The Hidi Midden excavation: production of space and the construction of Sukur history

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The Hidi House complex seen in August 1992 from Mungwolay hill to the southeast. The chief's inner house is in the lower left part of the Hidi House enclosure. The Patla public and ceremonial area, behind and left of the Hidi house, is marked by a huge baobab, below and to the left of which is the anthropologists' house. To the right of the baobab, the Hidi Midden is the low mound on the near skyline. Rocky Muzi hill is in the right middle distance.

A Note on Presentation

This report is published as three .pdf files:

- the text and essential figures − this file: HMreport2013Main.pdf
- field illustrations of artifacts by levels − HMreport2013ArkyFigs.pdf
- ethnographic and less critical archaeological illustrations (marked by an *asterisk in the text) − HMreport2013EthnoFigs.pdf

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Introduction

This is a report on an archaeological test excavation carried out in January 1993 on a mound that the chief and other Sukur elders call *gəzik Tli'di*, the midden of the Hidi (chief). Despite many failings – for example the pottery is still in the National Museum, Yola branch, awaiting analysis – this account, informed by ethnoarchaeology, makes a significant contribution to the history of Sukur. Besides, there being so few archaeological sites in the Mandara mountains, any and all additional data on the past of this region are of value (MacEachern 2012).

Middens are rubbish dumps, containing a high proportion of materials considered inedible or not otherwise immediately usable by humans, beasts and poultry. In excavating a test pit in the Hidi Midden we set out to answer a number of apparently simple questions. Is the site a midden? How old is it and how fast did it form? What, if anything, can it tell us about the development of Sukur as a chiefdom or as a producer of iron that was exchanged with many of its neighbors and widely traded to plains societies and particularly those to the north (David and Sterner 1996; David 2012b)? And is its popularly accepted association with the house of Hidi Sukur supported by the nature and contents of the site? Starting with such questions in mind, this report is an account of what we have learned about and from the Hidi Midden by means of a test excavation interpreted in the context of ongoing midden formation at Sukur and elsewhere in the Mandara mountains.

Sukur middens today

Sukur houses (or compounds), a structured series of rooms (or huts), granaries and other facilities confined within dry stone walls, generally make use of a single midden located outside and close but not adjacent to its entrance gateway (*Fig. 1)[1] Where houses are built close to each other they may share a midden. Since houses have single entrances through which household members pass several times a day and rooms are built close to each other and to the surrounding wall, there is little if any extra effort required to dispose of waste in a single midden outside the compound and close to its entrance. Such a midden is also a resource that can be deployed as required to support the fertility of household plots. As to other "waste", potentially useful inorganic remains such as large potsherds are often placed in temporary storage against the exterior wall or almost anywhere they will not hinder the life of the household. Materials that, for whatever reason, are regarded as a potential nuisance are discarded preferentially in open pits previously dug to obtain earth for building materials or some place near the compound that has no economically significant alternative use and where deposition of materials may even be of use. For example, discard in a gully can retard erosion.

Thus middens comprise for the most part organic and organically derived materials, including bone fragments, ash and bits of charcoal removed from hearths, and inorganic materials, including small potsherds, stone and glass fragments, and grit, bits of upper grindstones, and metal, leather, cloth and nowadays plastic scraps. (In earlier times bloomery iron fragments of any size were saved to be welded into a new artifact by the blacksmith.) They are

[1] The gateway (*maparam*) is a focus of household ritual but the deposition of rubbish outside rather than inside the household wall is a matter of space and practicality rather than symbolism.

also likely to contain some, usually small, lost or broken items, for example awls and beads. Under the tropical climatic conditions prevailing at Sukur, a midden's organic component rots down rapidly, rendering it a valuable source of compost. As a result middens rarely achieve any size or age, but are commonly redistributed in whole or in part as nutrients to the plots surrounding the house.

There are few large middens at Sukur. The following sample is drawn from Midalla (formerly Devdagwa) ward in upper Sukur:

1. The midden shown in *figure 1 is located on a slope, rising about 40 cm above ground level at the top of the slope and 150 cm above ground level at the base. We were told it has been in use some 27 years. It is located just outside the former gateway of a large house recently divided onto two, with new gateways built. It is now only used by half the former compound and is accessed by a gateway around the corner to the north. Located in a built-up area next to a well-traveled path, it has not been mined for compost – since plots are at some little distance – nor become a field itself. Besides peanut shells, scattered sherds and broken rock fragments but little bone were noted in its the dusty surface deposits.

2. Another midden is about 10 m long and 6 m wide, reaching a depth of over a meter (*Fig. 2). It is said to be over 60 years old and serves two long-established houses. Originally piled against a house wall, a channel has been dug through it close to the wall to allow rainwater to drain away. This reveals a section containing abundant peanut shells in the top 25 cm and a lower lens of burnt dung. There is considerable evidence of digging for compost. The deposits appear to consist mainly of ash, crop waste, house sweepings and soft organics including scraps of cloth. There are few sherds or bone fragments

3. In the Futu neighborhood a sub-conical midden, *ca* 8 by 9 m in extent and 1.5 to 2 m in maximum height, serves a cluster of houses of four Kigi clansmen. The senior household head informed us that the midden had been in use since before his father's time. If so, it could be over 100 years old. Lots of plant remains, but very little bone or pottery, are visible on the surface. There is evidence of compost digging. Tobacco is cultivated on its eastern quadrant and on a broader apron spread of midden materials. In this case ongoing accumulation appears to be more or less in balance with discard breakdown into compost and either removal to nearby plots or lateral displacement in the course of farming tobacco, a crop particularly demanding of nutrients.

A common characteristic of all these middens is that they are located below the houses that they serve. Middens located above their houses are very few, occurring only when the area below is occupied by other houses.

The Hidi Midden: location and nature

The site popularly described as the Hidi's midden, but not used as such in living memory, is located at 10° 44' 29.31" N; 13° 34' 14.26" E, just west and above the present residence of the chief and immediately south of what is held to be the site of a former Hidi House, marked now only by scattered rocks and a thorny grove (Figs *3, *4, *5). The midden is north of the public and ceremonial area called in Sukur the Patla, separated from it by some now unused enclosures and a walled field. The highest point in the immediate vicinity, it extends along the brow of a ridge that slopes steeply down to the west. Most of the surface of the midden and its surrounds, notable for a ragged line of desert date trees (*Balanites aegyptiaca*), is uncultivated, but the western slope is farmed. Cultivation is encroaching on this side of the midden, producing a cut bank that reveals a section in places over 50 cm high. The slope below is strewn with midden materials.

Figure 3. The Hidi House complex and its surrounds showing houses in Dunggom and Gwasa wards. The "?" indicates the location identified by Sukur as that of a former Hidi House, "Mbuk" the northern enclosure containing the council chamber, and "C" the sector in the chief's residence where most wives and children were once housed. Base image copyright of Google earth and Digital Globe 2013.

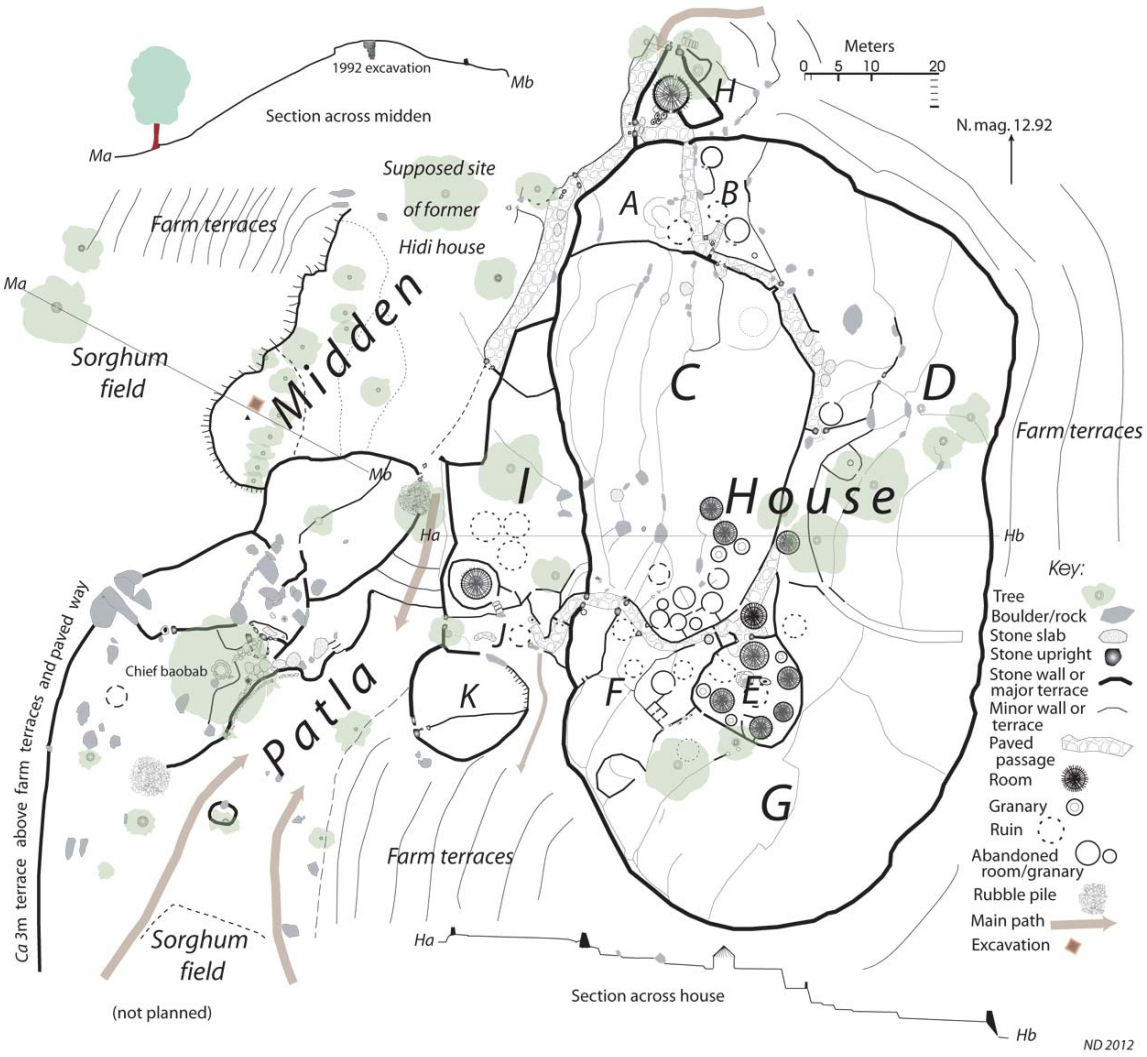


Figure 4. Plan of the Hidi House complex showing the Patla and the Hidi Midden. For further information on the Hidi House see Smith and David (1995). Note that the assembling of three separate plans, of the House, Patla and the Midden degrades accuracy.

The higher part of the midden covers an elliptical area approximately 20 m N-S by 14 m E-W, a somewhat lower portion (labeled middle on Figure 5) extending with decreasing thickness 6-10 m east and 24 m north, with a lower apron along part of its eastern side. It is not clear whether this is part of the midden proper or whether its considerable quantities of artifactual and other materials derive by erosion from higher up the midden. The south end of the feature is affected by a wall forming the northern limit of the Patla complex. East of the midden a path, in part paved, leads south from Mbuk, sector H of the Hidi House, skirting its western side before debouching on the Patla.

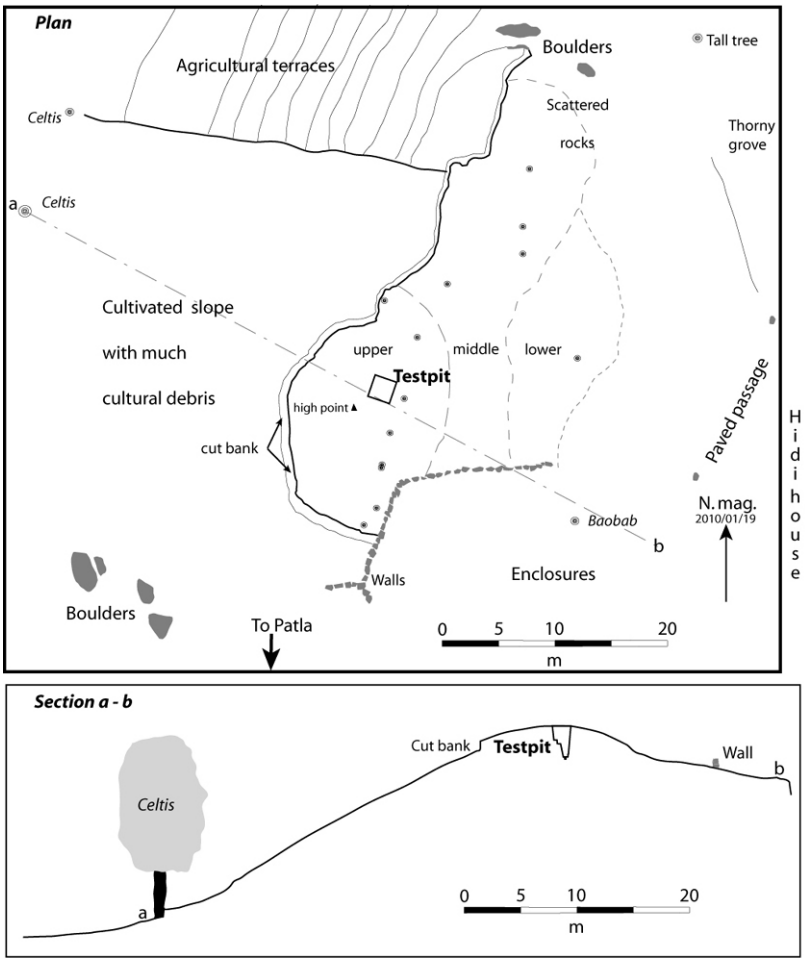


Figure 5. Plan and section of the Hidi Midden.

