CASTING THE NET WIDE
PAPERS IN HONOR OF GLYNN ISAAC AND HIS APPROACH TO HUMAN ORIGINS RESEARCH

Edited by Jeanne Sept and David Pilbeam
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THE TORTOISE AND THE OSTRICH EGG: PROJECTING THE HOME BASE HYPOTHESIS INTO THE 21ST CENTURY

Brian A. Stewart, John Parkington, and John W. Fisher, Jr.

Introduction

In the late 1970s Glynn Isaac was promoting a home base with food-sharing model to understand the residual sites of the Plio-Pleistocene of east Africa. The debate was around the competencies of our early ancestors and how these could be accessed through imaginative manipulation of the archaeological record (Binford 1981, 1985; Blumenschine 1986; Bunn 1981; Isaac 1978a, 1978b, 1984; Potts 1984, 1988; Sept 1982; Shipman 1983, 1984). The contemporary florescence of ethnographic documents on hunter-gatherer sites and spatial layouts was an important inspirational platform (Binford 1978, 1983; Gould 1978, 1980; O’Connell 1977, 1987; Yellen 1976, 1977). Many felt that it was a brave, not to say dangerous, leap backward from the 20th century Kalahari to the 2 million-year-old Turkana Basin. But we share with Glynn and his students the belief that it is the implementation, not the source, of an idea that matters. We support the view that ‘eureka’ can happen anywhere but it is the excavated record that has the final say. We applaud his determination to integrate insights from experiments, from ethnographies, from excavations and from innovative thinking into reconstructions of what might have happened in the past.

Our feeling is that an important strut in this kind of imagining of the distant past comes from an application in the recent past where preservation is usually very good, where analogous behaviors are more reliably postulated and where observations, including aspects of site structure, are more densely packed. Kroll and Isaac (1984) explored this possibility in more detailed mapping of the spatial patterning of artifacts, features and ‘site furniture’ (Binford 1983), showing the potential for reading the social from the spatial. Dunefield Midden or DFM, a very late pre-colonial Stone Age site in the Western Cape Province of South Africa provides just such an opportunity. Because the most persuasive and pervasive models are derived from Kalahari hunter-gatherer observations, this southern African forager behavioral residue should be amenable to the kind of inspired reconstruction Isaac favored. Here we look at the recognition of home base structure and sharing through the lens of a large, carefully excavated site with the preservation of a wide range of material evidence.

We have chosen to focus on tortoise bones and ostrich eggshell fragments because, in addition to being very common and almost always precisely mapped at DFM, they reflect interesting trajectories of objects brought to the site as food items, partly discarded and partly recycled as artifacts, curated, likely shared among families and ultimately abandoned. As we have shown elsewhere (Fisher and Strickland 1989, 1991), even briefly occupied hunter-gatherer camps have a life history that compounds the difficulties of reading behavior from spatially mapped residues. We can try to follow these use-trajectories through the brief time-span of the DFM occupation(s). We emphasize that DFM
differs in significant ways from ethnographic Kalahari San sites: DFM’s coastal setting and abundance of shellfish, a greater variety of thermal feature types (hearths, roasting pits, stone-packed hearths, etc.) than seems to be the case at Kalahari sites, a profusion of seal bones, and so forth. We look to the Kalahari San for hypotheses but not for direct analogues.

Below, we present the spatial patterns of tortoise and ostrich eggshell remains at DFM, and investigate the diverse use-histories and depositional trajectories that underpinned them. We then explore the fluid boundary between subsistence remains and technological remains by drawing comparisons between tortoises, ostrich eggshells and ceramic vessels at the site. We hope to showcase the importance of using relatively recent, exemplar home bases such as DFM to inform spatial interpretations of more ancient home bases like those which Glynn worked so energetically to understand.

Dunefield Midden: Site Overview

DFM is a series of very briefly occupied and marginally overlapping campsites located on the Atlantic coast at Elands Bay in the Western Cape Province, South Africa. It lies about 2 km north of the mouth of the Verlorenvlei River and some 600 m inland from the shoreline (Figure 15.1). The rich archaeological deposits contain just under 2,500 kg of shellfish remains, some 18,287 stone artifacts, in excess of 10,000 identified bones and teeth of a variety of mammals and other vertebrates, 796 ostrich eggshell fragments, 408 ostrich eggshell beads, 1,011 ceramic sherds, and other materials (Orton 2002; Parkington et al. 1992, 2009; Parkington and Fisher 2006; Stewart 2005a, 2005b, 2008, 2010, 2011; Stynder 2008; Tonner 2005). The majority of the occupation of DFM took place during a span of about a century between AD 1300–1400. A set of 27 radiocarbon dates from DFM on charcoal and shell has a narrow temporal distribution, with an average of the 27 calibrated dates being AD 1354 (Parkington et al. 2009; Tonner 2005).

