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**A. Haour<sup>i</sup>, S. Nixon<sup>i</sup>, D. N'Dah<sup>ii</sup>, C. Magnavita<sup>iii</sup> and A. Livingstone Smith<sup>iv</sup>**

<sup>i</sup> Sainsbury Research Unit for the Arts of Africa, Oceania and the Americas, University of East Anglia, Norwich NR4 7TJ

<sup>ii</sup> Université d'Abomey Calavi, Republic of Benin

<sup>iii</sup> Archaeoscan – Geophysical Prospecting

<sup>iv</sup> Royal Museum for Central Africa, Belgium; Université Libre de Bruxelles; GAES, University of Witwatersrand.

## **The settlement mound of Birnin Lafiya, Republic of Benin: new evidence from the eastern arc of the Niger river, ca. 4<sup>th</sup> to 13<sup>th</sup> centuries AD**

### **Introduction**

The lower half of the Niger River's course lies within one of the most archaeologically underexplored regions of the world. Yet this area includes first- and early second- millennium AD archaeological evidence of considerable significance. Lying downriver of the well-published site of Gao (Insoll 1996, 2000; Cissé et al. 2013), it includes, over some 500km, sites such as the necropolis of Bura with its world-renowned figurative terracottas (Gado 1993) and its better-published counterpart Kissi (S. Magnavita 2009, 2015), the tenth-century settlement of Oursi (Petit et al. 2011) and the mound sites of the Kainji area with their pottery pavements and figurines (Nzewunwa 1983; Sule & Haour 2014), all of this against a backdrop of densely-distributed archaeological materials (Gado 1980, Haour et al. 2006). Recent research is rebalancing the picture following decades of scholarly focus on the western Sahel, and is showing the importance of this eastern arc of the Niger, including related to questions of trans-Saharan trade (Nixon et al. 2011; S. Magnavita 2013, 2015). For instance, the cemetery site of Kissi (Burkina Faso) demonstrates an exchange engagement of some kind with North Africa throughout the first millennium AD (S. Magnavita 2009, 2015), a scenario confirmed by recent results from the Republic of Niger (S. Magnavita 2013). In historical terms, the eastern arc of the Niger River was also central in the later development of large-scale polities such as the Songhai "empire" along the Niger. Extensive debate has surrounded the routes followed by North African and/or Indian beads recovered from contexts dated to the late first millennium AD at the southern Nigerian site of Igbo-Ukwu (Sutton 1991; Insoll

& Shaw 1997; Sutton 2001); and the Benin segment of the Niger River was already identified nearly two decades ago as a research priority in this regard (Insoll & Shaw 1997: 21). Yet, despite the obvious regional, continental and international relevance of this eastern arc of the Niger River no synthetic study has been attempted.

Into this gap comes a five-year interdisciplinary research project, *Crossroads of Empires*, which has carried out archaeological test pitting and survey paired with oral-historical enquiries. The overall aim is to investigate how the large-scale polities described in historical sources are materialised archaeologically, and Dendi, a narrow region covering 150km by 15km, was chosen as a key case study. Parallel to the Niger River and almost totally uninvestigated archaeologically, Dendi lies at the edge of major historically-documented polities such as Songhai, the Hausa city-states and the Gourmantche kingdoms. It sits not just on putative riverine routes, but also on routes linking Sahel and forest in historical times and no doubt earlier (Kuba 2009). ‘Marginal territory’, ‘crossroad’, ‘refuge’: Dendi today is heterogeneous in terms of linguistic, ethnic and material identities, indicative of complicated population shifts.

This paper focuses on the key site investigated since 2011 by the *Crossroads* project, Birnin Lafiya (Figures 1, 2), a large mound first identified in 2001 by one of us (N’Dah 2006). During four field seasons totalling over 15 weeks, 20 trenches have been excavated and extensive mapping and geophysical prospection carried out. Archaeological remains are dense over most parts of the mound, and our work has shown the existence of deep stratigraphies and architectural features – specifically mud walls and pavements made of broken pottery – of a quality rarely encountered in sub-Saharan Africa.

### **Investigating Birnin Lafiya**

The settlement mound of Birnin Lafiya lies approximately 2km from the Niger River, close to the modern village of the same name. The site presents as a *tell*, under seasonal cultivation and with no comparable sites nearby. Among the hundreds of sites recorded by the team within the wider region, Birnin Lafiya stands out for its surface traces of well-preserved architectural features and its scale (at least 26 hectares in extent and on a mound rising eight metres above the surrounding landscape; Figure 3).

In order to better understand the site and determine excavation locations, foot survey was carried out, examining site morphology and noting surface features. In particular, we undertook a systematic survey of pottery pavements visible across the site surface. 73 pavements were recorded, both well-preserved examples and those undergoing dismantling by human or natural factors. Pavements included both undecorated and decorated potsherds and mainly occurred in the northeastern part of the site, over an area of about 6 ha (Figures 3, 4).

Alongside the generation of a digital elevation model (DEM), geophysical survey was carried out with the primary aim of mapping the site's subsurface extent to assess site limits, size, nature, and spatial organisation. Whilst ground-based geophysical methods have been in common usage in European and North American archaeology for decades (Gaffney & Gater 2003), their potential for the archaeology of other world regions remained largely under-exploited (Lowe 2012; Magnavita & Schleifer 2004; Reindel & Wagner 2009). This is changing as projects increasingly integrate geophysical surveys (for South American and sub-Saharan African examples, see Fleisher et al. 2012; Luiz & Pereira 2013; Magnavita et al. 2006, 2009; Osella et al. 2005;). Magnetometry has become the workhorse of archaeological geophysics worldwide due to its high sampling speed (Kvamme 2005: 430-432), and was considered well-suited to surveying such an extensive site as Birnin Lafiya. The magnetometer used was a three-channel wheeled fluxgate gradiometer with a resolution of 0.3 nT. After clearing low vegetation, 104 survey grids of various sizes were laid out using total station and differential GPS. A total area of 20.3 hectares was prospected (Figure 5).

