Arid Paradies or Dangerous Landscapes
A Review of Explanations for Paleolithic Assemblage Change in Arid Australia and Africa

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Introduction

An inspection of archaeological studies from the arid and semi-arid regions of Australia and sub-Saharan Africa reveals very different images of the human occupation of each continent. Since the human history of each landmass is obviously distinct, many aspects of these images of the human past may reflect divergent cultural processes being played out in dissimilar arid environments. Such arguments fail to explain why the archaeological record in each continent displays parallel patterns, and discount fundamental questions about our characterization and explication of archaeological changes in the two continents. For example, in both Africa and Australia ancient humans employed a particular technology that involved backing of flakes to produce distinctive and regularly shaped stone implements that we will call backed artifacts. (The term microlith has often been used for these forms but is applicable only to small size variants.) In both continents this technological behavior has been present for extended periods of time, but was emphasized in some periods but not in others. Rather than presume these parallel patterns must be unrelated or are uninteresting, this chapter examines the explanations that have been offered for the periodic emphasis on backed artifacts by archaeologists exploring the human history of these two continents. Our examination reveals that the formulation of seemingly similar themes of archaeological change has been radically different in each continent, and we employ that insight to both evaluate the viability of various kinds of explanations and to demonstrate that the inferred histories of humans in each landmass are founded on different images of human life in deserts.
Depicting the Archaeological Changes

Our starting point in this exploration is to describe the broad chronological and spatial patterns of backed implements on each continent and to discuss the way archaeologists have described changes in lithic assemblages. Our review includes sites that are presently in arid and semi-arid environments, but is of course not limited to those places, since the location of environmental boundaries has shifted through time.

Assemblage Change in Australia

Backed artifacts have been reliably dated to the early Holocene (9,000–6,000 BP) in Australia, but may have been present in the terminal Pleistocene (Hiscock and Attenbrow 1998). However, prior to the mid-Holocene backed artifact production was clearly occurring at low levels and may have been regionally restricted (Hiscock 2002). For at least some regions in eastern Australia these early examples of backed artifacts appear to be extremely similar to the size and morphological patterns found in later backed artifacts in each region, although the size and manufacturing strategies vary between regions.

The relationship between these terminal Pleistocene/early Holocene specimens and later backed artifacts was unclear until Hiscock and Attenbrow (1998) emphasized the importance of distinguishing between the appearance of backed artifacts and subsequent periods of increased rates of production. The importance of this distinction is that low rates of backed artifact production may be hard to detect archaeologically and such a period might be mistaken for one without such implements, while a subsequent period in which backed artifacts were frequently manufactured will be highly visible in the archaeological record and may appear to signal the "introduction" of backed artifacts to a region when in fact it represents the "efflorescence" of production. This methodological issue was accentuated by the low discovery probabilities for backed artifacts in small assemblages that were common in the early Holocene levels of a number of key sites (Hiscock 2001). These considerations have removed doubts about the existence of early Holocene backed artifacts and clarified the emergence of intensive backed artifact production following an extended period of low level backed artifact manufacture (Hiscock 2002).

During the mid- and late Holocene the production rate for backed artifacts increased dramatically (Hiscock 2002). The timing of this proliferation appears to vary between regions, with some regions displaying marked increases in discarded backed artifacts around 4,000 BP, while other regions show the increased rate of backed artifact production at about 3,000 BP or less. This phase of high rates of backed artifact manufacture was brief in Australia, and in most localities was concluded by 1,000 BP. In some regions the chronology of these changes is not yet precisely known.

The regionalized nature of these patterns is displayed on a continental scale. Backed artifacts are absent from the tropical north-central and northwestern
portions of the continent, landscapes in which bifacial points were manufactured. The island of Tasmania also has no recorded backed artifacts. Elsewhere on mainland Australia backed artifacts are known, although their relative and absolute abundance varies regionally. One broad scale spatial pattern involves the differential distribution of symmetrical and asymmetrical variants. Asymmetrical backed artifacts are very common on the east coast and in the southwest of the continent, while symmetrical crescent, triangle, and trapeze forms are abundant in the arid and semi-arid landscapes. The significance of these geographic differences for explanations of assemblage variation is currently being debated.