Our excavations exposed 859 m$^2$ of shallow living debris with many different ashy features and highly variable distributions of both artifacts and foodwaste. The location of all materials is known to at least its 1 m$^2$, and many items were piece plotted. Various lines of evidence support our belief that the spatial distribution of materials retains a high degree of integrity (Parkington et al. 2009). We have previously defined hearths, roasting pits, processing fires and other facilities (Figure 15.2a), demarcated domestic zones and dump zones and suggested different roles for different hearths (Parkington 2006; Parkington et al. 2009; Stewart 2008; Tonner 2005). Much of the site structure has survived and provides the spatial framework for looking at activities such as food consumption, sharing and waste disposal (Jakavula 1995; Nilsson 1989; Reeler 1992; Stewart 2008; Tonner 2002, 2005).

We discern a probable domestic area and a ‘main dump’ at DFM, which lie roughly parallel to one another on a northwest-southeast axis (Figure 15.2b). The domestic area is delineated by a linear, arcuate arrangement of hearths that extends from the site’s northern extremity southward toward the southeastern extremity. The main dump is situated to the west of the domestic area and consists of a dense concentration of shell, animal bones and artifacts. A number of hearths and many other ashy features also occur in the dump area; some of these might have been created early in the site occupation and subsequently were covered with dumped materials. Several small concentrations of shell and other materials - ‘satellite dumps’ - are situated near or east of some domestic hearths in the northern...
Figure 15.1 Map of South Africa’s west coast with Elands Bay and location of Dunefield Midden (DFM).
Figure 15.2 Maps of DFM showing (a) the positions of the various feature types, and (b) the position of the eastern domestic zone of hearths in relation to the main dump to the west.
half of the site (Parkington et al. 2009; Stewart 2008; Tonner 2005; Figure 15.2b).

**Tortoises**

More than 7,500 dispersed fragmentary and complete bones of angulate tortoise (*Chersina angulata*) have been recorded at DFM. The assemblage includes some 5,140 carapace specimens, 1,500 plastron specimens and some 920 non-shell skeletal elements (limbs, axial elements and crania). This species is extremely common in the near coastal sandveld surrounding the site. From indications of charred plates on both plastron and carapace bones, it is clear that tortoises were picked up, brought back to camp and cooked by simply placing the living animal on the coals of a fire (see Silberbauer 1981:216; Yellen and Lee 1976:41). The tortoise effectively cooks in its own juices. From the size of the bones all animals were fairly small, offering much less than 1 kg of edible material.

Carapaces often were made into bowls by simply removing the marginal plates and smoothing the lateral sutures of the costal plates. Just over 600 carapace bowl parts were recovered from DFM, which refit to form a minimum of 30 bowls and probably closer to 50. Adult tortoise carapaces were typically chosen for bowls, but some were made from (occasionally very young) juvenile individuals, raising the possibility that some functioned as spoons or compact bowls for special tasks such as preparing arrow poison (Schapera 1930:94, 132, 144). Adult or juvenile specimens may have also been used as ladles (Silberbauer 1981:72).

The anteriorly furrowed nuchal plate was always left intact and, whether these bowls were used in food consumption, preparation or both, may have acted as a spout for drinking or pouring. Unmodified carapaces may sometimes also have been used as bowls (Lee 1979:152).

All tortoise bones, including carapace, plastron and non-shell skeletal elements, are more numerous in the high density shell zone that we regard as a secondary dump area (the ‘main dump’; carapace: 50.2%, n = 2,249; plastron: 69.1% n = 1,106; non-shell skeletal: 59.7%, n = 610) than in the hearth-dominated eastern area we interpret as domestic space. All also show relatively homogenous distributions throughout the main dump, occurring more frequently near dump features than other feature types. In the domestic area, however, the relative frequency and spatial configurations of each anatomical category varies tremendously. We begin with non-shell skeletal elements then move on to plastron and carapace parts. Skeletal elements in the domestic zone are predominantly distributed in and around hearths: 49% (n = 202) are within 1 m of hearths. Limb bones and other non-shell bones of angulate tortoise are small and after consumption would have become easily buried through trampling or other vertical displacement in DFM’s unconsolidated sand substrate (Gifford-Gonzalez et al. 1985). Their hearth-centered domestic distribution thus presumably reflects primary discard (Schiffer 1987) - a drop or drool zone in Binford’s (1983) sense (Figure 15.3a).