The magnetic plot brings to light fundamental aspects of the site. Firstly, site limits are clearly visible to the north, east and south, and site shape and size can be confidently inferred. The magnetic plot reveals that areas of relatively dense archaeological remains are linked to higher ground, but also that lower-lying areas were used, probably seasonally given the likelihood of recurrent seasonal flooding. Geophysical prospection also confirmed site size, suggesting archaeological remains cover a minimum of 26-27 hectares. Finally, the geophysical data illuminate the location and density of archaeological evidence, suggesting that Birnin Lafiya was a relatively dispersed settlement, with occupation remains concentrating at the edges of elevated areas facing north and east. What remained unclear from the visible magnetic patterning is whether it resulted from a continuous long-lasting event or from successive occupations at different places and times. As we shall see below, this question was clarified by excavation. Interestingly, there is no indication that the site was once surrounded by

defensive ditches and earthen walls, structures that might be expected at tightly populated, nucleated settlements facing external threats, and which are extremely common throughout West Africa (Connah 2009).

A core component of the work was an extensive horizontal excavation (Unit 10) on the northern part of the site where initial survey identified remains of mud structures. We exposed a compound over about 100m<sup>2</sup>, with six distinct spaces, all with pavements of potsherds or laterite (Figure 6, 7), lying 20-40cms below the surface. The most complete spaces excavated are two circular rooms paved with potsherds laid flat, and a large adjoining paved area. Room 1 measures about 3m in diameter, with stumps of rammed earth walls and a potsherd-covered step (Figure 8, top right). At the centre of Room 1 the burial of a child some six or seven years old (estimate based on dentition) was recovered. Its association with the building is hypothesised, although the possibility cannot be ruled out that it is intrusive from a later period. Room 2, which is 2m in diameter, features similar walls to Room 1, but less well-preserved.

Pavements, wall stumps and postholes allow us to infer the structure's overall layout (Figure 6). The best preserved and most complete space is a large area adjoining Room 1 (Figure 7), which is divided into two distinct spaces, paved with potsherds or laterite and forming a partially enclosed courtyard. Within this space was a beaten earth disc (Figure 8, bottom left). Within a further laterite-paved area we recovered an intact pot and a roulette-decorated ceramic cylinder (17cm diameter and 46cm height; Figure 8, bottom right), the latter buried in the pavement. Faint indications suggest a passageway linked this large paved area to another extensive paved area adjoining Room 2. No wall stumps were evident in this second area, but postholes likely indicate a mat-and-pole structure. Throughout the complex, we recovered crushed pots on floor surfaces seemingly associated with the building's abandonment. Deposits excavated are mostly secondary contexts – resulting from infilling of the structure following destruction – but artefacts recovered include 21 beads of stone, clay and glass.

Further portions of the complex remained unexcavated to the south, while to the north and east unknown part are lost to erosion. The complex is well-dated through fourteen radiocarbon dates ranging from 921 ± 23 bp (OxA-29892) to 740 ± 40 bp (Beta-305218) (Table 1). The identification among the beads recovered of two examples of dichroic blue/yellow-green tubular glass beads of the so-called 'Ife' type supports the likelihood of a

twelfth-thirteenth century date for the structure (Sonja Magnavita, Deutsches Archäologisches Institut, Bonn). The complex was almost certainly destroyed by fire; deposits immediately overlying paved surfaces contained burnt clay and large clusters of charcoal, likely roofing material. This structure was overlain by an eroded pavement and, judging by keyhole trenches, is underlain by another pavement, indicating at least three phases of construction. Limited excavation of another zone some 75m away again revealed burnt walls associated with paved surfaces and indications of *in situ* crushed pots.

Alongside this shallow horizontal investigation, we excavated 12 test pits across the site (between 1m<sup>2</sup> and 4m<sup>2</sup> in surface), to understand settlement evolution through time and to document Birnin Lafiya's archaeological sequence (Figure 3). Material was sieved through a 5mm mesh; organic-rich features were sieved at 2mm or floated for archaeobotanical remains. Excavations followed archaeological contexts, proceeding by 10 cm spits where necessary; within each spit, contexts were sieved and finds bagged separately. Excavations proceeded to sterile in all but a few cases.

Stratigraphies extend between 2 and 4m in depth, and a suite of 27 radiocarbon dates from various contexts span the fourth to thirteenth centuries (Table 1). The occurrence of similar deposits, and of similar age ranges, through the site represents a strong argument in favour of a continuous long-lasting occupation. Two of the deep sequences, those of Units 9 and 11, are shown in Figures 9 and 10. These trenches were about 250m apart and they are broadly illustrative of the remains encountered. Generally speaking the sequence is characterised by a series of stabilisation layers and floors, collapsed architectural remains, and (re) filled pits. In addition to the child burial in Unit 10, a further intact burial was recovered, at 3.8m depth in Unit 11, dated  $1560 \pm 30$  bp from charcoal inside the cranium [Beta-345492] (Table 1; Figure 12). Only one other pottery pavement was encountered during excavation of these test pits, at 0.81m BD in Unit 11 (Context 7 on Figure 10), but compacted floor layers and laterite floors occurred frequently. Pits were very common, in keeping with indications of geophysical and surface survey. Once dug, and sometimes after a series of humid episodes evidenced by fine layers of clay and sand, pits were filled by a succession of refuse deposits, often characterised by a vivid green colour indicative of high phosphate content (Frederic Broes, Institut National de Recherches Archéologiques Préventives, *pers. comm.*), or grey-black deposits with dense charcoal or ash. Such contexts are easily delimited during excavation. However, they may be interleaved with significant stratigraphic units, of a colour (light beige to yellow) and content

(small potsherds mixed with burnt earth and charcoal) that are difficult to distinguish from encasing contexts. Such deposits suggest rapid infill from intentional backfilling or collapse of pit walls. Finally, the uppermost levels of pits evidence homogeneous deposits with significant bioturbations (stabilisation layers), suggesting gradual infill.

This rather simple sequence is complicated by the fact that pits were clearly dug repeatedly at the same areas over time; in Unit 9, for example, a 2x2x4m trench, no less than 17 pits were interlocked. The ubiquitous excavation of isolated human bone fragments and teeth testifies to a tendency to bury the dead in proximity to the active living, and to the degree of disturbance caused by human activity through time (MacEachern *pers. comm.*).