**Assemblage Change in Africa**

By comparison to the Australian situation the history of backed artifacts in sub-Saharan Africa is both long and complex. Large, thick backed artifacts have been present in very low quantities in at least some African assemblages during the initial phases of the Middle Stone Age (MSA) more than 300,000–200,000 years ago, although they were often infrequent. However, in central Africa the Lupemban Industry comprised assemblages dominated by backed artifacts dated to 300,000–250,000 BP (Barham 2002; Clark 1988; Cornelissen 2002). This demonstrates that backing of small flakes is a technical process that is present in sub-Saharan Africa from the very start of the MSA.

In southern Africa backed artifacts are known from sites such as Klasies River during the last interglacial and are present in assemblages designated as Phases 1 and 2 of the MSA, labeled MSA 1 and MSA 2 (Wurz 2002). However, although present, backing is comparatively infrequent in MSA 1/2 assemblages of southern Africa. Nevertheless, backed artifact production proliferates approximately 80,000–70,000 BP in a series of southern African assemblages. Termed the Howieson’s Poort Industry, these assemblages are best known for their numerous backed artifacts, although they also contain a range of other retouched artifacts including bifacially and unifacially flaked points with bulb thinning (Deacon and Wurz 1996). As represented at sites such as Klasies River these backed objects were regular in shape and were often made from non-local, fine-grained siliceous raw materials (Ambrose 2002; Wurz 2002).

Following the Howieson’s Poort Industries the subsequent culture historical periods, Phases 3 and 4 of the MSA, labeled MSA 3 and MSA 4, have no recorded backed artifacts. Although the MSA 3/4 assemblages are rare and low density phenomena, creating questions of sample adequacy in assessing assemblage composition, the consensus is that backed artifacts are absent from the MSA 3 and MSA 4 assemblages that succeed Howieson’s Poort (Ambrose 2002). However, this interpretation is not universally supported by archaeological evidence and in eastern African assemblages backed artifacts are present in the MSA, from at least 65,000–50,000 BP (McBrearty and Brooks 2000). We therefore suggest that MSA 3/4 assemblages have very few backed specimens, but that it is not clear that such implements were absent from all sites during those phases.
In southern Africa archaeologists classify assemblages containing small backed artifacts, points, bipolar cores, and denticulates, often making extensive use of good quality fine-grained raw material, as the Later Stone Age (LSA). The chronological and culture-historical coherence of early LSA assemblages is a matter of uncertainty, with most examples dating to less than 25,000 BP while a few sites display these characteristics at approximately 40,000 BP (Ambrose 2002). The early LSA assemblages have been classified into a variety of industries, including the Robberg and Albany, but the relevant feature is that although they typically contain backed artifacts these are infrequent elements in these assemblages (although see Mitchell 1988). Transitional and LSA industries in east Africa, such as the Nasera and Lemuta Industries of Tanzania and Kenya, also have backed artifacts and high quality non-local raw material imported a considerable distance (Ambrose 2002). In the early LSA industries of east Africa the proportional frequency of backed artifacts is highly variable. While backed specimens are extremely frequent in some assemblages, such as the Nasampolai as represented in Enkapune Ya Muto shelter, they are minor elements in many other east African LSA assemblages of the period prior to 25,000 BP. In both eastern and southern Africa during the LGM/terminal Pleistocene (20,000–13,000 BP) backed artifacts are less common in most industries than at earlier and later times (Ambrose 2002).

Backed artifacts are again a dominant element in some Holocene industries, most notably that called the Wilton, which is concentrated in the more arid period of the mid-Holocene. Wilton assemblages have high frequencies of regular, usually small backed artifacts and fine-grained raw materials.

Volman (1984) and others have suggested that both the MSA and LSA backed artifacts were produced for hafting. Direct evidence is sparse, although a few examples have been found with mastic traces. Because of the relative difference in size it has been suggested that MSA backed artifacts were hafted in spears, whereas their LSA counterparts were inserted into arrows.