Plastron parts occur in the domestic area, but they are less densely concentrated than non-shell skeletal elements in and near hearths. Rather, plastrons show a more patchy distribution in this area, with tight clusters near ashy features we interpret as components of satellite dumps that serviced the domestic hearths (Figure 15.3b). Plastrons have no further use after consumption and thus, like skeletal bones, their distribution presumably also strictly reflects discard. However, plastron plates are generally much bulkier than non-shell bones and their upright hypoplastron bridges could
Figure 15.3 Spatial distributions at DFM of different categories of (a–c) tortoise foodwaste, (d) carapace bowl parts, and (e) carapace bowl refits in relation to the various feature types.
potentially cause injury if left dorsal side-up in zones with high foot traffic. Their close association with ashy patches in satellite dumps therefore likely results from efforts to clear these plates from immediate domestic spaces where tortoises were typically cooked and consumed, indicating either a toss zone (cf. Binford 1983) or a localized secondary refuse aggregate (Murray 1980; Wilson 1994).

Carapace parts are far more widespread in both the domestic and dump areas than either non-shell skeletal elements or plastron parts, occurring at some frequency in most squares at the site. In the domestic area, some very high density concentrations of carapace (>50 specimens/m$^2$) exist in/near both hearths and ashy features of satellite dumps (Figure 15.3c). Indeed, comparable frequencies of carapace parts located outside of the main dump are situated 1 m from hearths and ashy patches. Carapace plates are more brittle than non-shell bones and plastron plates as shown by their high rate of fragmentation. This, along with the possibility that fragmented carapace plates were often trampled into the sand substrate (like non-shell bones), may help explain their ubiquity across the site. The most localized distribution is that of carapace bowl parts (Figure 15.3d). Bowls are skewed heavily towards the main dump (65.4%, n = 398) in proportions similar to that of plastron parts. The few bowls in the domestic area exhibit spatial patterns that diverge markedly from those of each food-waste category. Rather than diffuse distributions with localized patches of higher density in/near ashy patches and/or hearths, bowl parts in the domestic zone almost exclusively form several dense (>20 specimens/m$^2$) clusters concentrated next to several hearths (Features 9, 27, 32, 41 and 56). Indeed, 70.6% (n = 149) of bowls in the domestic area were recovered within 1 m of hearths, whereas only 0.92% (n = 2) were situated within the same range of ashy patches. These domestic hearth-centered specimens show some of the tightest spatial clustering of any carapace bowl refits, and include the only complete bowl and half of the nearly-complete bowls at DFM (Figure 15.3e). Such low dispersion of carapace bowl parts supports primary discard, perhaps at a late enough occupational stage to preclude secondary clean-up and disposal onto the dump, or perhaps the tight clustering reflects caching in anticipation of future visits.

The overall distribution of carapace bowls is especially striking relative to unmodified carapace plates and non-shell skeletal elements, both of which are far more diffusely scattered throughout DFM (compare Figures 15.3a, c–d). This is particularly true of the unmodified carapace assemblage. Non-shell skeletal elements, although not much more abundant than bowl carapace plates, also show a wider distribution across the site and occur, at some frequency, in and near most hearths in the domestic area. By contrast, bowls are concentrated in isolated, high density clusters that in the domestic zone take the form of tightly refitting ‘puddles’ near a very limited number of hearths. We suggest that this is a direct reflection of differences in the life histories of various tortoise body parts, with small disposable non-shell skeletal elements casually discarded in and around domestic hearths, bulkier carapace and plastron plates typically taken further afield to satellite or main dumps, and useful carapaces modified into bowls, curated, cached and more formally discarded after use.

**Ostrich Eggshells**

There are just under 800 mapped fragments of ostrich eggs at DFM, of which at least 70% have so
far been refitted, allowing us to estimate the existence of four to seven once-complete eggs. The refitted eggs had all been used as water flasks, recognizable from the perforations and rounded rim pieces. It is almost certain that more flasks were in use than we can detect (they simply did not break), and that flasks were transported and cached across the landscape for future use. Only 2 km away we have excavated a small portion of a site remarkably similar to DFM with a cache of five unbroken eggs (Jerardino et al. 2009; Parkington 2006). It is possible that ostriches were not common in this part of the sandveld and that eggs were systematically brought in as flasks and regularly buried as a source of fresh water. These caches are nearly impossible to detect in the sandy landscape and are probably far more common than we realize.

