floor in Level 2 marked a 19th century structure like that in the ZIV AREA. Underneath was a midden deposit that yielded bangles, three spindle whorls (two fragments) and considerable Period iv pottery, both *Class 4a* and *4b*. The deposit also contained a sizeable faunal assemblage that included some 56 cattle horn-core fragments and one goat

horn core (see Thorp 1995). It is noteworthy that shards in Trench 2, Square A/4 and Square A/5 fit onto vessels in Trench 4, Square A/4.

The team placed a 3 m square, Trench 4, in the likely ritual sister's area. It was later extended east (B) and south (C) to reach the stone boundaries of the enclosure. Some 17 to 20 cm of black loose soil covered daga flooring (H1) with a 4 cm thick plastering. The ancient walking surface outside H1 was 30 cm bpsl. Another daga wall started at 46 cm, but H1 was so poorly preserved that it was not clear whether it had been renovated or whether the lower daga wall belonged to a separate structure. Level 4, under the structure, yielded several different vessels, including large storage jars and smaller jars with a graphite-burnish as well as a small pot lid: some belong to *Class 4a*. Note that fragments of two different *Class 4a* vessels from Level 4 were found in the midden in Trench 2. The fibre core of a cuprous bracelet from Level 4 has been radiocarbon dated to B P 650±51 (IT-C-1463). Several yellow (220) and blue green (197) glass beads came from Level 6 under the hut. The stonewalling, built on Level 6 and 7 above bedrock, also dates to Period iva.

Trench 3 was different. The small enclosure inside could have been the office of the diviner or a beer/meat hut. The team placed a 3 m square here that was later extended east (B) to the dividing wall and north (C) towards the likely entrance. The structure in Trench 3 contained three floors. The upper floor supported two benches. The middle floor (Level 6) was 10-12 cm below floor A and about the same above floor C (Level 7). Inside was a series of five daga benches built with stone cores. The many daga benches indicate this structure was not a diviner's hut but one for beer or meat. Remnants of an older wall appeared below the benches in Level 7. The grey zone (Level 8) underneath floor C had been previously radiocarbon dated to B P 540±40 (Pta 2429), placing the associated structure and walling in Period ivb. Carbonized residue from a pot shard in the same level has now been AMS dated to B P 570±36 (IT-C-1528), which is in close agreement with the charcoal date. Further down, fragments of a stone path appeared in Level 11, while one spindle whorl came from Level 12. Evidently, the builders wanted a foundation because some 48 cm of compact granular yellow soil underlay the stonewalling. This wall appears to have been built in poor-quality Q-coursing and was a later addition, as was the daga structure. The fibre core of a cuprous bracelet from Level 12, under the wall, has been AMS dated to B P 640±62 (IT-C-1461), equal to the Period iva date in Trench 4.

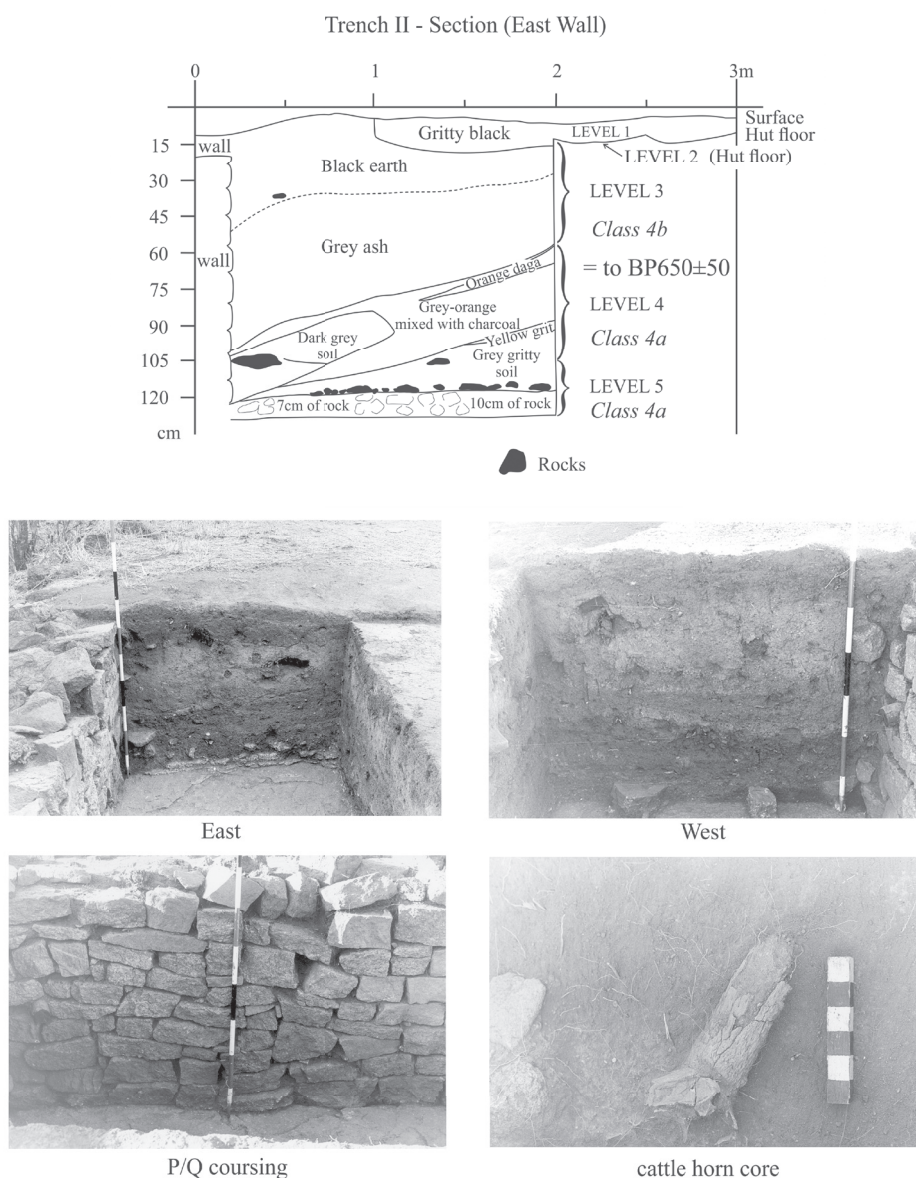


FIGURE 13
Great Zimbabwe ZV AREA, midden
in Trench 2.