In terms of material culture, a wide range of pottery was recovered (Figure 11), consisting principally of roulette-decorated (folded-strip roulette predominantly) coarse wares; distinctive assemblages include highly burnished wares, some of which incised. Our significant programme of post-excavation reconstruction of vessels has reconstituted large, coarse-ware items, likely liquid containers or storage vessels, and burnished bowls of various sizes, presumably for cooking and serving food and drink. Due to extensive sieving, recovery of small finds was good. A wide range of beads was retrieved. These are mainly various stone beads, including 25 red beads from the Unit 11 burial (Figure 12), some made of carnelian or of the local crypto-crystalline silica called *lantana*, known historically as a major regional trade item (O'Hear 1986). Less diagnostic items include shell and bone beads, of which approximately 64 were recovered from the Unit 11 burial, perhaps indicative of access to wide ranging resource networks. We also recovered glass beads and iron bracelets/anklets, spear and harpoon points. Small ceramic figurines were common, most depicting animals, but some anthropomorphic (Figure 13).

Extensive dry and wet sieving produced rich data on past diets. Unsurprisingly, fish are strongly represented, mainly floodplain species, as well as a diverse suite of wild mammals, and relatively rare domesticates (Veerle Linseele, KU Leuven, *pers. comm.*). Pearl millet (*Pennisetum glaucum*), African rice (*Oryza glaberrima*) and cotton (*Gossypium*) are all present (Dorian Fuller, University College London, *pers. comm.*), and charcoal analysis indicates the presence of agroforestry parklands dominated by shea butter and other useful fruit trees, and the regular exploitation of riverside vegetation (Barbara Eichhorn, Goethe

Universität, Frankfurt, *pers. comm.*). Altogether these data point to a slightly wetter environment than presently.

### **Wider significance**

Birnin Lafiya provides a significant contribution to the growing archaeological picture of the first and second millennium AD landscape in West Africa. On present evidence, occupation was seemingly initially established on a pre-existing elevation on the flood plain, but our excavations have so far only recovered shreds of original palaeosoil (in Unit 9). We suggest the natural mound was first probably used for low-intensity settlement, likely before the 4th century AD. The mound was thereafter more densely occupied: a significant stratigraphy was recovered in most test pits across the site, pointing to intensive occupation. Comparison of Figures 9 and 10, showing two long stratigraphic sequences that appear essentially similar in nature and date despite being from quite different parts of the mound, bolsters the case for a contemporaneous and long-standing occupation of several quarters of the mound. Indeed, there seems to have been some stability in the settlement grid. In Unit 9, near the edge of the excavated architectural complex, an intricate tangle of pits is visible in the east section (a situation replicated in Unit 4, some 20m north-west); the opposite profile, which cuts through the complex's pottery paved area, in contrast shows a succession of stabilisation layers (a situation paralleled in Unit 1, 20m to the north). It seems then that areas for house building and for pit-digging (for refuse disposal or clay extraction) may have been spatially separated at any one time and over time. The geophysical data suggest that pits were most probably dug adjacent to living areas or houses.

Our work represents the only intensive study of a large settlement mound within 400km. Such large, deeply-stratified sites are however known elsewhere in West Africa (see Figure 1 for site locations). The settlement site of Sadia, Mali, consists of five anthropogenic mounds over about three hectares and archaeological deposits spanning the 8th to the late 13th centuries AD approximately (Huysecom et al. 2015). Remains of buildings dating to the final phase (approximately mid-11th to late 13th century AD) were found amid a densely packed arrangement of features such as post-holes, pits, hearths, hardened occupation floors and burials, providing an insight into spatial organisation. At Kirikongo, Burkina Faso, at roughly the same latitude as Birnin Lafiya, excavations on a cluster of 13 mounds spanning AD 100-1300 identified a range of structures (Dueppen 2012). At the mound complex of Oursi,



Burkina Faso (Petit et al. 2011), excavations have revealed spectacularly preserved mud structures dating to the ninth/tenth centuries AD, with individual circular rooms and associated courtyards and linking spaces, and evidence for sudden and violent destruction. Survey identified at least 13 compounds, suggested by burnt mud brick debris.

Within West Africa, such mound sites are most often discussed in relation to the important, albeit often later, polities from further north in the Sahel, described by North African and Middle Eastern writers. The Dendi region features in no written sources, lying too far south for medieval authors, and interpretations must therefore rest on archaeology alone. The intensive utilisation of riverine resources and cultivation of important domesticates (including African rice) demonstrates this site's articulation with its immediate landscape. The question of interregional trade, and specifically riverine trade, is important here. There has long been a desire to put points on the map between known early trade locations situated on the eastern arc of the Niger River, such as Gao and Igbo-Ukwu: our work in Dendi does so. A range of finds are significant here; for instance lantana stone is known historically to have been a major trade item, quarried and delivered downriver by Hausa traders (O'Hear 1986), while the archaeobotanical recovery of cotton may relate to a trade in textiles. Definite long-distance finds from Birnin Lafiya include marine shells, for instance a bivalve from Unit 13 (Veerle Linseele, KU Leuven, pers. comm.). Overall, though, one notes a lack of further significant evidence for external trade goods, perhaps because few intact burial contexts were recovered. Certainly a number of case studies exist within the wider region which propose that comparatively compact settlements may have emerged as centres of city-states rather than large and expansionist territorial states traditionally called 'socially complex', or that highly visible signs of status differences may be absent (see e.g. McIntosh 1995, Dueppen 2012). Whether Birnin Lafiya can be identified as a past power centre will be partly clarified by our ongoing analysis of survey data to elicit settlement patterning.