Eggshell fragments are, by comparison with other artifacts and foodwaste, rather restricted in their distribution. They are far more common in the northern half of the site than in the south (Figure 15.4a); in the latter they form small patches that often refit with larger clusters in the north (the exception is one much larger, diffuse concentration near the southern hearth Feature 63). Most ostrich eggshell fragments were recovered from the main dump (71.3%, n = 561). This proportion is higher than any of the tortoise categories discussed above, but not far off from plastron (69.1%, n = 1,106) and bowl parts (65.4%, n = 398). In the main dump, ostrich eggshell fragments occur in three major concentrations in the north part of the site and a fourth in the south (near Feature 63). They associate with highest frequency near dump features, followed by processing features and then hearths. The relatively high frequency near processing features is something eggshell fragments share with tortoise carapace bowls. The behaviors responsible for these associations are obscure since it is difficult to envisage ostrich eggshells being used in food processing, unless, of course, it was the eggs themselves being prepared. Among Kalahari groups, however, ostrich eggshells are never broken during consumption, but rather the egg contents are accessed through the same perforation that later serves as the flask spout (Lee 1979; Silberbauer 1981).

In the domestic area, the distribution of ostrich eggshell fragments recalls tortoise carapace bowls in that relatively large concentrations cluster around a few specific hearths (Features 10, 11 and 22), with other hearths hosting one or two isolated fragments (Figure 15.4a). Thirty one percent (n = 70) of eggshell fragments outside the main dump are within 1 m of hearths, whereas 17.3% (n = 39) occur within 1 m of ashy patches. But unlike the bowls, the specific hearths around which eggshell fragments concentrate are not overlain by subsequent dump deposits and so can be more confidently associated with their adjacent eggshell scatters. We thus interpret the domestic distribution of eggshell fragments as indicating that flasks were in use at these hearths and subsequently discarded when broken. Fragments recovered near hearths presumably reflect incomplete hearths maintenance or fragment reuse. Fragments deemed waste were discarded either in nearby satellite dumps or in the main dump.

A detailed picture of ostrich eggshell flasks use, reuse and disposal can be reconstructed from the flask refit patterns, which are some of the most interesting of any class of archaeological material at DFM (Jakavula 1995; Figure 15.4b). Numerous connections exist within and between different eggshell clusters, features and areas of the site, showing that the flasks underwent remarkably dynamic depositional trajectories often involving long-distance movements. We recognize three broad types of connection:
Figure 15.4 Spatial distributions at DFM of (a) ostrich eggshell flask fragments, (b) ostrich eggshell flask refits, and (c–d) ostrich eggshell beads in relation to the various feature types.
1) refits within the domestic area; 2) refits between the domestic area and the main dump; and, 3) refits within the main dump.

Within the domestic zone a web of refits links five individual domestic hearths (Features 11, 12, 22, 33, and 35; Figure 15.4b). We suggest that this reflects the daily movements of people between individual domestic spaces organized around fireplaces. As with broken pots (see below), large fragments of broken ostrich eggshell flasks still would have been useful as plates, bowls, scoops, spoons, bead blanks and so forth - particularly if, as we suspect, ostrich eggs were difficult to come by in the local sandveld landscape. These hearth-to-hearth connections probably thus reflect the extended use-lives of these valuable objects as people transported and broke flasks, then shared and discarded the fragments. That the web knits together three neighboring hearths (Features 11, 12, and 22) raises the possibility that these features belonged to people who were close, whether kin relations or friends (cf. Yellen 1977). In addition to hearth-to-hearth connections, refits within the domestic zone also imply discard processes. Two of the domestic hearths linked by the web discussed above (Features 22 and 12) connect to the satellite dump directly north of Feature 12 (associated with two ash patches, Features 85 and 87), which suggests that different domestic units (families?) were using the same satellite dump, further strengthening their spatial (and social?) connectedness.

A number of the eggshell clusters involved in these hearth-to-hearth and hearth-to-satellite dump relationships link into the larger eggshell concentrations in the main dump (Figure 15.4b). These domestic-to-dump refits provide fairly unambiguous evidence for secondary discard processes; exhausted flask portions were collected during the cleaning of hearthside domestic spaces or satellite dumps and re-deposited in the site’s primary waste accumulation, the main dump. But they also give a sense of how the main dump formed, with (what we presume to have been) individual domestic units consistently depositing their waste in specific (prescribed?) parts of the dump, creating initially separate middens that coalesced with time (Parkington et al. 2009:116). The refit patterns show that these individual dumps were located in areas of the main dump nearest to the living spaces of the given domestic units that produced them.