4 Discussion

In recent papers, Chirikure and colleagues have rejected the evidence for rain control in the lower levels on Zimbabwe Hill. Our understanding of rain control activities, however, has been greatly improved as a result of excavations in the Limpopo Valley (Schoeman 2006) and an analysis of the relevant ethnography (Murimbika 2006). Based on these studies, nothing in the earlier levels is incompatible with rain control. Indeed, the awkward limited space among boulders and lack of true housing cannot be explained by normal residence: rain control is a better explanation.

Critics dismiss rain control, among other reasons, because they want stonewalling to have begun in Period III.

Chirikure et al. (2013a) rely on Bayesian modelling for this interpretation. In this regard, Bayesian statistics consider prior knowledge and the OxCal version 4, created for archaeologists, incorporates stratigraphic boundaries. In this procedure, different boundaries and different sequences generate different calibrated dates, and so the boundaries and sequences need to reflect stratigraphic reality. Unfortunately, Chirikure et al.'s (2013a: 863) Bayesian Model 1 does not consider the known differences between sporadic rainmaking episodes (Period Ia, Period Ib, Period II and Period III) and continuous occupation (Period IVa to IVc). The abrupt discontinuities provide chronological limits to the main occupations, but the authors do not use them this way. Bayesian models are all problematic, however, because they exclude the multiple

hut floors in the Western Enclosure which are undated. The problem with chrono-stratigraphical gaps is why we included a date from Gumanye Hill to represent Period II.

Because Periods I to III refer to rainmaking activities, we are most concerned with Period IV and the development of Great Zimbabwe as a state capital. Originally, Robinson (1961b) assigned each Period and ceramic Class to a different people; and so, to him, 'Class 3 influenced by Class 4' was the result of an overlap. Rather than separate peoples, however, this class begins the *Great Zimbabwe* series (Huffman 1972). Designated *Class 4a* (Huffman & Vogel 1991), the main characteristics include conical jar necks, poorly applied graphite and *Mapungubwe*-like motifs on the upper body, as well as a *Mapungubwe* jar profile (Robinson's *Class 3* profile) and a black *Mapungubwe*-like burnish. These features make sense regarding a Mapungubwe-derived dynasty that initiated Period Iva (Huffman 2009: 49–50). This initial occupation from the Limpopo Valley would explain the motifs, position and dark burnish, while local initiatives contributed graphite, conical necks and beaded rims (derived from the flattened lips in Period II). It is noteworthy that bowl-shaped jar necks and large storage jars with an appliqué band on the waist – Caton-Thompson's (1931) *Class C* – are also part of this assemblage (Fig. 14). These similarities reinforce the

placement of *Class 4a* at the beginning of the *Great Zimbabwe* ceramic series.

To date the beginning, we must consider the deposit in the Western Enclosure (Fig. 15), the king's area (Huffman 1996). The first solid-daga structure there (Robinson 1961a), which starts Period Iva, has not been directly dated although Pta 2705 (B P 760±50) from the Public Works Department section may well apply. Note that this sample was collected by John Vogel and its provenance can only be estimated: its midpoint now calibrates to AD 1288 (Table 4a). On this basis, we date the first solid-daga structures and *Class 4a* to AD 1285±10 (ca. B P 760). This is a new estimate.

To determine the end of Period Iva, we halved the time between its most recent midpoints and the earliest midpoints of Period IVb. With this procedure, the most likely transition from Iva to IVb dates to B P 615±10. Using the Southern Hemisphere calibration curve (Hogg et al. 2013; Stuiver et al. 2018), this calibrates to AD 1391–1404. A Bayesian model produces a similar result (Fig. 16). Period Iva therefore lasted over 100 years. This is a new result.

Our new understanding of Period Iva affects the dates for the first walling on Zimbabwe Hill. The earliest walling there, the south wall, was built in the P-style (uneven blocks placed in a vertical face without foundations), but the slightly later back wall of the Western Enclosure was P/Q (still vertical but with a better selection for size). Likewise, the earliest walling in the Great Enclosure, the No. 1 Enclosure, was built in P-style, but the inner wall of the parallel passage was P/Q. Because P/Q walling dates to the early 14th century (Pta 792, 1192 and 1594) and *Class 4a* pottery dates to the end of the 13th century (Table 4b), the first walling on the Hill must be at least as old.