Employing the distinction advocated by Hiscock and Attenbrow (1998) between periods representing a proliferation or efflorescence of backed artifacts and periods in which they are present but not emphasized, the sub-Saharan African sequence can be read as having multiple phases in which backed artifacts were produced at relatively high rates (measured as a proportion of retouched flakes), interspersed with phases in which backed artifacts were either absent or produced in relatively lower frequencies. While the patchy nature of high quality assemblage information through time and space makes it difficult to unambiguously specify the nature and duration of periods it is clear that we can talk of at least three or four efflorescence phases. The earliest is the early MSA backed artifact proliferation discussed by Barham (2002) for sites such as Twin Rivers and Kalambo Falls in central Africa. A distinct efflorescence is represented by Howieson’s Poort (ca. 70,000 BP), which is usually thought to be chronologically far earlier than LSA assemblages and therefore “is not considered to be transitional to the LSA” (Ambrose 2002: 12). A third period of intensified backed artifact production is found in some regional variants of the early LSA (50,000–30,000 BP). The fourth obvious efflorescence is represented by the Wilton and similar Holocene industries.
(8,000–3,000 BP). It is not our intention to hypothesize that there are only four periods in which assemblages have large quantities of backed implements, that during a period of high backed artifact production rates every assemblage in a region will display that pattern, or that this sequence applies across all of sub-Saharan Africa. What is important here is the recognition of the reoccurrence of technological patterns emphasizing backed artifacts. In Africa, assemblages dominated by backed artifacts are neither randomly situated in time and space nor restricted to a single culture-historical horizon. It is not merely the existence of early backed artifacts in the African sequence that contrasts with Australia and requires explanation, but also this reoccurring pattern of backed artifact efflorescence through time.

Explanations for Backed Artifact Efflorescence

We now turn to different explanations that archaeologists have offered for ancient backed artifacts in these two continents. Our concern is to characterize influential explanations and to evaluate their capacity to explicate the archaeological patterns as we have described them. Mitchell (1995) has presented a classification of “approaches” to Paleolithic studies in south Africa, in which he describes four kinds of models: organizational, functional, sociological, and techno-environmental. Rather than engage in a classificatory exercise of this kind our critique proceeds by examining specific explanations that have been offered for changes in backed artifact frequency.

Cognitive Capacity as an Explanation

One widely discussed explanation for the proliferation of backed artifacts in Africa is the emergence of modern human behavior or “cultural modernity” (Wadley 2001; see also Ambrose 2001). This explanation is based on the notion that earlier hominids had little or no capacity for language and symbolism and the social interactions that follow from those capacities. It is often argued that these capacities define modern human social life and that they must have emerged rapidly, as a revolution in human evolution (Wadley 2001). Authors such as Klein (2000: 27) have suggested a biological basis for the revolutionary shift in cultural capacities, arguing that we are observing a change in the “neural capacity for language or for ‘symboling.’” The archaeological signatures of such modern behavior are typically argued to be the manipulation and storage of symbolic information, represented by works of art and ornamentation, by campsite structures that reveal group interaction, by ritualized burials, and by stylistic expression in artifacts (e.g., Henshilwood et al. 2001a, 2002; Wadley 2001). It is this final feature that has been invoked in explaining patterns of backed artifacts in Africa. Some researchers have argued that the nature of backing, perhaps being preparation for insertion in a composite tool, and the precise and repeated form of backed artifacts, makes them indicators of specifically designed and style-laden behavior indicative of
cultural modernity. For instance, Barham (2001, 2002) concludes that the existence of large numbers of backed artifacts in the Middle Pleistocene Lupemban Industry indicates a new suite of behaviors were present approximately 300,000 BP. Other archaeologists demand more stringent evidence and therefore place the transition to cultural modernity at more recent dates. For example, a number of archaeologists have hypothesized that the standardized and rather modern looking backed specimens common in the Howieson’s Poort Industry are a better signal that modern-like tool concepts and social networks are present, and therefore argue that the Howieson’s Poort represents the transition point to modern behavioral systems at approximately 70,000 BP (Wurz 1999, 2002). Even more conservative arguments are presented by archaeologists such as Wadley (2001), who require archaeological evidence for multiple forms of symbolic behavior as an indicator that the “package” of symbolic behaviors was present (but see Henshilwood et al. 2001b for claims of an early “package”). Wadley (2001) rejects the Howieson’s Poort Industry because she concludes that it does not display the rapid turnover of styles she anticipates in modern behavioral systems, and instead argues that the LSA assemblages of sites such as Rose Cottage Cave and Sibudu Cave reveal the origins of cultural modernity in southern Africa about 40,000 years ago.