Finally, there are refits between ostrich eggshell fragments within the main dump. The main dump includes four major concentrations of eggshell fragments, each exhibiting considerable internal connectivity in refits (Figure 15.4b). However, occasional refits also link the concentrations to one another, which indicates they are contemporary, and again supports the notions that the main dump served interlinked domestic units and consists of several separate dumps that eventually fused together. The distances over which eggshell fragments refit in the main dump are extremely variable, ranging from a few centimeters to over 18 m (Figure 15.4b). These attenuated conjoins show that although discarded eggshells at DFM are intimately bound up with domestic processes in the north, occasional activities brought fragments further south, echoing the north-south connectivity exhibited by the domestic hearth-to-hearth refit patterns.

The above distributional and refit patterning gives an idea of ostrich eggshell flask use, reuse, sharing and discard at DFM. Also present at the site are ostrich eggshell beads which are, of course, another form of flask fragment reuse. Beads represent the far ‘distal end’ of an ostrich egg’s use-life. Interestingly, broken but finished beads are more common in the dump, and
whole finished ones are more common near hearths (Figure 15.4d). But despite the evidence presented above for hearth-to-hearth reuse of broken flasks, little attempt appears to have been made at DFM to turn ostrich eggshell fragments into beads. Out of a total of 408 ostrich eggshell beads at DFM, only three are unfinished and none were abandoned or broken in the course of manufacture (Kandel and Conard 2005; Orton 2008).

Spatially, beads and flask fragments consistently occur in different areas of both the domestic zone and especially the main dump (Figure 15.4a, c). In the domestic zone, the bead distribution is heavily skewed toward the south where several large clusters center directly on hearths. This pattern is the reverse of that exhibited by eggshell flask fragments; whereas the southern domestic area is virtually devoid of flask fragments, the north contains several sizeable concentrations. In the main dump these two artifact types coincide more frequently, but again their distributions diverge. From Figure 15.4a and 15.4c it is clear that squares with beads often occupy the spaces ‘between’ those with flask fragments. As with the domestic zone, most beads in the main dump are situated in the south. This, again, contrasts sharply with the distributions of flask fragments, the vast bulk of which comprise one of three major main dump concentrations in the north. This spatial mismatch of ostrich eggshell beads and flask fragments suggests that these artifacts experienced independent depositional trajectories. This is consistent with relatively minimal evidence for on-site bead production, indicating that although the use-lives of the ostrich eggshell flasks may have extended beyond breakage, they were not attenuated enough, at least at DFM, for fragments to be recycled into wholly new artifact forms.

Comparing Containers: Carapace Bowls, Eggshell Flasks and Ceramic Vessels

Ceramic vessels constitute a third container type employed by the DFM inhabitants in addition to tortoise carapace bowls and ostrich eggshell flasks (see Stewart 2005a, 2005b). Unlike the latter two, however, pots never underwent a comparable phase of being a food resource prior to becoming an artifact, and thus serve as a useful ‘yardstick’ against which to compare the spatial distributions of bowls and flasks. Here, we expand our view to consider the life histories of these three container types, and contemplate how much of that life history transpired at DFM and was captured in this site’s archaeological record. Because they differed sharply from one another in raw material availability, manufacturing effort, size, robusticity and, very probably, perceived value, our expectation is that the life histories of flasks, bowls and pots were diverse. Among our considerations is the notion that the number of specimens deposited at DFM and their spatial distribution might have been conditioned by the ‘turnover rate’ of each artifact type.

Tortoise carapace bowls began their artifact life history in the landscape outside of DFM when they were collected, most likely as live tortoises, and subsequently brought to DFM. At DFM the tortoises presumably were cooked and consumed, and afterward some carapaces were made into bowls. We suggest that carapace bowls typically spent most or all of their use-life at DFM. They could be replaced easily, so long as the availability of living tortoises remained adequate. Thus the turnover rate of carapace bowls might have been relatively rapid. If the DFM occupants used carapace bowls for serving food and eating, as in the Kalahari, they were likely to enter the archaeological record at DFM rather than at an offsite location. A high turnover rate coupled with discard at DFM rather than offsite
Figure 15.5 Spatial distributions at DFM of (a–b) tortoise carapace bowl parts and refits, (c–d) ostrich eggshell flask fragments and refits, and (e–f) ceramic sherds and refits in relation to the domestic zone of hearths and the main dump.
would result in a relatively high frequency of specimens; this is indeed the case, with 30 bowls a minimum estimate for DFM and upwards of 50 more likely.