The excavation

Circumstances of excavation.

Excavation took place between the 11th and 19th of January, 1993. The Mandara Archaeological Project members were N. David and J. Sterner, and our assistants, Philip E. Sukur, John Tizhe Habga and Isnga Sukur. The plan was for Dr J. Jemkur and students from Ahmadu Bello University to participate and to bring with them excavation and survey equipment. This proved impossible as they had no transport. The Nigerian Commission for Museums and Monuments had arranged for the then Head of the Maiduguri Station, Mr M.O. Adesina, and for two other staff members, James Ameje and Jude Anebi, to participate, and they arrived at Sukur but without tools. The dig was therefore conducted with minimal equipment. Measuring tapes, string, a builder's trowel and nails were our most sophisticated tools apart from a plane table and alidade, and, borrowed from the Wolfgang-Goethe University team in Maiduguri, a fine mesh sieve.

A 2 by 2 m square was laid out at the top of the midden mound with its N-S line on a bearing of 19° magnetic (Fig. 6). Depths are given in centimeters below surface (BS) from the southwest corner of the excavation. As we dug down we had to reduce the size of the excavation repeatedly both for access and to avoid possible collapse of the sides of the pit. The following account describes the stratigraphy as we encountered it in excavation. "Levels" refer to the

artificial units (spits), for the most part 20 cm in depth, by which most of the deposits were excavated. “Layers” and “lenses” within them are stratigraphic entities that relate to deposition at the site.

Figure 6. Work in progress on the Hidi Midden. View from the southeast with Muzi hill in the right background.

All deposit was sieved through 5 mm mesh and sorted through by hand on plastic sheeting (*Fig. 7). Furthermore the sievers regularly checked the dirt that went through the sieve for very small items. While we undoubtedly missed some tiny beads, I am confident that the great majority were recovered. Decorated sherds 5 cm^2 or more in exterior surface area were retained together with samples of plain sherds. Charcoal was regularly collected directly from the trench usually by myself using a trowel or penknife to pick up fragments, which were then wrapped in aluminum foil before being stored, as were artifacts, faunal remains and other samples, in robust plastic bags

Stratigraphy

The stratigraphy is described from top to bottom (Fig. 8) and soil samples in Appendix 2.

Layer 6 (0 - ~100 cm BS), levels 1-5

The deposit of levels 1-5 is generally grey, soft, ashy and featureless, with some evidence of small dumps and occasional small concentrations of reddish gravelly material. In the NW quadrant of level 4 a harder, browner surface was briefly followed before it lost coherence and disappeared towards the east. There are rodent, insect, arthropod (scorpion), and probably amphibian holes, infilled with sometimes softer but otherwise indistinguishable grey deposit.

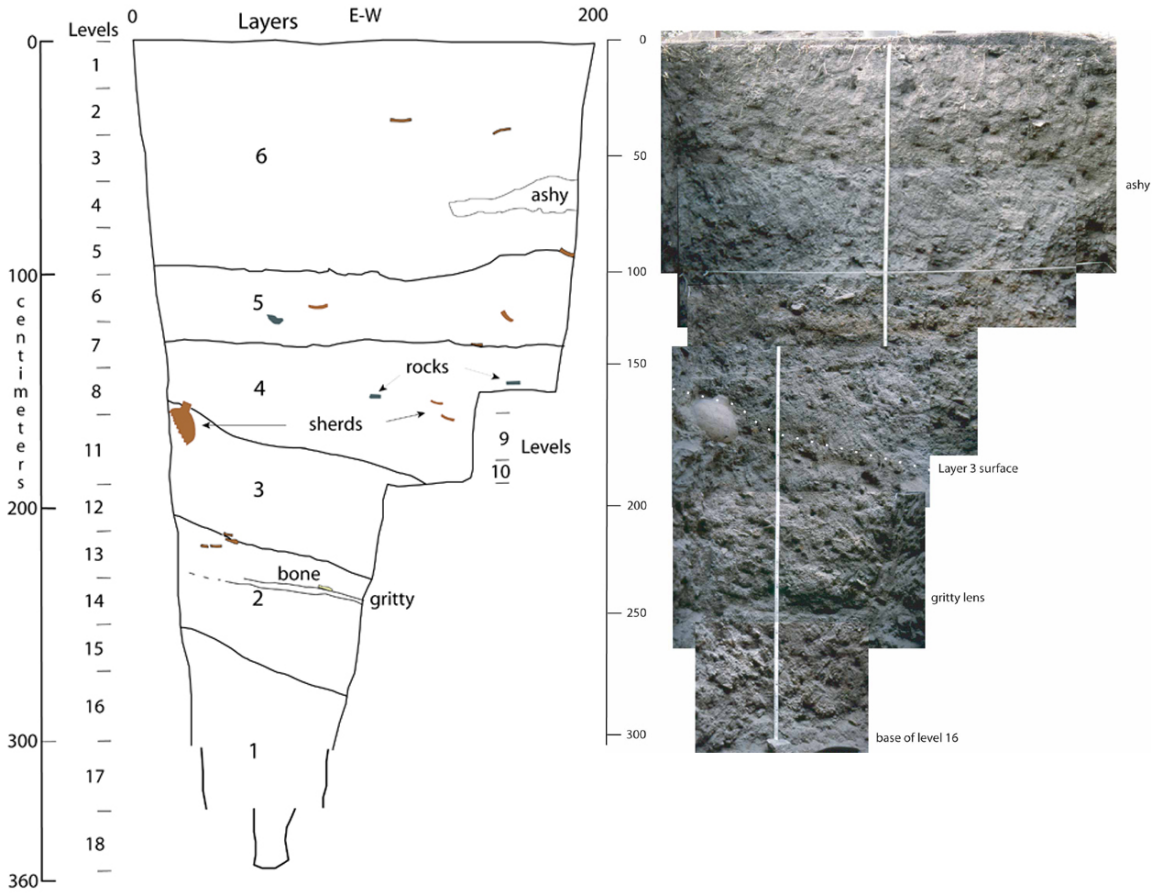


Figure 8. Stratigraphic section and photo collage of the south wall of the Hidi Midden excavation showing layers and levels.

In this and lower layers, there are – besides a small number of broken, worn out or lost small finds such as beads and tools – bone fragments, potsherds, a few flakes of quartz, small and occasional larger fragments of rotten granite, including broken and worn out upper grindstones. These are what one might expect of sweepings and other debris collected within and before the house and tossed onto a midden. There are few larger rocks: near the base of level 3 we found the first two rocks of any size, the larger 28 cm in maximum dimension. Slag from smelting and perhaps forging iron also occurs throughout the sequence. This is somewhat surprising since both furnaces and forges were, and in the case of forges still are, located apart though not necessarily far from houses. Charcoal is irregularly present in small lumps and dispersed fragments. A sample (Bag #10) was taken in level 2 and another (Bag #16) in level 3 where charcoal was somewhat more abundant.

In level 5 the area excavated was reduced by a 50 cm strip on the north side in order to provide a step. The distinction between layers 6 and underlying 5 was made on the basis of a slight color change visible in the section. In summary, the layer is typical of a midden containing household waste and sweepings after thorough decomposition of softer organics.

Layer 5 (~100-130 cm BS), levels 6 and upper 7

The layer comprises level 6 and the upper half of 7. It retains the same heterogeneous character

with a harder lump on the east side and a definite increase in the amount of reddish gravelly material especially in the southern and western parts of the excavation. Some thin lenses have significantly more charcoal flecks than in the rest of the deposit. Increased moisture content is probably responsible for overall slightly browner coloration. There is still evidence of burrows. A carbon sample (Beta-64952) from level 6, run on a lump of charcoal attached by rust to an iron rod, gave a date of 50 ± 60 BP.

Layer 4 (130-154 cm BS in SE corner of excavation), levels lower 7-10

The western 50 cm ceased to be excavated at 150 cm BS, reducing the area of excavation to 50-200 cm N-S and 0-150 cm E-W. Layer 4 comprises the lower half of level 7, and levels 8 (140-160 cm), 9 (160-180 cm) and 10 (180-190 cm), the last two wedge-shaped and not reaching the eastern wall of the excavation as they overlie the surface of layer 3 which slopes steeply down from southeast to northwest. There is no substantial change in the deposits though less reddened material was noted in level 8.

Layer 3 (157 – 203cm BS in SE corner), levels 11-upper 13)

At the base of layer 4 we followed the redder and harder surface of the underlying layer 3 as it sloped down at an angle of about 17° from southeast to northwest (*Fig. 9). Layer 3 comprises level 11 (layer 3 surface to 190 cm), level 12 (190-210 cm) and the upper part of level 13 (210-230 cm) on the western side of the pit. Since these levels cut across the sloping stratigraphy, there is a minor component of layer 3 deposits in level 12, while level 13 contains mainly layer 2 materials. At 190 cm BS it was necessary to reduce the excavated area by a further 50 cm step along the west side of the test pit.

In the middle of the excavated area a large sherd was found protruding vertically from layer 3 into the overlying layer 4. Containing a substantial amount of artifacts, charcoal and bone, these are still midden deposits, distinguished mainly by a lower ash content and more grit. The level 11 deposits are redder and harder than those above, the latter partly because they contain more granite fragments. The matrix of level 12 is more homogeneous: a strong brown (when moist) sandy matrix with a component of finer particles that stains the fingers when moistened. The grit fraction is larger in size with many pieces up to 2 cm in maximum dimension.

Layer 2 (203-252 cm BS in SE corner), lower level 13 to upper 15

Retaining the same general slope as layer 3, layer 2, comprising the lower part of level 13, level 14 and the upper part of 15, is still heterogeneous midden deposit. There is a gritty lens at the top of level 14 below which deposits are softer with more ash and less grit. Artifacts and animal bones are present in considerable quantities, bone being more abundant than potsherds in level 15.

Layer 1 (242 cm BS in SE corner – base of excavation at 355 cm) lower level 15 to 18

Layer 1 comprises a small part of level 15 and levels 16 to 18. The top of level 16 (270-300 cm) clearly consists of midden materials though some of the bone is in worse condition and more weathered than above. The sherds in the level 16 section are, as in layers 2 and 3, tilted from east down to the west indicating that the area excavated was at this time near the margin of the midden. In level 17 (300-330 cm) the area excavated was reduced again to 90 - 130 cm NS and 20 - 90 cm EW. Here the matrix remained gritty and included lesser quantities of archaeological materials. Level 18 (330 - 355 cm) represents the contents of a small cylindrical pit dug (with a spear!) into the base of an excavation that had become too deep and dangerous to continue. Its matrix is very gritty and similar to natural deposits seen in many places on the Sukur plateau, but

it contains small quantities of charcoal, bone and pottery and slag. It may be considered the lower part of a transition zone between natural and midden. However, sterile matrix was not reached.

Depositionary process

It is likely that, prior to the decision to create a midden, the area was cultivated or otherwise utilized and that the base of layer 1 represents soil containing – as is common today in the vicinity of houses – both artifactual and ecofactual materials, some perhaps deposited in the course of fertilization of fields with midden-composted household waste. Higher in the layer the density of such materials increases and at the top consists of heterogeneous materials from near the northwest edge of a midden. Layers 2 and 3 represent a continuation of the buildup of the midden in a series of small discrete episodes, some of which are evident in the presence of lumps or lenses of differentiated materials. These constitute only minor variations in the nature of deposition.

The surface of layer 3 marks a change. Rather than a significant break in the use of the midden or an environmental cause, the difference between the orientations of the lower sloping layers and upper horizontal ones is best attributed to changes in dumping influenced by factors, some unknown, but including the growth of the midden and by changing intensity of use and perhaps routes of access. Larger scale excavations would be needed to explore such possibilities and explain the redder surface of the layer, which is not apparent in section.

Layers 4 through 6 represent continued accumulation of materials, very probably by larger numbers of users, near the midden's center. The midden deposits are ashier and softer, suggesting a faster rate of deposition although tunneling of the deposits by animals must also contribute. It seems that at times hearths were dug up and thrown out before being remade of clay. This would account for the reddened patches and lumps of daub, sometimes associated with lumps of ashy material containing charcoal, that we find in the upper levels and which are likely to have come from the bases of hearths. Other reddish material not obviously burnt may derive from collapsed granaries and domes over rooms, for both of which a redder daub quarried nearby is presently used, though much is normally recycled.