Thackeray (1992) has likewise argued that the Howieson’s Poort backed artifacts (or any MSA examples) do not constitute evidence of modern behavior as they lack the standardization seen in the later LSA assemblages and what standardization as occurs is due to the functional requirements of hafting. Wurz (1999) has countered this with a metrical analysis that demonstrates that the backed artifacts of the Howieson’s Poort are as standardized as that of the Wilton and with the addition that the focus on exotic raw materials during the Howieson’s Poort is superfluous to hafting requirements.

There are several dilemmas associated with these vigorous debates about the origins of modern behavior in sub-Saharan Africa and the explanation of backed artifact proliferation in terms of the transition to cultural modernity. One potential weakness of such an explanation is that it is not applicable to later episodes of backed artifact proliferation in Africa, since all later industries are presumed to have been created by behaviorally modern humans. Indeed, the bold Foley and Lahr (1997, 2003) argument that modern behavior is associated with Mode 3 technologies would imply that such an explanation is not even applicable to the first episode of backed artifact proliferation. Reference to the onset of behavioral modernity as an explanation must also be invalid in the Australian situation where modern humans colonized the continent, and where backed artifact proliferation occurs in the Holocene. Consequently, only one of the multiple episodes of backed artifact proliferation can be understood with this explanation, and it follows that other causes must exist for the emphasis of such a technological strategy by a hunter-gatherer group. Torrence (2002) is correct in arguing that there may be multiple reasons for hunter-gatherer groups to emphasize backed artifacts, and hence the cause of an industry such as the Howieson’s Poort may be different to the cause of later backed artifact
proliferations. While this argument has merit it is nevertheless puzzling to see archaeologists invoke a major evolutionary shift to explain an archaeological phenomenon on one occasion, being obliged to seek more mundane explanations for the same technological shift on other seemingly similar occasions. Avoiding explanations of cognitive capacity by substituting models of demographic intensification (Shennan 2001) offers the theoretical advantage that population densities may increase and decrease through time and therefore provide a mechanism for multiple proliferation events.

Furthermore, it is curious that archaeologists have on the one hand advocated that backed artifacts acted as symbols in prehistoric African societies, but have not identified the first proliferation of those implements as the point at which symbolic behavior was initiated (e.g., Wadley 2001; Wurz 1999, 2002). Unless archaeologists adopt the argument that the earliest episode of backed artifact proliferation marks the onset of modern behaviors, at more than 300,000 years ago, we are left with a scenario in which backing was a strategy employed prior to modern behavior, and therefore modern behavior/cognition is not a necessary explanatory condition of implement backing. On the other hand, if the Middle Pleistocene examples of backed artifact proliferation are taken as an indication of cultural modernity in the absence of other evidence of symbolic activity, one of two conclusions must be reached. The first is that backed artifact production might be taking place in contexts without symbolic storage, in which case the conclusion that modern symbolic behavior is evidenced is unnecessary. The second possible conclusion is that backed artifacts alone demonstrate modern human symboling. If this inference is advocated the question that is raised is how to explain the subsequent appearance/proliferation of art and other symbolic paraphernalia if those phenomena do not emerge with the onset of cultural modernity but appear substantially later.

This discussion reveals the fundamental limitation of this explanation citing cognitive capacity. The shortcoming demonstrated above is that in invoking the “capacity” for symboling such an explanation has obvious constraints. Such an explanation can be employed on only one instance in any region without hypothesizing the displacement of behaviorally modern populations by non-symboling ones. Furthermore, since the development of a capacity does not require it to be used, this model does not adequately explain why in some situations the capacity was employed to make large numbers of backed artifacts while on other occasions the ability to construct symbols was directed towards other ends. If backed artifacts were symbols, the capacity for symbolic expression is a precondition of their production, but not a sufficient explanation for high rates of backed artifact production at any particular time. In other words, this model can be used as an explanation of the appearance/existence of these implements but not of their numerical proliferation or decline through time and space. As we have discussed, this model, by itself, cannot explain either the proliferation of backed artifacts in Australia or the pattern of multiple proliferations that occurred in Africa. For that reason archaeologists should seek additional or alternative explanatory models for these phenomena.
A longstanding explanatory model that has been applied to variation in lithic assemblages is that implement forms denote not merely the capacity for symbolic behavior but the use of those symbols as markers of group identity. This kind of model explains the proliferation of specific implement types in terms of the immigration of a group into a region, the spread of a cultural system, or change in the intensity and nature of cultural contact between groups.