Carapace bowl refits occur almost exclusively within the dump (Figure 15.5b). The few that occur in the domestic zone never connect two or more domestic hearths but instead form tight ‘puddles’ of near-complete bowls near several individual domestic hearths, and only one bowl connects the domestic area with the main dump. Moreover, the refit distances of carapace bowls within the dump span much shorter distances than is the case for ostrich eggshell and ceramic fragments. The combined evidence suggests that carapace bowls were rendered useless quickly after breakage, perhaps once one or two plates had fallen out, and disposed of in the dump while still relatively intact rather than after fragments had become dispersed. This is consistent with our notion that the turnover rate of these artifacts was relatively rapid.

We suggest that the life history of ostrich eggshell as an artifact differed significantly from tortoise carapace bowls in that ostrich eggs typically had lower turnover rates and generally ‘passed through’ DFM, whereas bowls were something more akin to ‘permanent residents’ at the site. Ostrich eggs also began their artifact life history away from DFM when they were obtained somewhere in the landscape. If ostriches and their eggs were rare in the sandveld, efforts would have been made to prolong their use-lives (Lee 1979:274). Also, if use as water flasks by the DFM occupants was the principal function of ostrich eggs, we suggest that flasks spent much of their life away from DFM. Flasks presumably would have accompanied women and men on gathering and hunting expeditions, respectively (Lee 1979; Silberbauer 1981). Further, the absence at DFM of whole flasks or even large fragments suggests those that remained intact when the inhabitants moved on were taken from DFM. The upshot of all this is that most flasks whose artifact life ended in breakage probably came to this end away from DFM. DFM was just a “stop” in what was a geographically broad network of use, and few flasks entered the archaeological record there. This scenario is consistent with the small number of flasks at the site – five to seven specimens.

Flask refits, unlike those of tortoise carapace bowls, connect between different domestic hearths with some regularity (Figure 15.5d). Perhaps broken flask fragments had useful functions as implements of some kind (e.g., plates, spoons, scoops), and once a flask broke the pieces were shared among multiple hearths (households?). We submit that the most ‘intuitive’ reason for sharing broken ostrich eggshell fragments is that they provide raw material for ostrich eggshell bead manufacture. But there is considerable evidence to suggest that the site occupants engaged only minimally in bead production at DFM. For now we lack a compelling explanation for this pattern, but the limited number of water flasks at DFM combined with their long refit distances is consistent with the idea that ostrich eggshells represented rare and thus relatively precious artifacts to be handled carefully, curated, perhaps reused as implements (if not recycled as beads) or, if still whole, transported away from DFM.

Ceramic vessels, of which there are at least 20 at DFM, also started their life history offsite where they were manufactured or acquired through trade with neighboring ceramic-producers (Stewart 2005b, 2008). Since the DFM pots were clearly employed in cooking (Stewart 2005a), their life history, like that of carapace bowls, was probably more strongly centered than ostrich eggshell flasks at DFM than at offsite locations. But similar to flasks (and unlike carapace
bowls), complete pots or serviceable pot portions would have been transported offsite when the occupants moved. Whether the pots were manufactured by the DFM occupants or traded in, the ceramic assemblage represents a substantial investment in time and/or resources. We suggest that efforts to protect, repair and reuse pots (Stewart 2008), along with their relatively high robusticity, would have resulted in use-lives that were certainly longer than carapace bowls and perhaps also ostrich egg flasks. But we also expect that the greater amount of time pots spent at DFM relative to flasks would have offered more opportunities for breakage on-site, resulting in more vessels than flasks but perhaps fewer than carapace bowls (which, though also ‘site-based’, were clearly more expendable). This is indeed what we see; DFM contains at most 25 ceramic vessels, more than the maximum number of ostrich egg flasks \( n \approx 7 \) and less than carapace bowls \( n \approx 50 \).