There are no marked changes in the stratigraphy of layers 4 through 6. While the differentiation of layers on the basis of inspection of the section (Fig. 8) is of no great significance, it reinforces our inference that the general lie of the upper deposits was horizontal and that the arbitrary levels excavated down to this depth reflect time quite accurately, lower materials being older than higher ones. Of course the animals responsible for tunnels visible and invisible during excavation produced some movement of objects up and down, but the overall depositional process allows analysis of the layers 4 to 6 materials as a chronological sequence.

Radiocarbon dating

A series of four radiocarbon dates, all on charcoal, were run on four of the samples collected. All were corrected for fractionation. They were calibrated using the Radiocarbon Calibration Program Rev. 3.0 (Stuiver and Pearson 1993) and are presented in table 1 as the maximum and minimum of the two sigma range.

Table 1. Radiocarbon dates from the Hidi Midden, Sukur

Lab. No.	Layer (level): cm BS	Date BP	Date cal. AD
Beta-64952	5 (6): 100-120	30±60	1686-1955
Beta-64953	2 (13): 230-250	Modern	
Beta-64954	1 (17): 300-330	50±60	1678-1955
Beta-64955	1 (18): 330-355	220±60	1520-1955

The same dates are also presented in table 2 as calibrated AD dates. I am confident that these samples were properly collected and transported and that the only contamination to which they may have been subjected occurred underground before the excavation as a result of animals tunneling through the deposits. Nonetheless these dates are virtually useless except to show that the midden built up rapidly – for which we have other evidence, perhaps best of all the extraordinarily well preserved bone. The midden has not been used as such in living memory and it is remarkable that a sample from over two meters below the surface should appear to be modern. On the other hand a 16th-17th century date for level 18 is perfectly possible.

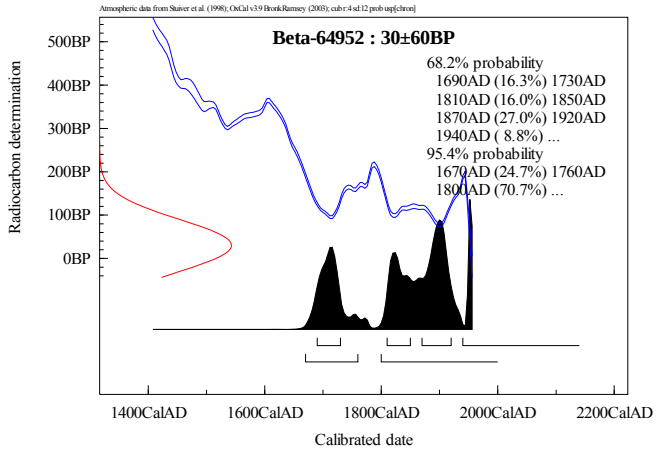
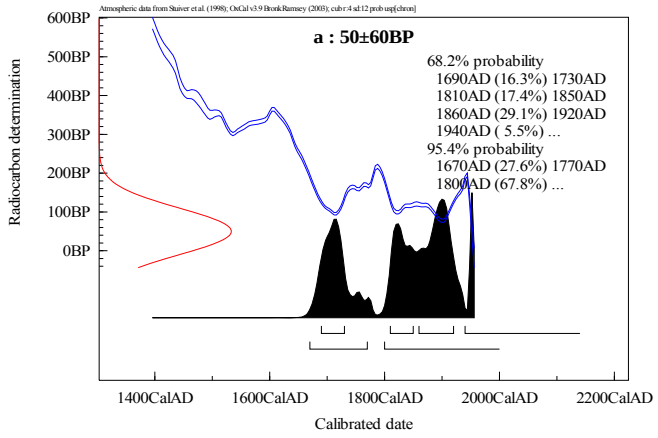
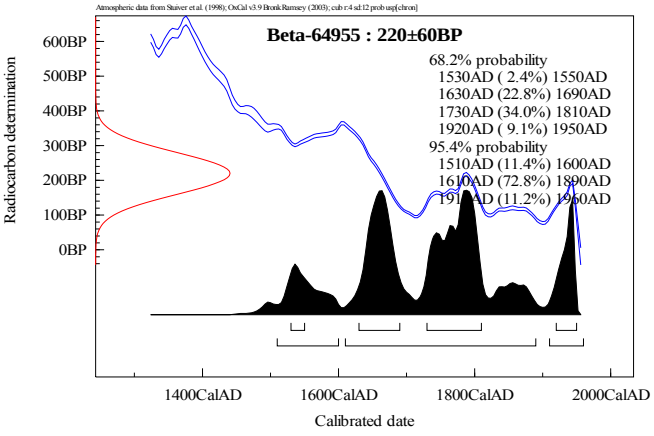
Fauna

The excellent preservation of bone, of which there is a large quantity, indicates that the midden formed quickly. Bones that lay on the surface for any considerable period would certainly show evidence of deterioration, cracking and flaking. Most of this material seems in excellent, almost fresh condition. However its fragmentary nature makes identification extremely difficult by anyone lacking access to an comparative collection of materials from the same environmental zone. Thus, rather than answering questions, the following discussion raises some that I hope will eventually be answered.

The chief and others say that the quantity of bone coming out of the site is greater than we would find in a modern Sukur midden. This might suggest that bone was not being as intensively processed as it is today when **mammal** parts are chopped and cut up into small pieces and much red meat is eaten on the bone in the form of a stew. Furthermore, bones of cattle killed at *Hən zlə*, the bull festival, are crushed in grindstone-mortars to make preserves of meat, marrow and fat. The tiny fragments of bone that remain after their consumption are unlikely to end up in a midden – or to be collected if they do. The pottery excavated includes sherds of neckless jars similar to those used today for storing meat preserves. Thus the faunal remains suggest a higher intake of meat than presently observed, a finding consistent with the association of the midden with past chiefs and their households and/or with less intensive cultivation and greater availability of wild game.

Not only is there a lot of fauna but there appear to be some very large bovids, probably large cattle, in layers 4 and above. If this is confirmed by specialist analysis, it would suggest a fairly recent date for these layers, as it would seem likely that before the arrival of Fulbe in the region the Sukur cattle were of the short-horned '*muturu*' variety (Seignobos and Thys, eds. 1998) An important objective of faunal analysis must be to determine what kinds of cattle are present. Similarly, "Vuwa" (Kanuri or other northerners) are reported to have brought sheep to Sukur to trade for iron. Are any of the ovicaprids present of a size that would suggest a large northern race of sheep?

Table 2. Radiocarbon dates from the Hidi Midden. All are on charcoal and corrected for fractionation. Calibration by OxCal version 3.9 (C. Bronk Ramsey 2003).

Lab. No.	Layer (level) and depth (cm) BS	Date cal. AD
Beta-64952	5 (6): 100-120 15 g lump of wood charcoal	
Beta-64953	2 (13): 230-250 24 g wood charcoal	Modern
Beta-64954	1 (17): 300-330 7 g wood charcoal	
Beta-64955	1 (18): 330-355 4 g wood charcoal	

Near the base of layer 6 a large incisor was identified by the chief as that of a horse. It is an equid incisor, though whether of horse, donkey or pony I cannot tell. It may be the only equid specimen. Identification of the species and race of any equids present is again of historical importance (Seignobos 1987). The identification of any wild vertebrates will provide important evidence on the past environment of Sukur and its region.

With regard to the **microfauna**, much of it is later than the deposits in which the bones were found. The midden has several burrow holes in it in which (I was told) ground squirrels were living and in level 4 we found the almost complete skeleton of a rat or squirrel that had died in its burrow (Bag #24).

As to **birds**, chiefs of Sukur are said to have special rights with regard to guinea fowl. It would be interesting to know whether this midden contains many guinea fowl bones. A few fragments of eggshell were recovered in level 15.

Fish are certainly present; for example there is a catfish mandible in level 11 and a skull fragment in level 13. Although limited fishing was done on Sukur territory, mainly on the plain in a lake upstream of Mefir Suku that has now disappeared under sugar cane, smoked fish were traded south in exchange for Sukur's iron. We would very much like to know whether any fish present are of species likely to live in the small seasonal streams that lead down to the Yedseram, or in the Yedseram itself, or whether they are more likely to be the remains of dried and smoked imports from the north or possibly elsewhere.

Invertebrates include a piece of crab claw from level 13, suggesting that the crab divination practiced today in Sukur has a long history, and imported cowry shells. Of these, all but one are modified and are discussed below with the artifacts.

Flora

Several levels of the site, particularly upper ones but as far down as level 14, produced quantities of hackberry (*Celtis integrifolia*) fruits, however these were, with the exception of beads, not collected, it being felt that a) they might be intrusive; and b) protection and exploitation of *Celtis*, the leaves as edible greens and the wood for a variety of purposes, have certainly been practiced at Sukur for thousands of years.

Artifacts

For illustrations of artifacts by level, refer to the HMreport2013ArkyFigs.pdf file

On the pottery

As mentioned earlier, the pottery was not studied in the field and awaits analysis at the National Museum, Yola. However, I noted at the time that there was great similarity with modern Sukur pottery (Fig. 10): Table 2 describes a sample of materials from the surface and gives an indication of typical forms, surface treatments, and decoration, typically applied in bands using twisted string roulettes (TGR), twisted strip roulettes (TPR) and potter's combs.

My fieldnotes on the pottery from the dig emphasize its similarity to modern wares:

> Level 1: The pottery is "instantly recognizable as being of the same tradition as modern Sukur …." For example the beer jar fragments seen in *figure 11 are very similar in form and decoration (comb and fiber roulette impressions) to recent examples but have rims that are more everted/flared.
> Level 3: "…pottery continues much as before − perhaps less decoration?"

Level 4: “I get the impression that the pottery is slowly changing but the same forms in general − stylistic change only?”
Level 7: “The pottery remains clearly in the same tradition as from the start of the excavation, similar decoration and the same range of forms.”

Figure 10. Pottery, mainly fragments of beer jars, scattered on the surface of the Hidi Midden.

There is no mention of substantive change through the lower part of the sequence, though the lesser amounts of pottery recovered from the smaller areas excavated would have made change less easily discernable. Of course the above means little without a description of the Sukur ceramics observed in the early 1990s. I intend to work on that topic in the future, however it is worth remarking that Sukur’s commitment to iron production meant that smiths’ wives were kept so busy with the collection and cleaning of ore and assisting their husbands in the forge that they made little pottery. Many of the pots used at Sukur were imported, mainly from the Higi and Margi. Thus ceramics from the Hidi Midden site are expected to be a mixed assemblage representative of the sub-region − all it should be said belonging to the same broad montagnard tradition − rather than a uniquely Sukur ceramic expression.

Table 3. Characterization of potsherd sample collected on the surface of the Hidi Midden.

Form	**Common use**	**Surface treatment**	**Decoration**	**Decoration**	**Other**
		On all/upper part of body	**Base of neck**	**At/near max. diam.**	
Bowl	Serve sauce	Red burnish int.; black burn. ext.	Stab-and-drag comb		
Large bowl	Storage, serve food, water livestock	Red wash			Flattened rim, w/ faint groove
Neckless jar	Ferment meat, storage		TGR		
“ ”			TPR		
Narrow-neck jar	Carry, serve beer	Red wash	TGR		
“ ”			TGR		
“ ”			Stab-and-drag comb		
“ ”			Stab-and-drag comb		Cowry appliqués
Medium-neck jar	Carry, serve, store liquids and dry goods	Red wash	TPR, TPR		
“ ”		Red wash	TPR (?)		
Wide mouth jar	Cooking porridge	Red burnish			
Tripod pot	Male cooking of high protein foods	Red burnish upper		Punctate impressions.	
Heavy, wide-mouthed vessel	Storage or brew beer	Red wash	App. band, finger tip impressions		
Sherd			Comb-grooving		

Table 4. Grinding equipment, hammerstones, quartz flakes, slag and tuyère fragments by layer and level.

Layer	Level	Upper grindstone fragments	Hammer-stone frags	Slag fragments		Tuyère frags
				Flow	Other	
6	**1**	6		26	17	
	2	3		9	15	
	3	5	1 qtz frag.	19	21	
	4	2		11	5	
	5	1		2	2	
5	**6**			3	16	
5 & 4	**7**	4		2	7	
4	**8**	1	1 qtz-rich granite lump	2	2	
	9	1	1 qtz lump			
	10	2		2	2	
3	**11**		1 qtz frag.		4	
	12		1 qtz frag.	2	4	
3 & 2	**13**	2			4	
2	**14**			2	9	2 tips
2 & 1	**15**				5	
1	**16**	1		10	25	
	17	(also a cone of granite 17 mm tall)		2	11	
	18				2	

Stone, slag and tuyère tips

The distribution of stone artifacts and slag, and two tuyère tip fragments is shown in Table 4.[2]

Stone

The development of grinding equipment through time at Sukur is described in David (1998). Grindstone fragments found in the excavation are all from granite upper grindstones, mostly of the most common convex-backed type with a roughened grinding surface. Measured surviving thicknesses are in the 40 to 50 mm range. There are occasional examples with two sub-parallel

[2] For a brief introduction into Mandara mountains metallurgy, see David (2012a). Slag consists of vitreous byproducts of smelting iron ore. Tuyères are pipes that direct air blown by the bellows into the furnace shaft. Their daub tips vitrify and melt back during the course of a smelt.

grinding facets, one of the latter from level 13 being almost complete and measuring 130 by 85 by 37 mm. A fragment from a similar piece has a thickness of 44 mm. Level 10 produced a fragment of the rarer – because much longer lasting – type with a smooth grinding surface used to crush vegetables and oily seeds and nuts.