The calibration places the midpoint of Pta 2693 at AD 1303±10 (Table 4b), which makes it equivalent to Robinson's Level 11 in Trench 1 in the Western Enclosure. Robinson (pers. comm. to Huffman 1980) thought that Pta 745 from the Public Works Department section (ca AD 1318) was equivalent to Level 9 and floor g, now dated to about AD 1336 (Pta-1986). Pta 745 may therefore match floor h₂ or h₁ in the lower Level 11 (Fig. 15). Whatever the best match, Level 11 is equivalent to the construction of the back wall, dated by a wooden lintel to about AD 1336. Floor i, slightly below, has the same date (ca. AD 1309) as the early midden (ca. AD 1306 and AD 1303) from the Great Enclosure, associated with P-coursing. Because of the match between dates for P-coursing in the Great Enclosure and floor i in the Hill Ruin, we date the first stonewalling to AD 1300±10. This is not a new date but the association with *Class 4a*

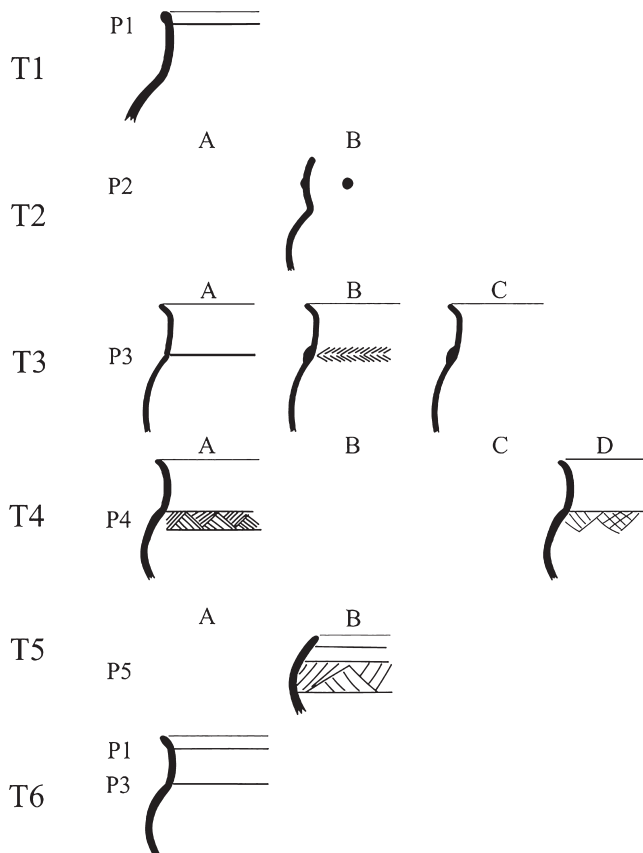


FIGURE 14 Great Zimbabwe *Class 4a*.

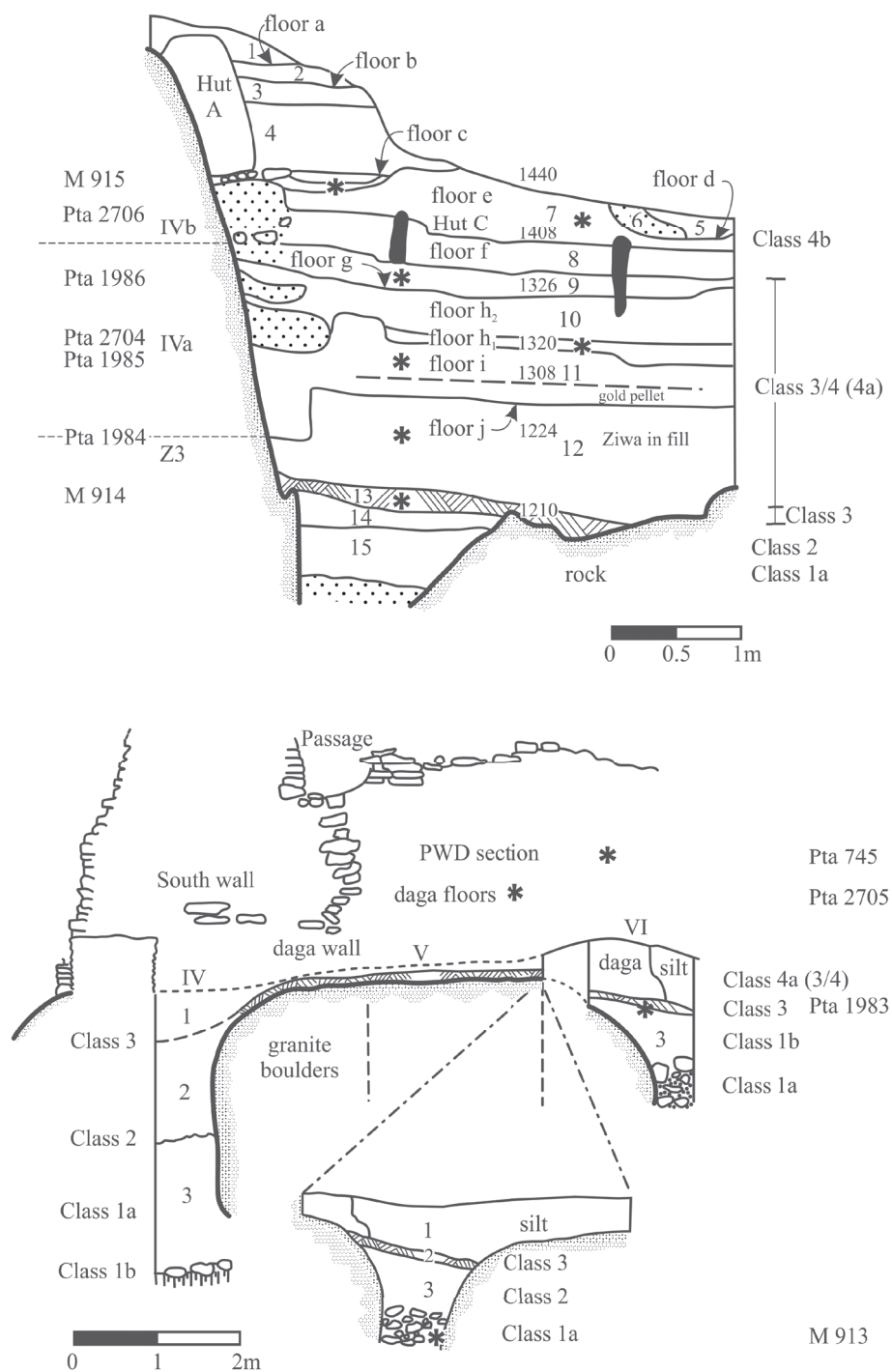


FIGURE 15
Great Zimbabwe Western Enclosure,
sections of Trench I and Trenches IV
to VI. After Robinson 1961a.