Amongst the evidence recovered, the pottery pavements are compelling features. Widely known within West Africa, the best-known examples are from Ife, made of potsherds set on edge, often in herringbone patterns (Willett 1959: Plate VIIIa; Garlake 1974, Figs. 3, 4 & Plate XXXVI; Eyo 1974: Fig. 3 & Plate XXVII). In a survey of West African ethnographic and archaeological occurrences, Nzewunwa (1989) notes that pavements served various uses: aesthetic value, religious practice, or to consolidate floors and prolong their life. Potsherd pavements occur widely within Dendi: in addition to the Birnin Lafiya examples we have

excavated instances, with associated dates, from Pekinga (60km northwest of Birnin Lafiya;  $610 \pm 30$  bp [Beta-321057]), Tin Tin Kanza (20km north-northwest;  $920 \pm 30$  bp [Beta-348774] and  $1010 \pm 30$  bp [Beta 345502]), and Alibori Site 2 (4 km west;  $730 \pm 30$  bp [Beta-378257]) (Figure 1 for site locations). At Tin Tin Kanza, seven superimposed pavements were recovered over a depth of some 50cm, in some instances associated with crushed pots (Champion & Haour 2013). Pottery pavements however appear absent inland from Dendi, and on the opposite shore of the Niger (N'Dah 2009; Boubé Gado, Université Abdou Moumouni, Niamey, *pers. comm.*), but significant examples are known about 200km downstream from Dendi (Nzewunwa 1989; Haour 2013).

Birnin Lafiya is exceptional not just in providing new and well-preserved examples of pottery pavements within West Africa, but in combining these with standing structural remains. A limited range of early West African evidence for mud architecture is known, including the well-known examples of Jenné-jeno (McIntosh 1995) and Dia (Bedaux et al. 2005), but also more recently published cases at Sadia (Huysecom et al. 2015), Kirikongo (Dueppen 2012) and Oursi (Petit et al. 2011) alluded to above. At Sadia, a series of circular and straight walls of sun-dried mud bricks indicate the location and shape of former circular buildings and the limits of domestic spaces. With inner diameters of about 1.5 metres, most of the better preserved structures likely did not serve as living spaces but fulfilled other functions. Less well-preserved circular walls exist, hinting at larger structures that may be interpreted as former houses (Huysecom et al. 2015: Figure 5). Sadia offers a striking parallel to the structural evidence found at Birnin Lafiya, involving a tight 'beehive' pattern of construction, through which a number of circular buildings are linked to each other by straight or curved walls forming small courtyards (Huysecom et al. 2015: Figure 5). At Kirikongo, floors of crushed laterite or a clay/laterite combination, as well as walls of sun-dried bricks or puddled mud, were recovered, including 2-2.5m diameter structures interpreted as huts, some of which featuring a bench or large pottery vessels, resembling the features recovered at Birnin Lafiya (Dueppen 2012). Finally, close parallels to Birnin Lafiya also exist at Oursi (Petit et al. 2011), where thirty or so rooms 3.5-4 metres in diameter, courtyards and other spaces were identified, as well as clusters of crushed pots. Architecture of sun-dried mud bricks with mud plaster coating was preserved to a height of 0.5 to 1.5m. Floors were made of trampled earth with a mud 'floor plaster' onto which was then laid a thick layer of sand, and there was clear evidence for a supporting roof, including pillars and roof timbers. Importantly, however, pottery pavements are not reported at either Sadia, Kirikongo or Oursi.

The likely interpretation for the complex we uncovered as Unit 10 at Birnin Lafiya is a domestic building, and the arrangement of circular rooms associated with a larger compound is common ethnographically (Denyer 1978; Dmochowski 1990). The building we excavated is a well-preserved example of a type which our wider surveys and excavations indicate was not uncommon throughout the settlement. Whether the fact that pavements and associated structures are largely confined to the eastern part of the site relates to chronological or to social factors is one question we are exploring. More widely, the Birnin Lafiya evidence represents a significant contribution to the study of early West African architecture, demonstrating well-preserved mud architecture remains associated with intact potsherd pavements over a large-scale exposure.

### **Conclusion**

The archaeology of Sahelian West Africa is increasingly contributing to global debates on social complexity. Within this, the Niger River valley has played a key role, being fundamental to the development of some of West Africa's most important cultural groups and political formations, and interregional connections. To the growing body of data we can now add Birnin Lafiya and its region, documenting occupation along the eastern portion of the Niger River within the first and second millennia AD. These data arise from a field doubly neglected – both chronologically and geographically – and they thus considerably diversify understanding of the archaeological landscape. As we begin to fill in the blanks on the map between the Niger bend and the forest to the south, we are inevitably confronted by new interpretational challenges, paralleling those which have been taken up by scholars working closer to the Atlantic coast, who have been grappling since the 1970s with the enigma of places such as Igbo-Ukwu (Chouin 2013). The large and complex site of Birnin Lafiya, intensively occupied over a period of nearly 1000 years, ultimately provides new perspectives for the global representation of wider themes of social organisation, trade, and craft specialisation. Importantly, it also represents a wider understudied landscape of large settlement mounds and provides a window into the under-explored cultures which gave rise to them.

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### Figure captions

Figure 1. Map showing sites mentioned in text. Map by Joseph Daniels.

Figure 2: Work ongoing at Birnin Lafiya.

Figure 3. Topographic map (0.5 m contour interval) of Birnin Lafiya site derived from a digital elevation model generated by Paul Adderley (University of Stirling) using a Leica GS09 GNSS differential survey system, showing the location of trenches excavated and pavements at site surface. Units 2, 3, 14, 15, 16, and 18 are at the same location as shown for Unit 10. Image by Didier N'Dah and Djafarou Abdoulaye.

Figure 4: Example of pavements surviving at the surface of Birnin Lafiya.

Figure 5: Greyscale magnetic plot of Birnin Lafiya showing subsurface anomalies detected and proposed limits of main site.

Figure 6: Plan of structural complex with rammed-earth walls and potsherd and laterite pavements, excavated as Unit 10 (relationship to Unit 9 also indicated).

Figure 7: Partial view of Birnin Lafiya architectural complex (Unit 10) during excavation. The large paved area abutting Room 1 is clearly visible. Unit 9 is to bottom of image.

Figure 8: Features within Unit 10 complex (clockwise from top left: detail of potsherd pavement; potsherd covered step; ceramic vessel buried in laterite floor; raised disc feature within laterite floor).

Figure 9. Stratigraphy from Unit 9.

Figure 10. Stratigraphy from Unit 11.