Occasional quartz flakes and flakelets were noted but not systematically collected. Most if not all are natural or result from the making and use of hammerstones to roughen grinding surfaces by pecking, though they have many other casual functions. The hammerstones, often fragmentary, tend towards the spherical and are always quartz-rich.

Slag and tuyère tips

Once liquid "flow" slag, including prills, occurs generally as smaller (3-4 cm) fragments than other heterogeneous slag. The presence of the latter, up to 7.5 cm in maximum dimension, may indicate that blooms with adhering slag were being brought into the midden's catchment area before the slag at the base of the bloom was knocked off. Why there should be flow slag is more problematic. There is no indication that a furnace was ever located within the present Hidi House. The two fragments of tuyère tip found in level 14 indicate even more strongly that some of the midden material was coming from a place in close proximity to a furnace. There are furnace remains on Muzi hill immediately to the north and some of the flow slag and tuyère material could have been eroded or brought down into the area of the Hidi House before it was built, and only later have been incorporated into sweepings that went into the midden. The Sukur used to use crushed slag as an ingredient in a cement-like plaster that is still preserved on some of the great rocks used to build Bugə, the Hidi's megalithic throne on Patla. There may also be other, non-utilitarian, reasons for the presence of slag. It is a substance believed to counteract magic (see the Hidi Kacima story in http://www.sukur.info/Soc/Hidis.htm) and might have been collected for such purposes. Finally, from level 14 there are two fragments of tuyère tips. Their partial vitrification and location in relation to Sukur's present social geography would suggest they are from a furnace rather than a forge.

The significance of these distributions will be explored in the conclusions.

Small finds

Samples of small finds of iron, brass, bone, cowries and pottery together with beads are illustrated in a series of figures each representing the materials of a particular level (Figs 12-27).

Iron artifacts

With exceptions such as the 5.5 cm of light industrial chain in level 1 (Fig. 12a), the great majority of the iron artifacts are heavily rusted and fragmentary (Tab. 5). While some fragments might be identifiable if X-rayed, in their present rusty state it is often impossible to ascribe them to a functional category. Thus pieces may be identified as "rings" on account of their form, but without implying that they were worn on a finger or used for any particular purpose. The majority of iron fragments are less than 2.5 cm long, sub-cylindrical to sub-rectangular in section and are likely to have been parts of tangs of arrowheads or knives, of awls or needles, or of decorative costume items. Other, flattened, scraps may be knife (Fig. 27h) or hoe blade (Fig. 20c) fragments, or in some cases strips such as the spirally wound piece from level 13 that was identified by an elder as part of the binding from the butt of a spear (Fig. 24h). Formally though not always functionally identifiable artifacts include the rings mentioned above, some of which are made by bending a strip of iron without welding the ends together. Awls used for working skins and repairing gourds are

Table 5. Iron artifacts, excluding beads, by layer and level. Items illustrated in figures 12-27 are indicated by an *asterisk.

Layer	Level	Identifiable artifacts in various states	Unident. Fragments of cross-section:	
			Rounded or squared	Flattened
6	1	*2 Rings *Chain, industrial (9 links)	14	**2 frags Curved iron band
	2	*Awl ? *Costume item? Ring, L 8, diam ~14	*22	2 hoe?
	3	** Knife, L 126 mm **2 Rings	14	1
	4	**2 Awls *Child's bracelet??	10	
	5	*Thatching needle? L 517mm *Tool socket *Bracelet	1	3
5	6	*Rod, L 155 mm *2 Ring frags	*11	
5 & 4	7	*Awl head?	**11	
4	8	*Razor	*8	
	9	* Ring, ends overlapping	**2	*1
	10		****4	
3	11	* Ring, ends overlapping		
	12			
3 & 2	13	*Coiled strip (spear binding ?)		
2	14		***3	
2 & 1	15		***3	
1	16	*Knife blade fr.		

present (Fig. 13d) and in level 5 there is a bracelet (Fig. 16e) and a long rod with an eyed end that may be a thatching needle used in roofing and in the sewing together of basketry granaries (Fig. 15a). A traditional razor is present in level 8 (Fig. 19a) and a tool socket in 5 (Fig. 16d).

It is evident that this iron small find series is largely made up of scraps of forged bloomery iron artifacts that were either lost or considered too small to be worth taking to a blacksmith to be reforged or welded into a larger piece. The range of types represents only a small part of the past Sukur iron inventory even though, apart from the industrial chain in level 1,

there is nothing within it, including the iron beads, that are not or could not have been or be manufactured today by smiths on the mountain.

Brass

Cuprous alloys, most probably brass, are represented by only four artifacts:

Level 1 - some 6 cm of bent wire less than 2 mm thick
Level 3 - a damaged cast bead (Fig. 14d and h), very like those seen in *figure 28 where they form part of a woman's apron, worn on formal occasions
Level 7 - a thin ring, 2.2 cm in diameter, made of wire less than 2 mm thick, almost certainly a costume item, similar to those now seen on women's belts worn on formal occasions (*Fig. 29), and
Level 8 - most of an almost identical piece.

Table 6. Bone and ivory artifacts and cowries by layer and level. Illustrated items are indicated by an *asterisk.

Layer	**Level**	Bone and Ivory artifacts	Cowries **Complete/back removed/fragment**
6	1	*Bone disc	0/2/1
	2		1/0/0
	3		
	4		0/0/1
	5	**2 Bone lip pins	0/1/0
5	6	Bracelet frag., ivory?	
5 & 4	7	*Bracelet frag, ivory?	
4	8		0/0/1
	9		
	10		0/3/0
3	11		
	12	*Bone lip pin head (charred)	
3 & 2	13	*Bone lip pin	
2	14	*Bone lip pin frag.	
2 & 1	15		0/1/1
1	16	Bangle frag., ivory?	as ceramic appliqué ?
	17		
	18		

Bone, ivory and cowries

Despite the quantity of bone recovered from the test trench, there are few artifacts and these represent only two types (Table 6). A number of elongate, well-polished, bone pieces were identified by elders as lip pins (*daaum*). No longer worn at Sukur except by one woman of Kapsiki origin (Fig. 30), these used to be made of bone, wood or iron, and hung from the pierced lower lip.

Lip plugs occur from layer 2 up to layer 6. A thin bone disc 2.5 cm in diameter with a serrated edge and a central perforation was found in level 1 and could be part of a recent toy. Three pieces provisionally identified as ivory are delaminating fragments of bangles or bracelets.

Cowries are presently used as decorative elements, forming part of women's ceremonial costume, sewn onto belts or as the distal elements of tassels (*Figs 28 and 31). Such use always involves removal of the dorsal surface of the shell by grinding. Cowries are similarly applied to other artifacts. In the excavation they were present in layers 2 through 6 and may have been present at the time of layer 1 where they may be depicted by two appliqués on a potsherd (Fig. 27k). Identification is difficult as dorsal surfaces have all lost color and are usually removed. In fact only one, from level 2, is complete (Fig. 13c). On the evidence of their well marked and often less rounded margins and smaller "teeth", the cowries are all identified as *Cyprea monetaria moneta*. This seems the more likely since cowries attached to ethnographic specimens collected in the region over the past decade are all *C. moneta* rather than *C. annulus*. The latter began to be imported into Nigeria in bulk only in 1851, primarily for the palm-oil trade in the southern part of the country (Johnson 1970:24-5). Sukur was never within a cowry currency zone and cowry use here was always decorative. The significance of cowries for dating is further discussed in the conclusions.

Ceramic small finds

Ceramic artifacts apart from pots, potsherds and beads are listed in Table 7. Despite the rarity of ceramic small finds, there is some suggestion of change through the sequence. Poorly fired figurine fragments, animal and possibly human, occur only in layers 1 and 2. The most nearly complete figurine is from level 17 and can be read as a human, probably male, with a pronounced umbilical hernia (Fig. 32). What might be bracelet fragments but are more likely to be pottery spike appliqués of the kind that frequently decorate pots that represent spirits occur in layers 2-5 (Fig. 22e, g). Other pieces may be fragments of pots, for example strap handles, or smoking pipes, and there are a number of pellets and larger pear-shaped items, always with the narrow end broken off.

Nothing in this series is of obvious chronological or other major cultural significance. Sukur, like most other African villages, now has access to inexpensive glass and plastic jewelry. Cheap toys are less available and there is still a strong tradition of making various forms of model cars with wire scraps, string, home-made or purchased, and locally available woods. Sukur children still make clay models, though we have not known them to be fired, and their subjects are sometimes surprisingly modern (Fig. 33). It is therefore not surprising that a considerable proportion of the ceramic small finds inventory appears to consist of child-related playthings and items of adornment, including ceramic beads, that have for the most part recently been replaced by purchased imports or items modeled on imports.

Table 7. Ceramic small finds, excluding beads, by layer and level. Illustrated items are indicated by an *asterisk.

Layer	Level	Artifacts	Pellets
6	1	–	
	2	–	
	3	–	1
	4	**2 smoking pipe/flask frags	
	5	–	
5	6	*1 perf. head of ?amulet *1 subcylindrical fragment.	
5 & 4	7	*2 spike pot appliqués 1 short, sub-cylindrical fragment	
4	8	1 pear-shaped object	2
	9	–	4
	10	–	*1
3	11	**2 spike pot appliqué	*1 (diam 16)
	12	–	
3 & 2	13	*1 bracelet frag. *1 elongate frag (L 22, W 8) *1 pear-shaped objects (L >2 cm)	2
2	14	*1 bracelet or strap handle frag **2 spike pot appliqués *2 pear-shaped objects (L ~3 cm)	*1
2 & 1	15	*1 figurine, animal, frag.	*1
1	16	*1 figurine, animal, frag. *1 "scoop" frag. *1 sherd with “cowry” appliqués and twisted strip rouletting	**2
	17	*1 figurine, human or cow, damaged in antiquity 1 figurine, crude animal, barely fired (L 32).	1
	18	–	

Beads in glass, "carnelian", iron and other materials

Glass

The data recorded in the field on glass beads are of limited value. They were first studied under primitive conditions without reference materials. Handling and cleaning especially of tiny examples was difficult and we had only a low power hand lens for magnification. Samples were photographed by level and a small selection, including all the beads from level 2, was returned to Canada in the hope that further analysis would allow the materials deposited with the National Museum's Yola branch to be better characterized. Table 1 of Appendix 2 is my attempt to describe the selected sample in the manner used by DeCorse et al. (2003) in their "Toward a systematic bead description system …" paper. This learning experience made it possible for me, using field photographs and notes, to develop a catalog of all the glass beads described according to the same principles but in simplified form (Appendix 2, Table 2). Figure 34 provides illustrations of a sample of beads from top to bottom of the deposits.

The language of description is drawn from DeCorse et al. (2003). The variables recorded in the various tables include:

bead count,
my reading of the manufacturing technique (wound, drawn and in one case molded),
structure (simple and compound, the latter here implying the presence of one or occasionally two coatings over the body of the bead),
shape (discussed below),
bead length and diameter,
remarks on the perforation (not included in DeCorsian analysis),
luster (Dull or Shiny),
diaphaneity (Opaque, Translucent)
color of bead body (in broad categories, turquoise covering a range of blue-green and green-blues)
color of coating(s) if present, and
remarks

The 'Secondary modification' variable is omitted as I am unable reliably to record the various techniques that give beads their final shape. Similarly I do not venture to comment on the 'Origin and age' of the beads.

The shape categories in DeCorse et al. (2003) are not fully specified. Here I use the following categories:

'Globular' beads approach the spherical but usually show some flattening of the ends.
'Short Globular' beads approach the globular but, in part because of flattening of the ends, their length is less than or equal to their diameter.
'Tubular' beads approximate the cylindrical form.
'Short Tubular' are tubular but with diameter equal to or greater than length. Smaller examples are sometimes described as 'seed beads' and often have very narrow perforations.
'Globular-Tubular' refers to beads with bodies intermediate between globular and tubular, and with ends usually flattened and/or rounded off (by whatever means)
'Ellipsoidal' beads may be regarded as a sub-category of 'Glob-Tub' but have regularly curved ellipsoidal outlines.
'Doughnut' beads approach the form of a ring with a (sub-)circular cross section, and are usually large with perforations that are wide relative to their size.