TABLE 4A Great Zimbabwe: radiocarbon dates from the Hill Ruin

	Location	BP	SHCal13 1 σ Span (AD)	Median 1 σ
Period ivb				
M-915	TI, Hut A	510 $\pm$ 75	1395-1497, 1601-1606	1446
Pta-2706	TI, level 7	580 $\pm$ 50	1328-1337, 1391-1438	1415
Pta-5970	HR midden upper level	590 $\pm$ 50	1324-1343, 1389-1432	1411
Period iva				
Pta-1986	TI, floor g	640 $\pm$ 45	1314-1357, 1380-1403	1336
Pta-1192	Lintel	640 $\pm$ 40	1316-1356, 1382-1402	1336
Pta-2704	TI, floor h1	670 $\pm$ 45	1304-1362, 1377-1391	1333
Pta-745	PWD section, =TI, level 11	670 $\pm$ 30	1306-1329, 1336-1361, 1377-1391	1318
Pta-1985	TI, floor i	690 $\pm$ 45	1294-1323, 1346-1388	1309
Pta-2705	PWD section	760 $\pm$ 50	1233-1245, 1264-1311, 1359-1379	1288
Period III				
Pta-1984	TI, level 12 (fill)	850 $\pm$ 50	1201-1273	1237
M-914	TI, level 13	875 $\pm$ 75	1074-1075, 1149-1277	1213
Period II				
Pta-1916	(Gumanye Hill)	935 $\pm$ 35	1052-1079, 1146-1208	1066, 1177
Period Ib				
Pta-1983	TVI	1280 $\pm$ 40	693-698, 723-730, 765-876	821
Period Ia				
M-913	TV, level 3	1630 $\pm$ 75	391-399, 405-548, 559-570	477

Note: Period II is undated at Great Zimbabwe.

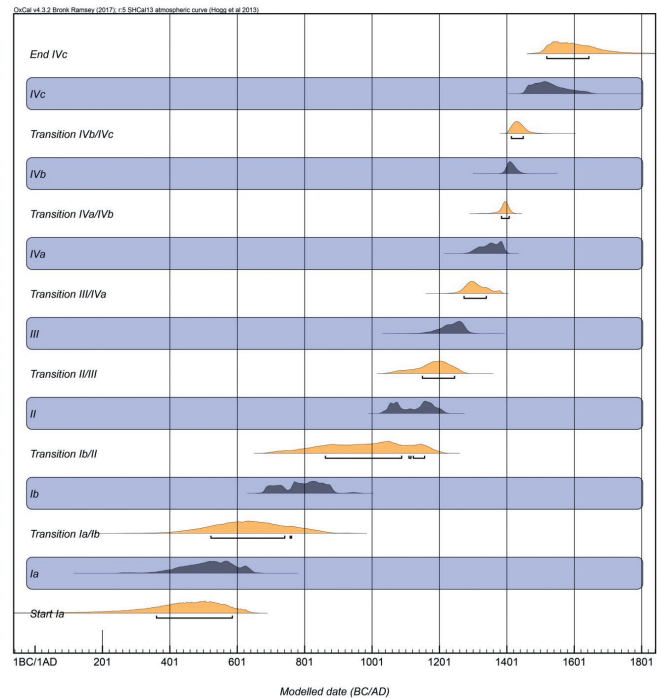


FIGURE 16 Bayesian model of radiocarbon dates from Great Zimbabwe.

COURTESY BRITT BOUSMAN

is new. Contrary to Chipunza (1994), stonewalling did not appear first in Period II or III, only in Period IV (Table 5).

Evidently, when the small Mapungubwe group first occupied Zimbabwe Hill – establishing a chiefdom based on sacred leadership – a daga wall provided ritual seclusion (Robinson 1961a: 177). At that time, the chiefdom was most likely under the hegemony of Mapungubwe. A short time later, workers erected the south stonewall to replace the daga wall. Because of the necessary investment in labour and organization, this first stonewalling must surely denote an increase in wealth and power. Through such growth, distant districts were often capable of independence and before long, Great Zimbabwe was a rival to Mapungubwe.

Before the 1970s excavations, it is worth noting, many thought elite enclosures were individual family units supported by a commoner population living elsewhere. With this model in mind, Garlake (1973: 195-196) estimated a total population of 1000 to 2500 at Great Zimbabwe and another 750 elite inhabitants in contemporaneous district centres. When the salvage excavations first started, Huffman (1977) raised the number to 11,000 at Great Zimbabwe and then to 18,000 (Huffman 1986). Now, Chirikure et al. (2017) have lowered the number dramatically. For Period IV, their Model 1 yielded 1148-2009 people (basically the same as Garlake 1973), while Model 2 for the same period yielded