The distributions of ceramic sherds (Figure 15.5e) echo those of ostrich egg flasks and tortoise carapace bowls in that each of these classes of artifact shows spatially tight concentrations of small numbers of specimens adjacent to and clearly associated with domestic hearths. These clusters might represent specimens that were broken shortly before the occupants departed DFM and thus were not cleaned up onto the dump, or they could be cached vessels (Nilssen 1989; Stewart 2008). Relative to ostrich eggshell flasks, the ceramic refits infrequently connect separate domestic hearths, perhaps implying that ceramic vessels rarely moved between domestic households. But the ceramics exhibit a much more expansive network of refits than either ostrich egg flasks or carapace bowls, with frequent connections between the domestic area and the main dump and within the dump (Figure 15.5f). We suggest that the relatively long use-lives and the site-based life histories of the DFM pots are reflected in these refit patterns. The use-life trajectory of ceramic vessels harbors potentially substantial complexity, and broken specimens could still be functional, albeit for uses different from their original function (Stewart 2005b, 2008). A range of stages in the use-life of vessels is represented by specimens of varying completeness, and different pieces of the same vessel are sometimes distributed among various locations at DFM, probably reflecting a “sequence” through time of a vessel being reduced by breakage and pieces re-used then eventually discarded (Stewart 2008).

**Discussion: From Foodwaste to Artifact**

Making sense of the spatial distributions of tortoise remains and ostrich egg fragments at DFM involves a consideration of seemingly complex life history trajectories, inasmuch as these two items offered the DFM inhabitants both a meal and a raw material from which to manufacture artifacts ranging from the practical to the ornamental. We find ourselves striving to integrate a diverse set of factors as we attempt to disentangle these differing but interconnected pathways. The factors involved range from cooking, consumption, and discard patterns conditioned by the size and structure of the food “package” to the trajectory and location of artifact manufacture, use, and discard to the “nuisance value” (O’Connell 1995) of objects and how that influenced the manner and location of disposal. Here we discuss several implications of these complex foodwaste-to-artifact trajectories for interpreting archaeological spatial patterning both at DFM and at older, less well preserved archaeological home bases.

A first observation is that the difference in availability of a food resource can directly affect the value of an artifact made from its waste byproducts and, by extension, the artifact’s spatial
distribution at home bases in the archaeological record. Tortoises abound in DFM’s sandveld landscape. Ample access to these animals reduced the value of carapace bowls. Even if a single carapace plate of a bowl fell out or broke, another bowl could be rapidly produced from an almost inexhaustible supply of live tortoises in the landscape or from discarded carapaces at DFM. Thus, carapace bowls at DFM probably had high turnover rates and negligible reuse of fragments upon breakage. The result is that although carapace bowls are the most abundant container type at DFM, they exhibit the shortest refit distances. This foodwaste-to-artifact pathway contrasts sharply to that of ostrich eggs, which are far less frequent in the sandveld landscape than tortoises. The limited accessibility of ostrich eggs and their importance as water flasks lowered their turnover rates and raised frequencies of flask fragment reuse. Consequently, there are far fewer ostrich egg flasks relative to carapace bowls at DFM, but individual flasks are widely dispersed with webs of long-distance refits linking domestic hearths with one another and with the main dump.

The analysis of spatial patterns of items that could be both foodwaste and artifact also has methodological implications for transcending the distinction between subsistence and technology at archaeological home bases. Striking differences in the spatial distribution of tortoise carapace bowls compared to unmodified carapace at DFM offers perhaps the strongest signal separating foodwaste and artifact. Carapace bowls occur largely in the dump whereas unmodified carapace occurs all throughout the dump and the domestic area, where they often associate with hearths. This dissimilarity suggests a significant difference in disposal between artifact and foodwaste—when it came time to dispose of carapace bowls they usually went to the dump, while disposal of unmodified carapace was more widespread across the site. The progressive disintegration and dispersal through time of a discarded, unmodified carapace or plastron into individual plates in the domestic area could result in rather widespread distribution of fragments. But could the differences in carapace distribution be detected at archaeological sites of people, such as the Ju/'hoansi, who did not modify carapace bowls before using them? If not, these important artifacts and their use-contexts would be misinterpreted as strictly subsistence-related. Archaeologists must be able to distinguish the spatial patterning of artifact and foodwaste categories, even when they are manifested by specimens made of the same raw material. We have presented steps in this direction in our analyses of tortoise and ostrich egg at DFM.