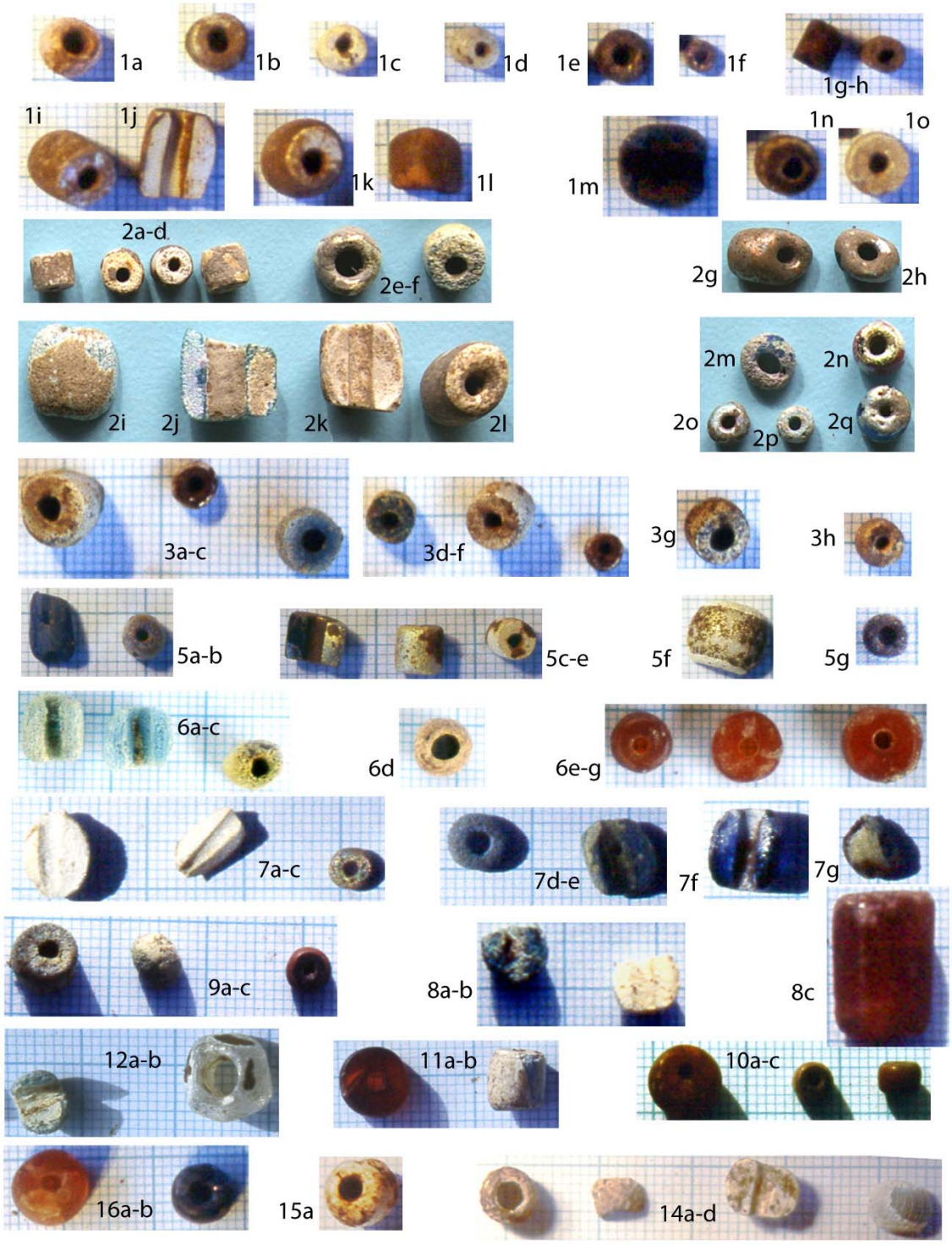


Figure 34. Glass and carnelian beads all to approximately the same scale as indicated by the millimeter paper background. Numbers relate to levels and lower case letters to individual beads described in Appendix 2, Tables 1 and 2,

In the summary table (App. 2. Tab. 2), bead sizes are grouped as indicated below, the measurement (mm) being the greater of the length of the bead or its diameter:

Large	>12 mm
Medium	9-12 mm
Small	5-8 mm
Tiny	<5 mm

The glass beads are of relatively simple types, mainly wound, some smaller examples drawn, and one single example from low in the sequence molded (Fig 34: 12b). Lack of standardization and departure from geometric forms indicate that they were produced by artisans rather than industrial machines. Almost all the compound beads have a single coating over the wound core.[3] Formal variety is limited as, for example, compared with the range found in the post-European contact bead series from the Upper Senegal region studied by DeCorse et al. (2003). However, it seems probable, and in the case of the drawn beads almost certain, that the majority of the beads are of European origin. This is to be expected of a collection that ended up on a site occupied by non-Muslims living at the margin of the Central and Western Sudan zone trading spheres.

Carnelian

Carnelian[4] beads are described with beads of other materials in Appendix 2, Table 2 and illustrated in figure 34 and with other small finds by levels. Seven were found, two from layers 1-3, five from 4 and 5, and one from layer 6. Thus the distribution of carnelian beads contrasts with that of glass.

Iron

Sixteen much rusted iron beads occur in layer 6, 15 of them long, narrow tubular examples (e.g., L 22, diam 4) (Fig. 12f) and one short tubular example (L ~4, diam ~6) One other short tubular bead was recovered from layer 2. The suggestion here is of an increased availability of iron at the time of the latest layer (6) of midden deposition.

Ceramic

Pottery beads fall into two broad categories: sometimes crude versions of various forms of glass or carnelian beads, and ring beads, some also crudely made, others with a red wash or black burnished surface treatment (Fig. 13a and b). Appendix 2, Table 2 provides descriptions. Ring beads are larger in diameter than glass beads and vary from carefully made flat examples with thinned outside edges (e.g, L 3, diam 16, perf 7) to pieces with carinated and sub-round cross sections. While some were likely made by children, better-made and decorated examples may have adorned women's belts, and if so were subsequently replaced by rings of brass or iron (*Fig. 29). This would be consistent with a fall in the ratio of rings to glass beads through time from 1 to 0.35 to 0.21 (Table 8).

[3] I am uncertain whether some beads designated as compound with white or turquoise cores and brown coatings might not be simple beads with exterior patination and in some cases exfoliation.
[4] I am unable to determine whether, besides carnelian, any of the red stone beads recovered are of chalcedony or jasper.

Table 8. Frequencies of ceramic ring beads and other bead forms by layer compared with glass beads.

Layer	Rings and Fragments	Beads and Fragments	N	Glass beads and Fragments
6	6 & 10 frags	−	16	78
4 & 5	2 & 1	3 & 2	8	23
1-3	1 & 6	2	9	9
n	9 & 17	5 & 2	33	110

Fruit

Beads made of the hard exterior of the small fruits of the hackberry (*Celtis integrifolia*) with their proximal and distal ends pierced occur in small numbers from levels 6-14 (Fig. 24a).

Conclusions

Type of site

It is time to revisit the questions raised in the introduction. The popular designation of the mound as a midden is entirely justified by the soft, often ashy, nature of the deposits, the evidence of small dumps of material and the presence of bone and numerous artifacts, mostly fragmentary and small, discarded and in some cases lost. Although present Sukur use of middens would lead one to expect that the Hidi Midden would have been exploited for compost, there are no features − pits for instance − that would indicate that such digging took place. Disturbance by animals of various kinds is at least partially responsible for the featureless nature and homogenization of the deposits, particularly in the upper layers 5-6, which were deposited horizontally, and layer 4, which starting from the harder, redder, sloping surface of layer 3, brought the surface to the horizontal.

The surface of layer 3 may indicate a brief cessation of deposition; it certainly marks a change in formation of the midden. The upper levels of layer 1 and layers 2 and 3 continue to be midden deposits though with quantities of artifactual material, less ash and more and in places larger particles of grit. The marked slope of the deposits down from southeast to northwest is suggestive of a smaller, more steeply sloped midden with its high point located not more than a few meters to the south and east of the test pit. The lower levels (17 and 18) of layer 1 contain fewer archaeological materials with some less well preserved bone. This represents a transition spanning natural deposition, pre-midden human activity and the first midden deposition.

The form of the midden (Fig. 5), the stratigraphy of the test pit (Fig. 8) and the good to almost fresh state of preservation of the bones in all but the lowest levels indicate that it began to accumulate to the south east of the test pit and that, especially following the start of layer 4, it was built up very quickly, extending northwards 30 m or so from its point of origin. This suggests that from layer 4 times it was serving a significantly larger social group, mostly coming from the northeast. One question we cannot answer definitively is whether the midden was exploited for compost. However, there is no sign of it in the excavated area nor surface indications elsewhere except on the western side where it is being progressively undermined − but not actively mined − by cultivation of the slope below. This is probably because of the Sukur belief that the midden is

associated with the chieftaincy and should therefore be preserved (Fig. 35).[5] I conclude that unlike other middens the Hidi Midden was not used as a compost heap to provide nutrients to nearby fields.

Dating

We have seen that the radiocarbon dates are of no use for tracking the development of the midden. The presence of cowries is of potential significance for dating. According to Johnson (1970: 33):

> Cowries reached Hausaland, if the Kano Chronicle is to be believed, in the first half of the eighteenth century, and Hiskett has argued that they reached there from the south rather than from the west. They were known to be the currency of Katsina in 1790, when Beaufoy was reporting from North Africa, and there is no suggestion that they were of recent introduction at that date. By 1822, when Clapperton was there, cowries had reached Katagum, but not Bornu; we know that they were introduced into Bornu shortly before Barth's visit there in 1850, but had not in his time reached Adamawa. By the 1890s cowries were in use in Adamawa also …

Johnson also states that cowries "spread up the Benue only during the nineteenth century − in mid-century, they were current 'only if Hausa traders were met with'." She is primarily concerned with the adoption of cowry currency, and diffusion of cowries to a particular region or state may antedate any monetary role by a considerable period of time. It is also the case that, whereas there would have been some delay in cowries reaching the Mandara mountains whether via the Benue or from the Sahel zone, Sukur, as a center for trade in iron, is likely to have received cowries earlier than the majority of its neighbors. It could be therefore be argued that, as cowries were already present at Sukur no later than layer 2 times, virtually the whole of the Hidi Midden sequence dates to the second half of the 19th century and later. Such an inference does not conflict with the radiocarbon determinations but it is incompatible, in my view, with the volume of the site and its over three and a half meters of − admittedly fast accumulating − deposits.

Let us take a different approach and ask how early the site might be. Cowries are present only in spits 1-4 of the main Cutting VIII at Daima. These units "present a telescoped chronology with alternating deposition and erosion creating a mixed assemblage", representing in part a "spasmodic kind of occupation" that may "have extended till the seventeenth or even the eighteenth century…" (Connah 1981: 166-7). Cowries are not present in extensive excavations at Cameroonian DGB sites located only 35 km to the north-northeast and well-dated to the 15th-17th centuries (David 2008: 55 and Scott MacEachern pers. comm.. 2013). These monumental sites might be expected to attract exotic items such as cowries. On the plains around the north of the mountains, no cowries were found in a large test excavation at Mehe, a large site with much evidence of smelting and iron working, thought to have been abandoned at or after the formation of the Wandala state in the 15th-16th centuries AD (Wahome 1989:64) A single cowry is present in Unit 3, Level 2 of Projet Maya-Wandala site 631, located north of Doulo and associated with Wandala occupation attributed on the basis of the ceramics to the 17th-19th centuries AD (Scott MacEachern pers. comm. 2013). I infer that no cowries were present in the Mandara region before AD 1500 at the earliest. At the Hidi Midden, the two earliest actual cowries appear in level 15 which spans the layer 2 to 3 transition. There are no other examples until above the marked stratigraphic break represented by the start of layer 4 deposition. It is of course possible that the ceramic appliqués in level 16 do not represent cowries and that the two examples from level 15

[5] It took a great deal of explanation and discussion with the chief and elders including important titleholders before I was allowed to put in the test pit.

are examples of downwards movement in midden deposits liable to disturbance. But the well-marked surface of layer 3 argues against an intrusion from layer 4 into layer 2, though intrusion from 3 into 2 is not impossible. Thus a conservative conclusion would be that:

1. Cowries were present, even if as rarities, at Sukur no later than layer 3 times.
2. Given our historical and archaeological knowledge of cowries in the region, layer 3 is unlikely to date earlier than AD 1700 or later than the mid-19th century.
3. Given our understanding of the Hidi Midden as an archaeological site, layer three is unlikely to date later than the early 19th century.
4. The best estimate for the deposition of Layer 3 falls between AD 1700 and 1850.
5. Given the above and oral traditions regarding the non-use of the site as a midden in living memory (as of 1992), layers 4 through 6 are most likely to have accumulated between 1850 and the first decade of the 20th century, at the end of which Sukur life was seriously disrupted by the extension of intensive slave raiding into the Mandara mountains by Hamman Yaji, Fulbe ruler of Madagali (Vaughan and Kirk-Green, eds, 1995; David 2012c).
6. We may refine the 1850 date for the start of the layers 4-6 accumulation to 1840 or possibly earlier on the grounds that, when Heinrich Barth (1965: 116-17, note) passed by to the west in 1851 Sukur had already achieved a notable reputation, attributed by the German explorer's informants to the chief's ritual powers but more probably associated with Sukur's dominant position in the iron trade.
7. If this is the case then some 175 cm of layers 4-6 midden deposit accumulated in about 70 years, a rate of 2.5 cm per annum. This figure represents the maximum rate − after the rotting of contained organics and some compaction − of deposition of materials in the deepest part of the midden. Although high, it is certainly possible.