Figure 11: Characteristic roulette-decorated and burnished pottery from Birnin Lafiya. From top right clockwise: Unit 9 context 13; Unit 6 A context 3; Unit 9 Context 12; Unit 11 Context 15; Unit 10 Context 8.

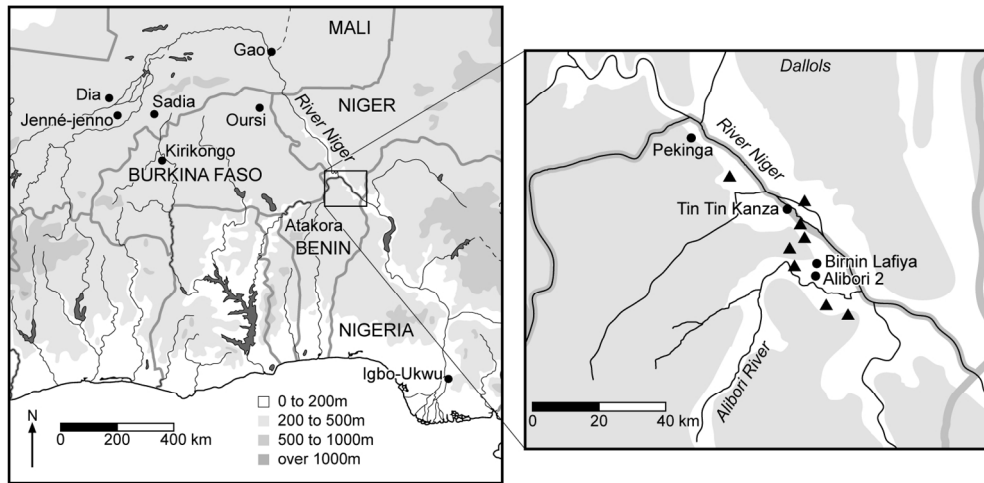
Figure 12: Burial within Birnin Lafiya Unit 11 under excavation (left) and beads from burial (right).

Figure 13: Figurine from Unit 13 (SF 2014-31). Photo by Andi Sapey.

Table 1. Dates from Birnin Lafiya site (total = 41), sorted by age. Charcoal determinations by Barbara Eichhorn, Goethe Universität Frankfurt. In bold: shown on Figures 10 and 11. The

Ox-A dates, as well as Beta-320517 and Beta-305218, are from the architectural complex, Unit 10. In the table above, Phase 2 = AD 0-500, Phase 3 = AD 500-1000, and Phase 4 = AD 1000-1400. Occupations from Phases 1 (pre 0) and 5 (post AD 1400) were documented through our work elsewhere in Dendi, but not at Birnin Lafiya. All dates calibrated using OxCal 4.2, Curve IntCal13, Bronk Ramsey 2009.

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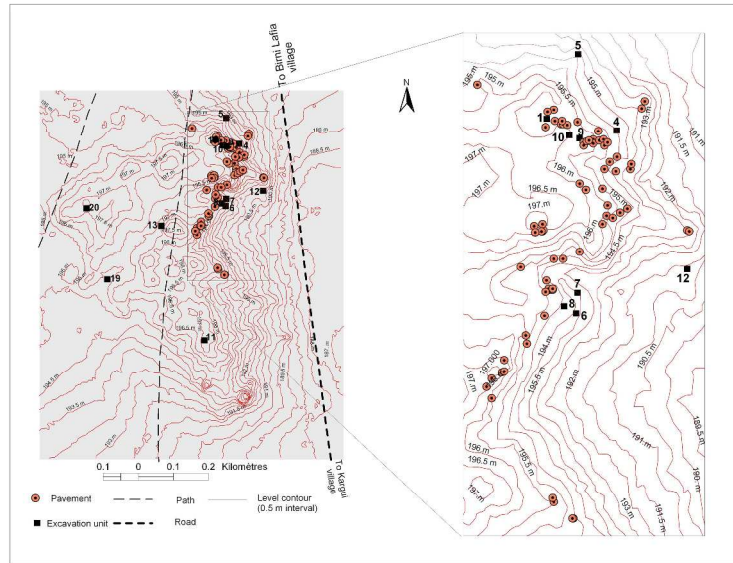