Finally, the foodwaste/artifact dichotomy holds implications for discerning social relationships and organization at archaeological home bases. Most efforts to reconstruct social connectivity at prehistoric campsites have focused on subsistence remains, particularly those of large animals that would have been shared between domestic units. The success of this approach depends directly on these bones being in primary context, such as near hearths around which consumption took place, which is most likely to happen at sites where occupation spans were short. But ethnoarchaeological research demonstrates that prehistoric home bases occupied for a longer period of time are more likely to have survived for archaeologists to detect them and, unfortunately, longer occupational durations mean more intensive secondary discard processes. DFM is a case in point. Here, larger animals such as eland and steenbok are more likely to have been shared between social units such as nuclear families, but also are more
likely to have ended up on the dump where the social connections are harder to trace (Stewart 2008). Smaller animals such as tortoise are more likely to have remained in primary context, but are less likely to have been shared between social units. By contrast, although some artifact types at DFM, notably carapace bowls, generally ended up on the dump, ceramics and ostrich egg flasks occur in the domestic area, and refits connect separate hearths. It might be, therefore, that artifacts – and especially those that were curated and shared – hold greater potential than subsistence remains for recognizing social connections at many archaeological home bases since efforts to remove them from domestic contexts were less rigorous.

Final Reflections

The objective of Glynn Isaac’s pursuit of a home base model in the 1970s was to demonstrate that early Pleistocene sites could plausibly be interpreted as home bases - places to which ancient men and women returned with food items separately gathered. The ‘home base’ concept implied the existence of a number of behavioral associations, including a division of labor, the capacity to agree on reuse of specific places as central locations from which to forage, and food sharing. In Isaac’s view, early Pleistocene foragers could be shown already to exhibit behavioral patterns well documented in the ethnographic record. Other archaeologists, of course, preferred to see a much later appearance of such ‘modernity’ (and Isaac himself modified his views). Despite this, the objective was rather simple. Positing the existence of a home base needed, according to Isaac, only the demonstration that faunal assemblages documented the residues of multiple episodes of animal food acquisition.

Since then ethnoarchaeologists and archaeologists have adopted much more ambitious agendas for the interpretation of scatters and patches of apparently associated faunal and artifactual remains. At DFM, for example, we recognize that a primary obligation is to persuasively argue for brevity of occupation and reliability of association as the underpinnings for a number of further inferences and conclusions. A large, reliably associated assemblage that includes food debris and artifactual wastes deriving from many sources and materials provides invaluable evidence as to the identity of occupants, the seasonality of visits, the exploitation of resources and the domestic organization of groups. Included in the behavioral objectives are the recognition and documentation of food and artifact sharing, waste disposal, artifact manufacture and gendered uses of features and spaces. Comparing the mapped distributions of similar and different sets of items, and tracing their variable trajectories using refits, lets us hypothesize about the behavioral dynamics that suffused and structured home bases in prehistory. Because even a hunter gatherer camp has a life history, it becomes possible to try to trace the passage of objects into, through and out of briefly occupied sites.

From our discussion above of tortoise and ostrich eggshell remains, it is obvious that there is a deep level of connectivity across the 859 m² we have excavated. Links between features that reveal contemporaneity of occupation across the whole excavated space boost our confidence in the brevity of occupation, and increasingly support the tight radiocarbon chronology. Dissecting this connectivity, we have argued for some specific uses of features within a broad distinction between domestic and waste disposal zones, with some features associated with particular types of artfacts and/or non-artifactual animal remains and others not, some quite focused, others less so. We have examined in some detail two such remains - tortoise and ostrich eggshell - that are particularly
revealing since both often transcended the porous boundary between subsistence and technology. We have argued that: 1) the availability of a food resource directly influences the abundance and spatial patterning of the artifactual byproduct; 2) interpretations of spatial patterning depend on the ability to distinguish between foodwaste and artifacts; and, 3) artifacts might yield better information than foodwaste about social connectivity at many home bases. We feel this last point to be particularly salient.

The success of spatial research at archaeological home bases in the 21st century depends on our capacity to bridge the yawning temporal and inferential gap between 20th century hunter-gatherers and archaeological traces of far more ancient foragers. The analytical power of relatively recent sites like DFM lies in the richness, diversity and preservation of remains, which greatly enhances the strictly 'stones and bones'-based archaeology that typifies most Paleolithic enquiries. But even at sites like DFM interpretive challenges loom. Efforts must be made to recognize the early, patchy accumulation of dumps that subsequently expanded and coalesced, swamping some hearths with their associated debris. More detailed work on tortoise limb bone distributions will likely firm up the recognition of consumption zones. That minimal bead making took place may have to do with the vagaries of behaviors on briefly occupied sites, but accurate interpretation must wait until other local and regional comparisons become available. These future directions should further strengthen our inferences at DFM, and with them our confidence that recent, well preserved and extensively excavated home bases like DFM can serve as stepping stones back into earlier times of the Paleolithic.

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