Human activities represented by the archaeological remains

Although the artifacts found in middens are mostly fragmentary and occur in a context of discard, they capture traces of a wide variety of activities relating to a social group that in today's Sukur rarely exceeds two closely linked nuclear, polygynous or extended families. The household constitutes a nexus through which materials from a wider catchment area comprising fields, markets, forges, workshops and the like pass en route from the systemic to the discard and, if the midden is not mined for compost, archaeological context. Thus the arti- and eco-factual contents of the midden have tales to tell, always supposing we have the right questions. It is time to review the most important of them from that perspective.

Many fragments of beer jars were noted on the midden surface and I remarked on the quantities of pottery in level 1, the similarity to modern Sukur wares, the abundance of burnished bowls, now and certainly also in the past used for serving and eating the sauces that accompany the staple thick millet porridge, and the rarity of large very wide-mouthed beer brewing pots (*duguzuwa*). As beer is drunk from gourds ("calabashes") that do not preserve, this assemblage might be indicative of festive beer-drinking, but unfortunately my notes on lower levels lack such information and the pottery analysis that might have been carried out by Nigerian archaeologists and students has never taken place. Information on the bone is a little better. It was agreed by the chief and other Sukur observers that bone fragments were often larger and the quantities recovered greater than in modern Sukur middens − in level 15 there was about three times as much bone as decorated pottery. We can infer both that more meat was consumed and that it was being less intensively processed. This in turn suggests that the household or households contributing to the midden contributors enjoyed overall good nutritional status, perhaps better

than that of most montagnards today despite the droughts, plagues and other natural disasters to which the Mandara mountains are only too often victim (Beauvilain 1989).

Until the 1990s grinding grain was a time and energy consuming daily task, the responsibility of women and girls and carried out either in a kitchen or grinding room on shaped grindstones set in grinding tables, though (much) earlier on nearby rocks (David 1998). Lower grindstones when they wear out or break are very unlikely to end up in a midden: they will be used as building materials or incorporated into terraces. Only small fragments of the much smaller upper grindstones (handstones) are likely to be discarded with domestic rubbish and the same is true of fragments of the quartz-rich hammerstones used for roughening lower grindstone surfaces by pecking. Thus in the recent past grinding was a quintessentially domestic activity. Smelting − a Sukur village industry carried out both by farmers and smiths − was on the other hand carried out some distance − tens of meters or more − from the house and was the responsibility of men and boys, though women sometimes assisted by pumping the bellows. Mandara montagnard smelters make use of magnetite ore and special furnaces in a process that produces less slag than the majority of African smelting technologies but nonetheless considerable numbers of fragments (David et al. 1989). Some slag adheres to the iron blooms removed from the furnace and is brought back to the house. The mechanical process of fining, removal of slag from the bloom by hammering, is likely to result in slag littering the area in and before the house, and it is such materials that are most likely to end up in general purpose middens. (Smiths have their own waste piles incorporating slag and the "forge cake" that forms at the bottom of their hearths.)

It follows that the ratios of upper grindstone to slag fragments by layer, standardized by expression as fragments per cubic meter of deposit excavated, can be regarded as a crude index of the relative importance of domestic versus industrial activities practiced within a midden's catchment area. The figures set out in table 9 give us no idea of the actual amounts of grinding and smelting represented by the samples but only changes in intensity through time and relative to each other. There is surprisingly little change in the figures for grindstone fragments per m^3 of deposit but, if we attribute the anomalous layer 4 data to sample size, there is a marked contrast between layers 2 and above and layer 1, the latter having almost four times as much slag per cubic meter as any of the later layers.

Layer 1 was earlier identified as representing a transition to midden from near natural deposits, the latter containing artifactual and ecofactual remains associated with cultivation or other activities. The high concentration of slag fragments is consistent with smelting being one of these. This makes excellent sense in view of the positioning in the landscape of the ridge on which the midden is located. Furnaces were frequently sited to catch any breeze from the west and, below and only 180 m west of the midden, there is a north-south ridge crossed by the northern paved way along which the ruins of several furnaces are located. We may reasonably infer that in early layer 1 times, one or more furnaces were located in the immediate area of what was to become the midden.

We can use a similar approach, this time contrasting iron artifacts with slag, to investigate the extent to which the assemblages from the various midden layer represent consumption versus production (Tab. 10). Once again the absolute frequencies have little meaning but the ratios demonstrate the marked contrast between the more industrial layer 1 and the more consumption oriented upper layers, layer 3 appearing somewhat anomalous in this regard.

Table 9. Comparison of frequencies and ratios of upper grindstone and slag fragments by layer and volume of deposits excavated. Artifacts from levels that transgress layers are distributed between them.

Layer	Deposit (m^3)	Upper grindstone fragments	Slag fragments by layer	Grindstone frags /m^3	Slag frags /m^3	Ratio (G/m^3 : S/m^3)
6	3.64	14	127	3.8	34.9	1: 9.2
5	0.78	2	23.5	2.6	30.1	1:11.6
4	1.07	6	4.5	4.2	4.2	1:1
3	0.40	1	12	2.5	30.0	1:12
2	0.42	1	15.5	2.4	36.9	1:15.4
1	0.35	1	52.5	2.9	150	1:51.7

Table 10. Comparison of frequencies of iron artifacts and fragments (including beads) and slag fragments by layer and volume of deposits excavated.

Layer	Deposit (m^3)	Iron artifacts (incl. frags)	Iron artifacts /m^3	Slag frags /m^3	Ratio (I/m^3 : S/m^3)
6	3.64	98	26.9	34.9	1:1.3
5	0.78	20	25.6	30.1	1:1.2
4	1.07	23	21.5	4.2	1:0.2
3	0.40	1.5	3.5	30.0	1:8.6
2	0.42	6	14.3	36.9	1:2.6
1	0.35	2.5	7.1	150	1:21.1

Table 11. Frequency of glass beads (complete + fragments) by layer and volume of deposit excavated (m^3)

Layer	Deposit (m^3)	Total beads	Beads per cu. m.
6	3.64	78	21.4
5	0.78	11	14.1
4	1.07	12	11.2
3	0.40	3	7.5
2	0.42	4.5	10.7
1	0.35	1.5	4.3

Change is expressed also in the glass bead components of layer assemblages. First, it is evident that beads are substantially more common in Layer 6 − the top meter of the deposits − than below (Table 11). Second, despite some small sample sizes, there is a strong suggestion that there is an increase in bead frequencies following the change in depositionary process that occurred at the start of layer 4.

Changes in bead abundance are paralleled by changes in their typology shown in Table 12. Layers 1-3 are characterized by globular white and turquoise beads. One of the two compound beads is a unique, probably press molded, pentagonal piece. In layers 4 and 5 there is a partial shift from globular to globular-tubular forms but white and turquoise remain the most common colors. In layer 6, the frequency of compound beads increases from about a fifth to a third of the total. Tubular and short tubular, frequently tiny, beads generally made by drawing

become a common element in the series. Large doughnut beads made in dark blue glass appear for the first time.

While there is undoubtedly much more to be said about this collection, I interpret the bead series from the test excavation as evidence of a substantial increase in the ability of Sukur to attract exotic trade goods from layer 4 times, which may have begun about 1840, with the process peaking in layer 6, dating from about 1870 to 1910. This was directly associated with Sukur's success as a producer and seller of iron and iron goods.

Table 12 a-c. Formal variation in beads (including fragments) by layer, level, shape and size.

a) Layers 1-3

Color	Size	Glob	Glob-Tub	Tub	short Tub	Doughnut	Other	n	N
	l, m							0	
White/Grey	s	3	1					4	4
	t							0	
	l, m							0	
Turquoise	s	2						2	2
	t							0	
	l, m							0	
Blue	s	1						1	1
	t							0	
	l, m							0	
Black	s							0	0
	t							0	
	l, m							0	
Red-Brown	s							0	0
	t							0	
	l, m							0	
Compound	s			1				1	2
	t						1	1	
N=		6	1	1	0	0	1		9

b) Layers 4 and 5

Color	Size	Globular	Glob-Tub	Tubular	short Tub	Doughnut	Unspec.	n	N
	l, m							0	
White/Grey	s	3*	1					4	4
	t							0	
	l, m							0	
Turquoise	s	1	9	1	1			12	12
	t							0	
	l, m							0	
Blue	s							0	0
	t							0	
	l, m							0	
Black	s				1			1	1
	t							0	
	l, m							0	
Red-Brown	s							0	1
	t		1					1	
	l, m						2	2	
Compound	s							0	5
	t		2		1			3	
N		4*	13	1	3	0	2		23

*2 Ellipsoidal fragments

c) Layer 6

Color	Size	Glob	Glob-Tub	Tub	Short Tub	Doughnut	Unspec.	n	N
	l, m		2			1		3	
White/Grey	s	3		3				6	19
	t	1		1	8			10	
	l, m							0	
Turquoise	s			3				3	7
	t		1	1	1	1		4	
	l, m		1	1		3		5	
Blue	s	2		1	2			5	12
	t			1		1		2	
	l, m							0	
Black	s							0	1
	t			1				1	
	l, m							0	
Red/Brown	s			1				1	1
	t							0	
	l, m		1					1	
Compound	s	3	9		6			18	26
	t	1		1	5			7	
Unspecified							12 frags		12
N		10	14	14	22	6	12		78

The midden and the chieftaincy

Finally there is the question of the association, universally accepted at Sukur, of the Hidi Midden site with the chieftaincy. To this an obvious objection is that unlike almost all Sukur middens, the Hidi Midden is sited above the Hidi House. We shall consider various arguments and counter-arguments after a brief review of what is known about the building of the present Hidi House. This has not changed since Smith and David (1995: 446) wrote:

> There is no absolute date for the construction of the Hidi House.[6] The people consider it very ancient and attribute its construction to superhuman agency. The great monoliths which form [the northern gate into the Mbuk enclosure] … are called Fula and Dəvə after legendary giants who, aided by shamanic seers pressed into service from neighboring communities, are said to have built the enclosure's great terraces, paved passages, and walls in a single night. Peter Berger (1973) has convincingly shown that the 'cosmologization' of places and objects removes them from the domain of human labor and thus lends their organization or form significant symbolic force. That Hidi Sukur's house was constructed not by men under human coercive authority but rather by supernatural beings gives sacred sanction to the social relations implied by its built environment. Occupation of sacralized space endorses the position of the Hidi atop the Sukur hierarchy.

Variants of this story, some of which involve Sukur men attempting and failing to cut down and bring to Sukur the great peak (a volcanic plug) of Kamale, are found in the some of the earliest European accounts (e.g., Kulp 1935; Kirk-Greene 1960).

The construction of the present house is most probably associated with Sukur's achievement of a leading role in iron production and trade with northerners who had international connections. This can be reasonably be associated with layers 4-6 of the Hidi Midden. Therefore a date of around 1840 seems the most likely for the construction of the present Hidi House. It is remarkable that, despite internal political divisions, all Sukur appears to have bought in to the cosmologizing account, presumably because it was in everyone's economic interest that the Hidi, patron and guarantor of the iron market, received maximum respect from visitors. Ideology indeed plays a role in the present discussion, but let us first deal with more practical issues.

Who besides the household of the Hidi might have contributed to the midden? Figure 3 shows a Google Earth view of the Hidi House complex and its surrounds as of June 2011. There are and to the best of our knowledge have never been houses on rocky Muzi hill or below and to the west of the midden. Houses in Gwasa, reached from the Hidi House down a steep path, have their own middens, as do houses in Dunggom ward 80 m and more to the south. The only regular potential source of midden materials is thus either the Hidi House of today or its supposed predecessor, indicated on figure 3 by a question mark.[7] I believe that both these houses contributed.

There are in upper Sukur at least three locations popularly described as former chiefly houses. Of these, two are characterized by house remains, gateways and/or stairways, built of

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[6] In the original Hidi was spelled Xidi. This was an error that I have corrected in this quotation (see http://www.sukur.info/Lang/langindex.htm).

[7] In the heyday of the iron trade, the enclosures between the midden and the Patla are believed to have been used by traders for a variety of purposes including stabling animals. Some of the waste materials resulting from such activities may well have been deposited on the midden, contributing to its rapid build up. Ceremonies conducted on the Patla also produce a certain amount of waste and it would have been appropriate to deposit this on the Hidi Midden

very large granite slabs or uprights. There are no explanatory traditions relating to these places that I have been able to elicit and I believe that they are associated with the chieftaincy for no other reason than the perceived architectural similarity to features of the existing Hidi House. On the other hand, the supposed house next to the Hidi Midden lacks any such elements (Fig 36). Indeed there is nothing visible on the surface besides a few boulders, rubble and a thorny thicket containing shrines to former chiefs (in the form of small and often broken jars of no artistic or monetary value). It is paradoxically the absence of striking architectural features and the presence of this grove and its contents that constitute the best evidence for the existence here of a former Hidi House. Once this is granted the position of the midden is no longer anomalous but becomes entirely appropriate.