In Australia it has been models of diffusion of socioeconomic organization, with accompanying symbols, that have commonly been discussed. Specifically, the Holocene proliferation of regular implement forms, including backed artifacts and unifacial and bifacial points, has been linked by many authors to either migrations of people or diffusion of symbolic systems through cultural contacts (e.g., Evans and Jones 1997; McConvell 1996). A dominant form of this argument has conventionally been based on a supposed coincidence in the timing of the arrival of the dingo and the appearance of these types of implement (Bowdler and O’Connor 1991; Flood 1983: 195). For example, Bowdler (1981) has argued at length that backed artifacts were a symbol of new religious and economic systems introduced with the dingo during the mid-Holocene. However, although this idea has been popular with Australian archaeologists, the notion that a mid-Holocene culture contact event explains the proliferation of backed artifacts in Australia is doubtful. For instance, the demonstration that the introduction of the dingo, economic change, and the first production of backed artifacts are not contemporaneous, and that backed artifacts were occasionally produced for millennia prior to a widespread proliferation, has removed the empirical basis for a hypothesis of mid-Holocene contact as a viable explanation (Hiscock 1994, 2001; Hiscock and Attenbrow 1998). A further cause for skepticism about such diffusionist explanations arises because the mere existence of contact with different cultural systems and new forms of material culture does not explain their adoption across Australia; theories of external introduction still require an explanation for the acceptance of traits by recipient groups. One mechanism hypothesized to trigger the acceptance and/or spread of symbols in Holocene Australia is the reorganization of social units. For instance, David and Lourandos (1998) have argued that the emergence of compartmentalized cultural landscapes created a context in which symbols that assisted groups in the negotiation of resource rights would have been advantageous, and backed artifacts were one of the objects employed in more intensive social interactions.

Ethnic or social symbolic explanations for the intensive use of backed artifacts have been much more extensively employed in African archaeology. In considering the criteria necessary to identify discrete social entities in the archaeological record, Clark (1988) contended that differences between social entities will be expressed in the types of material culture which groups carry and distribute. He advocated the view that distinctive styles embodying social identity would be applied to the items common to different groups. This view, long held in European archaeology, has also been explored in archaeological investigations of backed artifacts in Africa over
the last 30 years. For example, Singer and Wymer (1982: 107–9, 209–10) argued that the Howieson’s Poort, with its backed artifacts of non-local raw materials, was so unlike the preceding (MSA 2) and succeeding phases (MSA 3) of the MSA that it most likely represented the tool kit of an incoming or invading group whom they call the “Howieson’s Poort people” who, having occupied Klasies River Mouth for a relatively short period, moved on, taking their tool kit with them. The Indigenous population then reverted to producing the types of tools they had made during MSA 2. Singer and Wymer (1982: 107) explicitly rejected the notion that the technological emphasis on backing could have resulted as a response by the “Indigenous population . . . to a change of circumstances.”

Less direct social explanations, such as those interpreting stylistic differences in terms of social communication and signaling, have become especially popular in the African literature since the Bleek and Lloyd historical accounts of !Kung were “rediscovered” in the 1980s. An example is Mazel’s (1989) argument that changes in the distribution of backed artifacts and steep scrapers across the Thukula Basin during the LSA from 9,000–2,000 BP reflect alterations in social regions and in the extent and complexity of regional alliance/exchange networks. Backed implements dominate the assemblages region wide in the early phase, beginning about 9,000 years ago and continuing until sometime after 5,000 BP, when three distinct regions emerge: those whose diagnostic component is dominated by backed segments, those dominated by backed points and blades but which also have segments, and those dominated by backed points and blades but which lack segments. The variations in assemblages through time and space were interpreted by Mazel as demarcating social regions. He proposes that through time a single social network disintegrated and separated into three distinct social regions and alliance networks. Mazel’s model invokes Clark’s proposition that backed artifacts function to mark material cultural boundaries and thus express and maintain difference between social entities. What is clear in Mazel’s argument is the detailed and extensive use of ethnographic images from historic Africa.

Broadly similar models have also been advanced for the earlier proliferation events in southern Africa. For example, Deacon and Wurz (Deacon 1992; Deacon and Wurz 1996; Wurz 1999) have proposed that the backed artifacts of the MSA Howieson’s Poort assemblages were manufactured to be given as gifts in formal exchange systems and themselves functioned as symbols of mutual reliance and reciprocity in much the same way as the ethnographic projectiles produced and used by the San, discussed by Wiessner (1982, 1983).