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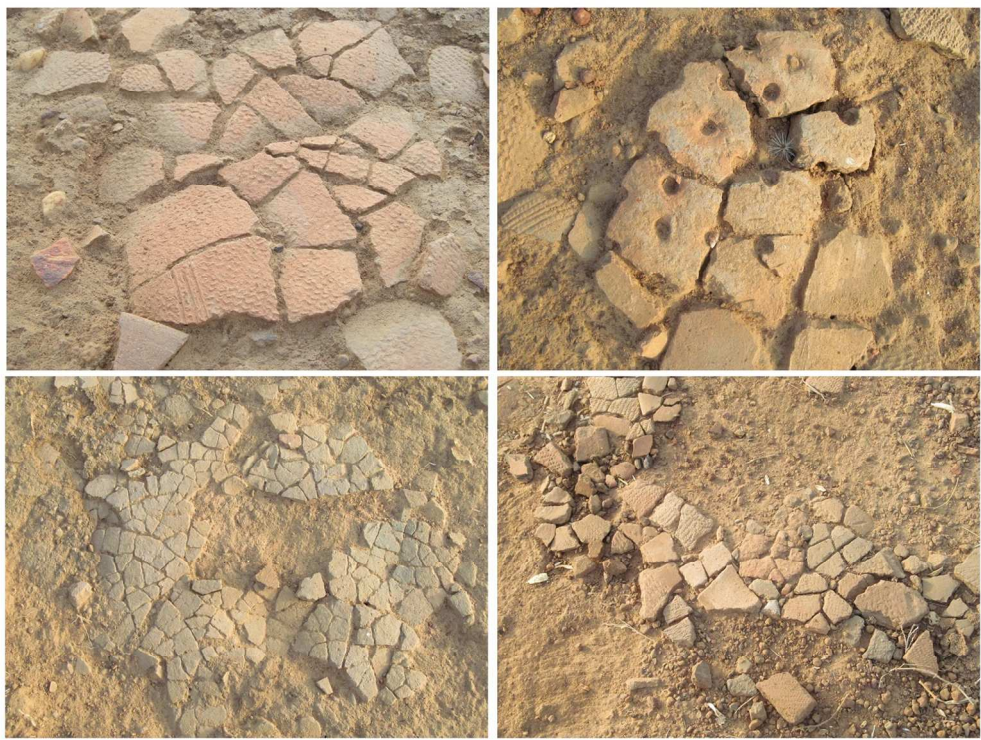
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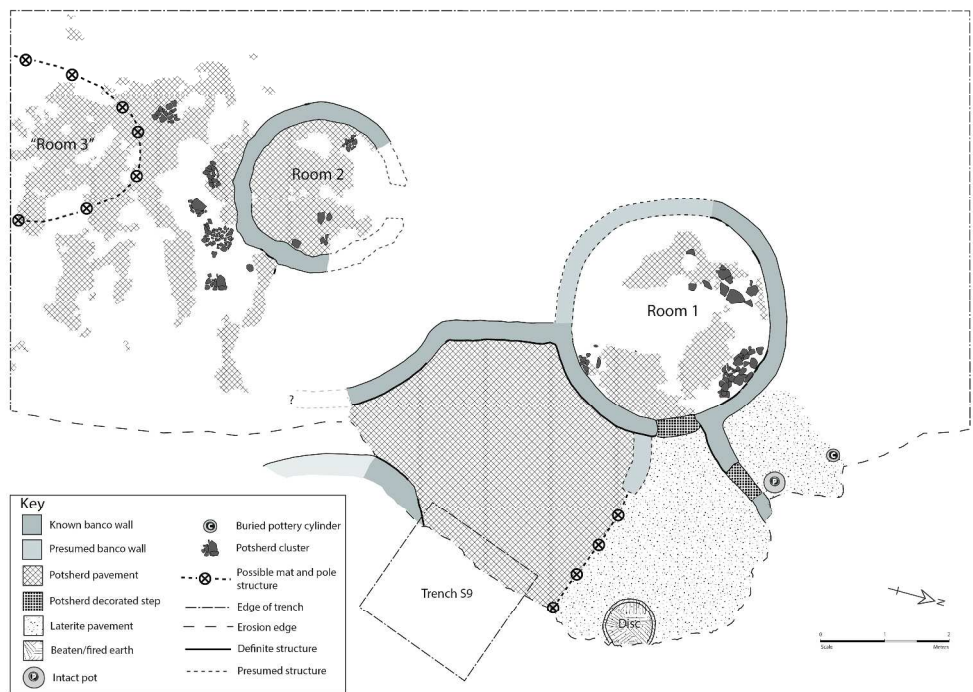
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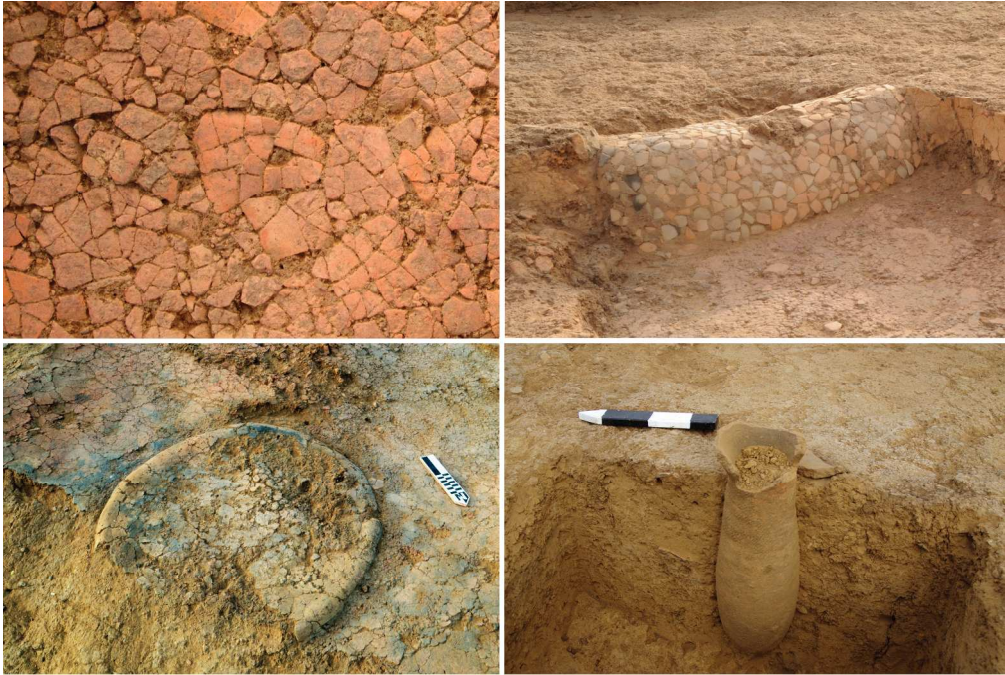
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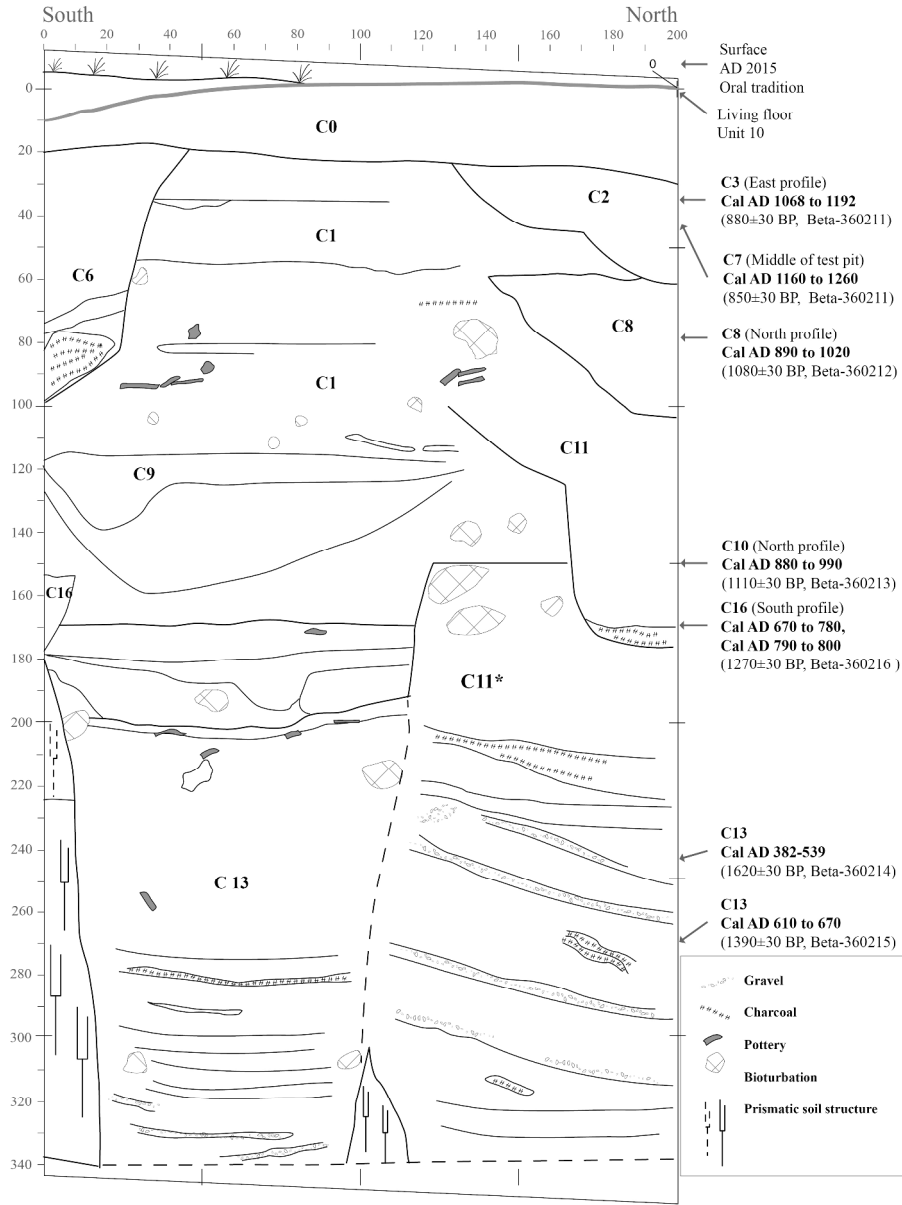