TABLE 4B Great Zimbabwe: radiocarbon dates from the valley and surrounds

	Location	BP	SHCal13 1 σ Span (AD)	Median 1 σ
Period ivc				
Beta-396345	Car Park midden	320 $\pm$ 30	1511-1549, ~~1560-1572,~~ ~~1622-1649~~	1530
Pta-2711	ZI, House 10	370 $\pm$ 50	1497-1528, ~~1532-1601,~~ ~~1606-1627~~	1513
Beta-36347	Car Park Midden	410 $\pm$ 30	1457-1504, ~~1590-1616~~	1481
Period ivb				
Pta-2429	Nemanwa	540 $\pm$ 40	1410-1442	1426
Pta-2423	ZIV, M 30-43cm	550 $\pm$ 50	1406-1438	1422
Wits-774	ZIV, M 71-83cm	600 $\pm$ 40	~~1324-1344,~~ 1389-1422	1406
Pta-1208	ZI House 35	600 $\pm$ 50	~~1322-1347,~~ 1387-1426	1407
Period iva				
Pta-1594	G E lintel	640 $\pm$ 40	1316-1356, ~~1382-1402~~	1336
Pta-792	G E lintel	650 $\pm$ 50	1309-1360, ~~1378-1400~~	1335
S R -47	G E	670 $\pm$ 30	1306-1329, ~~1336-1361,~~ ~~1377-1391~~	1318
Pta-2694	G E T8, level 6	700 $\pm$ 40	1292-1319, ~~1351-1385~~	1306
Pta-2693	G E T5, level 9	710 $\pm$ 45	1286-1319, ~~1351-1385~~	1303

228-399 people. These impossibly low numbers are partially due to methods inapplicable to Great Zimbabwe and to bad data. Among other things, they underestimate the number of houses uncovered in the 1970s excavations; they invent hut numbers for Periods I-III (where there is no evidence) but ignore the Period IV terraced houses inside the Inner Perimeter Wall (where there is evidence); their distribution of residential areas does not match Sinclair's (Sinclair et al. 1993: 710-713) phosphate analysis, despite their claim to the contrary; and finally, they claim that high-density housing units are limited to the centre, but every exposed residential complex has the same

TABLE 5 Great Zimbabwe: chronology of stonewalling during Period IVA

	Dating	Pottery	Comments
Q-coursing	AD 1375 $\pm$ 15	<i>Class 4a</i>	Outer wall of Great Enclosure
P/Q	AD 1330 $\pm$ 10	<i>Class 4a</i>	Nemanwa, lintel dates (Pta 792, 1192 and 1594)
P-coursing	AD 1300 $\pm$ 10	<i>Class 4a</i>	First walls in Hill Ruin No. 1 Ruin First walls in Great Enclosure Great Enclosure midden (Pta 2693 and 2694)
Solid-daga structures	AD 1285 $\pm$ 10	<i>Class 4a</i>	Western Enclosure of Hill Ruin

density outside elite enclosures, including our ZIV AREA, as well as their car park excavation and Collett's workshop area. Huffman's (1986) estimate of 18,000 people (half of which children) remains a viable estimate.

Significantly, population growth accompanied the growth in power. A rapid growth must have been early because the solid-daga housing under the main midden as well as the smaller residential midden against the Outer Perimeter Wall both date to Period IVA, as does the first H35. Further, the remarkable correspondence between the AMS date (AD 1315-1357) and the Kilwa coin (AD 1320-1333) reconfirms the important trade connections with the East Coast (Huffman 1972; Sutton 1997). *Class 4a* pottery in PW3, furthermore, shows that R-style walling was not late or decadent: it was contemporaneous with both P and Q.

The date for Q-style walling remains to be considered. If the Great Enclosure was built in stages (as Whitty 1961 showed) with each new king (which is reasonable), the Q-style was probably invented during the reign of the fourth king. This conclusion applies regardless of whether the building was a later palace or an initiation centre. If each king ruled for about 15 years, the outer wall would have been built in AD 1375 $\pm$ 15. Although later than previously estimated, this is still in Period IVA (Table 5).

The Nemanwa dates are now relevant. Despite the original classification, Nemanwa walls were not built in the R-style. As the excavations show, the builders made foundations for walling in Trench 3 (a later Q-wall), but not for

the main walls. Indeed, the court wall was built on bare granite. Furthermore, there were many attempts at coursing with blocks of varying size and the main walls were basically vertical. Rather than late R-style, these features show that Nemanwa was built in the P/Q-style. It was thus equivalent to early walls in the Hill Ruin and Great Enclosure, and like them, first established in Period Iva. This is a new result.

The new AMS dates indicate that Nemanwa was probably established at the beginning of the 14th century, shortly after P/Q evolved. Whatever the best date, Nemanwa was functioning early in the development of the Zimbabwe polity. Its function as the town headquarters of a district leader marks the rise of a new Zimbabwe state during Period Iva. This is another new result.

The end of Period Ivb coincides with the abandonment of Great Zimbabwe as a capital. Many researchers once credited ecological problems (Beach 1980; Garlake 1973; Huffman 1972), but this is no longer satisfactory. Cultivated fields vulnerable to degradation would have been an important component in the neighbourhood around Great Zimbabwe, but the system of tribute fields from distant areas (*zunde* in the Shona language) would have provided the main support. Furthermore, Great Zimbabwe lay in a high rainfall district and agriculture would have been viable regardless of the known climatic shifts. Thus, had environmental degradation been the cause, Great Zimbabwe would have been abandoned much earlier.

Rather than environmental reasons, the abandonment of Great Zimbabwe as a political centre was probably due to a disruption in the political economy. An international disruption (e.g. Pikirayi 2017) is unlikely since the floruit of Great Zimbabwe coincides with an economic downturn at Kilwa, the main entrepôt on the East Coast (Wood 2011a, b). Instead, the cause appears to have been local. By the early 15th century, the Torwa dynasty at Khami (Robinson 1959) was beginning to expand its hegemony. The sequence at Manekweni near the Mozambique coast (Garlake 1976) shows that Khami people had re-established the Limpopo trade route that was first prominent in Mapungubwe times (Fig. 17). Significantly, the Torwa state had taken control of the rich gold belt that extended from central Zimbabwe to Botswana. As the Khami capital gained in importance, Great Zimbabwe declined. By the mid-15th century, the Great Zimbabwe state had fragmented, and the political elite, along with many people, moved north to establish the historically known Mutapa dynasty (Garlake 1973).