Figure 36. The Hidi Midden seen from the north. Part of the present Hidi House can be seen on the left of the image. The earlier Hidi house is believed to have been located in the burnt area in the center of the image near the tall *hurumgə* tree. To its left (east) is the small thorny grove that contains small pots representing past Hidis.

The earlier Hidi House on the ridge between the midden and Muzi hill had available to it not more than one third and probably less of the 0.65 hectare space of the main Hidi House enclosure and could have accommodated only a few wives and their children. A social group of that size accords well with the smaller midden of layers 1-3 but not with the much larger midden of layers 4 to 6. It would seem then that even after the construction of the existing Hidi House the old midden continued to accumulate and at a more rapid rate.

There are no convincing economic reasons for the continuing use of the Hidi Midden when to carry waste to it from the existing chiefly residence required a roundabout route of about 100 m passing through either its southwestern or northern gateway. Limitations of space may then have constrained the disposal of organic materials within the Hidi House (it does not today), and, given the sacred nature of gateways and the public nature of the Patla, the areas outside the main gateways may have been considered unsuitable for waste disposal. But Hidi's dependents

could have tossed rubbish over the walls or outside a former eastern gateway, or, as also happens today, down the slope east of the northern enclosure.

Other factors were in play. The present Hidi House is produced space that, amongst other things, inverts the male/senior/higher : female/junior/lower trope widely expressed in Sukur and other montagnard architecture in order to represent the chief as a nurturing figure, "the wife of the people of Sukur" (Smith and David 1995:456). However, another theme that becomes especially apparent during the Yawal ceremony is the celebration of the chief and of his Dur clan. At one point the chief, titleholders and members of the clan process from the Yawal shrine to a dancing ground singing a song that treats other Sukur as "*vay*", slaves. During this ceremony the Hidi is capped and veiled and dressed in clothes − flowing gown over tunic and baggy trousers − modeled on those of a Muslim Emir. The retention of the Hidi Midden for waste disposal responds to both themes.

Figure 37. The Hidi Midden mound seen from Patla, the public and ceremonial area next to the chief's house, June 1991.

The location of the midden can be seen as an extension of the inversions seen within the Hidi House where wives and children housed in sector C were located higher than the Hidi, whose inner house is located below the intersection of two paved ways that lead down from the main entrances. But, and here the second theme is in play, the midden and its location are also a form of conspicuous consumption. Prominently located in proximity to and above the Patla (Fig. 37), it proclaimed the power and authority of the Hidi and the richness in people of his and his forebears' households. This boast was underscored by the fact that this, unlike all other middens, was *not* used to fertilize fields, a form of conspicuous consumption comparable to a cannibal not eating missionaries. The force of this argument is considerable, so that I hardly need to mention that Hidi Gezik Kanakakaw informed me in 1993 that the right to wear carnelian beads was reserved for the chief and his family. Much more convincing because of its ritual statement of

continuity was when, in September 1992, on the morning of Zoku, Sukur's annual purification ceremony, Hidi's wife came out of the Hidi House via the Mbuk enclosure and walked south along the paved path in order to discard ash, rotten thatch and other symbols of the departed year on the Hidi Midden.

In this paper, I have presented the data from a test excavation at Sukur that was carried out under adverse conditions. The excavation was below modern standards and data analysis is incomplete. I hope the latter will soon be remedied in part by an analysis of the bone to be undertaken by Veerle Linseele of the Laboratory of Biodiversity and Evolutionary Genomics, KULeuven, kindly arranged by Scott MacEachern. Apart from the sample of small finds temporarily held in the University of Calgary's Archaeology department, the collection remains in the care of the Nigerian National Museum, Yola branch. I hope that it will form the basis of a thesis by a Nigerian student.

Where I believe I have been able to make a contribution is in using my knowledge of Sukur culture and history to explicate the Hidi Midden and its place in Sukur history. I am myself surprised where this analysis has taken me, surprised that the part of the site that demonstrably is a midden should be so recent and have accumulated so fast, surprised that the existing Hidi House should have been built only in the mid 19th century, and astonished that the heyday of Sukur's iron production should also have been so late − though we know as yet nothing about its beginnings. I feel a little like Heinrich Barth (1965 II: 116-17, note), who having been told that "The Prince of Sugúr overawes all the petty neighboring chiefs …" came to his own conclusion (Ibid.: 100): "I perceived more clearly, as I advanced, what a small province [Sukur] must be, comprehending little more than the capital and a few hamlets close around." But what does not surprise me in the least is that, despite the horrific brutality and disruptions of early 20th century slave raiding and the cauterization of historical memory effected by Hamman Yaji, there is a fundamental truth in Sukur's knowledge of itself, and in its respect for a garbage dump that has a tale to tell.

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Figure captions

*Figures marked by an *asterisk appear in HMreportEthnoFigs2013.pdf.*

*Figure 1. A midden in Midalla ward, Jan. 1993.

*Figure 2. A midden in Midalla ward showing evidence of digging for compost, Jan. 1993.

Figure 3. The Hidi House complex and its surrounds showing houses in Dunggom and Gwasa wards. The "?" indicates the location identified by Sukur as that of a former Hidi House, "Mbuk" the northern enclosure containing the council chamber, and "C" the sector in the chief's residence where most wives and children were housed. Base image copyright of Google earth and Digital Globe 2013.

Figure 4. Plan of the Hidi House complex showing the Patla and the Hidi Midden. For further information on the Hidi House see Smith and David (1995). Note that the assembling of three separate plans, of the House, Patla and the Midden, degrades accuracy.

Figure 5. Plan and section of the Hidi Midden.

Figure 6. Work in progress on the Hidi Midden. View from the southeast with Muzi hill in the background.

*Figure 7. Excavation of the Hidi Midden with sorting of finds and sieving in progress. View from the south with Muzi hill in the background.

Figure 8. Stratigraphic section and photo collage of the south wall of the Hidi Midden excavation showing layers and levels.

*Figure 9. The test pit seen from the north. James Ameje, squatting on the surface of layer 3, completes excavation of level 10.

Figure 10. Pottery, mainly fragments of beer jars, scattered on the surface of the Hidi Midden.

*Figure 11. Beer jar fragments from the surface of the Hidi Midden. Their rims are more everted/flared than recent examples. The Swiss army knife is 9.1 cm long.

Figure 12. Level 1 selected small finds: a) industrial chain fragment; b) brass wire; c) bone disc; d) cowries; e) iron ring; f) tubular iron bead; g, h) curved iron band fragments.

Figure 13. Level 2 selected small finds: a, b) ceramic ring bead and fragment; c) cowry; d) awl?; e) iron fragment; f) short tubular iron bead; g) iron object, possible costume item; h) iron ring.

Figure 14. Level 3 selected small finds: a) iron knife; b, c) iron rings; d) damaged brass bead, enlarged in the inset h; e, f) ceramic ring beads; g) tubular iron bead and fragment.

Figure 15. Level 4 selected small finds and item a from level 5: a) iron rod with eye, thatching needle?; b, c) fragments of tobacco pips or small flasks; d, e) iron awls; f) child's iron bracelet fragment.

Figure 16. Level 5 selected small finds: a) cowry; b) head of lip pin; c) lip pin; d) iron tool socket; e) iron bracelet.

Figure 17. Level 6 selected small finds: a) iron rod; b) ceramic ring bead' c) ceramic globular bead; d) ceramic carinated bead; e-g) carnelian beads; h-j) iron fragments; k) sub-cylindrical pottery fragment; l) perforated head of ceramic amulet?

Figure 18. Level 7: selected small finds: a) ceramic appliqué spike?; b-c) ceramic strap handles?; d) unidentified ceramic; e) brass wire ring; f) iron awl head?; g) ivory bangle fragment; h, i) iron fragments.

Figure 19. Level 8 selected small finds: a) iron razor; b) brass iron ring fragment; c) carnelian bead; d, e) globular ceramic beads; f) iron fragment.

Figure 20. Level 9 selected small finds: a) ceramic ring; b) iron ring; c) flattened iron fragment; d, e) iron fragments.

Figure 21. Level 10 selected small finds: a-c) cowries; d) ceramic pellet; e-h) iron fragments.

Figure 22. Level 11 selected small finds: a) ceramic bead; b) *Celtis* fruit bead; c) carnelian bead; d) iron ring; e, g) spike pot appliqués; f) ceramic pellet; h) four fragments, 2 black burnished of ceramic rings.

Figure 23. Level 12 selected small finds: a) ceramic ring fragment, carinated; b) bone lip pin head (charred).

Figure 24. Level 13 selected small finds: a) *Celtis* fruit bead; b, d) ceramic ring fragments; c) bone lip pin; e) ceramic object; f) ceramic pellet; g) ceramic pear-shaped object; h) spirally wound piece, identified as spear butt binding..

Figure25. Level 14 selected small finds: a) iron bead; b) crude ceramic bead, damaged; c) ceramic ring fragment d) ceramic bracelet or strap handle fragment; e) ceramic spike appliqué ?; f) bone lip pin fragment; g) sub-cylindrical ceramic fragment; h, i) pear-shaped ceramic objects; j) ceramic pellet; k-m) iron fragments.

Figure 26. Level 15 selected small finds; a) damaged animal figurine; b) large ceramic pellet; c-e) iron fragments; f, g) cowry and fragment.

Figure 27. Level 16 selected small finds: a) ceramic pellet with partial perforation; b) ceramic "scoop" fragment; c) carnelian short globular-tubular bead; d) ivory bangle fragment; e) ceramic pellet; f, g) ceramic ring fragments; h) iron knife blade fragment; i) ceramic animal figurine fragment; k) sherd with cowry (?) appliqués.

*Figure 28. Items of Sukur women's traditional costume including an apron decorated with brass beads, Sept. 1992.

*Figure 29. Sukur woman's belt decorated with brass rings, Aug. 1992.

*Figure 30. Sukur woman of Kapsiki origin wearing a wooden plug in lower lip and modeling a girl's chain apron, Sept. 1992.

*Figure 31. Women dancing at Mbər, the men's initiation ceremony, wearing traditional costume that includes a belt of cowries, Aug. 1992.

Figure 32. Damaged pottery figurine from level 17.

Figure 33. Sukur boys with unfired models of a DJ's sound system, April 2008.

Figure 34. Glass and carnelian beads all to approximately the same scale as indicated by the millimeter paper background. Numbers relate to levels and lower case letters to individual beads described in Appendix 2, Tables 1 and 2,

*Figure 35. Infilling the test pit on the Hidi Midden.

Figure 36. The Hidi Midden seen from the north. Part of the present Hidi House can be seen on the left of the image. The earlier Hidi house is believed to have been located in the burnt area in the center of the image near the tall *hurumgə* tree. To its left (east) is the small thorny grove that contains small pots representing past Hidis.

Figure 37. The Hidi Midden mound seen from Patla, the public and ceremonial area outside the chief's house, June 1991.

*Appendix 1. Figure 1. Soil samples from the south wall of the Hidi Midden test excavation and from nearby natural deposits.

Table captions

Table 1. Radiocarbon dates from the Hidi Midden, Sukur.

Table 2. Radiocarbon dates from the Hidi Midden. All are on charcoal and corrected for fractionation. Calibration by OxCal version 3.9 (Bronk Ramsey 2003).

Table 3. Characterization of potsherds collected on the surface of the Hidi Midden.

Table 4. Grinding equipment, hammerstones, quartz flakes, slag and tuyère fragments by layer and level.

Table 5. Iron artifacts, excluding beads, by layer and level. Illustrated items are indicated by an *asterisk.

Table 6. Bone and ivory artifacts and cowries by layer and level. Illustrated items are indicated by an *asterisk.

Table 7. Ceramic small finds, excluding beads, by layer and level. Illustrated items are indicated by an *asterisk.

Table 8. Frequencies of ceramic ring beads and other bead forms by layer compared with glass beads.

Table 9. Comparison of frequencies and ratios of upper grindstone and slag fragments by layer and volume of deposits excavated.

Table 10. Comparison of frequencies and ratios of iron artifacts and fragments (including beads) and slag fragments by layer and volume of deposits excavated.

Table 11. Frequency of glass beads (complete + fragments) by layer and volume of deposit excavated (m^3).

Table 12 a-c. Formal variation in beads (including fragments) by layer, level, shape and size.

Appendix 2, Table 1. Description of selected sample of glass beads after the DeCorse et al. (2003) system.

Appendix 2. Table 2. Description of beads by material, layer and level. Abbreviations as explained in the main text with the addition of “white\brown” relating to compound beads and indicating in this instance a white core with a brown coating (and other such combinations)

Appendix 1: samples of deposits described

All samples were taken from the South wall of the excavation (Figure 8).

8) Layer 6, levels 3-4. 115 E-W; 60 cm BS
Grey-brown fine sandy material containing much ash. Heavily stains fingers when moistened. Feels soft but contains some granitic grit 1 mm - 7 mm in max diameter, for the most part in the lower part of this range, and some granite fragments 1-3 cm in size. A few larger rocks and flakes are visible in the section.