While such arguments are plausible in the historic and recent period, the basis for positing these social interactions in the distant past is insubstantial. Barham (1993) has argued that these models of social symbolic behavior are unjustified. In particular he argues that as expedient tools there is minimal capacity for these objects to store and convey social information. However, since the actual usage of these objects is unclear the conclusion that small expedient artifacts could not have performed social purposes should not be considered to have been established. A critique of such symbolic models can nevertheless be offered. To begin with, if they are to be comprehensive these models must also be capable of explaining the
range. They argue that a change from warmer moister conditions, such as those that prevailed during MSA 1 and MSA 2, towards a cooler climate at the end of the last interglacial, would have resulted in more open environments or a mosaic of open and closed habitats which would have reduced the exploitable game biomass and thus "the spatio-temporal abundance and predictability of faunal and floral resources" (Ambrose and Lorenz 1990: 25). In response to the reduced game biomass and increased risk, people enlarged their territorial range, thereby gaining access to better quality raw materials, thus allowing them to make more finely retouched tools. Ambrose and Lorenz (1990) dismiss the possibility that exotic fine-grained raw materials were acquired in order to produce backed artifacts because they argue that the archaeological record indicates that abrupt changes in lithic technology are imposed on more gradual changes in raw material, whereas the reverse would be expected if fine-grained raw materials were acquired in order to produce hafted backed blades.

There are several problems with the Ambrose and Lorenz model. Firstly, the Howieson's Poort faunal assemblages provide only partial support for the model in that, while they contain small numbers of large grazing open grassland species, they are dominated by small to medium-sized non-gregarious species that prefer closed habitats. Secondly, the model fails to explain the relationship between climate/environment change, territorial expansion, and the proliferation of backed artifacts at this time, except to the extent that because better raw material was available people used it to make more backed artifacts. Where recent evidence has been presented backing technologies appear to be associated with a variety of environments and not explicable in terms of the existence of a single niche or environmental change (e.g., Cornelissen 2002). Thirdly, and perhaps most importantly, as Ambrose and Lorenz (1990) themselves acknowledge, the model fails to account for the demise of backed artifacts in the MSA 3. During this time conditions became colder and drier, and more open vegetation communities prevail. The model predicts that this ecological scenario should result in higher territorial and logistic mobility and therefore an increase in exotic raw material and backed artifacts. While the MSA 3 faunal assemblages do indicate an increasing reliance on gregarious nomadic ungulates, the lithic assemblage of the MSA 3 runs entirely counter to the prediction, with no or few backed artifacts and a significant decline in the use of exotic material. Rather than question the relevance of the modern hunter-gatherer analogs they use to derive the model to the MSA, Ambrose and Lorenz interpret the non-compliance of MSA hunters with the predictive model (derived from modern hunter-gatherer behaviors) as proof of their lesser cognitive capabilities compared with their LSA counterparts or later modern humans.

Recent and influential models propose that the solution to unpredictable and unproductive environments was not an increase in foraging range or an economically beneficial technology, but a socially advantageous one. For instance, Deacon and Wurz (1996), while concurring with Clark (1992) that the backed blades of the Howieson's Poort functioned as projectiles, have specifically argued against the use of the backed artifacts in composite tools to increase hunting efficiency. They follow Klein (2000) in proposing that any differences in prey species hunted during
this phase of the MSA can be “linked to ecological factors rather than the effectiveness of projectile equipment” (Deacon and Wurz 1996). Instead, they (Deacon 1992, 1995; Deacon and Wurz 1996) advance the proposition that backed artifacts in the Howieson’s Poort were symbolic items that were central to delayed reciprocal exchange systems that evolved into the ethnographically documented San hxaro gift system. The production of backed artifacts on non-local stone materials is seen as having no technological or practical advantage given backed artifacts were also made on local coarser materials; but as “value adding” to their use as exchange items. By exchanging ornaments the foragers are inferred to have promoted social solidarity that maintained these social networks during periods of heightened environmental risk, and that the continuation of these social interactions facilitated resource sharing, thereby reducing the consequences of resource failure for foraging groups. Wurz (1999), in a slightly different slant on this position, has demonstrated (contra Thackeray 1992: 423) that the MSA backed artifacts are as standardized as those of the LSA and argued that the degree of standardization is independent of functional requirements or the form/size of the raw material, but is due rather to social stylistic conventions intrinsically linked to symboling.