In contrast, Chirikure and Pikirayi (2008) claim that Great Zimbabwe continued as the capital for at least two centuries. As evidence, they reject the Valley Ruins as the royal wives' compound and re-identify the stone enclosures as the shifting palaces of different kings, following the present-day Shona principle of collateral succession. In fact, none of the Valley Ruins conform to the palace pattern (over 300 are on record) and the succession principle only came into being in the mid-18th century with the collapse of sacred leadership in the Mutapa area (Huffman 2010, 2011). Garlake's (1973) basic interpretation still stands.

To determine the best date for the move north, we return to the Hill sequence and the Western Enclosure. Hut A in Robinson's (1961a) Trench 1 was the last solid-daga structure in the king's area. Remnants of this structure had survived the depredations of the Public Works Department in 1913. A radiocarbon date below this structure has a midpoint of BP 510±75 (M 915). If we calculate ten years for each renovation, the structure was used for about 40 years, making it contemporaneous with House 16 and Area 48 in the ZI AREA. The halfway point between these last Period Ivb dates and the beginning of Period Ivc yields a date of BP 465±10, or AD 1450. This is not a new estimate (cf. Garlake 1968), but the AMS dates provide further support.

This mid-15th century date helps to make sense of the ceramic sequence in the small Nemanwa palace. The court midden tested in Trench 2 yielded *Class 4a* and *4b*, but not *Class 4c*. The absence of *Class 4c* most likely reflects the change in political status of Great Zimbabwe: district leaders would have gone elsewhere once Great Zimbabwe was no longer the capital.

Period Ivc applies to the occupation of Great Zimbabwe after the political elite moved north. Besides the upper occupations in the ZI to ZIV AREAS, it encompasses the residential midden in the recent Car Park excavations (Chirikure et al. 2016), although some late dates there are questionable. In historic times, shifting capitals provided opportunities for social disruptions and not everyone followed the leader. As the excavations show, some people remained behind in the commoner compounds. According to De Barros' mid-16th century description (Theal 1898-1903: Vol. 6, 267-268), the Mutapa king kept some wives at Great Zimbabwe (identifiable by the conical tower). This statement most likely refers to the widespread Shona custom associated with the supernatural dangers of childbirth. Before they can interact, parents of both wife and husband must go through the *masungiro* ritual (Weinrich 1982: 108-109) and this would have been particularly

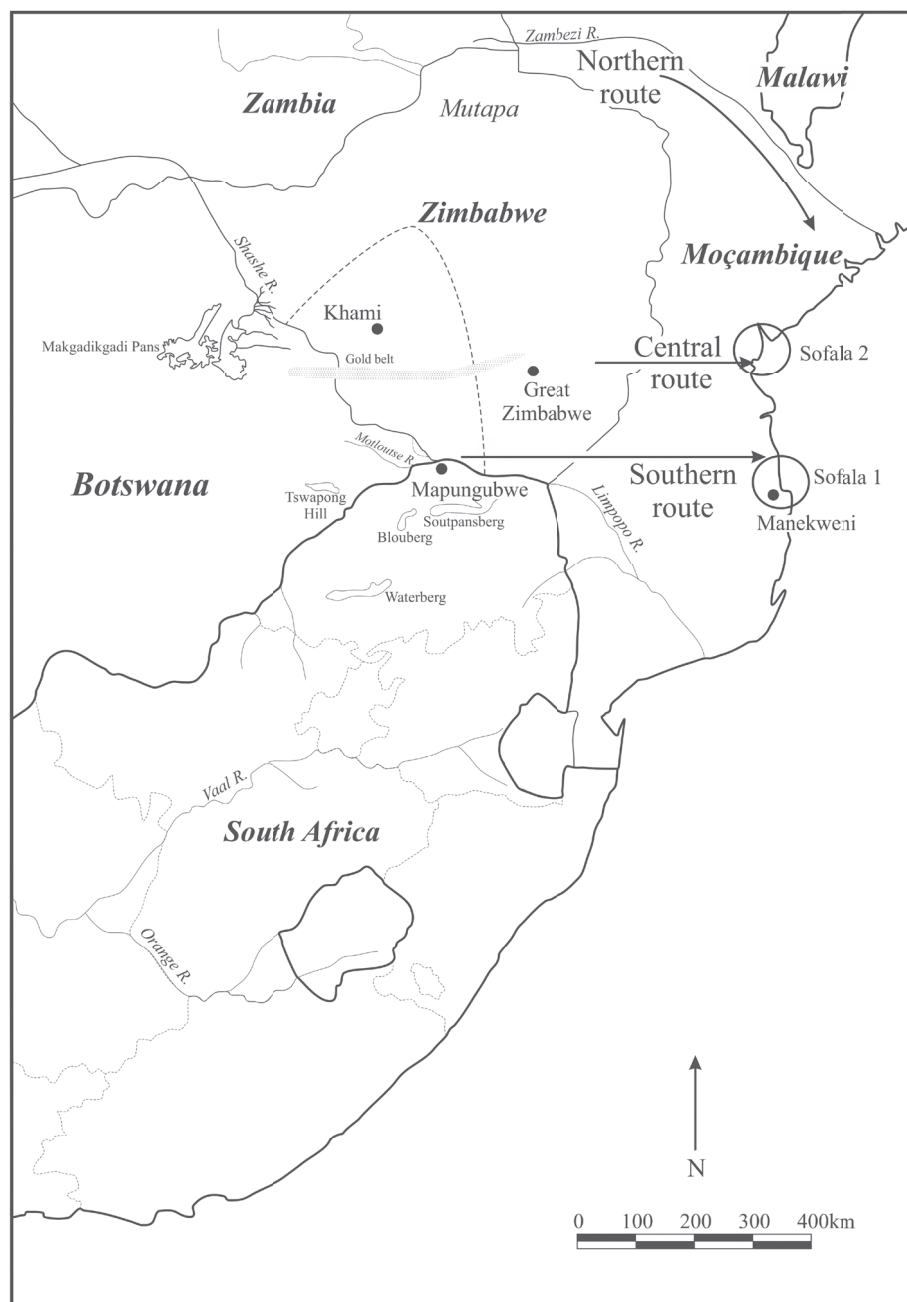


FIGURE 17
Major trade routes of the Zimbabwe culture.