7) Layers 4-5, level 7. 130 E-W; 112 cm BS
Deposit very similar differing in a higher ratio of grit to fine ashy material, and in color, being definitely redder (in part due to pink feldspar in the grit and in part to the burning of hearth material that probably was thrown out to form the deposit). The zone approx. 100 - 130 cm deep also contains some lenses with significantly more charcoal in them.

6) Layer 4, level 8. 92 E-W; 150 cm BS
Virtually identical to sample 8 but slightly browner (less ash) and containing numerous particles of charcoal of all sizes up to fragments of small branches 3 cm in diameter.

5) Layer 4, level 12. 75 E-W; 195 cm BS
Strong brown in color, higher proportion of fine sandy matrix to fine gravel sized particles (1 - 5 mm) and within this size range there is a much higher proportion of pieces at the smaller end of the range. Stains fingers considerably less than sample 8. Lighter in color (less grey) than sample 6.

4) Layer 2, level 15. 75 E-W; 260 cm BS
Very similar to sample 3.

3) Layer 1, level 16. 40EW; 280 cm BS
Much grittier; smaller proportion of fine sand and with a less marked reddish cast than sample 7. Grit contains a higher proportion of particles >5 mm in size. Charcoal present in some quantity.

2) Layer 1, level 17. 68E-W; 312 cm BS
Very similar to 3 but rather less charcoal. When moistened gives a dark brown smear.

1) Layer 1, level 18. from exploratory hole at 345 cm BS
Identical to 2.

0) 'Natural' deposit collected near a small baobab in the enclosure adjacent to (NW of) the Patla . Very similar to samples 1-3 though redder in color (less humanly generated discoloration by ash). Lumps of deposit hard to disaggregate. When moistened stains less and redder even than sample 1. On this evidence samples 1-3 are quite similar to the natural deposit but contain substantial amounts of cultural material accompanied by humanly generated fine grained material.

Figure 1. Soil samples from the south wall of the Hidi Midden test excavation and from nearby "natural" deposits.

Appendix 2: bead descriptions

Table 1. Description of selected sample of glass beads after the DeCorse et al. (2003) system.

Illustr. Fig. X	Level	Count	Manuf-acture.	Struct-ure	Shape	Length mm	Diam. mm	Perf-oration	Luster	Diaph-aneity	Color	Coating	Remarks
1j	1	1f	W	Cpd	Glob-Tub	8.5	7.0	cyl	D	OP	White	Brown	Coating much eroded
1l	1	1f	W	Cpd	short Tub	5.9	7.5	cyl	D	OP	Grey	Ocher/black	Sub-square section, rounded corners
1h	1	1	D	S	Tubular	4.7	3.8	cyl	D	OP	White		
2k	2	1 fr	W	S	Glob-Tub	8.6	8.0	cyl	D	OP	White		
2i,j	2	3 fr	W	Cpd ?	Glob-Tub	7.7 - 8.0	7.4 - 8.0	cyl	D	OP	Turq	Lt brown	Coating much eroded (or patina?)
	2	2 fr	W	Cpd ?	short Glob	5.4	7.0	cyl	D	OP	Turq	Lt brown	Coating much eroded (or patina?)
2l	2	1, 1 fr	W	Cpd	Glob-Tub	7.5	6.4	cyl - oval	D	OP	White	Dk brown	Coating much eroded
	2	1 fr	W	Cpd	short Glob	6.7	8.0	cyl	D	OP	White	Dk brown	Coating much eroded
2e	2	2	W	Cpd	short Tub	3.5 - 5.0	4.9 - 6.0	cyl	D	OP	White	Dk brown	
2f	2	1	W	Cpd	short Tub	5.1	5.1	cyl	D	OP	Turq	White	Coating much eroded (or patina?)
2q	2	1	W	Cpd	short Tub	4.5	4.5	cyl	S	TL	Pearly gray	Blue	Local oily sheen on exterior.
2h	2	1	W	Cpd	short Tub	3.9	5.6	cyl	S	TL	Pearly gray	Blue	Asymmetrical
2g	2	1	W	Cpd	short Tub	5.0	6.6	cyl	S	TL	Gray	Blue	Highly asymmetrical
2o	2	1	D	Cpd	(short) Glob-Tub	2.5	3.7	cyl	S	TL	White	Blue	Coating much eroded
2a,b,d	2	4	D	S	short Tub	2.9	3.6 - 3.7	cyl	D	OP	White		Exterior friable in one instance
2c	2	1	D	Cpd	short Tub	2.7	3.5	cyl-oval	S	OP	White	Dk blue	
	2	1	D	S	short Tub	2.5	3.2	cyl	D	OP	Gray		
2n	2	1	D	Cpd	short Tub	3.6	4.4	cyl	D	OP	White	Ocher red	

2m	2	1	W	S	Doughnut	1.6	4.9	wide, oval	D	OP	Turq.		
	2	1	W	S	short Glob-Tub	2.9	3.5	wider one end, sub-oval	D	OP	Turq.		
2p	2	1	W	S	(short) Glob-Tub	2.0	3.0	cyl	D	OP	Turq.		
	2	1 fr	W	S	short Glob	4.6 est.	5.2 est.	cyl	D	OP	Dk Gray		
	2	N= 27											
5d	5	1	D	Cpd	Tubular	4.9	4.8	cyl	D	OP	White	Lt brown	Ext coat much eroded (or patina?)
5g	5	1	W	S	Doughnut	1.9	4.9	cyl	D	OP	Dk grey		
7f	7	1f	W	Cpd	Glob-Tub	8.5	7.0	cyl	S	TL	Lt Grey	Dk blue	
7a	7	1f	W	Cpd	Ellipsoidal	~10	7 est	cyl	S	OP	White	White	Ext coat much eroded
	7	1	W	S	short Tub	6.0	8.0	cyl	S	OP	Black		
	7	1	W	S	short Tub	6.4	7.1	cyl	D	OP	Turq		
7d	7	1	W	S	short Glob	4.1	6.0		D	OP	Turq		Very fine longitudinal striations
7c	7	1	D	Cpd	short Tub	2.1	4.7	cyl	S	OP	White	Dk blue	Ext coat much eroded
10b	10	1	D	Cpd	short Tub	3.2	4.3	cyl	S	OP	Black	White under Ocher	Ext layer much eroded

Table 2. Description of beads by material, layer and level. Abbreviations as explained in the main text with the addition of "white\brown" relating to compound beads and indicating in this instance a white core with a brown coating (and other such combinations)

Layer	Level	Glass [number on Fig. 34]	Carnelian	Iron (and brass)	Ceramic	Fruit
6	1	1 fr Glob-Tub, dk blue, m 1 Tubular, red-brown, s [1h] 1 Cpd (?) Glob-Tub, colors ?, s [1n] 2 & 1 fr Cpd Glob-Tub, white\brown, s [1i, j, k] 1 Cpd short Tub, grey\red and black, s [1l] 1 short Glob, white, s [1a] 1 Tubular, white, s [d] 1 Tubular, dark blue, bent, s 1 Glob, grey, s [1b] 1 short Glob, dk blue, s [1e] 2 & 1 fr short Tub, white, t [1c, o] 1 Tubular, black, t [1g] 1 Tubular, blue, t [1f] 1 fr Tubular, turq, s n= 14 + 4 fr		8 tubular (~L 22, diam 4) and some fragments		
	2	1fr Glob-Tub, white, m [2k] 3 fr Cpd Glob-Tub, turq\lt brown, s [2i,j] 2 fr Cpd short Glob turq\lt brown, s 1 & 1 fr Cpd Glob-Tub, white\dk brown,s [2l] 1 fr Cpd short Glob, white\dk brown, s 2 Cpd short Tub, white\dk brown, s 1 Cpd short Tub, turq\white, s [2f] 1 fr short Glob, dk grey, s 1 Cpd short Tub, asym, pearly grey\blue, s [2h] 1 Cpd, short Tub, grey\blue, v. asym, s [2g] 1 Cpd short Tub, pearl grey\blue, t [2q] 1 Cpd Glob, white\blue, t [2o] 4 short Tub, white, t [2a, b,d] 1 Cpd short Tub, white\dk blue, t [2c] 1 short Tub, grey, t 1 Cpd short Tub, white\ocher red, t [2n] 1 Doughnut, turq, t [2m] 1 short Tub, turq, t 1 short Glob-Tub, turq, t [2p] n = 18 + 9 fr		1 short tubular, (L 4, diam 6)	*1 & 1 fr Ring, disc (L 3, diam 16, perf 7) 1 fr Ring, carinated disc (L 3.5, diam 17, perf 7) 1 fr Ring, sub-circ section, l	

6	3	2 Cpd short Tub, dark grey\red, t [3b, f] 1 short Glob, white, t [3h] 3 Tub, turq, s-t [3c, d] 1 Tub, white, s [3e] 1 Tub, grey, s [3g] 1 short Glob, v. asym (or pendant?), dk blue ("diam" 5) 1 Glob-Tub, white, m [3a] 12 misc frags n = 10 + 12 fr		6 & 1 fr tubular beads (e.g., L 23, diam 4) 1 cuprous, probably cast brass, thin, hollow, damaged (L ~14, diam 12, perf diam 6)	**2 & 6 fr Ring, (diam 16 & 13, perf 6 & 5)	
	4	1 Doughnut, asym, dk grey (diam 16) 1 Doughnut, dk blue (diam 15) 1 Doughnut, dark blue (diam 14) 1 Doughnut, dk blue (diam 16) n = 3 + 1 fr	1 unspecified, small		3 & 1 fr Ring (2 black burnish), l	
	5	1 Cpd Glob-Tub, white\brown, m [5f] 1 Tub, dk blue, m [5a] 1 fr short Tub, dk blue, s [5c] 1 short Tub, blue, s [5b] 1 Doughnut, dk blue, t [5g] 1 Cpd Tub, white\brown, t [5d] 1 Tub, white, t [5e] n = 6 + 1 fr			1 Ring, red-washed (diam 30)	
5	6	1 Tubular, turq, asym, s [6c] 1 Globular, white, wide perf, s [6d] 4 fr Glob-Tub, turq, s [6a,b] n = 2 + 4 fr	2 short Globular with flattened and slightly concave ends, cyl perf with one wider end, (L 4.5, diam 6.5) s 1 short Tubular, cyl perf with one wider end, (L 3.7, diam 8)		*1 and 1 fr Ring, carinated, red washed (diam 30, perf 15-17) *1 & 1 fr short Globular bead (diam 16) 1 fr Glob-Tub *1 fr carinated bead, black burnished (L 12, diam 15, perf 7)	1 *Celtis*
5 & 4	7	2 fr Ellipsoidal, white, m [7a, b]1 & 1 fr Cpd, lt grey, dk blue coat, m [7f]2 fr Glob-Tub, turq, s [7e]1 short Glob, turq, wide perf, s [7d]1 short Tub, black, s1 short Glob-Tub, turq, s [7g]1 Cpd short Tub, white\dk blue, t [7c] n= 5 + 5 fr			*1 fr, carinated, black (diam 14)	

4	8	1 fr Glob-Tub. turq, s [8a] 1 fr Glob-Tub, white, s [8b] n = 2 fr	1 hexagonal (L 16, diam 10.8))		2 Globular beads (L ~16, diam ~16; diam <14)	
	9	1 Glob-tub, turq, eroded, sub-cyl perf, s [9a] 1 fr short Tub, turq, white patina, s [9b] 1 Cpd Glob-Tub, black\red, t [9c] n = 2 + 1 fr			*1 Ring (diam 15, perf 7) 1 short Tubular	
	10	2 Cpd short Glob-Tub, black\red, t [10b, c] n = 2	1 short Globular, flattened ends (diam 8)			
3	11	1 Cpd Tubular turq\white, s [11b] n = 1	1 Tubular; cyl-perf, s (diam 7)		* 1 Globular bead (diam 8, perf 1.5) ****4 fr Ring, 2 black burnished	*1 *Celtis*
	12	1 compound bead, pentagonal section, colorless\,dark red, wide irreg. perf, m [12b] 1 fr Glob, turq exfoliating to white, cyl-perf, s [12a] n = 1 + 1 fr			*1 fr Ring, carinated (L ~11, diam ~20, perf ~9)	
3 & 2	13	n = 0			*2 fr Ring (est. diam ≥30)	*1 *Celtis*
2	14	1 short Glob, white, wide perf, s [14a] 1 fr short Glob, white, perf with wide end, s [14c] 1 fr short Glob, turq, exfoliating to white, cyl perf, faint longitudinal striations, s [14d] 1 fr Globular, white, s [14 b] n = 1 + 3 fr		1 short tubular (diam ~6)	*1 fr Ring, sub-circ section (diam ~ 18) 1Tubular, crude s-m	2 *Celtis*
2 & 1	15	1 Glob-Tub, white, exfoliating, irreg perf, s [15a] n = 1				
1	16	1 short Globular, blue, sub-cyl perf, s [16b] n = 1	1 short Glob-Tub, cyl-perf, s (diam 8)		*1 Ring, carinated (diam 24) & **2 fr.	
	17	–				
	18	–				