Deacon (1992, 1995; Deacon and Wurz 1996), Ambrose (2002), and Wurz (1999) have hypothesized that such reciprocity-based risk minimizing systems, literally symbolized by backed artifact manufacture, were one of the key innovations in the evolution of modern human behavior and a contributing factor in the success of our species at the expense of other hominids. These ethnographically derived social models fail to explain variability seen in the archaeological record. Why, for example, during the most arid phase of the LSA age, the Last Glacial Maximum (LGM), when social reciprocity and reliance networks should have been most highly developed, is the Robberg Industry almost totally devoid of backed artifacts or indeed any standardized retouched tool form?

Although citing foraging risk as the context in which these innovations emerge, such models are less about economic responses to environmental circumstances than they are economically situated variants of models emphasizing ethnicity and social interaction. For instance, by interpreting backed artifacts as functioning symbolically and identifying symbol use as a distinctively modern behavioral trait, archaeologists like Ambrose (2002: 21–2) have explicitly viewed backed artifacts as an archaeological marker of the movement and dispersal of behaviorally modern populations. Other researchers have seen long-term cultural continuity in southern Africa in the inferred emergence of the hxaro system from MSA occupation. These models raise the same questions (discussed above) of other symbolic interpretations of these stone artifacts: Why are images of behavioral modernity applied to one backed artifact proliferation event but not to the earliest one, and how do models of continuous symbolic activity explain declines in the production of, or the disappearance of, those symbols? By linking assemblage variation to changing economic contexts a mechanism for explaining increases and decreases in backed artifact production rates is created, but if backed artifacts are primarily symbols the interpretation of those changes in social terms requires further exploration.
Research Programs as Reflections of Desert Images

We have described and evaluated a number of the models offered to explain the chronological and spatial changes in backed artifacts in Australia and Africa. Although we could have chosen a number of other traits we have focused on those which illustrate that the emphasis given to archaeological explanations has varied between these continents. Since these two regions are both dominated by arid and semi-arid lands, characterized by rich ethnographic records, and studied by schools of archaeological thought with strong historical links to the British paleoeconomy approach, we argue that these contrasts are worth considering further. Specifically, we suggest that these differences exemplify distinctive research programs (pace Lakatos 1978) that have built on divergent images of archaeological material and different images of deserts and human life in them, largely derived from historical and modern ethnographic sources. Perhaps most influential and formative were the images of African desert dwellers arising from the Man the Hunter conference held in 1966. Its ethnographic studies of the Kalahari !Kung San groups, emphasizing the influence of their subsistence base and the abundance of their leisure time (at least for the males), fostered a view of deserts as relatively benign landscapes for hunter-gatherers. In particular, the abundance of the wondrous, tasty, and highly nutritious plant food staple, the mongongo nut (Schinzio-phyton rautanenii) (Lee 1968, 1979), led to characterizations of the !Kung as enjoying “a kind of material plenty” (Marshall 1961: 243, as cited in Sahlins 1974: 9), a theme taken up and developed by Sahlins (1974: 1–39) in his essay on hunter-gatherer material existence entitled “The original affluent society.” While such generalized forager models stressed notions of egalitarianism, neo-Marxist anthropologists emphasized the way in which the social structures of hunter-gatherer groups were reinforced by delayed return systems such as gift exchange which acted to ensure reciprocal access to territory, acted as buffers against subsistence failure and thereby provided “each individual !Kung with reciprocal and guaranteed access to the material conditions of production” (Keenan 1981: 18). These images of African deserts as arid paradises have been powerful influences on archaeological thinking.

As mentioned above, recent archaeological models for the context of backed artifact production in sub-Saharan Africa have been inspired by historic ethnographic images (e.g., Bleek and Lloyd n.d.), but have emphasized the structural rather than materialist position of social relations. Although they have stimulated archaeological analogies it is difficult to see why these images of historical Kalahari Desert life have any relevance to the context under which backing took place in the MSA or for that matter most of the LSA in sub-Saharan Africa. Cultural continuity from MSA or LSA to historic cultures has not been demonstrated, and evidence independent of ethnographic analogy for the moderation of environmental risk by reciprocal social relationships is a moot point. Even the claim that backed artifact production is a social response to lower and less predictable environmental productivity is not clearly established in the southern African case. Indeed, simple
functional associations between backed artifacts and a single environment or environmental productivity seem unfounded. For example, there is no strong association between production of backed artifacts and aridity. The archaeological assemblages indicate that when backed artifacts made of exotic material were first produced in large numbers, hunter-gatherers were living in close proximity to the coast in relatively warm humid conditions, and exploiting the resources of predominantly closed vegetation communities. There is little evidence to suggest these environments were extremely unproductive. As noted earlier, backed artifacts are also absent from the Robberg lithic assemblages made during the heightened arid conditions of the LGM by LSA hunter-gatherers. This suggests that citing historic environmental conditions and cultural responses will not be an effective framework for exploring MSA patterns.