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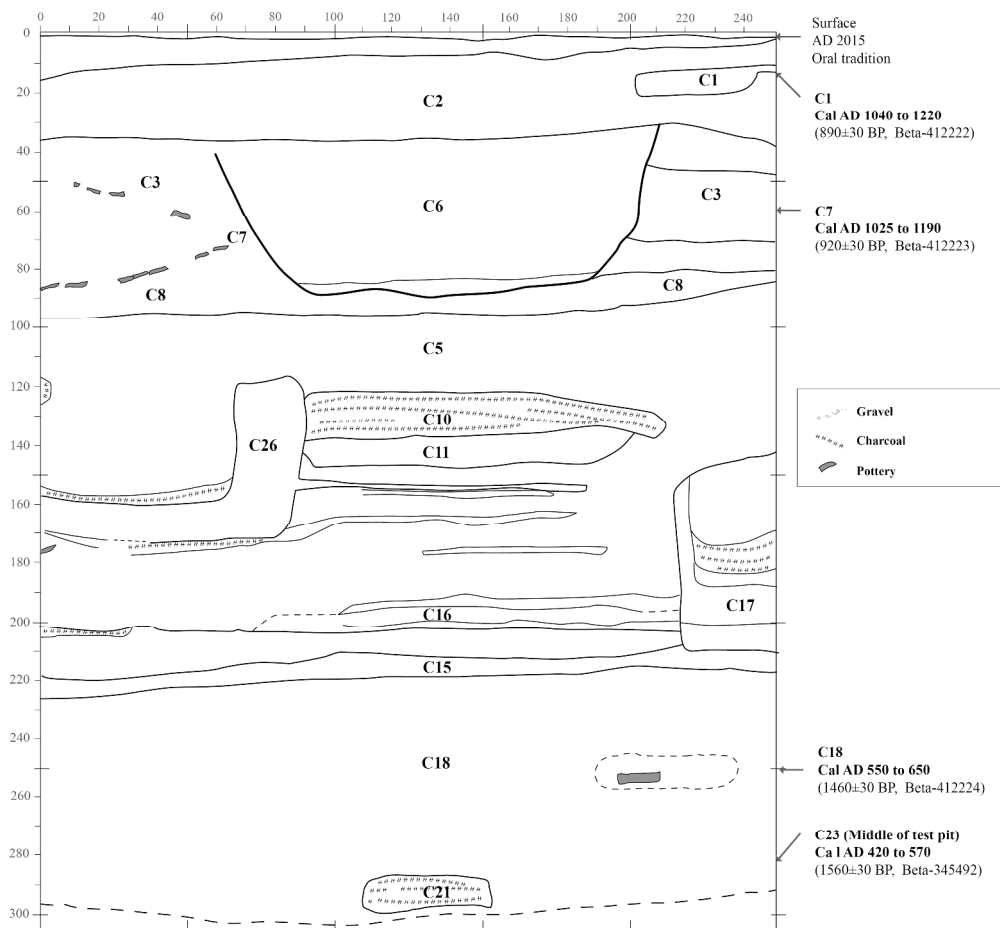
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364x270mm (300 x 300 DPI)

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380x170mm (300 x 300 DPI)

Peer Review



286x430mm (300 x 300 DPI)