important for members of the royal family. In this regard a *masungiro* centre can be identified with the Posselt/Phillips complex in the Lower Valley (Huffman 2011); it was not a later palace as Chirikure and Pikirayi (2008) suggested. As the spiritual home of the Mutapa dynasty, Great Zimbabwe could serve as a *masungiro* centre for the king's pregnant daughters even after it was abandoned. A Chinese blue-on-white vessel of the Hongzhi period (AD 1488-1505) found here (Collett et al. 1992) is more or less contemporaneous with De Barros' account. Perhaps the Mutapa wanted to maintain rights over his former territory in the face of Torwa expansion from Khami. Perhaps

again the Mutapa left people behind for this reason. These last suppositions remain for future research.

Our present project has resolved several dating issues. Most importantly, solid daga structures on Zimbabwe Hill first date to AD 1285 $\pm$ 10 and mark the beginning of sacred leadership and thus the beginning of Period IVa. This first division of the main occupation lasts for 100 years, until AD 1395 $\pm$ 10. During this time, Zimbabwe people developed all four walling styles: P (AD 1300 $\pm$ 10), P/Q (AD 1330 $\pm$ 10), Q (AD 1375 $\pm$ 15) and R (AD 1300-1550). Rather than late and decadent, R-style walling, like the Outer Perimeter Wall, was as early as P-style walling, or at least P/Q. Built in the

P/Q-style, the elite Nemanwa enclosure on the outskirts of Greater Zimbabwe shows that the Zimbabwe state was already functioning by the mid-14th century. As the town resident of a district leader, the Nemanwa enclosure was in use during Period ivb, but not Period ivc because political power had shifted north, and Great Zimbabwe was no longer the state capital. Nevertheless, some Zimbabwe people remained behind to watch over a *masungiro* ritual centre.

Acknowledgements

We thank the late Cran Cooke, Lillian Hodges and Don Monroe, as well as Josiah Moyo, Paul Sinclair and Carl Vernon for their support during the original project. Various Ranche House Schools of Archaeology participated in the excavations, along with a team from Great Zimbabwe. Wendy Voorvelt prepared the illustrations.

References

- Bandama, F., Moffett, A.J., Thondhlana, T.P. & Chirikure, S. 2016. The production, distribution and consumption of metals and alloys at Great Zimbabwe. *Archaeometry* 58 (s1), 164-181.
- Beach, D.N. 1980. *The Shona and Zimbabwe 900-1850*. Mambo Press, Gwelo [Gweru].
- Burke, E.E. (ed.) 1969. *The Journals of Carl Mauch 1837-1872*. National Archives of Rhodesia, Salisbury.
- Caton-Thompson, G. 1931. *The Zimbabwe Culture: Ruins and Reactions*. Clarendon Press, Oxford.
- Chipunza, K.T. 1994. *A Diachronic Analysis of the Architecture of the Hill Complex at Great Zimbabwe* (Studies in African Archaeology 8). Societa Archaeologica Upsaliensis, Uppsala.
- Chirikure, S. & Pikirayi, I. 2008. Inside and outside the dry stone walls: revisiting the material culture of Great Zimbabwe. *Antiquity* 82 (318), 976-993.
- Chirikure, S., Pollard, M., Manyanga, M. & Bandama, F. 2013a. A Bayesian chronology for Great Zimbabwe: re-threading the sequence for a vandalised monument. *Antiquity* 87 (337), 854-872.
- Chirikure, S., Manyanga, M., Pollard, M. & Pikirayi, I. 2013b. New pathways of sociopolitical complexity in southern Africa. *African Archaeological Review* 30 (4), 339-366.
- Chirikure, S., Bandama, F., House, M., Moffett, A., Mukwende, T. & Pollard, M. 2016. Decisive evidence for multidirectional evolution of sociopolitical complexity in southern Africa. *African Archaeological Review* 33 (1), 75-95.
- Chirikure, S., Moultrie, T., Bandama, F., Dandara, C. & Manyanga, M. 2017. What was the population of Great Zimbabwe (C E 1000-1800)? *PloS ONE* 12 (6), e0178335.
- Chirikure, S., Nyamushosho, R., Bandama, F. & Dandara, C. 2018. Elites and commoners at Great Zimbabwe: archaeological and ethnographic insights on social power. *Antiquity* 92 (364), 1056-1075.
- Chittick, N. 1965. The 'Shirazi' colonization of East Africa. *Journal of African History* 6 (3), 275-294.
- Collett, D.P., Vines, A. & Hughes, E.G. 1992. The chronology of the Valley Enclosures: implications for the interpretation of Great Zimbabwe. *African Archaeological Review* 10 (1), 139-161.
- Garlake, P.S. 1968. The value of imported ceramics in the dating and interpretation of the Rhodesian Iron Age. *Journal of African History* 9 (1), 13-33.
- Garlake, P.S. 1973. *Great Zimbabwe*. Thames and Hudson, London.
- Garlake, P.S. 1976. An investigation of Manekweni, Mocambique. *Azania* 11 (1), 25-47.
- Grant, M.R. 1999. The sourcing of southern African tin artefacts. *Journal of Archaeological Science* 26 (8), 1111-1117.
- Hogg, A.C., Hua, Q., Blackwell, P.G., Niu, M., Buck, C.E., Guilderson, T.P., Heaton, T.J., Palmer, J.G., Reimer, P.I., Reimer, R.W., Turney, C.S.M., & Zimmerman, S.R.H. (2013). SHCal13 Southern Hemisphere calibration, 0-50,000 years B.P. *Radiocarbon* 55 (4), 1889-1903.
- Huffman, T.N. 1972. The rise and fall of Zimbabwe. *Journal of African History* 13 (3), 353-356.
- Huffman, T.N. 1977. Zimbabwe: southern Africa's first town. *Rhodesian Prehistory* 7 (15), 9-14.
- Huffman, T.N. 1986. Iron Age settlement patterns and the origins of class distinction in southern Africa. In: Wendorf, F. & Close, E. (eds.), *Advances in World Archaeology* 5. Academic Press, New York, pp. 291-338.
- Huffman, T.N. 1996. *Snakes & Crocodiles: Power and Symbolism in Ancient Zimbabwe*. Witwatersrand University Press, Johannesburg.
- Huffman, T.N. 2007. *Handbook to the Iron Age: the Archaeology of Precolonial Farming Societies in southern Africa*. University of KwaZulu-Natal Press, Scottsville.
- Huffman, T.N. 2009. Mapungubwe and Great Zimbabwe: The origin and spread of social complexity in southern Africa. *Journal of Anthropological Archaeology* 28 (1), 37-54.
- Huffman, T.N. 2010. Revisiting Great Zimbabwe: a reply to Chirikure & Pikirayi. *Azania* 45 (3), 321-328.
- Huffman, T.N. 2011. Debating Great Zimbabwe. *South African Archaeological Bulletin* 66 (193), 27-40.
- Huffman, T.N. & Vogel, J.C. 1991. The chronology of Great Zimbabwe. *South African Archaeological Bulletin* 46 (154), 61-70.