Similar complexities exist in explaining patterns of Australian backed artifact production in simple environmental terms. Ethnoarchaeological studies of arid zone foragers in Australia, also carried out in the 1960s to 1980s, created an image diametrically opposite to the one developed in Africa. Australian researchers emphasized that desert life could be harsh and precarious and that social behavior and subsistence decisions were dominated by a variety of stress factors, primary among them being drought. Studies of Australian foragers typically adopted this image and described desert lifeways as marginal and conservative, stressing economic necessity rather than social advantages as the stimulus for reciprocity. These images of Australian deserts as dangerous landscapes have been powerful influences generally on archaeological models of Sahul.

The dominant proponent of the dangerous desert explanation for prehistoric Australia, Richard Gould, argued these strategies were reflected in the long-term archaeological sequences from the Western Desert demonstrating conservative unchanging technologies, and emphasizing risk-minimizing economic strategies throughout the Holocene. Following this lead some subsistence models for Pleistocene hunter-gatherers assumed that desert dwelling was a late adaptation only possible during the Holocene and that earlier foragers would have avoided arid inland areas (Bowdler 1977), or that the arid center of Australia may have initially sustained human life but must have been abandoned with onset of aridity during the late Pleistocene (e.g., Horton 1981). Models of Holocene arid zone settlement and technology as consequences of harsh and unpredictable environments also reflect the image of Australian deserts as dangerous landscapes (Hughes and Hiscock in press; Ross et al. 1992; Veth 1995). Some recent research into the archaeology of Australian deserts has argued against inferences of conservative technologies and uniform economic systems (Hiscock and Veth 1991; Hiscock 1994; O’Connor and Veth 1996; O’Connor et al. 1998; Veth 1993), and has instead argued that both archaeological and historical evidence suggests that diverse and flexible economic and social systems were employed. These revisionist models of Australian desert culture and cultural evolution were based more on archaeological patterns than ethnohistoric images, but most explanations for assemblage change in Australia remain based on ethnohistorical images whose relevance to the past is questionable.
Having characterized the desert images embedded in archaeological models from each continent in this way it is necessary to pose the obvious question: Are the dissimilar pictures of African deserts of abundance and Australian deserts of danger reflections of genuine environmental differences? Without doubt the environments found on the two continents are different. As Gould (1991: 16) points out, differences in physiography and rainfall predictability in the two continents underlie divergent images of their deserts. For example, the Kalahari has some coordinated drainage networks and catchments, whereas the Western Desert of Australia has none and all water supplies depend entirely upon rain capture in impermanent surface and sub-surface catchments. More importantly, rainfall in the Western Desert is not only lower than that for the Kalahari, but also extremely unpredictable. Even the central deserts of Australia, which have limited catchments, display annual rainfall patterns that are less predictable than the Kalahari. There may therefore be an empirical basis for the images of deserts generated on each continent, although the complexity of socially mediated economic strategies makes any simple equation of environmental characteristics and social or economic hazard difficult. However, if such an argument is sustained, and the Australian deserts are and have been inherently more difficult for foragers, archaeologists will be compelled to return to the question with which we began this chapter, namely, why does the archaeological record in each continent display parallel patterns of backed artifact proliferation and decline? Comprehending in more detail the environmental and social contexts of technological change in each continent, and testing models of the prehistoric past against the archaeological rather than modern cultural evidence, will be one path forward in exploring not only the differences in ancient desert life between Australia and southern Africa but also the similarities. This quest should form one agenda of the research programs on each continent, and as we have demonstrated in this chapter archaeological model building will benefit by moving away from local scales of explanation to a broad intercontinental comparative approach.

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Arid Paradises or Dangerous Landscapes