Sample #	Uncal bp	Context	Cal AD	Phase
Beta-305218	740 ± 40	Unit 2, Context 2. Possible posthole. Direct association with a pavement.	1215-1301 (92.6), 1368-1382 (2.8)	4
OxA-29894	781 ± 24	Unit 10, Room 2, Sample taken from underneath pottery cluster #4. <i>Dalbergia melanoxylo</i>	1218-1275	4
OxA-29888	819 ± 24	Unit 10, Context 30. Direct association with pavement. Charred botanical tissue.	1170-1263	4
OxA-29890	819 ± 24	Unit 10, Context 4. <i>Sapotaceae vitellaria par</i>	1170-1263	4
OxA-29896	840 ± 24	Unit 10, Context 8. Direct association with pavement. <i>Anogeissus leiocarpus</i> .	1161-1256	4
OxA-29891	843 ± 23	Unit 10, Context 4, Room 1. Direct association with pavement. <i>Sapotaceae vitellaria par</i> .	1160-1255	4
<b>Beta-360211</b>	<b>850 ± 30</b>	<b>Unit 9, Context 7</b>	<b>1052-1080 (5.2), 1152-1260 (90.2)</b>	<b>4</b>
Beta-321055	850 ± 30	Unit 6, context C 3	1052-1080 (5.2), 1152-1260 (90.2)	4
OxA-29886	862 ± 22	Unit 3, Context 6. Direct association with pavement. <i>Anogeissus leiocarpus</i> .	1052-1080 (5), 1152-1225 (89.1), 1233-1244 (1.2)	4
OxA-29893	869 ± 24	Unit 10, Room 2. Sample taken from underneath pottery cluster # 1. Charred plant tissue.	1048-1085 (11.6), 1123-1138 (2.3), 1149-1224 (81.5)	4
<b>Beta-360210</b>	<b>880 ± 30</b>	<b>Unit 9, Context 3, 45-60 cm</b>	<b>1042-1105 (27), 1117-1222 (68.4)</b>	<b>4</b>
Beta-320517	880 ± 30	Unit 3, Context 9. Direct association with pavement.	1042-1105 (27), 1117-1222 (68.4)	4
OxA-29889	887 ± 23	Unit 10, Context 4, Room 1. Sample taken from underneath pottery cluster #3. <i>Pterocarpus sp.</i>	1045-1095 (30.3), 1119-1217 (65.1)	4
<b>Beta-412222</b>	<b>890 +/- 30</b>	<b>Unit 11, Context 1</b>	<b>1041-1108 (35.9), 1116-1218 (59.5)</b>	<b>4</b>
Beta-320521	900 ± 30	Unit 5, 60-70 cm	1039-1210	4
OxA-29895	906 ± 23	Unit 10, Context 8. Direct association with pavement. <i>Rubiaceae, Mitragyna iner.</i>	1038-1189	4
OxA-29897	908 ± 22	Unit 10, Context 8. Direct association with pavement. <i>Anogeissus leiocarpus</i> .	1038-1185	4
OxA-29887	910 ± 23	Unit 3, Context 8. Direct association with pavement. <i>Anogeissus leiocarpus</i> .	1036-1185	4
Beta- 320522	920 ± 30	Unit 5, 110-120 cm.	1028-1184	4
<b>Beta-412223</b>	<b>920 ± 30</b>	<b>Unit 11, Context 3. <i>Sapotaceae Vitellaria</i> Pottery pavement and large iron implement</b>	<b>1028-1184</b>	<b>4</b>
OxA-29892	921 ± 23	Unit 10, Room 2. Direct association with pavement. <i>Sapotaceae vitellaria</i> .	1034-1163	4
<b>Beta-360212</b>	<b>1080 ± 30</b>	<b>Unit 9, Context 8</b>	<b>894-930 (27.2), 938-1018 (68.2)</b>	<b>3</b>
<b>Beta-360213</b>	<b>1110 ± 30</b>	<b>Unit 9, Context 8</b>	<b>879-1013</b>	<b>3</b>
Beta-321056	1160 ± 30	Unit 6 context 6	773-906 (71.8), 916-968 (23.6)	3
Beta-320519	1210 ± 30	Unit 4, South profile, Pit 5, at the base of which	695-700 (0.6), 710-745 (10.8),	3



		were two stacked ceramic vessels	764-891 (83.9)	
Beta-411139	1210 ± 30	Unit 13, Context 14, a likely pit feature	695-700 (0.6), 710-745 (10.8), 764-891 (83.9)	3
Beta- 305219	1260 ± 30	Unit 1, 120cm BD	669-779 (85.3), 791-829 (5.9), 838-865 (4.2)	3
<b>Beta-360216</b>	<b>1270 ± 30</b>	<b>Unit 9, Context 16</b>	<b>663-778 (92.3), 792-804 (1.3), 819-821 (0.2), 842-859 (1.6)</b>	<b>3</b>
Beta- 321054	1270 ± 30	Unit 7, square B	663-778 (92.3), 792-804 (1.3), 819-821 (0.2), 842-859 (1.6)	3
Beta-305221	1300 ± 30	Unit 1, 25-50cm	660-731 (64.4), 736-770 (31)	3
Beta-411141	1300 ± 30	Unit 13, Context 19	660-731 (64.4), 736-770 (31)	3
Beta-411140	1320 ± 30	Unit 13, Context 14	652-723 (73), 740-768 (22.4)	3
Beta-305217	1350 ± 30	Unit 1, 125 cm BD	637-714 (88.5), 744-765 (6.9)	3
<b>Beta-360215</b>	<b>1390 ± 30</b>	<b>Unit 9, Context 13</b>	<b>602-674</b>	<b>3</b>
Beta- 305220	1420 ± 30	Unit 1, 75-100 cm	582-661	3
<b>Beta-412224</b>	<b>1460 ± 30</b>	<b>Unit 11, Context 18. <i>Anogeissus</i></b>	<b>553-648</b>	<b>3</b>
Beta-320520	1540 ± 30	Unit 4, Pit 9, a well-sealed pit	426-588	2-3
<b>Beta-345492</b>	<b>1560 ± 30</b>	<b>Unit 11, Context 23 (taken inside human cranium)</b>	<b>420-565</b>	<b>2-3</b>
<b>Beta-360214</b>	<b>1620 ± 30</b>	<b>Unit 9, Context 13, associated with fragmented vessel</b>	<b>382-539</b>	<b>2</b>
Beta-345491	1620 ± 30	Unit 8, Context 4	382-539	2
Beta- 320518	1650 ± 30	Unit 4, West profile, Pit 4.	264-274 (1.1), 330-433 (85.3), 461-466 (0.5), 489-533 (8.5)	2

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**In bold: shown on Figures 10 and 11**

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