- Murimbika, M.T. 2006. *Sacred powers and rituals of transformation: an ethnoarchaeological study of rainmaking rituals and agricultural productivity during the evolution of the Mapungubwe state, A.D. 1000 to A.D. 1300*. PhD thesis, University of the Witwatersrand, Johannesburg.
- Pikirayi, I. 2017. Trade, globalization and the Archaic state in southern Africa. *Journal of Southern African Studies* 43 (5), 879-893.
- Robinson, K.R. 1959. *Khami Ruins*. Cambridge University Press, Cambridge.
- Robinson, K.R. 1961a. Excavations on the Acropolis Hill. *Occasional Papers National Museum of Southern Rhodesia* 3A (23), 159-192.
- Robinson, K.R. 1961b. Zimbabwe pottery. *Occasional Papers National Museum of Southern Rhodesia* 3A (23), 193-226.
- Schoeman, M.H. 2006. Imagining rain-places: rain-control and changing ritual landscapes in the Shashe-Limpopo confluence area, South Africa. *South African Archaeological Bulletin* 61, 152-165.
- Sinclair, P.J., Pikirayi, I., Pwiti, G. & Soper, R. 1993. Urban trajectories on the Zimbabwean plateau. In: Shaw, T., Sinclair, P., Andah, B. & Okopoko, A. (eds), *The Archaeology of Africa: Food, Metals and Towns*. Routledge, New York, pp. 705-731.
- Stuiver, M., Reimer, P.J. & Reimer, R. 2018. *CALIB 7.1* [www program] at <http://calib.org>.
- Summers, R. 1961. Excavations in the Great Enclosure. *Occasional Papers National Museum of Southern Rhodesia* 3A (23), 236-288.
- Summers, R., Robinson, K.R. & Whitty, A. (eds). 1961. Zimbabwe excavations 1958. *Occasional Papers National Museum of Southern Rhodesia* 3A (23), 157-332.
- Sutton, J.E.G. 1997. The African lords of the Intercontinental gold trade before the Black Death: Al-Hasan bin Sulaiman of Kilwa and Mansa Musa of Mali. *The Antiquaries Journal* 77, 221-242.
- Theal, G.M. 1898-1903. *Records of South-Eastern Africa* (9 volumes). Government of the Cape Colony, London.
- Thorp, C. 1995. *Kings, Commoners and Cattle at Zimbabwe Tradition Sites*. (Museum Memoir (New Series) No. 1). National Museums and Monuments of Zimbabwe, Harare.
- Vogel, J.C. 2000. Radiocarbon dating of the Iron Age sequence in the Limpopo Valley. In: Leslie, M. & Maggs, T. (eds.), *African Naissance: the Limpopo Valley 1000 years ago*. Goodwin Series 8. South African Archaeological Society, Cape Town, pp. 51-57.
- Weinrich, A.K.H. 1982. *African Marriage in Zimbabwe*. Mambo Press, Gweru.
- Whitty, A. 1961. Architectural style at Zimbabwe. *Occasional Papers National Museum of Southern Rhodesia* 3A (23), 289-305.
- Wood, M. 2011a. A glass bead sequence for southern Africa from the 8th to the 16th century A.D. *Journal of African Archaeology* 9 (1), 67-84.
- Wood, M. 2011b. *Interconnections: Glass Beads and Trade in southern and Eastern Africa and the Indian Ocean 7th to 16th centuries AD*. Studies in Global Archaeology 17. Uppsala University, Uppsala.